

## Socio-cultural, socio-economic and technological transformations for sustainable development on local level\*

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The article analyses current issues of socio-cultural transformations for the “culture of sustainability” based on equal access to municipal services for all citizens, nurturing the “sharing economy”, “collaborative economy” and other approaches that combine the ideas of entrepreneurship, civic engagement and societal transformation. It reflects the socio-economic transformations targeted at the formation of decentralized renewable energy production, local food production, innovative transportation concepts, new approaches to social services and many other innovations, development towards a circular economy. The article also highlights the technological transformations that support the necessary socio-cultural and socio-economic transformations and serve the interest of citizens and society.

*Keywords:* Third Industrial Revolution, Fourth Industrial Revolution, socio-cultural transformations, socio-economic transformations, technological transformations, sustainable development.

УДК 330.341:[316.7+316.42+316.6]:352/353

JEL код: O10, P35, Q55

**Introduction.** Modern information society on the way to sustainable development is characterized by more frequent bifurcation transformations. Thus, different changes in social and economic life become the norm. Scientists predict that the brink of the Fourth Industrial Revolution will fundamentally alter and transform our way of life. The research says that the leading role in the implementation of these transformations belongs to technologies. Each new level of information, economic and technological transformations leads to complete reassessment of new features and functions of used material things, as well as leads to a new revolution in production and consumption.

**Problem.** Current economic, social and environmental problems cannot be solved without socio-cultural, socio-economic and technological transformations. Reflecting on the way how societies and businesses change their modes of action in a digital world is urgent especially nowadays when the world is looking for transition to sustainable development. Especially there exists the necessity to act on local level searching for socio-cultural, socio-economic and technological transformations.

**Recent research.** Issues of socio-economic and technological development were raised by S. S. Kuznets [5], D. A. Mindell [6], P. G. Schedrovitskii [17], J. A. Schumpeter [9], etc. The issues of sustainable development were raised by H. Daly [2], H. Odum [15], R. Perelet [16], E. Weizsäcker [12, 13], etc.

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\* The publication contains the results of the research conducted within the framework of the President of Ukraine grant for competitive projects # Ф66/12689 of the State Fund for Fundamental Research.

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**Goal of the article.** Highlighting the current socio-cultural, socio-economic and technological transformations of societies on the local level for the sake of sustainable development in the light of the Third and Fourth Industrial Revolutions.

### **Characteristics of the Third and Fourth Industrial Revolutions**

Historical background of the Third Industrial Revolution is aimed at returning to harmony with nature through the transformation of production systems, greening economy and life style as well as the ensuring a new level of social and energy development. In these circumstances, industries must strive not to increase scale and forms of social production, but to increase productivity, functionality, and economic systems efficiency.

The Fourth Industrial Revolution (which is known as “Industry 4.0”) introduces cyber physical systems in production processes. It is foreseen that cyber physical systems will be combined into a single network with the formation of special local “eco-systems” serving for maintenance of a certain house, company or city.

The Third and Fourth Industrial Revolutions facilitate in achieving sustainable development. We can expect two key transformations in socio-economic activity. First, we can speak about:

1. Changes in consumption: transition from individual products and services to the formation of complexes for creating comfortable conditions for human biological needs, development of social needs and the realization of human creativity.

2. Changes in production: transition from "torn" production cycles to the formation of nature friendly labor, production and consumption organized according to closed cycles.

Based on the analysis of a number of publications [4, 10, 14], the authors formulated the most important functions of cyber physical systems carried out without any human participation:

- information exchange (a kind of a “dialogue”) in real time;
- control of external and internal parameters;
- self-activation and stop under certain information signals;
- self-tuning for optimal operating conditions;
- forecasted (anticipatory, preventive) systems self-service;
- interaction with produced goods (production systems case);
- adaptation to the new needs of consumers;
- definition of the needed equipment to produce the required products or meet new demands;
- self-learning of new work methods.

The Third and Fourth Industrial Revolutions prepared a solid basis for ensuring sustainable development local communities. On this way they need to progress in three basic types of transformations: socio-cultural, socio-economic and technological transformations. What are these steps that have already been fulfilled or are ready to be implemented on local levels in cities and towns? These and many other issues were discussed during the 8<sup>th</sup> European Conference on Sustainable Cities and Towns “Transformative Action: the potential for Europe”, which took place in Bilbao in April 2016. As a result the Basque Declaration was adopted. It reflects the decisions necessary for progress and transformations on the way to sustainable development on local level.

### New Pathways for local communities to ensure sustainable development

The necessity for local transformations as well as their role is transferred by the adopted Basque Declaration "New Pathways for European Cities and Towns: to create productive, sustainable and resilient cities for a liveable and inclusive Europe". As the Declaration says local communities understand the need for transformations in order to [11]:

1. Decarbonise our energy systems and reduce total energy consumption.
2. Create sustainable urban mobility patterns and accessibility for all.
3. Protect and enhance biodiversity and ecosystem services.
4. Reduce the use of greenfield land and natural space.
5. Protect water resources, water and air quality.
6. Adapt to climate change, and reduce the risk of disasters.
7. Improve public space to create convivial, safe, and vibrant environments.
8. Provide sufficient and adequate housing for all.
9. Guarantee the social inclusion and integration of all parts of the society.
10. Strengthen our local economies and local employment opportunities.

Necessary transformations are the following:

*The Socio-Cultural Transformations* develop a "culture of sustainability" based on equal access to municipal services for all citizens, nurturing the "sharing economy", "collaborative economy" or "civic economy" and other approaches that combine the ideas of entrepreneurship, civic engagement and societal transformation [11].

In "collaborative economy" all economic agents have, first of all, much more equality rights in decision-making and responsibility for possible risks, and secondly, a much higher degree of freedom and self-organization level. A. Dash systematized social and solidarity economy differences from other economic sectors and gave a better understanding of its specific features (Table 1) [3].

Table 1

Three economic sectors [3]

	<i>State</i>	<i>Private</i>	<i>Social and solidarity</i>
Dominating agents	State	Market	Society
Rationale	Distribution	Competition	Cooperation
Basic relations	Power	Exchange	Solidarity/reciprocity
Regulation	Control	Freedom	Participation
Capitalization	Public goods	Accumulation of capital	Connection of values (social, environmental, moral).

Forms and methods of social and solidarity economy are a kind of an alternative to market competition. If the latter can achieve economic systems efficiency through the selection of their most advanced forms, social and solidarity economy achieves a similar increase in efficiency through the implementation of synergies in the integration efforts of their individual participants.

*The Socio-Economic Transformations* are targeted at the formation of decentralized renewable energy production, local food production, innovative transportation concepts, new approaches to social services and many other innovations, development towards a circular

economy, to reduce the need for natural resource consumption and the production of waste, as well as increase of eco-efficiency [11].

Benefits of eco-efficiency refer to increase in economic value with unchanged (or decreased) environmental impact. Four variants of increased eco-efficiency indicators can be defined:

- an increase in eco-productivity;
- a decrease of nature intensity;
- an increase in the efficiency of environmental costs;
- a decrease in environmental specific costs.

To be sustainable organizations must embrace new objectives: optimize operations to minimize environmental impact and improve social outcomes in a manner that also maximizes performance.

No matter what your business is, sustainability is your business. For example, by 2025 buildings will use more energy than any other category of “consumers”. In addition, 40 % of the world’s current output of raw materials goes into buildings. That is about 3 billion tons annually.

Table 2 highlights the shift within industries from pollution control to eliminating pollution and waste in the production process, first through steps to improve efficiency, then by institutionalizing pollution control and other environmental issues into mainstream manufacturing and, finally, by restructuring production to make zero-emissions the norm [7].

*Table 2*

Four steps to sustainable industrial production in cities [8]

Steps	FIRM	CITY	NATION
Step 1: Control	End of pipe technology	Relocate dirty industries	End of pipe regulation
Step 2: Efficiency	Cleaner production	Collective environmental services	Environmental assessment
Step 3: Institutionalize	Lifecycle environmental management	Eco-industrial estates	Integrated pollution control
Step 4: Restructure	Zero emissions	Carrying capacity planning	Extended producer responsibility

*The Technological Transformations* apply new and smart technologies that support the necessary socio-cultural and socio-economic transformations and serve the interest of the citizens and the public good, as well as form “Internet of things” and “Internet of citizens”.

“Internet of Things” is the concept of the computer network of physical objects (“things”), equipped with built-in technologies to communicate with each other or with the external environment, which may be partially or completely without any human being. It is assumed that the system of such networks is able to rebuild economic and social processes, promoting social development of man.

Technological transformations determine what will be a valuable natural resource and how it will change the scale of our preferences tomorrow. So, we are witnessing the process of

transformation of such commonplace and familiar resources as sand (which is used for production of silicon chips) and sea water (which contains a variety of minerals – from gold to magnesium) into most important industrial resources. Less applicable now are such key resources as natural rubber (replaced by synthetic) and tin (replaced by aluminum and plastics).

The above mentioned transformations should stimulate the relationships that bring the life of local communities on new sustainable development levels. The following actions may help:

- development of local green markets;
- raising funds for development green projects for local community members;
- fostering public management model for continuous improvement;
- development of a common sustainable strategy;
- local self-governing democracy.

Management for sustainable development of local economies in small communities and small businesses, ensure diversity, self-support and self-sufficiency. Figure 1 presents management model of the Local Plan of Action and degree of progress in the sustainable development of the municipality.

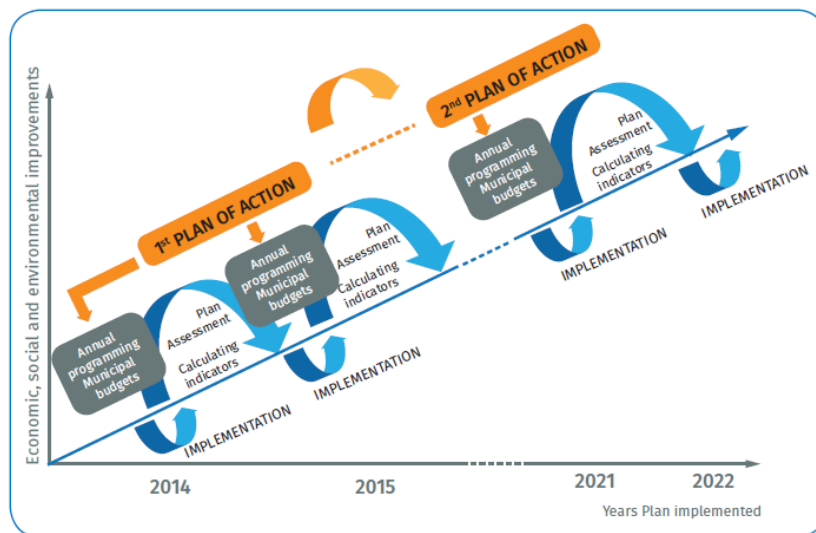


Figure 1. Management model of the Local Plan of Action and degree of progress in the sustainable development of the municipality [1]

The national and regional governments should think and take decisions on substantially increase and management models of the Local Plan of Action. Local departments and ministries as well as all levels of governance should be actively involved in decision making on policies relating to local development.

The results of this is generation of a new circular economy and low carbon model, that is based on the efficient use of natural resources, minimization of wastes, and creating green jobs. As well local communities will get: social equality; sustainable and lively local

economy; common natural assets; responsible consumption and lifestyle choices; better mobility and less traffic; local management for sustainability.

**Conclusions.** The Third and Fourth Industrial Revolutions bring the necessity of socio-cultural, socio-economic and technological transformations for sustainable development on local level. On the one hand, it reveals new opportunities for huge increase of economic efficiency as well as various risks. These new transformations have the potential to “create and close local value chains, facilitate innovative cooperation of businesses in order to capture local and regional value, create small scale local investment opportunities and jobs, and increase the public income” [11].

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**Соціально-культурні, соціально-економічні та технологічні  
трансформації для забезпечення сестейнового розвитку на місцевому рівні**

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*Manuscript received 08 May 2016*

**Соціально-культурні, соціально-економічні та технологічні трансформації для забезпечення сестейнового розвитку на місцевому рівні**

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У статті досліджуються соціально-культурні трансформації, спрямовані на формування «сестейнової культури», що означає рівний доступ громадян до можливостей свого соціального розвитку, їх співпраці в співконструюванні та співоновленні свого середовища, формуванні основ солідарної економіки і розвитку різних її форм, а саме: «шерінгової», «коллаборативної», «громадянської» економік. У статті відображені соціально-економічні трансформації, які орієнтовані на формування децентрованих відновлюваних джерел енергії, регіональне виробництво продуктів харчування, інноваційні концепції розвитку транспорту, нові підходи у наданні соціальних послуг, формування мереж невеликих за розміром, але продуктивних локальних структур, використання інноваційних форм фінансування бізнесу, створення основ циркуляційної економіки. Розкрито значення технологічних трансформацій, які просувають «розумні» технології, які закладають основу для реалізації необхідних соціально-культурних і соціально-економічних трансформацій, а також для формування «Інтернету речей» і «Інтернету громадян».

*Ключові слова:* третя промислова революція, четверта промислова революція, соціально-культурні трансформації, соціально-економічні трансформації, технологічні трансформації, сестейновий розвиток.

*Mechanism of Economic Regulation, 2016, No 2, 32–40  
ISSN 1726-8699 (print)*

**Социально-культурные, социально-экономические и технологические трансформации для обеспечения сестейного развития на местном уровне**

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**Получено 08.05.2016 г.**

В статье исследуются социально-культурные трансформации, направленные на формирование «сестейновой культуры», означающей равный доступ граждан к возможностям своего социального развития, их сотрудничества в со-конструировании и со-обновлении своей среды, формировании основ солидарной экономики и развитии различных её форм, а именно: «шеринговой», «коллаборативной», «гражданской» экономик. В статье отражены социально-экономические трансформации, которые ориентированы на формирование децентрализованных возобновимых источников энергии, региональное производство продуктов питания, инновационные концепции развития транспорта, новые подходы в предоставлении социальных услуг, формирование сетей небольших по размеру, но производительных локальных структур, использование инновационных форм финансирования бизнеса, создание основ циркуляционной экономики. Раскрыто значение технологических трансформаций, которые продвигают «умные» технологии, закладывающие основу для реализации необходимых социально-культурных и социально-экономических трансформаций, а также для формирования «интернета вещей» и «интернета граждан».

*Ключевые слова:* третья промышленная революция, четвертая промышленная революция, социально-культурные трансформации, социально-экономические трансформации, технологические преобразования, устойчивое развитие.

*JEL Codes:* O 10, P35, Q55

*Table: 2, Figures: 1, References: 17*

*Language of the article:* English

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