

Higher Education and Science: Portrait Against the Background of Global Crisis

¹Ibragim E. Suleimenov, ²Grigoriy A. Mun, ³Pavel E. Grigoriev, ⁴El-Sayed Moussa Negim,
⁵Gulzhakhan Zh. Yeligbayeva and ⁶Kamilya I. Suleimenova

¹Department of Radio Engineering and Almaty University of Power Engineering and Telecommunications, Telecommunications, Almaty, Kazakhstan

²Department of Chemistry and Technology of Organic Substances, Natural Compounds and Polymers, Al-Farabi Kazakh National University, Almaty, Kazakhstan

³Crimea State Medical University named after S. Georgievsky, Simferopol, Ukraine

⁴School of Chemical Sciences, Universiti Sains Malaysia, 11800 Penang, Malaysia

⁵Department of Oil and Gas Processing,

Kazakh National Technical University Named After Satpaev, Almaty, Kazakhstan

⁶State University of Nice, Institute of Economics and Management, Sophia-Antipolis, France

Abstract: This paper analyses possible scenarios for the development of a systemic crisis of the Higher Education and Science of the industrial phase of civilization, which takes place at this time. It was shown that effective measures can be taken only if you go beyond the plane of the existing "framework limitations". This paper shows that an adequate strategizing can be done only under the condition that it is fully implemented in accordance with the paradigm of post-industrial world.

Key words: Macroeconomics • Global crisis • Higher education • Science • Nanotechnology

INTRODUCTION

Experts in the field of macroeconomics now recognize that the discipline is in a rather deep crisis [1, 2]. One reason for this is the excessive focus on the solution of purely economic problems, which, in particular, led to a lack of generally accepted schemes of countering the global crisis. Discussions regarding this range of issues are still in process and their severity continues to grow. Accordingly, to preserve the role of Macroeconomics as a "counselor of the Prince" [3], amongst other means the maximum extension of interdisciplinary collaboration is required since the cause of the crisis lie not only in those areas that traditionally regarded as the responsibility of Macroeconomics as an independent scientific discipline.

This paper briefly analyses possible scenarios for the development of a systemic crisis of the industrial phase of civilization, which takes place at this time. We give a proof that none of the traditional ways of its resolution will lead to an acceptable result. This is the basis for the next step

in the argument: effective measures can be taken only if you go beyond the plane of the existing "framework limitations". More specifically, this paper shows that an adequate strategizing can be done only under the condition that it is fully implemented in accordance with the paradigm of post-industrial world. Such a view leads to a paradoxical, at first glance, conclusion. In a crisis of capitalization of existing macro-economic sub-systems (wider - institutions formed in the industrial period), there is only one viable option, which would surprise in the first reading: *"The current system (global) crisis can be resolved only by capitalization of the crisis itself"*.

The strategy can be implemented only under the condition that it will be assimilated not only by the administrative elite, but also by rather a large number of economic agents, when it becomes institutional. It should be emphasized that in view of the crisis of macroeconomics, which was discussed in [1-4], the most consistent picture of the current systemic crisis has been given by either interdisciplinary teams [3-6] or researchers

Corresponding Author: Grigoriy A. Mun, Department of Chemistry and Technology of Organic Substances, Natural Compounds and Polymers, Al-Farabi Kazakh National University, Almaty, Kazakhstan.

who are generally far removed from the economy in its traditional sense [7]. The conception of a systemic nature of the global crisis have been formulated in [3-6] in terms of analysis of the role of nanotechnology as a "global brand" for modern society and regardless of [3-6] in the monograph [7], in terms of "designing the future" or, more specifically, in terms of futurological geopolitical analysis in some exaggerated form. Let us dwell briefly on the reasons that compel the conclusion of a systemic nature of the current global crisis, following [3-12].

Signs of a Systemic Crisis of the Industrial Phase of Civilization:

If you stay within the traditional macroeconomic concepts, the schema of mortgage crisis that was the beginning of the transition of the crisis into the global (systemic) phase can be outlined as follows. Making a profit from lending is the basis for the existence of institutions that shape modern banking and, wider, financial sector. By the end of the 20th century, much of the U.S. banking sector focused on lending of real estate. The used scheme functioned stably as long as the lending rate did not exceed the growth in property prices. The rapid development of this market, in turn, led to an overestimate price increases in real estate (recapitalizing this market segment, which at some point had to be maintained artificially). At some point, a collapse in prices in this market was inevitable and that caused a severe crisis of unsecured loans, which then spread throughout the chain covering the construction industry, mechanical engineering and mining. This scheme is now well known, but fact that is much more important is rarely emphasized: the primary principle is not the specifics of the real estate market, the primary principle is the need for credit, which provides the very existence of the modern financial system and is a component of the system base for power of the international financial community.

Real estate has become one of the "focus points" along with investments in pension funds and similar derivatives, because in other spheres of human activity capital productivity (the ability to profit from your investment) fell even lower. Banking was forced to inflate the "financial bubble", because by the end of the 20th century no areas of capital investment remained that could provide income in the right amounts. (Right amounts; we emphasize that, required for the stable existence of the global credit and financial system.) In the earlier stages, the scope of this capital investment has been technological (wider - innovational) development, which rates at the end of the 20th century have slowed down [3, 7].

A more general conclusion is as follows. The world monetary system is an integral feature of the industrial phase of development, which, consequently, can only be expansionary. Necessary for stable functioning of the financial system and credit growth in profits in the preceding decades was ensured by the development of new markets, primarily geographic expansion and technological revolution. The surface of the earth is finite and resources of geographic expansion are now exhausted; the potential of scientific and technological development is exhausted as well in view of the systemic crisis of management schemes in scientific research. Attempts to create artificial markets (expansion into virtual space, the market for environmentally friendly products and technologies) have failed to provide the required amount of capitalization. Expansion into Space and Oceans was technically unsecured. For this reason, the world's leaders in 2008-2009 attempted to maximally stimulate the nanotechnology market, hoping for the possibility of expansion on the lower floors of the structure of matter. However, it is likely that nanotechnology (and biotechnology) will not be able to provide resolving of the macroeconomic objectives entrusted to them. This is mainly due not to the actual success or failure of nanotechnological (or biotech) research orientation, which, strictly speaking, had no special chance to be noticed. The institutions that were designed to provide an exponential technological development, proved to be unsuitable in principle for the solution of such large-scale problems. Nanotechnology has become simply "fashion brand" that quickly turned into something strange due to overly frequent (and not always justified) use.

Impulse sent by world leaders scattered in space highlighting yet another component of a systemic crisis. Namely, those institutions that are (theoretically) should have been responsible for the forecast of a crisis, as well as for the formation of solutions to overcome it, (science and higher education) are in deep crisis themselves. This is understandable: these institutions were formed in the industrial era and have the inertia to the same extent as the monetary system. They were created to solve very different problems and therefore, they cannot work under conditions of Postmodern. Moreover, *industrial* science and *industrial* higher education (as an institution, having a relative independence) will not do anything and, most importantly, can do nothing for the emergence of *post-industrial* science and *post-industrial* education, because it means their own removal. These structures (as well as

through specific persons occupying a prominent position in them) will inevitably seek to preserve themselves, despite the fact that their development potential long been exhausted. This fact is general in nature and that makes talk of a systemic crisis, which corresponds to the period of transition from the industrial phase of civilization to a postindustrial. All institutions formed in the industrial era, met the requirements of tasks congruent with that period of historical development. Once for the sake of their development humanity had to sent into oblivion institutions that formed the basis of the earlier phase of development (often called "traditional"). With the depletion of the industrial phase, the question of large-scale reconstruction of the vast majority of existing institutions raises again.

To do this, obviously, requires huge resources, as well as a clear understanding of the meaning of what is happening (if, of course, you proceed from the assumption of the need to make the crisis manageable). In essence, this is a strategy to overcome the potential barrier between the industrial and postindustrial era, which defines the basic content of the current global crisis. Possible scenarios for the resolution of the global crisis are considered, in particular, in [6], we shall consider them briefly for completeness.

Scenarios for Resolution of the Systemic Crisis: If you stay within the traditional schemes, the set of possible scenarios for resolution of the crisis (the crisis caused by the transition between the industrial and postindustrial phase) is restricted to only a few options:

Homeostatic Scenario: The elite direct its efforts to maintaining the status quo; over time this leads to an increase in conflicts and deepening of the "deferred crisis".

Military Scenario: an analog¹ of the World War of 1939 - 1945 that followed the Great Depression; from the economic point of view, the main anti-crisis tool is the increase in military spending, military actions themselves are nothing more than the result of the hypertrophic growth of the military machine and military industrial complex.

Hi-Tech Scenario (Scenario of Accelerated Transition to High-Tech Development): Nanotechnology and biotechnology create major new markets that provide further expansion and the transition to a new phase of the industrial stage of development.

Neofeudalistic Scenario: The growth of contradictions causes a crisis accompanied by a simplification of the systems of civilization to a level below the industrial threshold and a sharp decrease in population size of Homo Sapiens.

Obviously, the hi-tech scenario is the most preferred from this list, but its realism is more than doubtful. First of all, this is due to the inability to overcome the inertia of the respective institutions (research and higher education) and their hidden, but no less effective resistance to change. We emphasize that this resistance is not a part of someone's malicious intent; it just connected to the desire of specific individuals to keep a familiar social environment and social status. A typical example is the following. Many of their scientific fields, which currently continue to "pull" on themselves funding and other resources, in fact, have lost relevance. They continue to develop only due to the "inertia force": over the past decade, there has formed a sufficiently large pool of expertise in this specific area, many of which have become a significant influence and authority. This authority is generally used to ensure the continuation of the direction - the machine starts idling, wasting resources just to support its own existence.

The above factor becomes decisive especially in the post-totalitarian democracies, complicating the use of extreme means (similar to those used in the implementation of the Soviet atomic project). In addition, the effectiveness of hi-tech scenario is significantly limited by the time factor and a number of subjective factors (the bureaucratization of science, corruption in higher education, etc., etc.). Thus, the set of acceptable solutions, *if we remain within the traditional framework*, is empty as noted in [6]. For this reason, it seems appropriate to go beyond them, at least with regard to strategizing. In particular, this applies to "taboo" imposed on the open discussion of problems of the global crisis and the limited range of professionals involved in the formation of appropriate strategies. The problem is too serious and the cost of failure is too great to be able to leave it in charge of small groups of experts, even if very highly qualified. Hence, it is easy to take the next step in the reasoning: to overcome the considered global crisis, more precisely, to overcome the interphase transition, society must be mobilized on the conscious (or partially conscious) basis.

To implement this approach in practice, at least in theory, you can use the same tools that lie at the heart of the "financial bubble". The financial resources of individual economic agents, in principle, can be brought

¹In the form of aggregate of system-related regional conflicts as well

to the crisis, provided that there it will be made clear exactly how the money invested will overcome its consequences for the individual investor. In simple terms, capitalization of the crisis itself, which was mentioned in this article, is possible through the "insurance against the consequences of the crisis" in one form or another or in several forms at once.

Of course, this "insurance" cannot be done classically, through insurance premiums in the traditional sense of the term, as in the projected crisis, effectiveness of any financial tools or instruments similar to them is, to say the least, debatable. An alternative way is to develop *humanitarian* technologies capable of providing real protection to certain groups of economic agents and attracting their own funds as "investment into anti-crisis measures" for that purpose. In essence, this way in certain respects the same as the hi-tech scenario, with the notable exception.

The rate of implementation of humanitarian technologies supported by modern methods of communication management and PR-tools can be extremely high, which is directly confirmed by the example of exponential growth of social networking users. In addition, these technologies require at least an order of magnitude lower investment than high-tech that requires the implementation of the full production chain, including the construction of the plants. The simplest variant of such technologies is educational technology. It is not the most effective, but the possibility of its practical implementation is beyond doubt, so let's start with a review of it.

Anti-Crisis Education: The effectiveness of education, both secondary and higher steadily decline as noted in the majority of research in this area. The volumes of funds invested in this area remain significant, including personal finances of users. Thus, the amount of cash payment for education (paid training) in RK is estimated to reach 5 billion tenge a year just for technical professions. This clearly indicates the demand for less traditional higher education as such (actual knowledge) as to the relevancy of the documents that have become elements of identity and social status. Education has become a "symbolic" goods in the sense attached to this term by Jean Baudrillard [12].

As a result, a second degree and its surrogates (training, advanced training courses, etc., etc.) is becoming more and more popular. People who de facto have not received the higher education via the traditional scheme are investing their own funds to fill the gap and the capitalization of the sector has a tendency to growth.

This tendency is reinforced by tense anticipation forming in the vast majority of post-Soviet countries. (Distrust of official information sources that play down the crisis, the "Islamic threat", etc. etc.). It is important to note that a significant part of the services in this market is provided by the organizations having no educational status. Examples are the training courses accomplished on a work place, or courses on acquainting with imported equipment conducted by companies that supply them, etc. The market share of education that such structures capture de facto will increase substantially in the near future as the crisis of higher education that meets the industrial era deepens. (Unless, of course, it becomes possible to implement a set of anti-crisis measures in the field of higher education that is characterized as extremely highly inert.)

Actually, in today's post-Soviet states the two systems of education are already present, they are "symbolic" (in Baudrillard sense) and "real". The first consists mainly of state institutions; the second rarely has the official status of a "provider of educational services," amongst other sources the corresponding functions are carried by many Internet resources. This situation completely corresponds to the concept of interphase barrier: institutions of the industrial era co-exist with the emerging post-industrial institutions. There is no conflict between them because of a certain division of spheres of influence. Traditional education gives the consumer the "Certificate of social status," and the one in the process of forming provides an opportunity to retain develop this status. It is essential for this work to show that the very "post-industrial education germs" are also a kind of "insurance premium" made by consumers in case of projected changes (both personal and public). This resource (psychosocial in nature) may be used to capitalize the crisis in the format described above. Such anti-crisis education in a primitive form can be a system of courses "What do you do if" In a more adequate form, this would be a second higher education designed to act as a "crisis damper" for those who receive it.

A logical question is how to ensure such education and what it should teach?

In general terms the answer is of no doubt: it should teach the same humanitarian technologies, which are supposed take place of "high-tech" scenario on the list above. In principle, these technologies already exist but their verification is still controversial and most importantly, they do not form a system of such a level of organization that is needed to solve strategic problems. Therefore, their implementation in a traditional way at this stage is difficult. However, there is not enough time to

implement the traditional approach, in which a specific scientific discipline is created first and later it is implemented in the education system. Otherwise, the considered scenario of crisis resolving would be as unrealistic as the hi-tech one. Accordingly, it makes sense to speak only about the parallel reform of the humanitarian field that covers both science and education. It should be emphasized: both open resistance and the hidden one is going to be fierce, it is easy to predict a tantrum about the crossing off the traditions, oblivion of cultural, national and all other values collectively. Occurrence of such an outburst is explicable; reformation of any field would develop in exactly the same pattern. Institutions established in the industrial age will not give up their position without drastic efforts to prolong their existence. (Actually, this very kind of conflicts constitutes the content of crises generated by the transition from modernity to post modernity). However, the scenario envisaging the creation of humanitarian technologies that could become an alternative to hi-tech scenario has many advantages.

Institutions capable to ensure the creation of such technologies can be re-created in the shortest possible time. (Actually, it does not require anything other than an aggregate of well-considered management decisions.) This is why this paper uses the term "restructuring" and not the term "reform". To reform the current humanitarian situation formed in the industrial era is meaningless because it rearranges any undertakings and makes them work for its own favor. Something similar has happened with nanotechnologies foolishly dispersed over the whole set of scientific fields existed before, so that they have lost the original macroeconomic aspect.

The existent science as an institution of the industrial era assimilated brand "nanotechnology" when she emptied it of its contents and thus thwarted the idea of world elites. Those who tried to "make nanotechnology out of apricot pits" have earned the curse of posterity, as it was because of them that the high-tech scenario of development of civilization has become unrealistic, but it is not so important; the most important matter here is to not repeat the mistakes. Nanotechnology (we are grateful to those who figured out the move) still played a very important *social* role and clearly showed that the existing institutions, in the first place, will desperately resist and, secondly, the resistance within post-totalitarian democracy will be impossible to break down.

Civilization has the last chance to somehow stay within the framework of "sustainable development" and it is to create a post-industrial human technology "at once and out of nothing," while the existing institutions

responsible for the humanities and liberal arts education are distanced from this process as much as possible. It is possible because creation of such technologies requires negligible resources, especially in comparison with the level of problems to be solved (at least we will not have to build factories and ensure the production cycle). There are additional arguments in favor of realism of this scenario that are discussed below.

"Keys" to the Restructuring of the Humanities: The first and basic requirement for humanitarian technologies aimed at stabilizing the transition to post-industrial era can be formulated already at this stage: they must provide verifiable quantitative forecast including prediction of the response of society to certain events (as well as to the reforms initiated by the top authorities). Such a forecast is needed, above all, in order to convince individual investors of the positive prospect of investment in this post-industrial human technology. You will need to prove with numbers on hands that it is a very promising investment able to dampen the crisis for each of these investors personally.

In the first stage, of course, it would be an investment in anti-crisis education, but even here, arguments in favor of expediency are crucial. From this comes the critical point. Disciplines that study human societies have to be mathematized rapidly, more accurately, such a trend (and it is being formed at present) should be encouraged. Simply speaking, it makes sense in this area to use the same tools that have made nanotechnology a "world brand". The fact not be missed is that the development of tools that provide a quantitative prediction of phenomena occurring in modern society will take time, but it is not so important. The main factor here is the statement of the problem itself, which will utilize the enormous potential accumulated in the field of mathematics and natural sciences as well as those disciplines that deal with different aspects of information theory and related engineering systems. Outset, nobody is going to question the relevance of existing ways of development of these disciplines. However, the crisis of science as an institution of the industrial era still led to the fact that the above intellectual potential is used only to a limited extent since there is no corresponding social demand. Rather, the occurrence of such a demand (and co-factors ranging from moral encouragement to funding) could lead to additional growth points in sciences that in one way or another connected to the concept of "information". After all, the most impressive discoveries of the second half of the 20th century were made at the intersection of sciences and mathematization

of economics does not surprise anyone. (Although at the time representatives of the "classical" economic schools totally opposed that just as today many representatives of the humanities stand against the mathematization.). Moreover, post-industrial era spawned informational structures that do not fit into the classical framework. Therefore, stimulating the development of new scientific disciplines designed to create a "key" human technology, strictly speaking, does not contradict existing traditions; the only question is what influence these research areas will have in the institutional sense. Thus, interdisciplinary research in the field between the classical humanitarian knowledge and sciences that operate the category of information may well play the macroeconomic role, which, due to objective reasons, nanotechnology was not able to handle. The case depends on the managerial decisions. In conclusion, let us consider a specific example of human technology that meets the criteria stated above.

Personal Management Technologies and Their Expected

Impact on Society: Any person, one way or another, deals with what might be called "personal management". He or she, most often according to intuition and experience, routinely solves problems related to a variety of scientific disciplines. The most obvious example is the logistics, only because so many of us go shopping and to choose the best route is often a nontrivial task (especially if we take into account the traffic on the roads). Often we have to solve economic problems by distributing the family budget. Taking into account the relatively small losses associated with errors of intuition in most cases you may not worry about optimization (which itself requires additional resources.) However, there is another area in which the errors for the individual may become unacceptable. With a convention the area may be called the "choice of life path." The easiest way to explain this is by the choice of institution and specialty at which the applicant intends to study. In the implementation of such a choice, most of them focus on anything (opinion of parents, their own passions, fashion, dictation of the social environment), but the weighted forecast of the actual position in society. Similarly, the selection of workplace is carried out.

Such a forecast under present conditions, in principle, can be done independently. In the network, there is enough information about the state of the economy, development trends of various industries, the level and prospects of individual companies, etc. etc. A person trained in the techniques of prognosis, with greater or lesser proportion of confidence, can predict the

basic parameters of the "self in the future" and determine the accuracy of this forecast. Even if this prediction is a fairly rough estimate, it can be much more reliable guide than the notorious "tips from elders", most of whom have lost themselves in the wilds of the information society. Therefore, there is a definite technology, the demand for which is guaranteed at a minimum investment in the PR campaign. Of course, the market that shows only those technologies has minimal capacity; however, first of all, we are talking only about a specific example and, secondly, the introduction of this humanitarian technology will cause an avalanche-like increase of others straight away. The domino effect will be triggered. Indeed, universities that have not invested in technology "to ensure the future" will lose their contingent at once. Consequently, they also will have to apply the relevant humanitarian technologies that enable prediction of their own future just to be able to correct the negative image. The next step is to use the prognosis technology for the correction of this image. Private companies seeking to acquire and / or retain qualified personnel will be forced to act in a similar way.

In summary, it can be asserted that the introduction of "fashion" in personal management (which is extremely easy to do under present conditions, for example, through social networks) ensures sharp increase in market of forecasting methods and tools as an example of the anti-crisis humanitarian technology.

For the first steps in this direction, less than modest (compared with the expected result) funds and resources will suffice. Actually, it will be sufficient to develop the relevant sections of the mathematical theory of communication management focused on a specific user. The existing level of development of mathematical sciences and the humanities allows doing it extremely fast. Thus, there is a specific *single* example of a human technology that can form a significant segment in the market of a new type service that ensures the implementation of anti-crisis scenario. You can offer a number of other similar examples of a particular control technology for personal social capital the consideration of which, however, is beyond the scope of this work.

CONCLUSION

Thus, the thesis on resolving the global crisis by the way of capitalization of the crisis itself can be well justified. Essentially, it is all about capitalization of natural tendency of economic agents to avoid reprisal. In this case, it is possible to tolerate that during the first stages

of the implementation of humanitarian technologies, which were discussed in this paper, the corresponding institutions will be developed according to the "financial bubble" scheme.

The speed of implementation of the technologies into practice, as well as the worn-out management technologies in the communications sector, suggest that in this case there will be a reverse situation. What began as a "financial bubble" can develop into something really useful – if only the politics in the field of anti-crisis education will be suspended and the same scenario that took place at "introduction" of nanotechnology will not be implemented.

REFERENCES

1. Claude Berthomieu, Anastasia Ri and Kamilya Suleymenova, 2010. Hiver 2006/2007: des macroéconomistes prestigieux s'interrogent sur la double dimension scientifique et pratique de leur discipline, dans *La Theorie Economique Moderne et la Reformation de l'Economie Russe, Partie III*, Ed. Economika, Moscou-Nice (Universite de l'Amitie des Peuples de Russie et Universite de Nice-Sophia Antipolis).
2. Erol Karaca, 2009. *World Applied Sciences Journal*, 6(1): 123-128.
3. Claude Berthomieu, 2010. La théorie macroéconomique moderne à nouveau en débat: l'impossible synthèse. Conséquence sur le rôle de l'Etat, dans *La théorie économique moderne et la réformation de l'économie Russe*, Moscou: Economica.
4. Melaku Tefera, 2010. *Global Veterinaria*, 5(6): 294-301.
5. Yergozhin Ye. Ye., Ye. M. Aryn, I.E. Suleimenov, G.A. Mun, N.M. Belenko, O.A. Gabrielyan, N.T. Park, El-S. M. El-Ash. Negim, K.I. Suleymenova. *Nanotechnology versus the global crisis*. Seoul, Hollym Corporation Publishers.
6. Gbenga Lawal, 2006. *Humanity & Social Science Journal*, 1(1): 65-78.
7. Yergozhin, Y.E.Y.E., K.I. Suleimenova, G.A. Mun, P.E. Grigoriev and I.E. Suleimenov, 2010. The global crisis in terms of information theory and communications. *Bulletin of the Almaty Institute of Power Engineering and Telecommunications*, Almaty, 1(8): 12-18.
8. Leila Nikpoor Ghanavati, Habib Ahmadib and Bijan Abadi, 2011. *World Applied Sciences Journal*, 13(4): 872-879.
9. Suleimenov, I.E. and P.E. Grigoriev, 2010. *Space and Life: unity and diversity*. Under a collective monograph. Ed. Simferopol.
10. Pereslegin, C., 2010. *Hazardous Occam's Razor*. M.
11. Dezhina, I.G., 2003. Russian science as a factor in world politics. *Cosmopolis*, 2: 43-56.
12. Baudrillard, J.C., 2008. *To the critique of Political Economy Mark. M.*, pp: 218.
13. Şuay Nilhan Açıkalin, 2011. *Humanity and Social Sciences Journal*, 6(1): 22-28.