

## Chapter 1

# THE END OF GLOBALIZATION AND THE CHALLENGES CIVILIZATIONS FACE IN THE POST-GLOBAL APPROACH

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### Abstract

The Globalization processes are presented in a system of three consecutive stages of globalization. With reference to the first two stages, we can observe an interpretation analogy postulated by Robbie Robertson [2003]. However, the assumed civilization perspective points at a different interpretation of the third stage of globalization, here pertaining to the IT revolution. The consecutive stages thus outlined in this system constitute an independent trend aiming at integration on the level of material culture, which is largely complemented during the decline of the third stage of globalization, i.e. about 2025. The end of globalization is understood as complementation of the process commenced five centuries ago together with new categories of accompanying challenges. The author presents civilizational challenges faced on the threshold of a post-global order and considers a likely scenario for the processes that will follow the third stage of globalization.

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## 1. Introduction

Globalization is, first of all, presented as a process in the area of a human material culture. This process has its beginning, its stages and aims and at its end is understood to be the fulfillment or the realization of its role. The aim of this study is to systemize globalization from a civilization-related perspective and at the same time to present new challenges faced by contemporary civilizations as seen both from a social and economic perspective. This aims to point to those aspects of human activity that can introduce a new qualitative change in the development of civilization. The implementation of these research objectives is methodologically based on future studies [cf. Karpinski, 2009]. The adopted method is that of a historical analysis of globalization process as approached by civilizational studies. The identification of the processes of globalization and an analysis of challenges confronting civilizations in the 21<sup>st</sup> century makes it possible to indicate a process which has the potential to dominate the social reality of the post-global world.

The economic approach to globalization emphasizes its transformative influence on economic relations. It is often pointed out that the world economy evolved in three consecutive stages based on regional [Braudel, 1995] or even parochial relations (parochial world-economy) [Mozaffari, 2002], through the rivalry of two competitive civilization and economic systems, through the Cold War up until the global economy of the present day.

The principal of discrepancy is the interpretation of the globalization notion lies in its placement in time rather than in its scope. Generally, scholars agree on the fact that globalization refers to serious changes within the system of international relations. Andrew Jones [2006] defines globalization as “a developing interconnection and interrelation of all the social aspects.” Referring to globalization theorists, such as Anthony Giddens and Ulrich Beck, Jones points out that globalization “can be identified in almost every aspect of modern life, in a way that has never been recognized before in human history, and its exponential development started in the mid-20<sup>th</sup> century” [Jones, 2006, p. 2].

Globalization studies come as a relatively new field of science, nevertheless, in his Dictionary of Globalization, Andrew Jones has managed to put over 500 definitions which could be divided into three categories: institutions and organizations, processes, theorists and activists. Among definitions containing the notion of globalization we can find, among others, for example: global apartheid, global cities, global civic society, global village, global communication, global corporation, global culture, global financial integration, global management, global network, global north, global production network, global social

democracy, global system, global terrorism, global warming, globalism, globalization, globalization theory, globalization, etc.

From among the written works on the history of globalization, *Globalization in World History* edited by A.G. Hopkins [2002] deserves special attention. It has been pointed out that the notion of globalization, although extremely popular since 1990, can equally well present mutual networks of relations shaped after 1500. Researchers introduce the following classification of the historical periods of globalization: archaic globalization, proto-globalization, modern globalization and post-colonial globalization.

## 2. The first stage of globalization

The breakpoint year of 1500 is defined by Robbie Robertson as the beginning of the first stage of globalization. The globalization process itself is interpreted as “human interconnections that have assumed global proportions and transformed themselves” [Robertson, 2003, p. 3]. At the same time, the author emphasizes its dynamic and multilateral character as eminent features that characterize this process. Robertson’s first stage of globalization is oriented towards the transformation of regional markets into a multisided global network of connections. The industrialization that took place after 1800 brought about the second stage of globalization. According to Robertson, the third stage started in 1945, a year which symbolizes the new architecture of the post-war world, where American and Russian visions of globalization clashed. Presenting the subsequent stages of globalization, Robertson focuses on social relations and the reasons for the fall of the subsequent stages. He perceives the decline of the particular stages as a social failure. Robertson writes: “globalization has twice faltered because elites sought to frustrate democratization and reorient globalization towards more exclusive ends” [Robertson, 2003, p. 6]. And so, he identifies the end of the first stage coincides with the French Revolution as the culmination of mounting social tensions that aimed at eliminating social, religious and racial disparities, etc. The second stage developed new forms of disparity and social discrepancies, leading to some degenerations, such as racism or mass destruction. The emerging empires defined the subordinated world by their own rules, often destabilizing their colonies.

The two following world wars may be regarded as a significant epitaph to the domination of the declining empires. The new empires lost their vitality in the course of the third stage of globalization, characterized by American and Russian competitive globalization visions. International globalization brought along a number of new interactions with the growing network of social relations,

expressed by the transformation of work and family models, the deepening of democracy, changes in the position of women in society and interracial relations (radically transformed gender and race relations).

The classification of the globalization process suggested above illustrates the social aspects of the globalization dimension. However, it does not reflect its cause-and-effect nature. This nature is presented better by the following classification of globalization stages:

I stage: **Revolution of the geographical horizon development** (1500–1800)

II stage: **Industrial revolution and technological industrialization** (1800–1950)

III stage: **IT revolution and computerization** (1950–2025)

From its definition, globalization requires global relations functioning on the world scale. These relations would not have been possible without the geographical discoveries made by the Europeans between 1500–1800.

**Table 1.** The breakthrough in discovering the world in 1400–1800

Year	Known territories in million km <sup>2</sup>	Terra Incognita in million km <sup>2</sup>	The ratio of known and unknown territories
1400	50	460	10:90
1500	110	400	22:78
1600	316	194	62:38
1700	377	133	74:26
1800	455	55	89:11

Source: A. Oppel (1891), *Terra Incognita*, Bremen, p. 23. After: A. Piskozub (2003a), p. 110.

Before the revolutionary discoveries by the Europeans, the geographical civilization horizon was limited to knowledge of the closest environment of particular civilizations. This knowledge was incidentally extended by some stories told by such merchants as Marco Polo or some missionary priests. These contacts, however, were considerably limited and often boiled down to the vague transfer of information about the eastern part of the Old World. The image of some known but distant nations was mainly based on half-legendary speculations rather than on actual knowledge.

In Roman times, the Silk Route connected *Imperium Romanum* with China. However, this interconnection was of a limited character, considering trade, the flow of people and especially, its durability within the transportation system. The knowledge about the distant and rich Chinese or Indian markets used to stimulate the imagination of numerous Europeans who wished to develop direct trade contacts, avoiding the unfavourable Muslim middlemen. The

basis on which the future achievements were made was created by Henry the Navigator (1394–1460), who was a Portuguese prince and the organizer of the first European navigation school.

Were there any similar attempts on the other side to seek contact with the outside world? The Chinese seemed technically prepared for distant seafaring in their huge junks. Occasionally, there appear that the Chinese made some attempts and were the first to circumnavigate the world. However, this statement is considered to be highly doubtful nowadays.<sup>1</sup> Yet, there is no doubt that no other civilization developed the world's exploration to such an extent as the Europeans.

The breakthrough and the dynamic period of broadening geographical horizons is closely connected with Christopher Columbus' crossing "the sea of darkness," which was the Atlantic Ocean in 1492, and his discovery of a new route to India – as he was erroneously convinced. In fact, Columbus initiated the discovery of the New World by other Europeans and the newly-found land was named after another explorer, the Italian sailor, Amerigo Vespucci, who verified Columbus' fallacious statement. Around that time, the real new route to India was discovered by Vasco da Gama in 1495. Therefore, accepting the year 1500 as the conventional turning point which particularly refers to the revolutionary development of geographical horizon awareness which allows us to systemize the beginning of the great transformations that will be later on referred to as "globalization."

The course of discovering the world by the Europeans became their common accomplishment but, at the same time, it also initiated some disintegration processes. New discoveries closed the period of the then European unity and started a new chapter of mutual competition. Andrzej Piskozub [2003b, p. 118] divides the process of discovering the world by the Europeans and their conquest of the World Seas into the following stages:

1. Portuguese discoveries: 1420–1495 (1498)
2. The domination of Spanish discoveries: 1495 (1492)–1570
3. The domination of discoveries by other European countries: 1570–1645
4. The interruption in maritime discoveries: 1645–1720
5. The domination of the Pacific Ocean discoveries: 1720–1795.

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<sup>1</sup> Some attempts to prove that the Chinese were the first to circumnavigate our planet were made by Gavin Menzies in his book *1421, the Year when the Chinese Discovered America and Circumnavigated the World*, Amber Publishing, 2002. This former officer of the Royal Navy Submarines and member of the Royal Geographical Society gathered some evidence to prove that Admiral Zheng He had circumnavigated the world between 1421–1423. However, this not only appears as interesting, but also on the verge of fantasy. This attempt and many subsequent ones have never cast any doubt on the fact that the Europeans were the first discoverers of the New World. Even if someone could prove that Zheng He was in America before Columbus, this fact could be only compared to the fruitless discovery of America made by the Vikings at the end of the first Millennium of our era.

The use of the adjectives Portuguese, Spanish etc. does not refer to the nationality of the discoverer but to the geographical origin of the sovereigns. It should also be mentioned that at the time of the first geographical discoveries, the leaders of the exploration teams were navigators who came mainly from the Italian Peninsula but operated under different ensigns.

The first stage actually lays the foundations for the oceanic expansion of the Europeans. The above-mentioned prince, Henry the Navigator, contributed significantly to this accomplishment. As Andrzej Piskozub [1994, p. 174] states, “having no prospects for the Portuguese throne, he focused on external expansion which went in two directions: fighting the Moors and seafaring exploration.” The prince himself did not participate in these expeditions. However, he was an excellent organizer who was determined to continue new discoveries. His death in 1460 did not close the time of Portuguese discoveries – it was just the middle of this period. The exploration of the African coast, from Upper Guinea to the south end of the continent was still to come, and Vasco da Gama was still to find a new route to India after circumnavigating Africa, during the rule of the Portuguese king Joao II.

Anticipating this expedition, Queen Isabella ordered Columbus to discover the desired new route to India, starting the Spanish domination in the development of the geographical horizon. This resulted in the discovery of both Americas and the exploration and domination over the Pacific Ocean navigation. After the Spanish, the English and the Dutch followed suit. The Spanish discovered the Canadian coast up to Hudson Bay and the Baffin’s Sea, whereas the Dutch sailed round Cape Horn and circumnavigated Australia discovering the size of its coastline. During this time the geographical horizon was also extended on land, by the French – inside North America and by the Russians – inside North Asia.

The interruption period in sea exploration was caused by the fact that some European countries – England, Holland and France – concentrated on mutual competition for the islands of the Indian Ocean and the Caribbean Sea. Other geographical discoveries were made by the continually competing English and French, who explored the coasts and islands beyond polar zones.

The consequence of the development of the geographical horizon was the exploration of this area organized by the competing European countries. The discovered lands and new transportation routes became the objects of colonization or trade exchange domination for them. These processes particularly intensified in America, where the clash between Pre-Columbian and Latin cultures resulted in the fall of the former.

The first stage of globalization, understood as the geographical horizon development, lasted for 300 years and during this time the Europeans discovered



almost 90% of the Earth. The Western civilization played the key role in this process and became the driving force and the major beneficiary of this process. Having gained this position, the Western civilization entered the second stage, this time manifesting itself in industrialization, which was the consequence of a revolutionary invention, or, actually of utilizing the steam engine, discovered anew.<sup>2</sup>

### 3. The second stage of globalization

Even before 1800, two inventors-engineers, James Watt and Mathew Boulton, constructed a steam engine which was to revolutionize the British industry, especially in the field of coal and other mineral mining, iron production, textile industry and the production of consumption goods. This new technology allowed the British, who took advantage of their position from the first stage of globalization, to assume the leading role in the active expansion in international trade. At the same time, they expanded their production beyond the British Island territories.

Paul Atterbury [2008] states that the total British export in 1809 was worth £25,4 M, in 1839 it was worth £76 M, and in 1849 – £124,5 M. The main markets for the British were Europe, India, the remaining part of Asia and the United States of America. In the Victorian era, Great Britain became the leading economic power in the world.

The industrial revolution moved humanity into a new stage of the social development that created the post-industrial civilization. Alvin Toffler [1997, p. 61] defines it as the civilization of “the second stage.” He writes that in opposition to the agricultural civilizations of “the first stage,” “the industrial revolution determined the course of the second stage and created a strange, powerful and bustling counter-civilization. Industrialism was not only the chimneys and assembly lines. It turned out to be a rich, comprehensive social system which affected all aspects of human life and challenged everything that was connected with the first stage. It was industrialism that created Willow Run plants near Detroit. It placed the tractor on the field, the typewriter in the office and the refrigerator in the kitchen. It created daily newspapers, the cinema and DC-3 aircraft. It gave us cubism and twelve-tone music. We also got the Bauhaus style and Barcelona chairs, sit-down strikes, vitamin pills and a longer life. A hand watch and a ballot box became everyday objects. Moreover, it connected all these things together – it combined them into one mechanism – creating the most

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<sup>2</sup> The steam engine was invented in ancient times by the Romans, however they limited themselves to using it only as a tool for ramming gates.

powerful, the most concise, unrestricted in its expansion system of all those known before – the social system of the civilization of the second stage.”

The steam engine was successfully applied in transportation. The journey time was shortened by the dynamic speed increase presented by the new transportation means in the field of production, characterized by unprecedented efficiency. Industrialization in its multilateral dimension affected society in the places where the industry was developed and also communities which were located far away from industrial centers. Fernand Braudel [1995] gives an example of the British colony in India, which destroyed the traditional cotton industry that had been developing there since ancient times. First, they improved its productivity with orders from Europe and then they reduced the Indian market to the function of a raw material supplier to the newly constructed cotton mills in Lancashire, England. As a side effect, it also disturbed the traditional development of agriculture by orientating production towards industrial needs rather than food demand, which caused according to Braudel [1995, p. 240] “the catastrophic waves of famine in the last thirty years of the 20th century.” Apart from their technological aspects, the consequences of this revolution also had economic, ecological and widely understood social repercussions. The mobility of production means and capital allocation were the elements characterizing globalization transformations in the second stage of this process.

Globalization in the industrial field developed much faster than during the first stage, which was connected with discovering the world. The second globalization stage took half the time than the first one – humanity did not need 300 but only 150 years to consume the technological effects of civilization transformations.

#### 4. The third stage of globalization

The next globalization stage is marked by the IT revolution, which started, as can be assumed, in the mid-20<sup>th</sup> century. The novel method of digital recording of data introduced a new dimension and unprecedented quality into storing and processing information. The third stage of globalization was related to hardware linked to the equipment required for new technologies, and software connected with IT programs. These two elements are closely related and their mutual interdependence is defined by accommodating opposing absolute values. *Hardware* aims at the minimization or even the micro-minimization of equipment, whereas software has been assigned the task of the maximization or the gigantization of the calculation capacity in IT programs. All tendencies aim at compressing the most advanced technological capacities in the smallest possible



equipment. The first computers used to be the size of an office room, nowadays they are minuscule and fit in the palm of the human hand.

Computerization comes as the essence of the third globalization stage in the same way that industrialization was the essence of its second stage. The history of computerization reflects the nature and dynamic of this process.

The picture of the IT revolution is complete with the speed of data transmission and the possibility of instant communication with every corner of the world. The telephone was invented in the second stage of globalization. The development of this revolutionary communication technology was slowed down for many years by all the necessary expenditure connected with its infrastructure development. This situation changed during the third stage of globalization when this stationary invention turned into a practical mobile device. According to Levinson [2004, p. 55]. The first public talk with the use of a cell phone took place on the 3<sup>rd</sup> of April 1973. The popularization of this invention took over ten years. Nowadays, the mobile phone is used by the masses almost everywhere in the world.

Hardware would never have been developed without the development of software used for wired and wireless communication. The invention of the Internet with the possibility of digital data transmission (in the form of texts, numbers, sounds and pictures) was a real breakthrough. It allowed global communication on a massive scale. It is commonly used and Internet access is generally affordable. The world is being turned into a global village.<sup>3</sup>

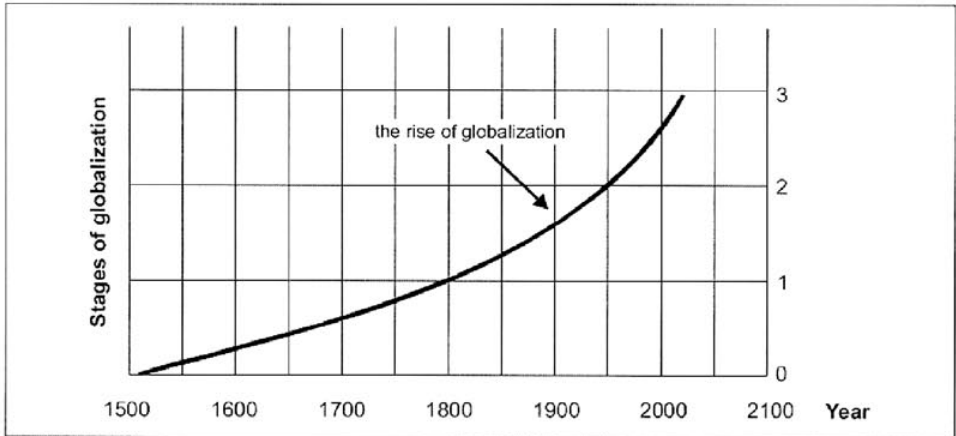
The characteristic feature of IT transformations is the miniaturization of maximally efficient IT products together with their mobile capacities. Hardly had the computer become widely available, when it turned out to be the traveler's indispensable tool. What has so far been a determinant of technological advance, i.e. the stationary telephone, now has to perform at its best, and nevertheless will be eventually defeated by its mobile counterpart. Modern IT technology changes human life and affects the functioning of society and transforms it into an IT society. Institutions, enterprises and citizens move their activities to the Internet. The state creates e-clerks and citizens demand more influence on social issues, manifesting their postulates in a non-violent way, as in the case of ACTA, or organizing armed resistance against non-democratic regimes, as in the case of the Arab Spring. Using IT achievements, enterprises have become more and more efficient and the IT application in modern machine design has developed robotization and automation of production. As a consequence of technological development, it will not be necessary to employ masses of people for mass production. This, in turn, will lead to further social changes.

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<sup>3</sup> The term "global village" was introduced by Marshall MacLuhan in 1962, in his *The Gutenberg Galaxy*, to define the society functioning in the time of mass communication which breaks time and space barriers.

Within the field of computerization we have almost run out of amazing and innovative inventions. However, we can still cope very well with implementing and improving technological innovations. Assuming that each subsequent stage of globalization takes half the time taken by its previous stage, we can state that creative powers of the third stage of globalization will run dry in about 2025. It does not mean, however, that after this year we will not be able to invent anything novel within the domain of IT. There can be still an infinite number of items and programs, but it does not change the fact that computerization has finished its performance in the globalization process.

**Figure 1.** The Dynamics of Globalization



Source: compiled by author.

The end of globalization – in the same way as the end of history [Fukuyama, 1992] – cannot be interpreted as a stop, let alone regress of the ongoing process. History and its integral part, globalization, will expand in the same way as the universe. The geographical horizon does not end discoveries in the realm of lands and oceans by man. We are left with exploration of what is under the surface of lands and waters and, especially, what is beyond the Earth. The end of the 300-year process of broadening geographical horizons meant only that it gave way to another one – a more revolutionary process of modern industrial revolution, different from the common images of the existing world. Further geographical discoveries generated a lot of interest – but still, it was only interest. The world was accelerating as a steam engine and the industrialization process, after 150 years, had to give way to social attention focused then on IT revolution and remote communications. Considering the time in which the subsequent significant civilization revolution happened, it is possible to assume that

the time after which an invention becomes common is shortened by 50%. The history of globalization does not finish at the three stages presented above. However, a period of its consolidation is being completed. From now on the world will be global, just as history will be continually created, and even if there are more and more efficient solutions introduced to its particular fields, it will be just globalization.

## 5. The Post-Global Approach

The post-global world is defined by old challenges and new discoveries. The macro level is determined by homogenization and universalization processes. As Mehdi Mozaffari [2002, p. 48] notices: “the standard of civilization will follow the pace of globalization. International ethics and international law will take more room and attract more attention than before because of a more or less pronounced degree of homogenization of the world identity and consequently the progressive transformation of state identity.”

To refer to the micro level, it is necessary to pay attention to old challenges, often put into new formulas. Ch. Patten [2008] names the most important challenges that we have to face to survive in the 21<sup>st</sup> century: fight against poverty, international crime, global terrorism, the control of weapons of mass destruction (nuclear and biological), reduction of the number and scope of armed conflicts,<sup>4</sup> the international arms trade, corruption, climatic changes and the greenhouse effect, the lack of drinking water and non-drinking water management, trafficking in human organs, access to energy supplies considering the national policy of energy security, pandemic diseases and prolonged life expectancy.

R. Cox [2002] pays special attention to the civilization challenge which accompanies the establishment of the self-regulating free market. This market is of a global scale due to economic globalization. He describes [Cox, 2002, p. 8] the conflict resulting from this situation in the following words: “There is an implicit conflict between the dominance over society of abstract economic laws and the construction of substantive economies<sup>5</sup> that organize economic activity in compatibility with the norms of existing societies. That conflict is expressed in practical policy issues in different parts of the world today. In that conflict

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<sup>4</sup> Paul Collier [*The Bottom Billion*, Oxford University Press, 2007] evaluates that 73% of the world’s poorest people, ‘the bottom billion’, live either in areas where armed conflicts are being escalated, or in areas where armed conflicts have just been finished.

<sup>5</sup> Anthropologist Karl Polanyi treated “substantive economics” in relation to various historically created forms through which people had become organized to satisfy their material needs. Economic processes were embedded in social relations and served social purposes.

civilizational perspectives challenge the dominance of the global self-regulating market.”

It frequently happens that the global challenges are connected with weak nation-states which are unable to cope with growing problems by themselves. This fact makes us look for a new formula for organizing international order. The critics of the nation-state, Eric Cazdyn and Imre Szeman [2011, p. 18] claim that “The nation-state system was nothing to be celebrated and clung to: its record is of unending war, suffering, and exclusions. The disagreements over and anxieties about globalization lay not in the prospective end of the nation, as much as in the precise character of what was going to take the place of the nation-state system.”

The challenge presented in the global governing formula is very significant from the systemic perspective of the state structure organization, in connection with the growing role of international organizations. The evolution of the state model will continue in the post-global order, running up against a number of difficulties created by the beneficiaries of the present chaos on one hand, and the ideologists of archaic structures on the other.

The challenges listed by the globalization researchers refer mainly to their organizational character. Patten [2008, p. 426] concludes optimistically: “even this planet changing-climate problem is not insoluble. We know the sort of things that will have to be done. They are not riddles or mysteries. Looking at one problem after another – proliferation, money laundering and crime, the Middle East, energy security, lootable resources, civic conflict – the answers are usually pretty clear. The puzzle is not ‘What is to be done?’ but rather ‘Who is to do it and how?’.” Introducing new qualities into particular areas is likely to be of an evolutionary nature, and it does not seem to lead us to a civilization leap similar to the previous revolutions, which shaped the global world. The potential civilization leap can be seen in the discoveries developed by scientists, which can lead to an entirely new quality of perceiving and treating human life and body.

The discovery of the structure of deoxyribonucleic acid (DNA) in 1953 by James Watson and Francis Crick constituted a prelude to a new quality leap by human civilization. X-ray crystallography developed by Rosalind Franklin and Maurice Wilkins facilitated the discovery of DNA. These scientists (Franklin died in 1958) received the Nobel Prize for their breakthrough research in 1962. The developments in research of DNA introduced a new quality into biotechnology and molecular medicine.

Farming civilizations had already utilized diverse forms of biotechnology in various aspects of agricultural activity including crop fertilization or the production of yogurts and cheeses enhanced by the use of bacteria generating lactic acid. In modern times biotechnology contributed to the discovery of the mold

(*Penicillium*) in 1928 and the subsequent mass production of the antibiotic called Penicillin (1940), effectively applied for combating bacteria-related contagious diseases ever since. Discoveries in the domain of genetics prompted the introduction of legal regulations for the protection of patent rights of genetically modified microorganisms.

The development of research in genes lead to the creation of genetic engineering whose focus was on interference, which does not take place in natural conditions, with the genetic material of organisms so as to modify their hereditary features. Genetic engineering is interested in modifying the DNA structures of plants, animals as well as humans. With regards to plants, the technology enables the researchers to interfere with the genetic structure of organisms contributed to several legally-sanctioned discoveries. Thus, insulin is extracted and genetically modified organisms (GMO) such as tobacco, corn, soya, potatoes, tomatoes and many others are grown in 8% of the Earth's farming areas, in 29 countries inhabited by 4 billion people. Genetically modified food products are still generating much social concern, so it is obligatory to mark food products containing GMO in EU Member States. Regardless of the present-day consumer trends in Europe, a further growth in GMO production in Europe and all over the world is predictable.

The branch of genetic engineering dealing with the cloning of animals, especially with the use of human genes, raises much more controversy. Even stem cell cloning is severely condemned by followers of different religions, including Catholic Christianity. Ethical dilemmas appear not only around the contested issue of human cloning but also in the case of *in vitro* insemination. Genetic modifications may lead to permanent hereditary alterations in the capacity of the human immune system, external appearance, personality or intelligence. Moreover, economic disparities are likely to create a gap in society resulting from the fact that only the wealthy will have the means to bear the cost of a desired genetic modification.

Alongside the controversy around genetic engineering, molecular medicine gives rise to many hopes. Genetic therapies provide more chances of recovering from ailments categorized as terminal and low-survival-rate oncologic diseases such as breast cancer, lung cancer, leukemia or melanoma, viral infections (e.g. HIV) and genetic hereditary diseases. The symbiosis of science and technology yields many chances for saving and prolonging human life. Whole limbs and organs may be replaced by electronically adjusted prostheses made of high-quality materials. The Bionic Bodies, a BBC popular science series, presents contemporary solutions available in this domain. Deep brain stimulation for Parkinson's disease has been quoted as one of the technological novelties allowing for independent moving about and, possibly, disuse of the wheelchair.

This goes with the price tag of EUR 36,000 or \$48,000. An artificial heart costs EUR 120,000 or \$160,000. The most popular substitute for a human organ is the sound detector enabling the user to retrieve his hearing. It costs a mere EUR 20,000 or \$26,000. The eye implant granting visual perception on the level of 1500 pixels is accompanied by the cost of EUR 80,000 or \$100,000. An artificial leg together with fixing, warranty and servicing costs EUR 60,000 or \$80,000.<sup>6</sup>

Bionic bodies are produced not only on the basis of modern technology and advanced synthetic materials. Institute for Regenerative Medicine at the Wake Forest Baptist Medical Center in North Carolina (US) has made breakthroughs in building bladders and urethras. In his interview for BBC, Dr Anthony Atala admits that it is possible to breed Simple organic structures but there has been no breakthrough in cloning solid organs in humans, such as the kidney, heart or liver [Gallagher, 2012].

## 6. Conclusions

The civilizational processes involved in globalization span over five centuries. Three stages shaping international and inter-civilizational relations are distinguished. The end of globalization understood as the accomplishment of certain formative phases does not mean a reversal or denial of globalization as such, but rather marks a new civilizational opening. Among the many challenges facing the world in the 21<sup>st</sup> century, it is biotechnology that is identified as a potential area of creative and qualitative change.

The up-to-date attainments in genetic engineering, molecular medicine or, broadly speaking, biotechnology stir up much emotion and raise much contention and dispute. These achievements can hardly be regarded as the markers of an entirely new stage in the development of civilization. Then comparison of the current level of accomplishments in biotechnology and the preparatory phase preceding the great geographical discoveries made by the Europeans seem to be more adequate. This preparative period encompasses the Portuguese discoveries made between 1420 and 1495 and the time when the school of navigation of Prince Henry the Sailor paved the way for further, significant findings in the world. If the presented dynamic of globalization is borne out by the completion of the third stage of globalization in about 2025, it is highly probable that the biotechnological revolution will replace this particular third step. This time the new revolution will not endow globalization with a new dimension but will in-

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<sup>6</sup> *Can you build a human body?* BBC News access <http://www.bbc.co.uk/news/health-17235058> of 2 March 2012.



roduce a new quality into the development of mankind. Owing to its complexity and the accompanying controversies, this process may be stretched in time and regarded as the subsequent multiyear secular epoch.

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