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INTERNATIONAL ASPECT OF ECOLOGICAL INNOVATIONS¹

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The article deals with the international aspect of ecological innovations. Today one of the most significant factors to achieve sustainable development in Ukraine is to activate the ecologically oriented innovative activity. This requires new approaches creation for the innovative processes management system at different economic levels. Ecological or “green” start-ups consist in realization of ideas by non-typical way, how it is possible to save ecology and to gain material benefits. All win in business-model of the similar projects: governments save on waste disposal, citizens are awarded for ecological way of life, and sponsors realize social responsibility.

Keywords: *start-up, innovation, globalization, sustainable development, eco-innovations.*

Introduction. Today one of the most significant factors to achieve sustainable development in Ukraine is to activate the ecologically oriented innovative activity. The knowledge of this requires new approaches creation to the innovative processes management system at different economic levels, which have to take into account interconnection between socio-ecological and economic constituents in the socio-ecological-economic system, which are indicators of the sustainable development.

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Recently degree and vector of the economic system development has been defined by the tempo of scientific and technical progress (STP), proved by changes in ratio between economic growing factors (innovative changes take the first place). Orientation to the innovative way in development strengthened economic and political security in countries, which defined its priority and activated their work in this area. However after Stockholm conference, where questions on the ecological problems global value and necessary control of the modern civilization development process, appeared for the first time, and Ukrainian conference UNO on the environmental problems and development (Rio de Janeiro, 1992), where human development strategy was confirmed, contradiction between further social and economic development, which is impossible without STP, and necessity of the natural capacity constant decrease in the productive systems, become more obviously. In order to solve these contradictions, one has to transform the idea about innovative activity as a factor of socio-ecological and economic system development.

Analysis of the recent research and publications. The scientific research of foreign and native authors represents theoretical and methodological aspects concerning innovative activity ecologization. At the same time there are some contradictions to the interpretation of categorical system among representatives of different scientific schools, requiring further study in this area.

Analytical works have complex nature, comprising ecological problems together with ecological, social and cultural tasks solving, shown in works of the such famous scientists as J. Beddington, W. Bell, A. Cosby, P. Newell, R. Stavins, J. Stiglitz, N. Stern etc.

Other organizations carry out the same activity, regional agreements and separate countries, e.g. EU and и OECD. Almost all suggested variants include efficiency to use main recourses types, ecosystems, investments into innovations and “green” markets, and people’s welfare [3]. Eco-innovations are very perspective and necessary to develop for Ukraine, because the existing potential (both intellectual and scientific-technical) – huge, there is great experience to control problems, connected with ecological sphere. It will provide an ability to come to new level of cooperation with many countries in the world and faster to be integrated into the international community [2].

The object of an article is to study international aspect of ecological innovations on example of start-up approach.

Main material representation. Ecology obtains significant value in the international policy, expressed in growing of scientific works number on this topic. Questions on ecology integration in the international relations theory, on intercommunication between geopolity and environmental pollution, and geopolitical aspects concerning access to the reducing natural resources, are observed. Great attention must be paid to the climatic changes impact on national and international security.

The last political tendencies in many countries-members of OECD prove the fact that national research and innovative activity strategies become “more green”. Countries pay more attention to ecological problems, climate and energetics changing in the national programs on science and innovative activity development. Health and quality of life are related to the important priorities.

Now the question is about trends, relating to ecology: for example, about indicative phenomenon of goods and service, which simply “include new life”. Instead of being disposed

or recycled, these goods can seamlessly “come back” to the natural environment, in order to engender something new, the same “eco” by status.

Green growth includes stimulation means of the ecological growth and development, providing the fact that natural assets continue to render resources and ecological service, on which our prosperity depends. It has to be a catalyzer of innovations and investments, which will be the base for sustainable growth and will lead to new economic abilities appearing.

Both industry and government need to better understand and determine how to move towards a sustainable future. Innovation plays a key role in moving manufacturing industries towards sustainable production. Experts of OECD provide simple illustration of the general conceptual relations between sustainable manufacturing and eco-innovation. The steps in sustainable manufacturing are depicted in terms of their primary association with respect to ecoinnovation, i.e. with innovation targets on the left and mechanisms at the bottom (fig. 1).

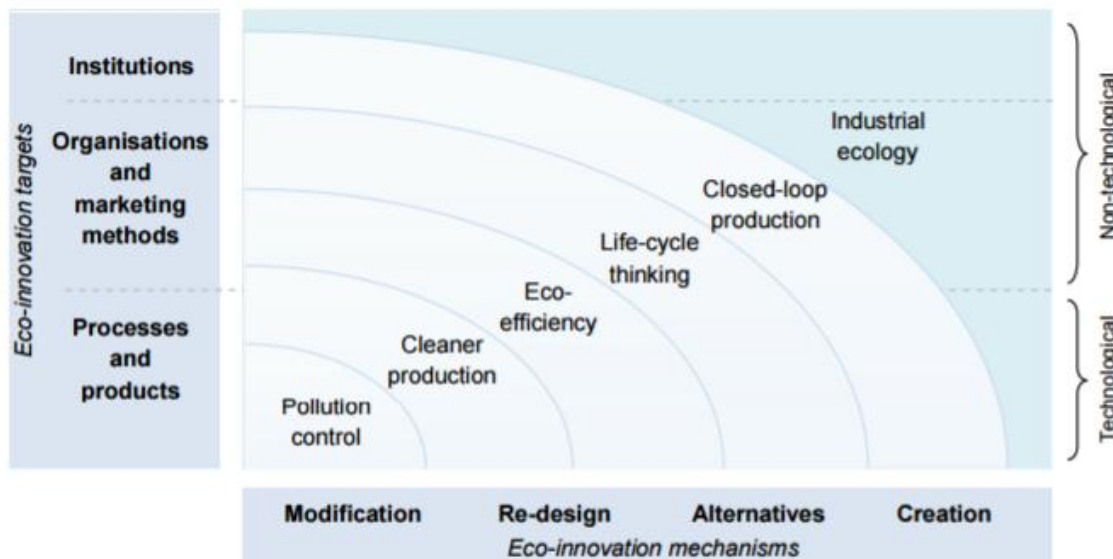


Fig. 1. Conceptual relationships between sustainable manufacturing and eco-innovation [6]

Goods of “new life” do not solve many ecological problems, but recent years become the symbol to create something new, a product which has friendly relations with nature.

Technological changes in the industrial sector lead to formation of national programs and conceptual documents concerning industrial development, responding to challenges, made by internal and external genesis changes, connected with digital revolution, in relation to the producing sector. Among industrial policies one of the key one is strategic initiative Industry 4.0, realized since 2013 in Germany.

Without consideration of the high expenses problem, great amounts of raw material and energy consumption by the producing sector cause some ecological and market limitations, including demand reducing for the proper goods. Initiative Industry 4.0 acts to raise resources efficiency and general profitability of the enterprises. It is necessary to find a compromise decision between objects of additional investing resources, oriented to the producing sector intellectualization, and potential savings.

Green growth has a potential to solve economic and ecological problems and to discover new growth drivers owing to the following channels:

1. Productivity. Motivations to increase efficiency to use resources and natural assets: increase of productivity, reducing of wastes and energy usage and maximum effective resources using.

2. Innovations. Opportunities for innovations, supported by political and framing terms, which allow to solve ecological problems in a new light.

3. New markets. New markets creation by means of demand stimulation for green technologies, goods and service, therefore forming potential for new opportunities of employment.

4. Trust. Increasing of trust to investors, owing to much predictability and stability of such approach, through which governments will solve main ecological problems.

5. Stability. More balanced macroeconomic conditions, reducing of price variation for resources and support of state finances consolidation owing to, e.g. reviewing of the state expenses structure and efficiency and incomes increase through price setting for pollution.

It can also reduce risk of the negative disturbances for growth, connected with the following factors:

- Lack of resources, which leads to investments rise in price, such as needs in capital intensive infrastructure, when water reserves are exhausted or their quality is decreased (for example, equipment for water distillation). In this relation natural capital losses can exceed benefits from economic activity, affecting the possibility for the further growth sustainability.

- Imbalance in the natural systems raises risk for more profound, more destructive and potentially inconvertible devastation. Such situation appeared with some fish stocks, and it may appear with bio variety loss under irreducible changes in climate. Attempts to establish potential threshold levels show that in some cases – climate changes, global nitrogen cycles and bio variety loss – such critical levels have been already surpassed.

More and more people relate to the environmental pollution not as to the constant impending disaster, but as to the huge field for scientific research, ideas and own business development. One can make sure on the example of small and large ecological victories, which appear in the whole world, until most inhabitants of the metropolises sit in traffic and complain that “it’s hard to breathe in this city”.

Social entrepreneurship thrives in the green industry, helping to solve our world’s greatest environmental problems by offering innovative solutions. Ecological start-up may be developed and bring profit in the same way as any other project, although fast efficiency occurs seldom in this sphere. Therefore a good ecological start-up is almost always supported by society, is shown widely in mass media, attracts new participants.

Business in the ecological branch is meant to reduce or exclude negative impact on the environment. The aim of such initiative is not only to receive profit, but also to sanitize our planet. This sphere of activity includes:

- niches, which provide environmental pollution volumes reducing. It comprises: producing of equipment, tools, transport vehicles, special service of the ecological expertise etc;
- niches, which use resources economy technology (alternative types of energy);
- improvement of the environment, design of landscapes according to the natural balance

keeping principles;

- ecological enlightenment. It is well-known that not a resource but the ready product is more profitable to sell.

The native ecobusiness line: measuring and controlling instruments, facilities and technologies to save resources, secondary raw material use, ecological planning and reproduction, human resources reproduction, organization of rest, teaching of ecology, control of population number level.

Innovation has to be observed as a complicated system, which transfers from one category into another, getting new essence, i.e. it has its own evolutionary development in time interval, or life cycle. Taking into account the mentioned above, ecological innovation is to be studied as an evolutionary development, comprising several historical forms:

– an idea – proposal of the new project, imagination about possible ecological innovation as an ecoproduct. Intermediaries between an idea and ecological innovation include:

– plan (conception) of the ecological innovation – investigated idea, formed from the viewpoint of new goods significant features for consumer, as scientifically grounded and extended imagination;

– an experimental sample – material embodiment of the accepted idea for development and perceived by consumer as an image of the future innovative production (or ecoproduct by the plan);

– an ecological novelty (or an industrial sample) – an experimental sample, tested by laboratory operations and accepted for further trials under market conditions;

– an ecological novation is an industrial sample, which has successfully been tested at the market and accepted to be introduced into the commercial production;

– an ecological introduction – ecoinnovation, entering the market;

– an ecological innovation – ecological introduction, which had success and was extended at the market;

– traditional ecoproduct – form of the ecoinnovation, which has place after another ecological novelty introduction at the market.

Thus, transferring from one category to another defines the beginning of new stage in the ecoinnovation development, which is one of the consistent stages in the whole life cycle.

At the same time, such approach complicates the essence of ecological innovation from the viewpoint of marketing theory, the main conception of which determines the whole innovative activity focus at the enterprise to the final consumption (consumer) at the market, i.e. an ability to satisfy the current needs in the best way through production and selling of goods (service), matching the consumers' demands. The innovation is a value for consumer only as a final result, proposed at the market. He is not interested in the actions complex, which precede a new product appearing at the market, but only as an existing more perfect mean to satisfy needs, which wouldn't cause the ecodestructive impact both in the consumption (use) process and in the long-term perspective.

Considering the mentioned above, ecological innovation has to be observed in two aspects: in wider aspect (as function of changes) and in strict sense (as a final result).

In wide sense the ecological innovation consists in changes of the integral resource, influenced by purposeful human activity, which reduce integral ecodestructive impact and

increase economic efficiency in the sphere of production and consumption.

In research [5] it is noted, that bioinspired innovation has the potential to transform large segments of the U.S. economy by increasing both gross domestic product (GDP) and employment. The Fermanian Business & Economic Institute (Institute) estimates that bioinspired innovation could account for approximately \$425 billion of U.S. GDP by 2030 (valued in 2013 dollars). Beyond 2030, the impact of bioinspired innovation is expected to grow as knowledge and awareness of the field expand.

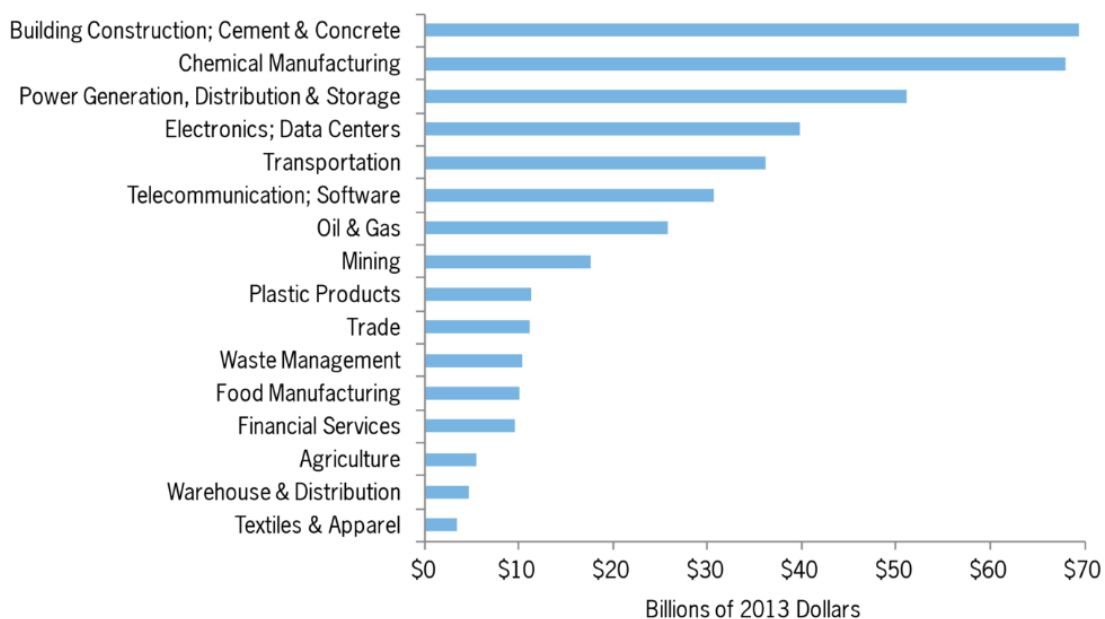


Fig. 2. **Bioinspired innovation impact on GDP by 2030** [5]

Conclusions. Today one of the most significant factors to achieve sustainable development in Ukraine is to activate the ecologically oriented innovative activity. This requires new approaches creation for the innovative processes management system at different economic levels.

Ecological or “green” start-ups consist in realization of ideas by non-typical way, how it is possible to save ecology and to gain material benefits. All win in business-model of the similar projects: governments save on waste disposal, citizens are awarded for ecological way of life, and sponsors realize social responsibility.

No existing measurement approach can capture the overall trends and characteristics of ecoinnovation. Further progress in benchmarking and indicators might include the development of an “eco-innovation scoreboard” and start-up approach, which combines different statistics and market philosophy. These could help improve understanding of the nature, drivers/barriers and impacts of ecoinnovation and raise awareness among policy makers and industry.

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