

MODERNIZATION AS THE KEY ELEMENT OF INNOVATIVE PROGRESS AND ITS IMPACT ON THE SOCIO-ECONOMIC DEVELOPMENT

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Abstract: *The article presents modernizational changes as the driver for innovative development which is characteristic of the modern trend of transition to the new level of technological and social development marked by the knowledge-based economy and network society. Explained is the intrinsic characteristic of modernization which is to help alleviate negative side-effects normally associated with drastic and rapid changes in the course of technological revolutions.*

Social impact of the modernizational advance along with the social modernization phenomenon are examined with recognition that their produce direct and most serious influence on the lifestyle and wellbeing of the people. Furthermore, efficient modernizational strategies, which should result in the most effective synergetic outcome of the transformational progress, are reviewed along with the key modernizational goals explained and substantiated.

Proceeding from the fundamental paradigm that innovation lies at the heart of all current modernizational processes, the parametrical analysis and evaluation of the modernizational potential is presented as one of the principal elements in the process of developing national innovation strategies.

Key words: *modernization, innovation, science and technology revolution, modernizational potential, social impact, social modernization, factors, socio-economic development, transformations, knowledge economy, network society.*

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Introduction

Nowadays modernizational changes and reforms often prove to be akin to significant technological transformations and sometimes even technological revolutions of various forms which are currently progressing in our life and result in creating new approaches toward economic development, give rise to new products and industries, crucially transform industrial and employment structures and thus modify the very focus of the world economy shifting it from mere profit making to data and knowledge accumulation.

As the leading industry of the world economy has changed to knowledge we can observe the gradual emergence of the network society and ultimately the network-based personality which is a sort of online image of natural person who obtains needed knowledge and information through the network sharing activities. Obviously, this impacts significantly the social environment that people live in, with one of the key changes being the fact that the ability to find necessary information and knowledge is becoming to prevail over the traditional possession or memorizing of such respective information and knowledge. This observation demonstrates yet another important influence of the modern network society on individual characteristics and behaviour and ultimately on the modern socio-economic system as a whole.

Analysis of recent studies

The scientific-technical revolutions which force modernizational-transformational changes in the economic systems serve as basis for the national advancement while presenting new strategic opportunities, and countries exploiting such opportunities are able to achieve the world's advanced level of development while those ignoring such usually enjoy poor performance and even suffer from the decline in international status. According to many experts' prognosis, the next upcoming revolution will be producing much greater impact, both in economic and social terms, than the previous ones as it will this time present the combination of scientific, technological and industrial upheavals: it will be a revolution of new biology from the scientific perspective, revolution of bio-creation and bio-regeneration from the technological perspective, revolution of bionics from the industrial perspective, and also revolution of bio-regeneration and long life from the perspective of civilizational development. Thus, it is true to say that the next

scientific-technical revolution will profoundly change our views of life and lifestyle, learning, work, family relationship and life expectancy in a very radical manner while granting the people a sense of liberation through super green manufacturing system and artificial intelligence expected to be used extensively to replace people's manual and mental labour.

In an attempt to formalize the above ideas and streamline the process of adjusting our life and activities to the profound changes ahead the modernization study has emerged as a new interdisciplinary science which includes the modernization theory and knowledge, and deals with modernization phenomenon by explaining both the crucial changes in the modern civilization and the principles of national advancement along with the international competition and differentiation. Being a new discipline of science it effectively embraces three key meanings: knowledge system on the facts, features and principles of the modernization; scientific research on the modernizational phenomenon; and rational thinking and methods to carry out modernizational research.

The purpose of the article

The general modernizational activities can be described as actions aimed primarily at realizing profound transformations and reconstruction on the basis of entirely new and innovative progressive principles of the economic structure, organization and management in response to the modern challenges and trends. It is targeted to make progressive improvements to the object of an economic system as well as support its steady advancement and development, and therefore it becomes an integral part of the innovative activities. Innovative products developed and produced as a result of modernizational activities possess a completely and entirely new character since they are obtained not just on the basis of a simple new knowledge application but rather on the more comprehensive principles of the novel knowledge-based economy. Indeed, modernizational activities produce transformations, progressive changes, structural shifts, and promote re-invigoration of the economic system on the basis of expedited investment-innovative activities.

Modernization also means achieving new progressive form by an economic system: in technological sphere this leads to a higher technological development stage, in social sphere - to post-industrial and network society, and in cognitive area - to informational society. Modernization is also becoming crucial for achieving higher levels of competitiveness and socio-economic system development, as it brings positive transformations focused on increased efficiency through innovation and innovative management techniques, and impels reformation in response to the inefficiencies arising within the existing management system with the purpose of stabilizing functional parameters of the socio-economic system. Thus, modernization can, in a way, be described as the ability of modern people to scientifically direct progressive changes in the society in order to effect improvements needed to successfully respond and react to the challenges of modernity through efficient structural, technological, and institutional changes in the national economy aimed at enhancing its competitiveness and ensuring its long-term sustainable development. Modernization is therefore enjoying a dual nature by being, on one hand, a *comprehensive process* comprising changes implemented in economic, political, legal, and cultural institutions and relationships and performed at several levels at the same time, and, on the other hand, a *mobilization process* introduced to narrow the lag with competitors.

The ultimate result of the successful modernization should be the establishment of socially responsible economy which is dynamic and capable of self-improvement, can comprehensively involve general public into efficient labour with proper motivation, ensures effective utilization of all available production resources of the society, capable of realizing intellectual potential of a country through science and education development, and is effectively based on modern social relationships. Achieving this is possible, first of all, through successful transition toward the network structure of activities and management which proves optimal in conditions of unstable interaction between various involved organizations, and presents an adaptive model of a complex social and economic system which includes respective discrete processes, projects, and programs.

With the purpose of this article to, firstly, emphasize the significance of modernization for efficient development of an economic system, and, secondly, analyze the impact of respective transformational changes and shifts on the social sphere, it is important to stress that the science-technical revolutions, and modernization as its key component, always provide new ideas, new life conditions and new knowledge for social progress such as scientific spirit, methodology and knowledge. Therefore, people's lifestyle has been marked successively by the use of machinery, electricity, automation and informatization, while people themselves have experienced the progressive change of life from a rural to an urban and then international one, from real to virtual one. Nowadays, social, economic and educational spheres become closely integrated by the phenomenon of intellectual resources as the most dynamic factor of modern society development with social, economic and educational projections becoming the key components of human life and society. As the beginning of the 21st century saw a transition from industrial to innovative type of economy based on the priority of new knowledge and production of the new type of information, it became quite obvious that modernization should regard education as one of its focus spheres. The key point of modernization in education lies in transformation of the educational system in order to ensure its steady development on the basis of advancing innovative scientific findings, therefore basic studies in the field of methodology of education should be focused on defining and substantiating the common set of strategies which can be integrated into the mechanism of modernization and theoretical background for development of innovative teaching and training techniques.

With the development of the post-industrial economy and knowledge-intensive industries specializing in high-tech products, modern processes of development of the global economic system are increasingly characterized by the emergence of a new paradigm, according to which the nature, main trends, pace of development of the post-industrial innovation-driven global economy are increasingly influenced by the development and accumulation of scientific knowledge, intellectual potential of the society, knowledge and science-intensive labor processes. Thus, the highest priority goes to the development of a new knowledge that can ensure social and economic progress, and the mechanisms of such knowledge production should include fundamental and applied sciences, system of communications, educational establishments, system of patents, etc. In this context, the contribution made by well-established educational systems will effectively define the level of knowledge obtained and spur creation of new technologies. So, against the background of technological rise which is becoming crucial for the economic growth of the state, when the knowledge and information turn to main productive resources, the formation of *intellectual potential* capable to generate new knowledge becomes one of the main tasks to achieve.

The development and modernization of the educational system, and then innovative research capabilities, is thus growing into a critical factor for the formation of a knowledge society as it practically becomes a determinant of the technological rise and characterizes the very economic growth of the state ultimately resulting in the increased national competitiveness on the international stage. As the steady social and economic development of the country is closely connected with the efficient development of education, training and innovative research, the economic growth becomes also largely associated with the increased investments into an individual personality, including through the quality of educational system, as a defining factor for the formation of the society of knowledge.

With proper recognition of the importance of efficient education and training for preparing highly skilled workforce as one of the key social impacts of the transformational-modernizational changes in the economic system it is also important to review in a greater detail the very essence of the general socio-economic influence of the modernizational advance. First of all, it should be observed that socio-economic impact is different from the social-economic impact, as these must be two substantially different categories, and their difference, though seemingly insignificant at first, should be clarified. So, the social-economic transformation could be interpreted as a simple combination of social and economic factors producing positive effect by adding one parameter to the other. As an example, social-economic impact may be reached by opening a new department at a local hospital which enhances medical care in the area by offering improved health services to the community as well as provides new workplaces for the members of such community. On the other hand, the socio-economic impact is characterized by an effect of synergy or rather such specific interaction between the components that can produce dramatically new results in both

economic and social sphere. For instance, this could be the modernization of the public transport system with self-driving modules replacing bus drivers with robotized driving devices with the purpose of increasing driving safety, efficient driving schedule monitoring, dispensing with potential human error, etc. Evidently, this kind of modernizational impact is capable to produce quite far-reaching repercussions of both positive and negative character, therefore it is the socio-economic transformations that should be specifically identified, monitored, evaluated and strategized into any plan of modernization to ensure that their ultimate synergetic effect brings positive results.

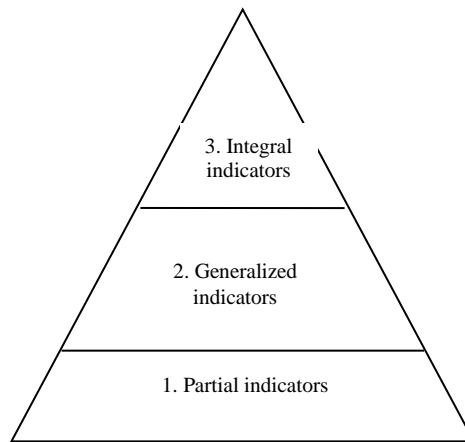
By claiming here that modernization constitutes an integral component, or rather an instrument, of the science and technological revolutions, and also duly recognizing the common fact that technological revolutions almost always together with the scientific breakthroughs and great discoveries bring along serious destruction of old and traditional parameters, it is important to recognize that one of the key essences of modernization should be the *alleviating factor* of any possible destructive elements arising from revolutionary changes in the scientific area which can accordingly produce quite negative impact on the society. In other words, modernization must provide for orderly innovative transformations and shifts as compared to revolutions with their breakneck pace of changes and sweeping radical effects which may not be always accurately predicted and therefore orderly manipulated. In a way, modernization is an instrument to harness rapid innovative advance and radical transformations so as to most efficiently adapt them to the primary purpose of enhancing the socially responsible economic development with all necessary attributes of sustainable growth and prosperity.

The new type of the economy which is based on the knowledge bears evident difference from the earlier agrarian and industrial economies in that, although natural and material resources continue to serve as a basis for creating economic wealth, it provides a greater degree of internal, nonmaterial factors, the most important of which are the knowledge and human capital. Thus, very important aspects of the knowledge-based economy will always include sustainability and social responsibility as the instruments of channeling modernizational transformations for the benefit of people's wellbeing, and as such the knowledge-based economies will have the following conspicuous manifestations:

- major role would go to production of services, information and cultural products;
- industries not based on the physical infrastructure will take the leading positions;
- improvement of older yet still viable infrastructures with their gradual renewal will be progressing;
- continuous growth in scientific research financed by both the state and business will rise and expand;
- stable capitalization growth of innovative companies will be observed;
- emergence of individual with creative thinking as the key element of the national wealth will occur;
- priority investments will go into individual fundamental knowledge;
- research and educational centers will grow into clusters of production and development activities.

As the world countries realize all the benefits that transition to the knowledge-based economy brings they develop individual strategies and measures to promote this process. These are normally tailored to best respond and adapt to the specific features and peculiarities of both economic systems and social environment of a country. Another important factor here is also the ability to properly evaluate and analyze the modernizational potential that each country has, which becomes increasingly essential in order to be able to use it as one of the key criteria in the process of developing efficient modernizational strategies. One of the effective techniques for evaluation of the modernizational potential can be the parametrical analysis performed at several levels/stages providing a comprehensive picture of all available components which should be efficiently exploited in the future.

The following graph presents panels (stages) of parametrical indicators of the modernizational potential analysis:



where:

- (1) represents indicators reflecting the component structure of the modernizational potential;
- (2) represents indicators which characterize the level of development of main components of modernization and their intrinsic factors;
- (3) represents indicators of parameters of the potential which reflect integration of all functional elements of the system.

As regards the concrete steps in Ukraine aimed at promoting modernizational advance the following modernizational efforts as of late can be named:

- *from the institutional perspective*: the government has for the first time allocated finances (50 million UAH) in the budget for the development of innovative ideas and products. The money will be channeled to the newly established Innovation Fund which will distribute it to the most successful and prospective innovative projects. Furthermore, the one-year postponement of the tax payment was proposed by the government for the import of modernizational products and services into Ukraine;
- *from the business perspective*: the European Investment Bank had approved the loan (about 40 million Euros), the first of its kind for Ukraine, for modernizational activities in the agricultural sphere, namely storage facilities improvement, allowing the company receiving this loan to develop innovative software to control and monitor operation of respective storage equipment.

These are just some measures and steps in the process of development of the Ukrainian economy with the focus on modernizational aspect, and obviously they demonstrate both the recognition and importance of the modernizational-transformational changes for the sake of efficient economic development in the country. Also, many other countries have already recognized the importance of modernization and even proclaimed the rapid transition to the knowledge-based economy as the national strategies aiming to, first of all, reduce their dependence on foreign technologies and products. In general, the measures undertaken in various countries to achieve this task can be narrowed down to the following:

- increased funding for educational and training system;
- recognizing education and knowledge as key priorities of the development;
- creating favourable conditions for the transnational corporations to open their production and research facilities on the ground;
- creating technological parks and clusters as the areas of promoting the development of high and new technologies;
- providing scholarships for local talented students to study abroad in the world class educational institutions;
- increasing support to theoretical research associated with the knowledge economy.

In some cases such measures are added with the efforts to re-invite scholars and scientist who had left the country earlier and achieved significant progress abroad to return to the home country and apply their gained knowledge and skills there. Moreover, modernizational efforts may often include focusing on the development of the strong national services sector as well as concentration of the most official support on specific key and priority technological areas and industries which should serve as so called "locomotives" of the innovative development.

With the review of a whole spectrum of modernizational efforts ranging significantly in their essence and scale it is absolutely clear that modernization of the economy with the purpose of increasing wellbeing of the people becomes an indispensable element of the modern globalized development. The most evident social impact of the economic modernization, therefore, can be observed through social transformations and shifts which are often presented as the *social modernization* activities. As a part of greater general modernizational concept, the social modernization can be interpreted simply as the modernization of the social sphere in the form of a social change and international competition since the latest industrial revolution. It is also often called the frontier process of the formation, development, transformation, and international interaction of the modern society; a comprehensive process of the innovation, selection, diffusion, and elimination of social factors; and also the international social competition, differentiation, and stratification to catch up with, reach, and maintain the world's advanced level of the social development. Progressing in the transition from agricultural to industrial society and from industrial to knowledge society, social modernization brings the improvement of social effectiveness and quality of life, significantly changes lifestyle and living ideas, and enhances civic quality of culture and health, social welfare, equity, and international social status.

Social modernization thus means the world frontiers of social change and the process to reach such frontiers, so the initial social modernization as a transition from agricultural to industrial society and from family to welfare society was focused on urbanization, welfarism, mobility, specialization, rationalization, electrification, technologization, equity, social differentiation and integration, universal primary education, etc. It resulted in the formation of the first social modernity and diversity, while its major side effects included the widening gap between the rich and the poor. The next social modernization which is currently underway is pursuing a transition from industrial to knowledge society and from material to ecological society. Its main features include: intellectualization, informatization, suburbanization, urban-rural balance, green development, ecologization, naturalization, innovation, internationalization, diversification, individualization, leisure, rights of women and children, universal higher education, lifetime learning, and so on. While its ultimate result should be formation of the second social modernity and diversity, the very negative impact it brings is the serious information divide. Generally, the integrated social modernization is presented as a basic path for the world developing countries in the twenty-first century.

Based on the above, the following functional mechanism of the social modernization can be summarized (Fig. 1):

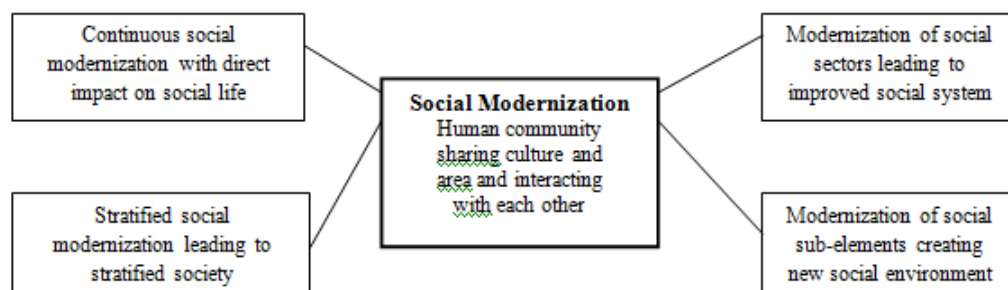


Figure 1. Social modernization operational-functional mechanism.

Recognizing importance of the social impact of modernization it should be stressed that modernizational transformations comprehensively progress in all three domains of the societal development, namely economic, political and social-cultural, though its specific extent is not necessarily uniform in all of them. Economic modernization primarily refers to a change of perception concerning

earning profit, rational economic activity, widespread use of sophisticated technology and dedicated effort to bring about innovative changes in the production system. In this context, industrial and post-industrial economies foster people with the entrepreneurial drive and strong profit motive as well as rational and scientific views towards economic enterprise who also make an excessive use of sophisticated modern technology, while extensive modernization activities lead to the increase in consumerism when people become more interested in excessive purchases and develop the habit of consuming more and more while changing the items quite frequently. The successful political modernization, in its turn, should result in a satisfied public and politically modern society with very vibrant civil society capable to effectively protect the rights of fellow citizens. Modernization as a process of cultural change produces rational and scientific world views and new social values on the basis of which progressive changes in the social system take place.

Although for the sake of theoretical analysis it is possible to break down modernization process into categories of economic, political and social-cultural transformations, it has to be reiterated that modernization presents an integrated, complex and comprehensive process which impacts all three domains although in a different extent and scope. Thus, it is very important to make sure that the modernizational strategy developed in the country provides for efficient balance between all these three major components of the modernizational transformations so that they produce synergetic effect rather than present a mere combination of efforts and measures. Being at the core of the economic development strategies modernization requires that such strategies be based on the principles of innovation which will ensure reforming of all branches of the economy, establishment of new and more efficient economic structures with relevant protection mechanisms against globalizational challenges as well as promote rapid and efficient development and advancement. Obviously, in this context the very ability to create innovations will for long remain one of the key factors determining the place and role of a country on the world stage, its competitive advantage, and ultimately will determine its capacity to modernize national economy and ensure continuous production of innovative products. It can thus be inferred that the core of the modernization is formed of innovative technologies and related economic and social institutions with modern globalization processes playing a significant role of a very strong catalyst in the progress of modernizational transformations.

As the innovation is regarded crucial for the economic advancement in the globalized world, modernization of the economic system becomes an instrument for implementation of innovations, with success in the modernizational advancement guaranteeing successful innovative progress of the economic system as a whole. To achieve successful generation of innovations a comprehensive approach should be taken toward effecting necessary changes and improvements in the following three major areas: institutional reforms - improving rules and procedures of the social and economic life; organizational mechanism and economic policy - application of relevant and effective instruments of influence on economic processes; and social policy - enabling all social groups to realize their interests in the most effective way. Generally, the concept of the innovative development determines priority directions of the state policy which should start with the establishment of relevant institutions to support financial, scientific and industrial entities in introducing and implementing innovative ideas and products. For this purpose initially adequate fiscal measures and steps should be taken, namely: reduction of taxes, provision of tax credits, expedited amortization, targeted support through grants and loans combined with the formation of adequate infrastructure of the innovative economy, advance development of the humanitarian sphere, introduction and development of general innovative culture.

The successful implementation of the above priorities should result in a highly efficient and socially responsible modernized economy capable of the dynamic self-improvement, effective involvement of the general public into modernizational efforts, efficient use of all available production resources, primarily human ones, and continuously producing favourable conditions for successful realization of intellectual potential of the country, through science and education, under complex modern social relationships.

Conclusion

Modernization is crucial for the modern innovative development and can be viewed as an efficient instrument of the science and technology revolutions taking place on the global economic stage. It brings comprehensive impact on all spheres of human development, with social impact being the most noticeable in terms of ensuring better life and work conditions for the people and ultimately contributing to their wellbeing. Proper assessment of the social impact in the modernizational strategies of the countries should safeguard the population against possible negative side-effects of the rapid technological advance and transformations.

Efficient modernizational efforts should serve not only to advance the socio-economic development of the country but also smooth out the transition to the new technological level of the knowledge-based economy, while effective evaluation of the modernizational potential will provide better understanding of the modernizational effects on the future economic advancement.

Social modernization is the one having the most visible effect on the life of the people and thus should be adequately reflected in the general modernizational strategies with its key focus on improving lifestyle of the population under the circumstances of current significant changes in the system of human relationships.

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