



QUALITY OF LIFE AS AN INDICATOR OF EFFICIENCY OF INNOVATIVE MODELS OF MODERN ECONOMY

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ABSTRACT

The work attempted to integrate indicators of economic growth, innovation and knowledge with the quality-of-life indicator. The review of previous studies allowed determining a range of socio-economic problems of nation-states. The major components of the quality-of-life indicator were identified such as knowledge, economic growth and innovation. The composite indicator of the quality of life consists of measures and variables from the international indexes (i.e., Quality of Life Index, Human Development Index, Knowledge Economy Index, and Enabling Trade Index). The structural-institutional model of quality of life as an indicator in an innovation economy framework suggests that economic growth directly correlates with the quality of life while knowledge and innovation correlate with the economic growth at micro and macro levels. The study offered a new approach towards the definition of the quality of life as an indicator in the innovation economy framework, which effectively combines units of labor and capital to create production in the era of the Fourth Industrial Revolution. A framework for building human-centric and transhumanist development processes was established.

Keywords: human-centric paradigm, quality of life, innovation economy, international indexes, economic growth

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1. INTRODUCTION

The society and economy of today are undergoing fundamental changes. A model for the integration of nation states in the global economy is about to become universally applicable, for an innovative economic development model is on arrival that has unique nation-specific characteristics. Once this innovative model is employed, the diverse economic systems will acquire a new qualitative feature. First, the post-industrial society is projected to implement innovations but this tendency requires higher and more specific requirements for the quality of the human capital (Makhmudova, 2010). Second, the post-capitalist economy will shift from private towards human capital. Additionally, countries are expected to follow multiple global standards for trade operations, direct investment, etc. (The International Labour Organization, 2004). Note that modern social transformations are as contradictory as those that took place in the past. The new socio-economic paradigm features technology integration, informatization and digitalization. These processes, however, can be associated with both creation and destruction (Osterle, 2019). Therefore, it is crucial to shape a new systemic quality of life in the process of “creative destruction” (Kraus, 2019; Zhilinskaya, 2012). From the perspective of global development, it is advisable to make sure that an innovation-based systemic transformation enables the creation of a special value, i.e., progress in the interests of human development.

The innovation economy was proven to stand on two pillars, science and production, and drive the economic growth and competitiveness in the world market (Maslennikov, 2016). Each year, the World Bank (WB) evaluates 80 national states across nine sub-rankings: adventure, citizenship, cultural influence, entrepreneurship, heritage, movers, being open to business, power, and the quality of life. As of 2019, the best countries are Switzerland, Japan and Canada. The bottom slots in the overall ranking are occupied by Angola, Iran and Iraq. Ukraine holds the 65th place, lagging behind the European Union (EU) countries (with the exception of Bulgaria, which ranked 67th) but overtaking countries of the former Soviet Union such as Kazakhstan (68th place), Azerbaijan (70th place) and Belarus (73rd place) (Radu, 2020; U.S. News & World Report LP, 2019).

The major challenge Ukraine faces on its path towards the innovation-driven progress rises from the failure of the national economy to promptly switch external and internal factors of globalization. Over the past decade, Ukraine has recorded a decline in the national production alongside an increase in import dependency, and a significant gap between the growth rate for household income and consumer price index (CPI) (Kramarev et al., 2019; Shlikova & Levanda, 2019). On the other hand, Ukraine possesses a great deal of intellectual resources that can improve its economic growth, as evidenced by the 46th position in the Entrepreneurship Sub-ranking (Bulter et al., 2019; U.S. News & World Report LP, 2019).

Considering the above, the innovative development framework needs a mechanism for meeting the needs of personal development that will promote knowledge accumulation and permit self-realization. The new systemic quality of social life is shapable with a set of factors driving productivity, personal growth and development in the era of the Fourth Industrial Revolution (4IR). This requires coordination of diverse social subsystems such as the economic, political, social, and others.

As the monetary policy spins out of control, national economy turns to fiscal policies, structural reforms and social incentives to allocate more resources and take advantage of the

new opportunities provided by 4IR. For this reason, the international community demands new models and standards for competitive growth and social development (Schwab, 2018).

The relevance of this study lies in the fact that it defines “the quality of life” as an indicator measuring the efficiency of innovative development in the context of Industry 4.0.

2. LITERATURE REVIEW

Many studies have been recently devoted to innovative economic development and life quality. J. Schumpeter is considered to be the father of the innovation-based paradigm of socio-economic development. According to his theory, innovation is a new product that results from an innovative labor and drives a predecessor product out. He understood development as a result of finding and employing innovative products in new conditions (Zhilinskaya, 2012). For Schumpeter, innovation is a key to the economic growth of a country.

Constanza, Farley, Kubiszewski, and Plut argue that economic growth alone does not lead to life quality improvement but increases the availability of consumer goods and services, strengthens the infrastructure, and enhances services in healthcare (Constanza et al., 2010; Plut, 2010). Hicks discussed the influence of income on the quality of life and suggested measuring quality of life through objective and subjective well-being measures (Hicks, 2012). Andrews argues that well-being entails economic growth but this effect is only achieved if the government ensures citizen well-being and has tools necessary to measure it (Andrews, 1974). Easterlin notes that economic growth alone does not increase the happiness of population. Gross Domestic Product (GDP) provides an idea about the scale of market operations and measures neither conditions of living here and now nor government social responsibility, nor the impact of research on the population. Innovation is among the important sources of well-being and happiness, along with meaningful employment and social protection policy (Andrews, 1974).

Some Ukrainian researchers considered the quality of life of the population in the context of economic instability. For instance, Mazur analyzes institutional traps that impede business development in a market economy and allow no shifts in the quality of goods and services for the better (Maslennikov, 2016). Kramarev, Shlykova, and Levanda note a narrow range of commodities, mostly raw materials, for export in Ukraine. Hence, the country may be considered dependent upon high-tech imports and weak in terms of competitiveness in the processing industry (Kramarev et al., 2019). Radchenko and Shavalyuk claim an imbalance between stages of the innovation process and country's economy due to insufficient R&D spending to be a crucial obstacle on the path towards innovation economy in Ukraine. In their own words, science and economics go their separate ways (Maslennikov, 2016).

Rudinska and Ponomaryova have a broader understanding of life quality as an indicator measuring the efficiency of innovative economic development. They distinguish three categories of global problems:

1. destructive relationships between countries due to contradictions in their socio-political systems;
2. inadequate interaction between society and nature. This problem emerges in countries with a low standard of living, referred to as commodity economies, and entails many environmental issues;
3. violation of UN human rights (Kraus, 2019).

Zaitsev, Moskalenko, and Deineka focus on political and socio-economic contradictions and challenges associated with the modern models of Industry 4.0 development (Deineka, 2018; Zaitsev & Moskalenko, 2017). These barriers grew from the unevenness of development that has occurred between countries, markets and societies. It was suggested that the world of information technology can, under certain conditions, narrow the possibilities for creative

activity. For these authors, a person operating in a digital space is forced to constantly relearn and change jobs. This description corresponds to that of a precariat class of creative people who have no permanent job. The Industry 4.0 is, however, a competitive playground where digital employees can reach success if sufficient efforts are put. Meanwhile, the economic policy needs to use human-centric and transhumanist approaches to redirect creative potential and enable rapid innovative development.

In this study, the efficiency of socio-economic policies was examined on the basis of variables such as quality of life, economic growth, and innovation. All information was collected in previous studies. Although many studies were devoted to effective innovative models of economic development, information about the quality of life as an indicator is not sufficient.

2.1. Problem Statement

To strengthen the connection between national and global advances in social development, it is necessary to enter the world community and focus on social structures (knowledge and skills) and population expectations (income, social status, communication system) when moving towards economic growth. Research on the quality of life as an indicator for measuring efficiency of innovative development models is expected to provide relevant details about the life of people, the level of national production and technology, and the participation of nation states in the global economy. This study shifted from using measures of production to estimating people's well-being in an innovation economy framework. The analysis enabled a predictive assessment of changes in life quality over time. A structural-institutional model of life quality built on the basis of analysis results was used to draw recommendations on how to effectively improve quality of life at the national level.

The work aimed to investigate quality of life as an indicator measuring the efficiency of an innovative model of economic development.

2.2. Research objectives

1. to study and systematize generally accepted approaches to the exploration of life quality as an indicator in innovation economy framework;
2. to rank Ukraine on quality of life;
3. to build a structural-functional model of social development in the context of innovative economic development.

3. MATERIALS AND METHODS

The study defined quality of life as an indicator measuring efficiency of innovative economic development and built a structural-functional model of social development. The said model comprises the major micro and macro components of the quality of life and innovative development (Figure 1). The informative value of the quality-of-life components was evaluated and a model of social development was built using information from international indexes.

The work reviewed domestic and foreign studies on various aspects of the quality of life, innovations, and knowledge. Macroeconomic differences in the following categories were found for single countries:

Population: the number of inhabitants, employment/unemployment rate, life expectancy, birth rate and mortality;

Standard of living: GDP, and income equality;

Health: food security index (FSI);

Ecology: emissions into the atmosphere, environmental protection costs.

All information was collected from reports published by the executive authorities of Ukraine and international organizations (State Statistics Service of Ukraine, 2020). Among Ukrainian data providers, the Ministry of Social Policy; the Ministry for Development of Economy, Trade and Agriculture; and the State Statistics Service. International organizations of interest included the World Health Organization (WHO), the European Union Statistical Office (Eurostat), the World Bank, the World Trade Organization (WTO) Statistical Database, the UN Statistics Division, and the UN Economic Commission for Europe.

The methodological framework consists of a comparison method, generalization approach, methods of analysis and synthesis, systemic approach, statistical data collection and processing, and simulation modeling.

Research object: quality of life in the context of globalization and social transformation.

Research subject: theoretical and practical aspects of the relationship between quality of life and the efficiency of innovative economic development.

4. RESULTS

The human-centered economic advancement model is normally designed to boost sustainable and equitable well-being of the population. Although the economic growth is not a goal of itself, it lays groundwork for better well-being, i.e., provides resources needed to enhance healthcare, education and security. Therefore, it is important to track not only factors that influence competitiveness but also broad public goals and relevant compromises. The human-centric and transhumanist paradigms pose a new challenge to innovation policy. The 4IR came along with a digital divide. Some jobs became obsolete in these circumstances, reshaping the labor market and therefore generating economic inequality. For these reasons, the innovation policy is at cross purposes. Both paradigms will set business, society, and politicians to a nanotechnology revolution, which is expected to significantly facilitate decision-making and satisfaction of social interests through technology, artificial intelligence, robotics, etc. However, by simply employing technologies, the country will not produce a human capital of a high quality (Deineka, 2018).

The stimulation of innovation industry generates inequality, as the country asymmetrically brings members of society into contact with the new economic reality. This necessitates the use of specific tools to ensure that inequality does not deepen. Hence, a resource framework for the generation of multiple income streams, human and physical capital development, and inclusive growth is required. It is clear that countries need a brand new creative solution to ensure economic growth and high quality of life in the future, i.e., including global partnerships. To improve the quality of life of the global population, as intellectual innovative capital needs to be established. Intellectual innovative capital, also referred to as creative capital, is a form of human capital that embraces creative and moral values (Deineka, 2018; Zaitsev & Moskalenko, 2017).

Currently, there are various approaches to the definition of quality of life. The generally accepted definitions are those offered by international organizations such as WHO, Eurostat, and Economist Intelligence Unit. The international community views the quality of life from different angles, i.e., medical, sociological, and economic. In this regard, using a systematic approach to the quality-of-life indicator will maximize the value of its assessment (Ben-Nun, 2019). The WHO estimates quality of life through the lens of health protection. By contrast, Eurostat agency builds up the indicator of the quality of life using the EU-SILC micro data. EU-SILC or EU statistics on income and living conditions is a survey based on data from the EU member states and provides statistics on personal and household well-being. The Economist Intelligence Unit interprets the quality of life in terms of economics. A summary of these three approaches is presented in Table 1.

Table 1 A Model to Estimate Quality of Life

Organization	Definition
World Health Organization	The quality of life framework includes four areas: physical health; psychological health; environment; social relations.
European Statistical Office	The quality of life framework encompasses nine dimensions: material living conditions (income, budget, consumption); health; education; employment; governance and basic rights; leisure and social interactions; natural and living environment; economic security and physical safety; overall experience of life.
Economist intelligence Unit	The quality of life framework comprises nine indicators: GDP per capita; life expectancy; job security; political freedom and security; family life; climate and geography; political stability; gender equality; community life.

Source: adapted from data available in European Commission (2020), The Economist (2020), WHO (2020).

The generally accepted composite indicators of the quality of life of the population in the innovative models of economic development as of 2019 are presented in Table 2.

Table 2 Composite Quality of Life Indexes

Index	Organization	Total countries	Leader	Ukraine
QLI (Quality of Life Index)	Economist intelligence Unit	80	Denmark	65th
HDI (Human Development Index)	United Nations Development Programme	189	Norway	88th
KEI (Knowledge Economy Index)	European Bank for Reconstruction and Development (EBRD)	38	Estonia	27th
ETI (Enabling Trade Index)	World Economic Forum	136	Singapore	95th

Source: adapted from data available in European Bank (2019), Numbeo (2020), United Nations Development Programme (2019), World Economic Forum (2016).

In 2019, Ukraine occupied bottom positions in the global rankings, as evidenced by data in Table 2. The analysis shows that Ukraine has a poor standard of living and, accordingly, low quality of life, uncompetitive market, an environment not conducive for innovation and access to information to stimulate productivity growth.

Figure 1 depicts major indicators of the quality of life from the available literature incorporated in a structural-institutional model of social development. All variables in the model are linked with the quality of life. Key directions for quality-of-life improvement in the context of innovation economy were identified.

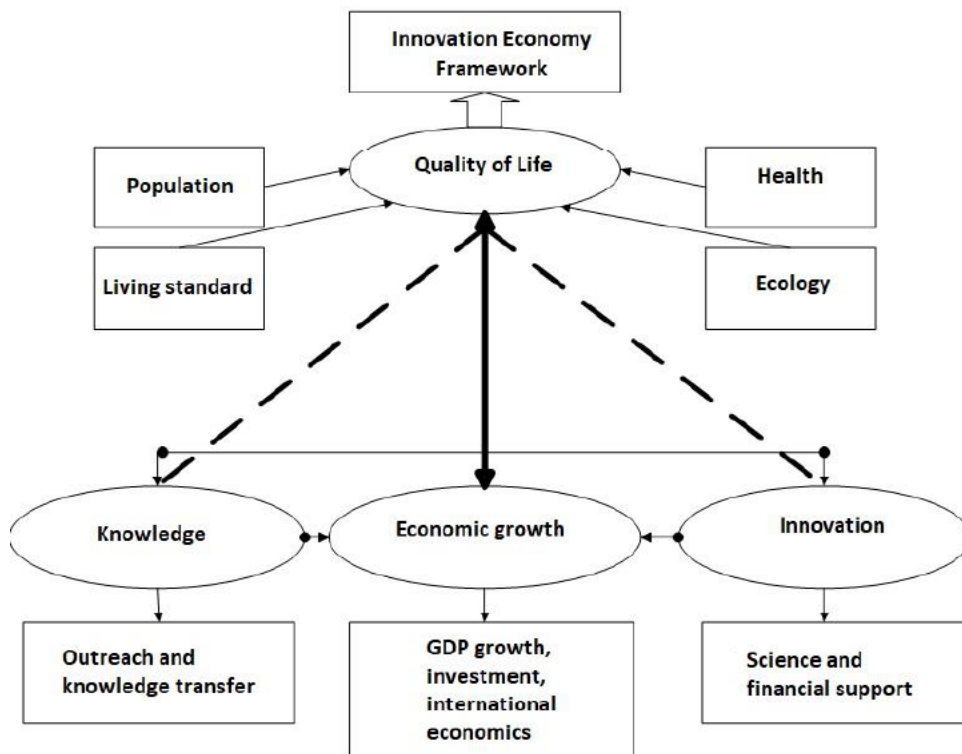


Figure 1 Structural-institutional model of life quality as an indicator of efficiency of innovative models of modern economy (*developed by authors*)

Figure 1 shows a close macro-level connection between quality of life and three factors of knowledge (outreach and knowledge transfer), economic growth (GDP, investment, international economics), and innovation (science and financial support) that are variable. Note that economic growth directly correlates with the quality of life, while knowledge and innovation directly correlate with the economic growth. In addition, the structural-institutional model encompasses measures of the quality of life that are related to population (population growth, population activity, life expectancy, and birth rate), health and HDI (life satisfaction), and ecology (balance of natural resources, energy consumption and environmental impact).

The Global Competitiveness Index 4.0 ranked 141 countries on fiscal policy, market, human capital, and innovation, and revealed a direct relationship between indicators of economic progress on a scale from 0 to 100, with 100 being the best score. High income countries such as Switzerland, Japan, Germany, Canada (GDP per capita ranges from 39.3058 to 82.9503 US dollars) scored high in human capital (mean score, 89) and innovation (mean score, 77). Upper-middle income countries such as Russia, Bulgaria, Romania, Kazakhstan, and Azerbaijan (GDP per capita ranges from 4.5692 to 12.2852 US dollars) occupied lower positions with the mean scores of 70 and 54 in human capital and innovation. Ukraine is a low-income country (GDP

per capita is 2.9635 US dollars) and scored lower in human capital and innovation with the mean scores of 68 and 49, respectively (Schwab, 2019).

More details regarding the relationship between indicators of economic progress are given in Figure 2.

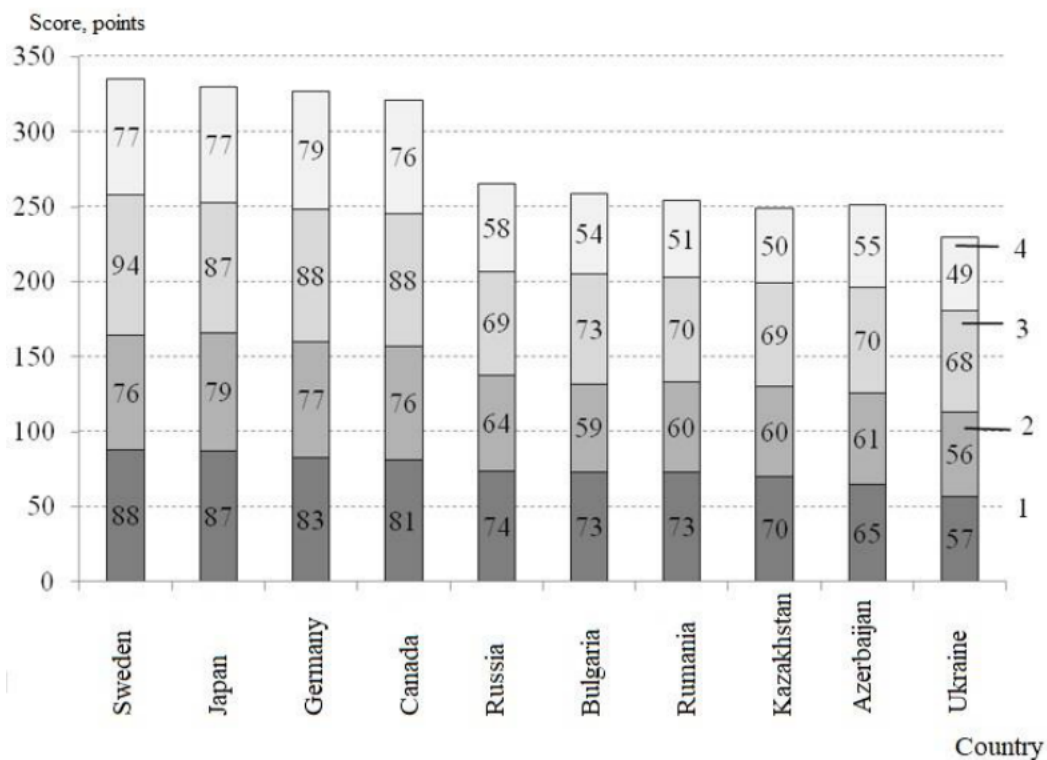


Figure 2 Some countries in GCI 4.0: 1. Fiscal policy; 2. Market; 3. Human capital; 4. Innovation

Statistical data in Figure 2 confirm the relationship between income and quality of life. Additionally, a holistic approach emphasizes that competitiveness is achievable for all countries in the world.

5. DISCUSSION

This study contributes to the implementation of the state policy for socio-economic development. A new set of components (knowledge, economic growth and innovation) was established that constitute a quality of life indicator. A model was built that suggests using statistical indicators to reach a holistic understanding of the quality of life as an indicator in the model of innovative economic development (Table 1, 2; Fig. 1, 2). This model may be applied to decision-making in the field of innovation policies. The model comprises a set of interconnected variables such as knowledge, economic growth and innovation as well as the core measures of the quality of life.

In modern conditions, structural changes in a consumer society and savings are of demand. Note that GDP data allows estimating productivity growth but does not assess the population well-being. In the HDI index, the GDP is used to assess the standard of living of the population. It is proved that high levels of income allow the country to meet the actual needs and, accordingly, boost the quality of life (Dolan et al., 2011). The generally accepted indicators of the quality of life were considered as indicators measuring the efficiency of the innovative economic development model. Incorporation of new indicators will enable a better innovation policy and the enhancement of practical knowledge in the field of education and science, which

drives the quality of life of the population. Stiglitz concluded in his work that it is advisable to improve national balance sheets with the welfare indicators. He noted an interdependence between economic growth, financial markets and quality of life. In this regard, a need to justify the life quality standard in the innovation economy framework arises, as such a justification will ensure effective socio-economic relations.

6. CONCLUSIONS

This study attempted to examine the quality of life within the innovation economy framework. The analysis showed a wide range of factors linked to the quality of life, from occupation and health to safety, social relations, and management. The concept of quality of life is broader, as compared to economic growth and living standard. The generally accepted indicators of the quality of life were assessed and the results revealed that the most objective indicators were those that were measured from the perspective of adequate, rather than minimum, satisfaction of human needs. The use of systematic approach allowed tracking changes in the quality of life in different countries over time and ranking Ukraine in the category under consideration. Social changes were qualitatively assessed and a structural-institutional model of the quality of life was built. Primary components of the quality of life indicator were allocated that assess well-being of the population and can be easily found in the public domain. Additional micro and macro indicators and variables were determined that are associated with the quality of life.

The model of social development offered in this study is an effective new approach towards the understanding of the quality of life as an indicator in an innovation economy framework.

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