

Matrix of the Industrial Wave of Civilizational Development

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Abstract: The study deals with the problems of interrelation between macroeconomic processes and “tectonic changes” occurring in the modern world. The current global crisis revived interest in economic cycles not only of researchers but also of the wider public. Cyclicity has been and remains the most important feature of socio-economic macrodynamics. Therefore, the analysis of economic cycles, the study of their structure and factors of development, interrelations and interdependence with social forms and institutions is undoubtedly one of the most important directions of scientific research. The matrix of the industrial civilizational wave is an attempt to reveal the main factors of the processes that took place in the world economy over the last 250 years. The systematization of these factors and the determination of the main relationships between them will reveal the causes and mechanism of the serious changes taking place in the modern world. The construction of the matrix is based on the general findings of many years of research by the world’s leading scientists who believe in the cyclical character of evolutionary development. The analysis of the global economic development over the past 250 years allows us to predict the further development of the world for the next 30-40 years and to outline the main directions of development until the end of this century.

Key words: Civilizational waves, large cycles of economic conjuncture (K-cycles), systemic cycles of capital accumulation, techno-economic paradigm, techno-logical revolutions, world economic structures, world-systems

INTRODUCTION

If we look at the development of the world economy not burdened with scientific knowledge, then there is a sense of chaos and no regularities in its development are visible. Therefore, macroeconomists, considering the economy as a linearly developing system, cannot understand the fundamental laws of its development. The graph in Fig. 1 shows how the share of individual countries in the world GDP has changed. From this graph it is absolutely unclear why the countries that occupied the leading positions at a certain stage of historical development suddenly lose their leadership and turn into an economic periphery while others suddenly turn into leaders of the world development.

It seems that the development of countries and the world economy is chaotic. But when science in full accordance with the theory of the Nobel prize winner Ilya Prigogin “Order from Chaos” (Prigogin and Stengers, 1986), tries to systematize and structure this chaos, then the laws of the development of the world economy

become clear and understandable. Following Prigogin, we will try to “get out of chaos,” try to find patterns in the development of the world economy, changing world centers of power and the world economic order, the dominant systems of world and economic institutions. The basis of our research is the hypothesis that the world economy is developing not linearly but undulating and these waves have a certain cyclicity. The history of the world economy in our system represents the sum of economic waves of different periods and the periods of passage of each wave form cycles of historical development.

In our research, we relied on the findings of scientific research by Russian and foreign economists who adhere to the concept of a wave-like cyclical character of the civilizational development of mankind: the theory of large cycles of the economic conjuncture (K-cycles, Kondratiev waves) by Kondratiev (1998). Schumpeter and Fels (1939) technological and world economic structures by Glazyev (2016) and Pentin (1998).

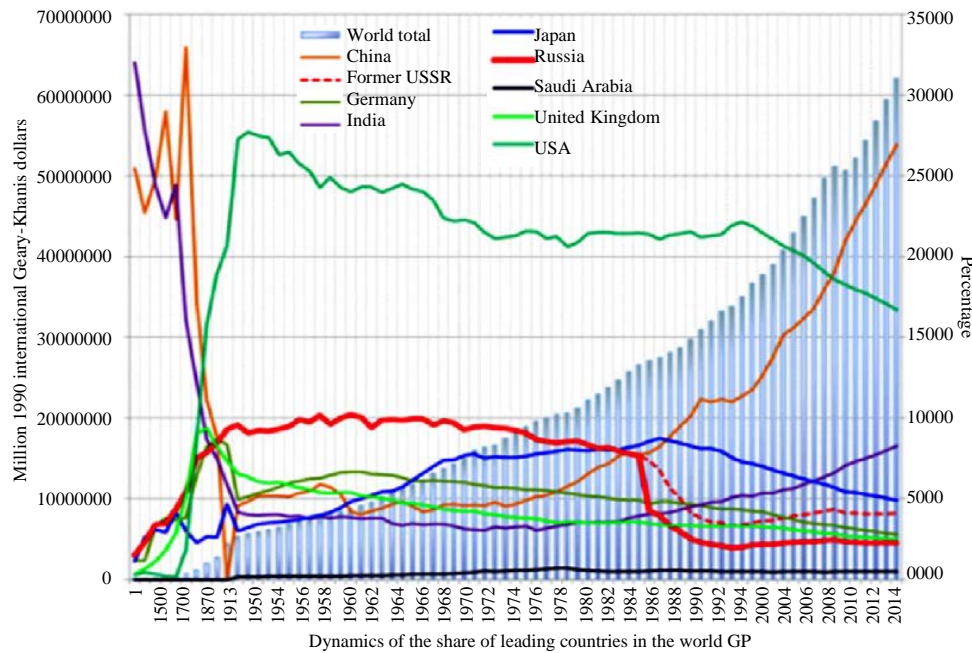


Fig. 1: Dynamics of the share of leading countries in the world GP (InoSML, 2016)

TECHNOLOGICAL FORMS AND KONDRATIEV WAVES

Our study is devoted to the Industrial Wave of Civilizational Development (WCD) which led to a sharp acceleration of economic development which is perfectly illustrated by the data of the outstanding British statistician Angus Maddison (Maddison, 2008). Over 120 years (1700-1820) within the framework of the agricultural wave, the world gross product (WGP) grew 1.9 times. In the Industrial WCD, thanks to the industrial revolution, over 93 years (1820-1913), the WGP increased 3.9 times. Over the next 77 years (1913-1990), the WGP increased almost 10-fold. In the 21st century, according to calculations by Kobayakov (2016), based on A. Maddison's method, by 2030 the WGP will have grown more than fourfold in 40 years. At the same time, the growth rates of the WGP which reached their peak in the 1950s and 1960s, began to slow down. This proves the fact in our opinion, that the development of the Industrial WCD which is carried out according to the model of the "Hubbert curve" (Hubbert, 1956) with attenuation after passing through the peak, will soon be completed and humanity will move on to the next (Informational) WCD.

Matrix in translation from Latin means "original cause", i.e., something that triggers the visible processes of historical development. When we look at what is happening in the world politics and the economy, we see only the upper part of the "iceberg" but we do not see

what is hidden "under water". Our Matrix is the hidden part of the picture of social development, taken under the water during the period of the industrial civilizational wave. The vertical part of the Matrix from the bottom up shows the mechanism of formation of economic processes that determine the world economic structure and policy. Horizontally, it shows how the main economic processes evolved in time and space. Vertical multicolored stripes of our Matrix are Upward Waves (UW) and Downward Waves (DW) of K-cycles (Fig. 2).

V. Pantin introduced significant corrections to N. Kondratiev's theory. Kondratiev began the periodization of his cycles with UW, his follower, the American scientist Modelski (2006) called the UW of K-cycles "growth phases" and the DW "acceleration phases" (Ajvazov and Belikov, 1996). but the "growth phase" is impossible without the "phase of acceleration", so, V. Pantin suggested starting the chronology of K-cycles in the Industrial WCD not from the "growth phase" as N. Kondratiev (from the end of the 18th century) but with the preceding "phase of acceleration" (from the middle of the 18th century). And this hypothesis of V. Pantin was absolutely correct, because "the phase of acceleration" of the new K-cycle is still formed "under the umbrella" of the DW of the K-cycle, smoothly passing into the "growth phase" of the UW. Therefore, it would be more correct to start the chronology of the Kondratiev cycles with the "phase of acceleration", i.e., with the DW. V. Pantin developed the

Matrix of the industrial wave of civilizational development

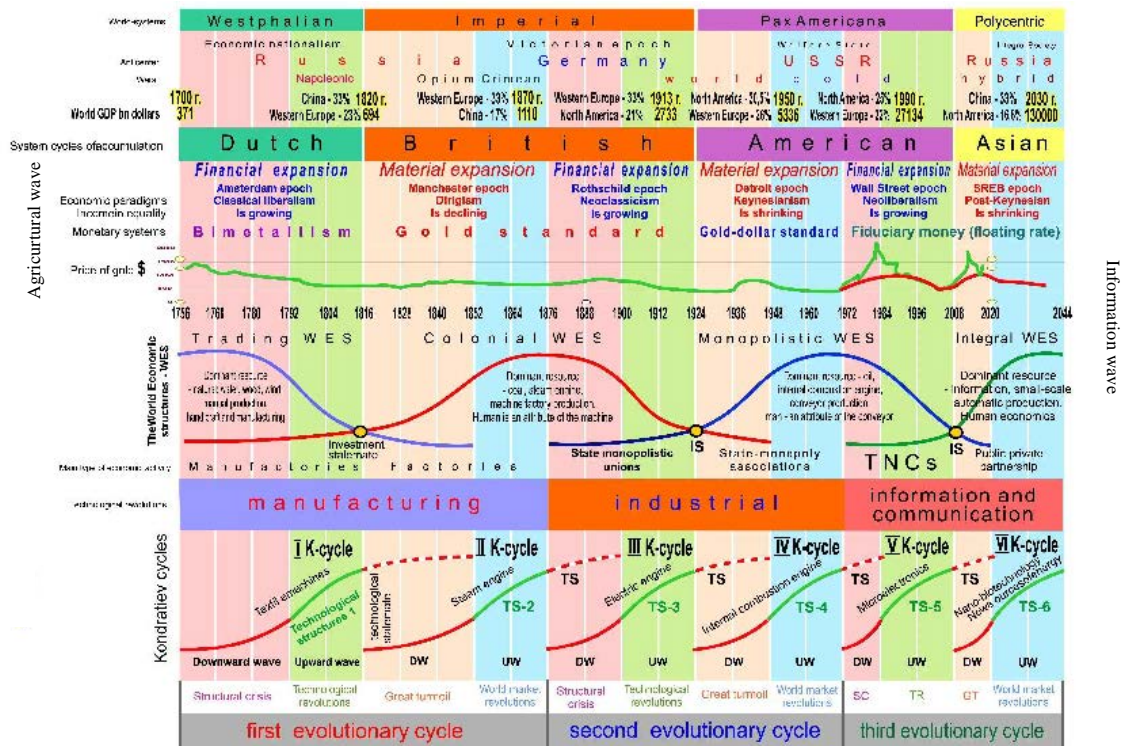


Fig. 2: The matrix of the industrial wave of civilizational development of mankind

theory of evolutionary cycles based on the Kondratiev cycles. (Each evolutionary cycle of V. Pantin combines four Kondratiev waves. The first phase (the DW of the K-cycle) of the Evolutionary cycle he called the “Structural Crisis” when serious structural disproportions in the world economy that require their solution are growing. The second phase (UW) was called the “Technological Revolution”, i.e., historical period when the formation of a new TR begins. The third phase (again DW) was called “Great Shocks”. As a rule, at this phase, world wars, revolutions and other tectonic shifts in the world politics occur. Now a days, the world is going through the phase of the “Great Shocks”, the unipolar American world is disappearing and the formation of a new multipolar world is taking place. The fourth phase (UW) V. Pantin called the “Revolution of the World Markets” when the structure and the directions of the world trade flows are radically changing (Pantin, 1996).

Most economists writing about K-cycles estimate their duration by 50-60 years. V. Pantin introduced the idea of compression of K-cycles within the historical development and not both waves are compressed but only DW (Pantin, 1996). And this is not an accident as UW include several important processes that are

shrinking in time (a cluster of basic innovations of the new technological order is formed, the ideological paradigms of development are changing, the society overcomes economic crises and their consequences). With the accumulation of historical experience, the world community carries out these processes in shorter periods of time. On UW diffusion of new technologies into old industries and the absorption of these technologies by the entire economy takes place which requires a fairly stable period of time. Therefore, we used the periodization of K-cycles in the interpretation of V. Pantin as the basis of our Matrix. The matrix describes the history of the world during the Industrial WCD from 1756 to 2044, that is, the past 260 years and the next 28 years.

Changes in the economy on the Industrial WCD are determined by the development of the productive forces of the society, thanks to the formation of new Technological Structures (TS). Obviously, innovative development does not occur smoothly and evenly technologies are formed by beams or clusters and the transition from one TS to another is characterized by “creative destruction” (Schumpeter and Felse, 1939). The formation and development of the new TS correspond to changes in the economic conjuncture which were called the large Kondratiev cycles. At a certain stage of

development, the economy develops a growth potential on the basis of a certain technological specification, resulting in an exhaustion of the possibilities of the old and the delay of new technologies of wide application (Polterovich, 2009). The economy begins to fever, the crisis is replaced by depression which after a brief revival turns into stagnation.

For further development the “creative destruction” is necessary which implies transition to a new TS but private capital is cautious and does not hurry to invest in the unknown: new inventions are able to provide growth or lead to losses. The conducted serious researches assert that only 7% of new inventions and discoveries have an economic perspective and 93% is money spent for nothing. In addition, some inventions are waiting for their use from 10-110 years (Menshikov and Klimenk, 1989). The period when the old TS has already used its development potential and the new one has not yet been formed, was called by G.Mensch the Technology Stalemate (Mensch, 1975).

The way out of the Technology Stalemate, as a rule is provided by the state through military spending. So, the USA under R. Regan through the program of “Star wars” financed the formation of the fifth TS which provided rapid development of the world economy in the 1990’s. The USSR “overslept” the formation of the 5th TS, lost in the economic competition with the US and becoming uncompetitive, collapsed. Academician V.M. Glushkov as early as in 1964 suggested that A.N. Kosygin should begin the development of the 5th TS before the Americans but received a refusal because that required huge investments exceeding the cost of both space and nuclear projects combined. The result of that refusal was sad for the USSR.

The 6th TS was timely mastered by Stalin in the 1930s, simultaneously with the completion of the third TS formation. Thanks to that, the USSR not only won in World War 2 and created a “nuclear shield” but also was the first to send a man into space. The current Russian leaders to our great regret, believe in liberal mythology that private business is capable of implementing an innovative break-through as long as it is free from state bonds but as Mazzucato (2015) convincingly proved in her research, most of the key technologies of the new TS are the fruits of state-funded research. (“You can use the Internet wherever you are; GPS, thanks to which you know where you are anywhere in the world; Touchscreen which also makes it really easy to use your phone. All these applications are very smart, revolutionary features of the iPhone and they all were financed by the government. And the point is that the Internet was funded by DARPA, the US Department of Defense. GPS

was funded by the Navstar military program. Even Siri was actually funded by DARPA. The touchscreen was funded by two public grants from the CIA and NSF for two researchers at the University of Delaware ,... And it turns out that as many as 75% of new molecular substances with a priority rating have been developed in boring, Kafkaian state laboratories. This does not mean that Big Pharmaceuticals do not invest in innovation. They invest in the marketing part. They invest in development not in research. They spend huge sums to redeem their shares which is very problematic. In fact, companies like Pfizer and Amgen spent more money buying their shares to increase their stock quotes than on research and development ... And the most interesting is the role of the state in all these examples, it did much more than just a correction of market failures. It actually formed and created markets ... Venture investments are extremely short-term. They want a feedback within the next three to 5 years. Innovations require much more time, from 15-20 years.” (<https://ru.tiny.ted.org/talks/mariana-mazzucato-government-investor-risk-taker-innovator>) (Kondratev, 1989). Without such financing of fundamental and applied research, without government investments in specific companies such as Tesla, the new technological breakthrough in the US would have simply been impossible.

At present, the world is experiencing the state of the technology stalemate: a cluster of technology of the 6th TS has already been formed and there has been no powerful inflow of investments in these technologies yet. When mass investments in technologies of the 6th TS begin and diffusion of these technologies in old branches of production starts as it was suggested at the summit of the “Twen-ty” by Xi Jinping in Hangzhou then the growth of the world economy will begin on the basis of the sixth TS. but first it will be governmental investments and only then private ones will appear. This will lead to the completion of the DW of the K-cycle in the 2020s. And the “acceleration phase” of the new K-cycle will transform into the “growth phase”. Until then, the global economy will continue to stagnate as it almost completely exhausted the potential for the development of the fifth TS (Veber, 2006).

TECHNOLOGICAL REVOLUTIONS AND WORLD ECONOMIC STRUCTURES

The main mechanism of the Industrial WCD is determined by the formation and development of the TS which is reflected in changes of the economic conjuncture. These changes occur within the framework of K-cycles which during the “acceleration phase” in the

DW are characterized by particular duration and depth of depressions, shortness and weakness of upswings. The “phase of growth” in the UW on the contrary is characterized by protracted rises, short and shallow crises (Badaljan and Krivorotov, 2009). Paired TSs form the Technological Revolution (TR), leading to the emergence of a new World Economic Structure (WES). The new WES leads to a change in the Systemic Cycle of Capital Accumulation (SCCA), i.e., to the shift of the capital accumulation center to a new region of the world and the emergence of a new world economic leader.

The new Capital Accumulation Center forms a new World System (WS). And the old economic leader never gives up without a fight, so, the change of capital accumulation centers and the WS is always accompanied by bloody wars: such in our history were the Napoleonic wars, Opium wars and World Wars. Nuclear weapons made the new World Wars impossible as there will be no winner, due to the risk of a “nuclear winter”. Therefore, a new form of confrontation are Hybrid Wars, characterized by a tough confrontation in the financial, political, ideological spheres and in cyber space. Military conflicts also persist but they occur exclusively in the third countries and with the use of terrorist organizations. The first TR or “Industrial Revolution”, consisted of two TS. The first TS made great use of mechanical weaving looms and other mechanical machines which were created thanks to the operational division of labor at the manufactures. Mechanical machines required the use of a steam engine which initiated the second TS and completed the industrial revolution, creating not only factory production but also steamships, locomotives, railways, etc. The steam engine ensured the explosive growth of labor productivity and expanded the limits of both domestic national markets and the entire world market. On the other hand and the emergence of steam locomotives, steamships, railways dramatically strengthened the military-political power of the industrialized countries, increasing their ability to colonial expansion which manifested itself in the formation of the Colonial WES.

The third TS was formed on the basis of the development of the steel and chemical industry as well as electricity. The production of machine tools for mechanical processing of metal was widespread. The production of an internal combustion engine became the basis of the fourth TS. In the transition period between the third and the fourth TS (between the two world wars), the conveyor production, new principles of labor organization (the systems of F. Taylor and G. Ford) became widespread. That is why, the third and the fourth TS, in our opinion, formed the second (Industrial) TR

which ensured the explosive growth of labor productivity and world production in the middle of the 20th century. The construction of long railways and other large infrastructure projects as well as mass conveyor production, required the accumulation of huge capital which led to the emergence of monopolies and the formation of the Monopolistic WES.

The third TR began in the 1970s with the creation of microprocessor technology, personal computers, the Internet and mobile communications. Stagflation of the DW in the 1970s-1980s convincingly showed that the fourth TS reached the limit of the potential of its economic growth and that the world economy fell into the state of the Technological Stalemate again. For the world economy to start developing again, it was necessary to go through the process of “creative destruction” which culminated on the DW of the K-cycle by the mid-1980s. A cluster of basic innovations of the fifth TS was formed. Since the late 1980s the global economy was booming in the framework of the UW of the K-cycle until the crisis of 2008 when the world once again entered a new DW. The cluster of basic innovations of the sixth TS began to form. In the West it became popular to call the sixth TS “the fourth industrial revolution”. But from a scientific point of view, this is not right; as the sixth TS is an extension of the fifth TS but at a new nano-molecular level. That’s why we unite the fifth TS and the sixth TS in the third (Information and Communication) TR.

WES represents industrial relations and the institutes formed on the basis of TR. Each WES continues for two K-cycles, although it is born “under the umbrella” of the previous one (this was also pointed out by F. Brodel). There are very interesting studies on this topic by L. Badalyan and V. Krivorotov where the concept of “censis” is used which is close in content to WES (Sorokin, 1997). Information and communication TR which started in the 1970s provoked production relations and institutions that are not characteristic of Monopolistic WES. From the 1970-2008s, the new WES was formed “under the umbrella” of the old one but after the crisis of 2008, it revealed itself. It became clear that the process of globalization, the main conductor and beneficiary of which was TNK and TNB, was at a dead-lock. This is proved by the transition of the world economy to the next DW of the K-cycle. With the transition to a new TS, the world economy will also shift to the new WES. S. Glaziev proposed to call it integral as P. Sorokin called the future society structure in the 1960s. (“Probably the dominant type of the emerging society and culture is neither capitalist nor communist but a type of sui generis which we denote as an integral type. This type will be

intermediate between capitalist and communist forms and ways of life. It should include 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 a simple eclectic mixture of specific features of both types but a unified system of integral cultural values, social institutions and an integral type of personality that is substantially different from the capitalist and communist models".) (Veber, 2006).

The creators of the SCCA theory J. Arrighi and F. Brodel drew attention to the fact that the centers of capital accumulation are constantly geographically moving. In the middle ages, capital accumulation centers were located in the north of Italy (Genoa, Florence and Venice) where the trade capital was concentrated. It developed from the trade with the East along the Great Silk Road. In the 16th-18th centuries the center of accumulation of commercial capital moved to Holland (Amsterdam) which traded with the East (the Dutch East India Company) and with the North (Scandinavia, Russia). With the onset of the Industrial Revolution, the world capital accumulation center moved to Britain and in the 20th century to the United States. In our Matrix, the Dutch cycle of capital accumulation, formed as part of the Agricultural WCD is presented only as the final phase, under the umbrella of which the British cycle of capital accumulation was born within the boundaries of the first TS. The heyday of the British, American and the formation of the Asian capital accumulation centers occurred within the framework of the Industrial WCD which is researched in our Matrix.

To illustrate the changes in the correlation of forces in the world economy, we used the data of A. Maddison (Maddison, 2008). From 1700-1820 within the framework of the Agricultural WCD, the leader of the world economy was China which produced 33% of the WGP while Western Europe produced 23% of the WGP and North America <2%. With the launch of the Industrial WCD, thanks to the Industrial Revolution, Western Europe moved ahead, its share in the WGP grew to 33%. China as a result of the Opium Wars was thrown back: in 1870 its share was 17% and in 1913-8.8% of the WGP. but by 1913, North America had gone to the second place with 21% of the WGP and began to oust Western Europe from the first place. This was facilitated by the First World War which undermined the financial and economic power of Europe. By 1950 on the basis of the formed Monopolistic WES, North America had already come out on top, creating 30.5% of the WGP. In the 21st century, the world joins the SCCA, based on the integral WES. According to

A. Kobyakov (calculated on the basis of A. Maddison's method) (Fig. 3) by 2030, North America will move to the second place (16.6% of the WGP), losing the first place to China (32.9% of the WGP).

Even now, North America is inferior to China's share in the WGP but together the West (US, Europe and Japan) is still stronger than China. The BRICS countries by their contribution to the WGP have come very close to the group of leading G7 countries and Russia has nuclear parity with the United States. Therefore, we have a difficult situation. The West can no longer dictate its will to the rest of the world as it did 10-15 years ago. The East has not yet gained enough power to finally break the hegemony of the West. but by 2030 the situation will radically change and the economic power of the cumulative West will be inferior to the economic strength of China alone. Therefore, the task of the new US President D. Trump is not to "fight the windmills" of the Russian threat but to revive the US economic power lost in pursuit of a phantom of global leadership and to suppress China's economic growth as much as possible. And then objectively, the US needs to prevent the alliance between China and Russia which Western countries led by B. Obama, H. Clinton and A. Merkel, simply forced us into in recent years.

Thus, in about 200 years of the Industrial WCD, the world economy is in the process of completing its cycle and China, together with the rest of the East is once again the leader of the world economic development. And this is not an accident as M. Weber claimed that the Protestant ethics (hard work and modesty in consumption which provided the accumulation at the initial stage) gave rise to the "spirit of capitalism". Liberalism as the entropy of social development (striving without state intervention for destructuring and chaos) with its boundless consumerism, propensity to idleness and satisfaction of physiological needs, even perversions (LGBT), destroyed this "spirit of capitalism" in the West. The center of wealth accumulation moves to Asia where hard work and modesty in consumption, collectivism and mutual help are the features of the national character of the Chinese, Japanese and other Asian peoples.

The research of J. Arrighi convincingly showed that each SCCA is divided into two phases: material and financial expansion. Each of them continues one K-cycle. Material expansion occurs during the period of rapid growth of the corresponding WES in real production according to the formula of Karl Marx, $D-T-D'$. But a powerful and unmanageable flow of investment in material production leads to a redistribution of capital and a fall in

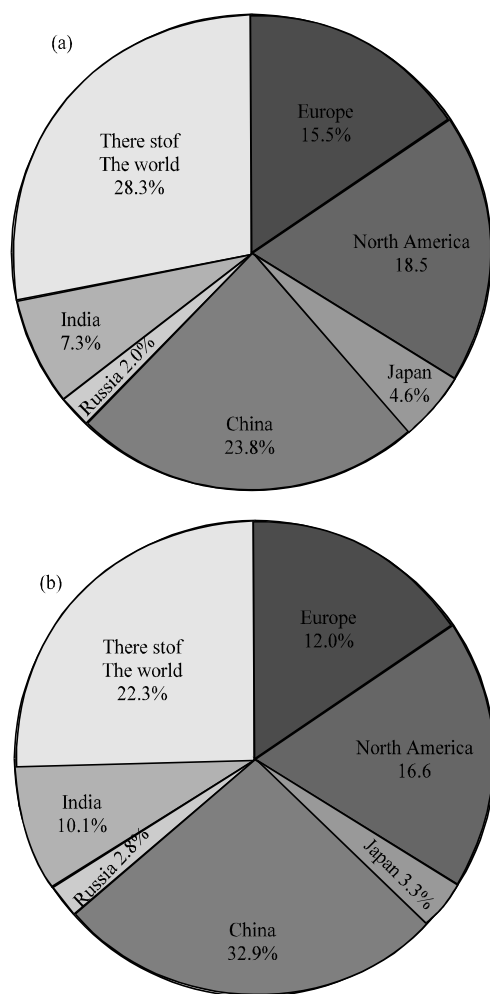


Fig. 3: Shares of leading countries in the world economy (purchasing power parity) in 2015 and 2030 (forecast) (Kobjakov, 2016)

the average profit rate in the real economy. Capital begins to look for the sphere of application in finance, implying the accumulation of fictitious capital, thanks to speculation, according to the formula of K. Marx $D-D'$. So, it was the situation at the end of the Dutch and British cycles (described by R. Hilferding and V. Lenin 100 years ago). This is also happening now in the final phase of the American SCCA. In the 1980s the financial subdivisions of industrial corporations accounted for 15% of the total profit but now they bring half of the total profits of corporations.

Therefore, the capital accumulation centers change their dislocation all the time. In the period of the Dutch SCCA, the center was Amsterdam where huge warehouses, first exchanges, banks, etc. were concentrated. In the phase of the material expansion of

the British SCCA, Manchester became the symbol of capital accumulation as the center of factory production and in the phase of financial expansion the center moved to the City of London where the Rothschilds were the brightest representatives. Detroit became the symbol of capital accumulation in the phase of the material expansion of the American SCCA as the center of the world automobile industry and over the last 30-40 years the center moved to Wall Street, the world financial center as a symbol of making money from the air. During the Asian SCCA, the capital accumulation center will move to Asia and its symbol will be the economic belt of the Silk Road where the main accumulation of capital will take place in the next 25-30 years.

It would be incorrect to consider that financial capital performs exclusively the parasitic function of producing money from the air. The main task of financial capital is the concentration and accumulation of capital for a new leap in the expansion of productive capital and the redirection of capital into new spheres of production, formed by a new TS. The thing is that the market economy never develops gradually and in a balanced way, it constantly creates the most powerful imbalances that are resolved through crises. Now the world economy is “pregnant” with another such financial collapse which can happen at any moment. Since, 2008, the total amount of public and private debt in the world’s major economies has grown from \$60 trillion to more than \$200 trillion which is about 300% of the GDP of these countries. Assuming that the average interest rate is 2%, then the debt-to-GDP ratio of 300% means that the economy should grow at a rate of 6% only to cover interest payments but in fact it stagnates at around 1-2%.

Economist Ludwig von Mises was pessimistic about the outcome of this process: “There are no ways to avoid the final collapse of the boom caused by the credit expansion. There are two alternatives: either the crisis will come earlier as a result of voluntary renunciation of further credit expansion or it will come later in the form of a full catastrophe, including the collapse of the monetary system”.

At the last meeting of G7, Japanese Prime Minister Shinzo Abe said that the world is on the verge of a financial collapse, exactly like during the days before the collapse of Lehman Brothers in 2008 (Egishjanc, 2015). but after such financial collapse (“creative destruction”) the economy always turns to material expansion and without collapses it continues to stagnate within the framework of the “casino economy”. Therefore, President D. Trump proposed not to wait for a financial collapse but to move to material expansion through infrastructure projects and the development of real production in the United States.

The development of the Integral WES will inevitably provide a transition from the American to the Asian SCCA when Asia becomes the center of the world economy and the center of capital accumulation where the majority of the world's population is concentrated. The accumulation of capital within the American cycle occurred in the developed countries that make up the "golden billion". The remaining 6 billion people on the planet belong to the periphery which provided the prosperity of the "golden billion". But there was saturation of the payment-able demand of the "golden billion" and in 2008 came the demand crisis the crisis of overproduction. The world economy in the old system of coordinates had nowhere to grow because potential demand is concentrated in developing countries and major finance remains in developed countries. As a result, the overwhelming majority of the world's population in developing countries do not consume as much as they could and in developed countries there is nowhere to invest the accumulated capital, except for financial bubbles that will inevitably burst. This is the main contradiction of the modern world economy and until the center of capital accumulation finally moves from developed to developing countries, first of all to Asia, the world economy will not get out of the crisis.

World financial systems: The world financial systems play the most important role in the development of system cycles of capital accumulation. Historically, money in the form of gold and silver coins was the universal equivalent only because it was a commodity that satisfied the people's need. In the period of the Agricultural wave, mankind did not have the opportunity, without a real physical intermediary in the form of gold and silver to carry out its exchange operations because people did not trust any other types of money. Gold and silver were considered a special monetary commodity the "universal equivalent" and their main functions were a "measure of value" and "world money". The classical Marxist school of economic science exposed the materialist basis for the emergence and development of money as a result of the development of the exchange process, removing from it the flair of "miraculous mystery". But in the modern economic mainstream there is no understanding of money and the role of gold because all this is replaced by the general concept of "assets", "liquidity", etc. Therefore, to analyze the systemic cycles of capital accumulation, it is very important to study the stages of development of the world's monetary systems.

The industrial wave inherited from the Agricultural bimetallism in the form of gold and silver coins of different weights and purchasing power. But for the industrial wave with its rapid growth in trade, precious metals were

not suitable as money because the extraction of gold and silver did not keep up with the market's needs for money. Therefore, as early as in the 17th century, study money started circulating. This was fiat money (from the Latin fiat a decree, an order, "so, be it"), the gold worth of which was guaranteed by the state and which could be freely exchanged for gold and silver coins.

Britain's leadership in the Colonial WES and the British cycle of capital accumulation required the creation of a new financial system controlled by Britain. The British proposed to the whole world to switch from bimetallism to the "gold standard", making their study pound sterling "as good as gold". It could be freely exchanged for gold and study money was more convenient to use. In the second half of the 19th century, developed countries, submitting to British pressure, switched to the "gold standard". However, after the First World War, the financial system of the British Empire was, so, weakened that it could no longer support the "gold standard" system and in 1931 Britain refused from it.

The United States throughout the 19 century was actually a financial colony of Britain. However, they constantly resisted the attempts of British bankers to put the US financial system under their control through the creation of the Central Bank. A. Lincoln's attempt to organize the issue of state study money "greenbacks" (hence the name of dollars "green" or "bucks") especially outraged Rothschild and other British bankers. The head of the Banking Association Buel stated, "Repeating the trick with the emission of their own money by the government can provide people with money which will seriously undermine our revenue base as bankers and creditors." And the Rothschild-controlled newspaper "The Times of London" was indignant, "If this dangerous policy that comes from the United States gets stronger and becomes a reality, then the government will receive its money at no cost. It will pay debts without borrowing. It will have the money needed to trade. The country will become prosperous, setting a precedent in the history of civilized governments in the world. The brains and wealth of all countries will flow into North America. This government must be destroyed or it will destroy all monarchies on the globe" (Piketti, 2015). Lincoln was shot and the Greenbacks were no longer issued.

During the Great Depression, F. Roosevelt introduced the gold dollar standard by Decree No. 6102 of April 5th, 1933, confiscating all the gold in the US in bullion and coins. He ordered all calculations to be made solely with paper money in accordance with the exchange rate equal to \$35 per troy ounce. During the Second World War, belligerent countries paid for military supplies from the United States with physical gold. In addition, many European countries transported their gold reserves to the

United States. As a result, the United States became the owner of almost 70% of the world's gold reserves. This made the dollar almost "as good as gold", turning it into "world money". In 1944, the US consolidated its financial dominance in the Bretton Woods financial system. The basis for international deals was the US dollar as an international reserve currency, performing the function of "world money" with an exchange rate of \$35 per troy ounce. All other currencies were equated not to gold but to the US dollar.

Dollars in accordance with the Marshall plan became widespread in Europe and Asia. The firmness and security of the US dollar were unshakable, until De Gaulle demanded the exchange of US dollars invested by France for real gold at a fixed rate of \$35 per troy ounce. Under political pressure, the United States had to take this exchange but similar demands followed from Japan, the Federal Republic of Germany and other countries. As a result on August 15, 1971, US President Richard Nixon was forced to default, abolishing the free exchange of the dollar for gold. The abolition of the gold content of the dollar brought down the Bretton Woods monetary-financial system.

In the 1970s a powerful depreciation of the US currency began, manifested in inflation, calculated in double digits. For 10-12 years, prices of the main consumer goods in the US increased 5-7 times and of gold and oil ("black gold") 18-20 times which is fixed in the chart of the gold price of our Matrix. Green surges of "gold prices" over the red line are not an increase in the "price of gold" but the depreciation of the US dollar which went to "free float". The depreciation of the dollar as well as the defeat in the Vietnam war undermined the credibility of the United States. In search of the restoration of their position, the US government, through the efforts of G. Kissinger, agreed with Saudi Arabia and other Arab countries on the oil trade in the world exclusively in dollars. In addition, the Arab oil sheikhs agreed to invest their "petrodollars" in US banks, making the dollar "as good as oil", the main energy resource of Monopolistic WES.

In January 1976, the members of the IMF reviewed the status of gold, it became a common commodity. Instead of the "gold standard", floating exchange rates were introduced. The Bretton Woods world currency system was replaced by Jamaican in which exchange rates are established not by states but by the market. It is characterized by a constant fluctuation of exchange rates, therefore they are called floating in contrast to the fixed rates of the Bretton Woods system. This financial system existed up to the present time, although lately there has been an increasing talk about the need for its

reorganization. The transition to floating exchange rates led to a change in the economic nature of money: phatic money was replaced by fiduciary money (from Latin fiducia-trust). Their nominal value was not established by the state, regardless of the cost of the material from which the money is made or the amount of the gold depositories.

Fiduciary money is unsecured money which depends only on whether people trust it or not: if they trust the currency rate is growing when they do not trust the currency depreciates. Fiduciary money is virtual money. Dollars, Euros, Yen, etc. only by inertia are the representatives of the fiat money, specific economies and states, although in reality they are not. Ideal fiduciary money is "bitcoins" which is not worth any material values or specific states. They are "money", just because someone trusts them. The "golden dream" of the medieval alchemists who dreamed of turning any object into GOLD, blank papers and electronic recordings began to be considered MONEY!

Today dollars are almost no different from "bitcoins", it's just a myth that they represent the American economy. They are issued not by state bodies of the USA but by a corporation of private banks called the FRS. The transition to fiduciary money shows that money is not a thing but a relationship between people. We can say that at the heart of money as an instrument of exchange lies the TRUST. When this trust is undermined, the owners of money flee to the "quiet harbor" called GOLD! And this is reflected in the graph of "gold prices" in our Matrix. The Bretton Woods system collapsed in the 1970s and where did the owners of capital go? GOLD. Gold prices grew tens of times. The economic crisis broke out in 2008 and where did the owners of capital flee again? Again GOLD! Now everyone expects a new crisis and analysts predict that gold prices will rise, at least to 2.5-3 thousand and or even up to 5 thousand dollars per ounce.

As the Integral WES is being formed, several currency zones around the dollar, euro, yuan, etc. are already being formed. This will inevitably lead to the creation of a new polycentric world financial system, based on several major currencies, performing the function of "world money" as integrators of national currencies. But with the formation of currency zones, it is necessary to take into account the negative experience of such currency as the euro. For the countries of northern Europe, it became a "cheap" currency, ensuring the increase of their export potential. For the less developed countries of the south of Europe, it became an "expensive" currency which undermined their export potential and weakened the economy. Therefore, the function of "world money" should perform the currencies

that leave the possibility for the currencies of other countries to regulate their exchange rate depending on the economic situation. If this had been envisaged in the euro area, then there would have been no Greek or Italian crisis. And we remember the proposals of J.M. Keynes at the Bretton Woods Conference on the introduction of the “bankor”. The proposals were rejected in the interests of establishing peace in the American way and the hegemony of the US dollar.

How does the economy

Affect politics? And there is another very important feature of the systemic cycles of capital accumulation: the phase of financial expansion which is always accompanied by the prevailing liberal ideology, dramatically increases social inequality. At the phase of material expansion, accompanied by the strengthening of the dirigist ideology, social inequality is substantially reduced. Confirmation of this is given in T. Picetti’s fundamental research “Capital in the 21st Century” (Ajvazov, 2013) and A. Aivazov’s article “Who benefits from the flat scale of personal income tax”s. This is quite natural because financial capital accumulates huge funds by robbing the main masses of the population and it needs freedom of flow between various industries, regions, countries and continents. It must quickly appear at the right time in the right place where the most favorable conditions for its self-growth are formed. Liberalism which dominates the phase of financial expansion, always makes the rich richer while the poor get even poorer. As a result, there is a demand crisis, caused by a decline in the demand of the bulk of the population. Productive capital needs help and support from the state, moreover, it is interested in the growth of effective demand of the population through the redistribution of national income through the state budget in the interests of the poor which leads to a significant expansion of sales markets.

Figure 4 shows a sharp increase of inequality in American society in the era of liberal ideology and financial capital dominance in the first third of the 20th century and in the last 30 years at the turn of the 20th and 21st centuries. In the 1920-30’s the income of 1% of wealthy Americans exceeded the average American income by almost 20 times and the income of the super-rich (0.01% of Americans) exceeded the per capita income by 325 times. In the 1960s the outstanding American economist Simon Kuznets on the basis of statistical data concluded that with the industrial development of the US inequality in the country decreases. Indeed, in the 1960’s and 70’s in the phase of

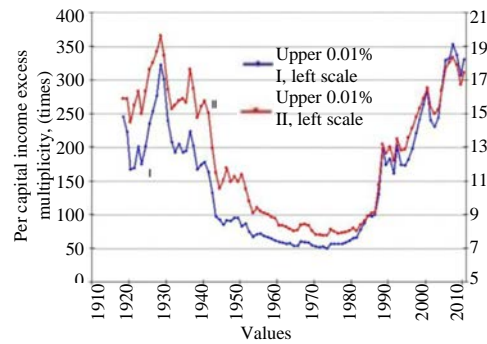


Fig. 4: Dynamics of changes in the income ratio of the richest groups of the population and per capita income in the USA (Ajvazov and Belikov, 2016)

material expansion and the dominance of the dirigist Keynesian ideology, inequality in the United States sharply diminished. The difference in income between 1% of wealthy Americans and average per capita income in the US decreased from 20-8 times and the difference between 0.01% of super-rich Americans and average per capita incomes fell from 325-50 times. But with the transition in the late 20th century to a new phase of financial expansion and the dominance of neo-liberalism, inequality increased even more than in the 1920s and 1930’s. The difference in income between 0.01% of the super rich and the income of the average Americans grew to 350 times. Revenues of the American “middle class” were significantly reduced due to the transfer of production from the US to developing countries while the income of financiers from Wall Street increased fabulously at the expense of increased financial speculation.

Within each K-cycle not only the form of capital accumulation is replaced but also the leading ideology of economic development. And in the material phase, the state always takes an active part in economic life and the ideological paradigm has a dirigist character. In the phase of financial expansion, liberal paradigm is the dominant. During the “Amsterdam era”, the classical liberal economic doctrine, formulated by the physiocrats, was formed: “laissez faire, laissez passer” (provide freedom of action) and “the invisible hand of the market” by A. Smith. Dirigist ideas of F. Liszt and K. Marx dominated the “Manchester era”. In the “Rothschild era”, the ideas of a liberal “neoclassicism” (marginalism and A. Marshall) were formed which in the “era of Detroit” replaced “Keynesianism”. In the “Wall Street era”, “neo-liberalism” dominated which will inevitably be superseded in the near future by “post-Keynesianism” and new “state managers” like D. Trump and his team will replace the “old” corporatocrats.

The transition to a new SCCA is opposed by the unipolar worldsystem Pax Americana. Its self-destruction manifested in the “tectonic shifts” in the world has been discussed by politicians and political scientists lately. All power within the Pax Americana in recent times is concentrated in the hands of TNCs and TNBs, 70% of which are American. Their interests are serviced by politicians and the world media but the movement towards globalization in the interests of TNCs is the path to self-destruction of the world. TNCs withdrew their production to developing countries, depriving the US of the middle class and reducing the level of national consumption. The average salary of the American people dropped to the level of 1958 as jobs in material production decreased and new were formed in the service sector where salaries are several times lower than in production.

There cannot be two winners in this fight. Either global corporations will definitively destroy the sovereignty of states and make the world a global market, corporate rules and profits will be more important than state norms and laws and then robbery of the planet will continue until total depletion of resources or the states will take revenge and return to themselves everything stolen from them by corporations in recent decades. To ensure their power, TNCs are trying to realize their idea of the Transatlantic Trade and Investment Partnership (TTIP) and the Trans-Pacific Trade Partnership (TPP). These “partnerships”, on the one hand implied the elimination of barriers to access of TNCs to the markets of participating countries (which would lead to the destruction of local companies), on the other hand and the submission of the legislative and judicial powers of the countries to the ISDS mechanism. In accordance with it, transnational corporations can sue in private supranational courts, sponsored by TNCs with the authorities of the countries. The ISDS mechanism as it is evident from the description, actually implied a loss of sovereignty of those countries that signed TTIP and TPP.

At the same time, the bulk of taxes TNCs pay offshore, hiding their own revenues there: TNCs and TNBs in order to avoid paying taxes in their home country, keep \$2.4 trillion of profits in off-shores. As a result, TNCs and TNBs, relying on the military-political and financial power of the United States, try to subordinate the whole world to their interests and their contribution to the American economy is decreasing. Thus, they are enriched not only by robbing developing countries but also by impoverishing the population of their own countries. Therefore, in developed countries

there is growing dissatisfaction with the activities of TNCs and TNBs which was manifested in Britain’s “brexit”, the victory of D. Trump in the USA, the nomination of Marin Le Pen and F. Fignon for the presidency in France, the failure of M. Renzi in the referendum on the change of Constitution in Italy as well as in the general strengthening of nationalist movements. Financial capital does not give up which is fully reflected in the fierce struggle of the Western establishment and the controlled media against the new US president, D. Trump and the newly nominated French President Marin Le Pen and Francois Fillon.

But globalization in the interests of TNCs and TNBs is coming to its logical conclusion and with the neoliberal development paradigm protecting the interests of TNCs and TNBs, will soon be over. The world has come to the next investment stalemate which always accompanies the change of the WES. The world will inevitably evolve to a new Polycentric world-system with post-Keynesian ideology based on economic nationalism. The main D. Trump’s ideologist S. Bannon frankly states: “I am an economic nationalist! The globalists destroyed the American working class and created the middle class in Asia. Now we are talking about the Americans who want to get back what belonged to them” (Glaziev, 2016). And he as an adviser on strategic development, will determine the general direction of the economic policy of the new US president. And in the EU, the future is not for those who defend the interests of global TNCs and their proteges Brussels bureaucrats but for the leaders with ideas of national sovereignty such as D. Trump, Marin Le Pen or F. Fillon.

The transition from one World-System (WS) to another was always mediated by world wars. The Napoleonic wars were not yet world ones, they were fought for supremacy in the European WS because at that time the global economy had not yet acquired the global character. After the victory over Napoleon, Britain became the leader of Europe and led the wars for the world domination. The colonial conquests in India and the Opium Wars with China finally turned Britain into the most powerful empire in the world. China which produced in the early 19th century a third of the WGP, lost its leadership for a century and a half, its share in the WGP in the middle of the 20th century was less than 5%. By the middle of the 19th century, Britain had become the industrial factory of the world which produced half of the world’s industrial output. The colonial WES was formed on the basis of which the British Imperial WS developed.

In any WS there always appeared a leader and an opposing counter-center. Wars played an important role in the struggle between the center and the counter-center. In Europe in the period we are examining, the role of the counter-center was most often performed by Russia in different ways. Since, the reign of Catherine the Great, the Russian Empire served as an anti-center which was pro-claimed in the witty expression of Prince Bezborodko: "No cannon shot in Europe without our permission!" The victory over Napoleon was the best confirmation of these words. But that continued until the Crimean War which showed that military and political might must be supported by an economic power. Russia "missed" the industrial revolution and found itself on the periphery of the world economy and consequently on the periphery of world politics. The liberal reforms of Alexander 2 finally slowed down the development of the economy of the Russian Empire which is easy to see in Fig. 1 and finally, led to the revolutions of 1917.

At the same time, the Franco-Prussian War consolidated Germany which became the counter-center of Britain before the world wars. Both world wars in our opinion for their deep economic reasons were wars not between Germany and its rivals but between the British Empire and the United States for the world leadership. In 1913, the US, producing more than a fifth of the WGP, outscored the British Empire in its economic strength. Britain entered the first world war as the main creditor of the United States but ended up as their main debtor. but economic power is not enough to become a leader of the world and create its own WS, it is necessary to have the appropriate military and political power. Therefore, the US needed to unleash the second world war to become the world leader and legitimize in Bretton Woods a new WS: the world in American tradition Pax Americana. But the Second World War raised another country, the USSR to the crest of the wave of the world development which in the 1930s managed to implement the Industrial Revolution and became the new anti-center for the United States.

The creation of nuclear weapons made it senseless to unleash a new world war, threatening the destruction of all warring parties and the onset of a "nuclear winter". Therefore, a new type of war appeared hybrid, combining several basic directions. The most destructive are information-cognitive wars in financial (financial market collapse), information (hacker attacks), political (creating "organized" chaos and financing terrorist activities), ideological and other spheres. They were studied in detail by S. Glazyev in his recent researches. With the help of a hybrid war the US try to keep their leadership and preserve Pax Americana but they will not succeed, because the formation of the integral WES is already in

full swing, the leader of which is China. The difference between the mentality of Americans and Chinese is very accurately noted by the well-known Israeli analyst Yakov Kedmi ("Americans do not treat anyone as equal, they consider themselves to be "the first of all the first." Until now when all the treaties between Russia and the United States were signed, the Americans did it the same way as they concluded treaties with the Indians and looked at you as if you were redskins, not equal to them. This attitude to the whole world is deeply rooted in American elites ... The concept of "equality" contradicts the American system, the American way of life, the American understanding because everything is based on the principle: "Prove that you are better", ... Chinese civilization, unlike the West European is not expansive. The Chinese always said: "We do not want these barbarians to influence what is happening in our country. We, the Chinese, determine for ourselves how to live." China never wanted to conquer other countries. They say: "What we need to get from them, we will get by peaceful means but we do not want to let them in", ... The Americans say: "We want everyone to think like we do, because we are right." The Chinese have a different approach. They say: "How you live is not our business. The main thing is that your interests should not interfere with ours and that we should benefit from you" (Pravda.r.u., 2017).

CONCLUSION

Our studies allow us to formulate the following main conclusions. Changes in the economy on the Industrial Civilization Wave begin with the changes in the development of the productive forces of society, thanks to the formation of the new TS. The change of economic paradigms takes place at the points of technological stalemate. The development and change of technological structures lead to cyclical fluctuations of the economy which is best described in the theory of large cycles of the economic conjuncture by N. Kondratiev. Large K-cycles consist of two waves: a descending and an upward wave. On the descending wave, the previous TS is exhausted and the cluster of new basic technologies is developed and prepared for use. The implementation of new technologies in the leading branches of production leads to a transition to the upward wave of the K-cycle. Together with the changes in the TS, organizational forms of business structures are formed (from manufactory to TNC). Consecutive pairs of TS complete a technological revolution.

The changes in the national economies that have accumulated as a result of the implementation of the

Technological Revolutions lead to changes in the world economic structures, the advanced experience of one country becomes the property of the whole civilized world, the world economy acquires a new quality. In the process of formation of the new WES, the points of the investment deadlock appear, corresponding to the points of the technological deadlock when the TS is changed. The development of WES is accompanied by a cyclical change in the instruments of capital accumulation, financial expansion corresponding to the downward wave of the WES development is replaced by material expansion carried out on the upswing. These processes are reflected in the periodic change of scientific paradigms of the economy perception and its management. In the phase of the productive capital dominance, the state always takes an active part and the ideological paradigm is of a dirigist nature and in the phase of domination of financial capital, the liberal paradigm prevails.

The development of the WES leads to the change in the Systemic cycle of capital accumulation, i.e., to the shift of the economic power center to a new region of the world and the emergence of a new world economic leader. The new Center for Capital Accumulation forms its World System with the core (metropolis) and the periphery with the corresponding international relations, institutions and cataclysms in the form of direct and hidden wars.

Knowledge of the laws and details of the mechanism of the world economic development allows us to understand and explain the hidden causes of the external manifestations in the world. Accident is an extremely rare phenomenon, referring only to the forms of manifestation or temporary deviations from the main, regular directions of development.

Knowing the past helps to explain the present. Knowledge of the past and present makes it possible to predict the future. At the moment, the world is experiencing a new technological and investment stalemate as the technologies of the 6th TS are already being formed and there is yet no powerful inflow of investments in these new technologies. The growth of the world economy will begin with the mass investments in the technology of the sixth TS and diffusion of these technologies in the old production branches. This will happen only in the 2020s, when the next DW of the K-cycle is completed. Until then the world economy will continue to stagnate in the mode of financial expansion.

The process of globalization, the main conductor and beneficiary of which were TNCs and TNBs, reached the deadlock as evidenced by the transition of the world economy in 2008 to the DW of the K-cycle. With the transition to the new sixth TS, the world economy will evolve to the new (Integral) WES. The development of

the Integral WES will ensure the transition from the American to the Asian systemic cycle of capital accumulation. The USA with its satellites will no longer be the center of the world economy and capital accumulation, instead huge Asia led by China and India where the majority of the world's population is concentrated will perform this function.

Globalization, as a movement in the interests of TNCs and TNBs, comes to its logical conclusion and with the neoliberal development paradigm formulated in the interests of TNCs and TNBs, it will soon be completely over. "Neo-liberalism" of the "Wall Street era" in the near future will inevitably be ousted by "post-Keynesianism" and the managers of the new wave should replace the "old" corporatist generals.

The downward wave of 2008-2020 means the end of Pax Americana and the transition to the new Polycentric world-system with the post-Keynesianism ideology, based on economic nationalism. Wall Street as a symbol of credit expansion and making money from the air in the "economic Casino", will be replaced by the Economic belt of the Silk Road as a symbol of the Asian cycle of capital accumulation.

Forecasts of the world development allow us to determine the "challenges" that face our country and to respond to them in advance and correctly. Many economists believe that the current crisis is the crisis of capitalism itself. Any system has a finite lifespan and capitalism is no exception. In the 19th century, K. Marx, analyzing the Colonial WES and the British SCCA, concluded that capitalism was coming to an end. And the end came but not to capitalism but to the British SCCA which was replaced by the American one. Now we can hear again that capitalism has come to an end but this is the end of the American SCCA and Pax Americana. It is too early to bury capitalism because the principle of capital accumulation still remains the main principle of the world economic development. The world will have to go through another K-cycle, within the framework of which there will be the sixth techno-economic paradigm be formed which completes the Information and Communication TR and the Integral WES. These processes imply the transition from capitalism to some new socio-economic formation where the principle of capital accumulation will no longer play a fundamental role in social development. but this will not happen until the middle of the 21st century.

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