

**STRATEGY OF SUSTAINABLE DEVELOPMENT IN UKRAINE:
CIRCULAR ECONOMY AND CIRCULAR BUSINESS-MODELS****Seysbayeva N.G.***Zaporizhzhia National University
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Key words:

European Union, circular economy, sustainable development, circular business-models, natural resources.

The article is dedicated to circular economy principles and business-models of circular economy examination. For today solution to the sustainable development problem and ideas of circular economy has been actively promoted by different organizations (as the UN), institutions and foundations. The circular economy model based on Ellen MacArthur Foundation development is the most widespread and most complete. It should be noted that Organization of the United Nations (UN) and its institutions and foundations has been actively promoted solution to the sustainable development problem. "An agenda of sustainable development up to 2030" has been adopted in 2015; it is a recurrent guiding document throughout the UN wide structure. It consists of 17 objectives aimed at eradicating poverty, preserving the planet's resources and ensuring total well-being. The classification of circular economy models presented by international consulting company Accenture includes certain different point. Business-model of circular suppliers is based on delivery of fully renewable and suitable for recycling resources that underlie the manufacturing and consumption systems. Business-model of resource recovery places the product value at the end of its life cycle for its further return to delivery chain and further waste material transformation through innovative recycling or upcycling. Product Life Extension model allows companies to increase the life cycle of products and assets. Business-model of Sharing Platforms contributes to creating a platform for joint use by private persons as well as entities. The business-model "Product as a Service (PaaS)" turns incentives for product durability and its modernization upside down by changing the priority from amount to productivity/efficiency (performance).

**СТРАТЕГІЯ СТАЛОГО РОЗВИТКУ УКРАЇНИ:
ЦИРКУЛЯРНА ЕКОНОМІКА ТА ЦИРКУЛЯРНІ БІЗНЕС-МОДЕЛІ****Сейсебаєва Н.Г.***Запорізький національний університет
Україна, 69600, м. Запоріжжя, вул. Жуковського, 66***Ключові слова:**

Європейський Союз, циркулярна економіка, сталий розвиток, бізнес-моделі, природні ресурси.

Розглянуто одну з найважливіших проблем сучасності – необхідність відділення економічного зростання від споживання природних ресурсів. Поточний рівень споживання ресурсів нестійкий, і для суспільства, і для бізнесу, які залежать від споживання природних ресурсів при поточній лінійній моделі економіки. Для досягнення і підтримки балансу в екосистемі планети розроблена та активно просувається концепція сталого розвитку, одним з обов'язкових умов якого є перехід до найбільш відповідального виробництва і споживання - циркулярної економіки. Слід зазначити, що організація об'єднаних націй (ООН), її установи та фонди активно сприяють вирішенню проблеми сталого розвитку. «Програма сталого розвитку до 2030 року» прийнята у 2015 році і є постійним керівним документом на всій території ООН. Вона складається з 17 цілей, спрямованих на подолання бідності, збереження ресурсів планети та забезпечення загального добробуту. Циркулярна економіка за моделлю, яка основана на розробці фонду Еллен Макартур, націлена забезпечувати поетапне відтворення ресурсної ефективності та безоплатності. У 2018 році Всесвітній економічний форум розширив п'ять базових принципів циркулярної економіки до десяти - так звані 10R. Класифікація бізнес-моделей у циркулярній економіці представлена міжнародною консалтинговою компанією Accenture. Бізнес-модель «Circular Suppliers» – циркулярні постачальники» базується на постачанні повністю відновлюваних і придатних для перероблення ресурсів, що лежать в основі виробничих і споживчих систем. Бізнес-модель «Resource Recovery» – відновлення ресурсів» ставить цінність продукту наприкінці його життєвого циклу для його подальшого повернення до ланцюга постачання

та подальшого перетворення відходів через інноваційну переробку або утилізацію. Бізнес-модель «Product Life Extension» – продовження терміну служби продукту» дозволяє компаніям збільшити життєвий цикл продукції та активів. Бізнес-модель «Sharing Platforms» – спільне користування» сприяє створенню платформи для спільного використання надлишкових або недовикористаних потужностей як юридичними особами, так і приватними особами. Бізнес-модель «Product as a Service» – продукт як послуга» (PaaS) перетворює довговічність продукту, повторне використання та спільне використання його не на ризики розукomплектування, а на чинники зростання доходів і зниження витрат.

Statement of the problem

“Problems cannot be solved by the same level of thinking that created them” (A. Einstein). Understanding the global trends is important in terms of estimation of current risks and possibilities for Ukraine and as regards of strategic vision of its optimal development.

Analysis of recent studies and publications

Circular economy is a forward-looking concept. It has been actively advanced by certain governments by the European Union and represents part of state policy of the European countries and other. Furthermore, the shift to circular economy is significantly affected by regional organizations and state Foundations. Thus British Charitable Ellen MacArthur Foundation has been created for implementation of circular economy in 2010. It has won wide recognition as well as obtained financial support from leading world companies and governments. The foundation has set up the global learning platform based on the circular economy concept. Since its establishment the Foundation has emphasized the actuality of a circular economy in the real world by identifying the business innovations as a core of the economic shifts.

Works of X. Nguyen, M. Stuchtey, M. Zils, N. Pahomova, P. Williams, M. Ilic, M. Nikolic, H. Kersty, L. Nicholas [1,2] are devoted to the essence and main principles of circular economy functioning and areas for improvement of waste management investigation. The works of Ukrainian researchers O. Alimov, V. Geetz, A. Chukhno are dedicated to problems of industrial modernization in Ukraine. In works of I. Zvarych, I. Cocheshkova, N. Tryshkina, E. Khlobystov circular economy problems, global changes and their effect on national economy has been investigated and the main principles of sustainable development in the national economy, ecological and economic problems have been highlighted and ways to provide solutions in particular by use of best foreign practices have been proposed. Waste management has become an object of research of leading scientists as V. Mishenko, G. Vygovska, V. Baranovska, who explored the European experience and directions of state policy of solid waste management.

Objectives of the article

The purpose of the article is the analysis of circular economy business-models and efficiency of business-processes based on circular economy principles

considered their expenditure for sustainable development.

The main material of the research

In view of the emergence of acute global problems in the late 1960's and early 1970's organizations searching for recovery from global crisis began to appear. Emerged by Italian manufacturer A. Pecci in 1968 [1] the Club of Rome is one of the most successful organizations. Members of this informal and financial independent organization have elaborated the concept of transition to a global balance. This idea has been put forward in first report “Limits to growth” under the leadership of D. Meadows’ group to The Club of Rome in 1972. Conclusions of Meadows’ group have made a lot of people think about global problems, the future of the earth and have created relevant discussion that had resulted in the emergence of the Concept of sustainable development elaborated in 1980s.

In 2017 The Club of Rome has presented a new report “Come On! Capitalism, short-sightedness, population and destroying the planet” dedicated to its half-century anniversary. Potentially it is one of the most important documents of our time. The Club of Rome remains the central forum that formulates an agenda of responsible globalism and sustainable development. Report views the several alternative economical models elaborated, inter alia, by J. Rifkin, K. Felber, J. Fullerton and G. Pauli. For all differences in the details the general pattern boils down to that economy of the future should endeavour to resilience and not to growth and to increase the common goods, and not to maximize the personal gain.

The circular logic will replace linear one that means that manufactured articles would be optimized for repairing and reuse.

For today Organisation of the united nations (UN) as well as its institutions and foundations has been actively promoting a solution to the sustainable development problem. “An agenda of sustainable development up to 2030” has been adopted in 2015 [2]; it is a recurrent guiding document throughout the UN wide structure. It consists of 17 objectives (Fig. 1) aimed at eradicating poverty, preserving the planet's resources and ensuring total well-being. Stated objectives and goals are complex and undivided and ensure well-balancing of economical, social and ecological components of sustainable development.



Fig. 1. Objectives in sphere of sustainable development / OUN.

Source: <http://www.un.org/sustainabledevelopment/ru/sustainable-development-goals/>

Solution 12 of the objective of sustainable development represents the transition to circular economy and expresses the system of manufacturing or consumption while maximum efficiency of resource use, zero waste and external negative impact on the environment minimization.

Solution 12 of objective by moving towards a circular economy also allows to achieve goals number 6, 7, 11, 13, 14, 15 and will have a positive impact on the other problems solution.

In 2018 World Economic Forum has expanded the number of basic principles of the circular economy from 5 to 10, so called 10R, which include (Table 1):

Table 1 – Circular economy basic principles

Refuse	refusal to produce a product at certain technology or of certain materials, proposition of alternative product
Rethink	rethinking of areas of product use, exchange or joint use of product
Reduce	reducing of natural resources use with manufacturing or consumption efficiency enhancing
Reuse	reuse of second-hand product to destination by other customer
Repair	repairing and maintenance of defective articles with further use on the main appointment
Refurbish	old product restoration for further consumption
Remanufacture	reprocessing and use of old article part in new product on the main appointment
Repurpose	refocusing of old article part in new product for another functional appointments
Recycle	materials recycling for product of the same or lower quality manufacturing
Recover	materials combustion with expended energy restoration

For today there are more than ten circular economy models visualizations with similar structures. However, the model based on Ellen MacArthur Foundation development [3] is the most widespread and most complete (Fig. 2).

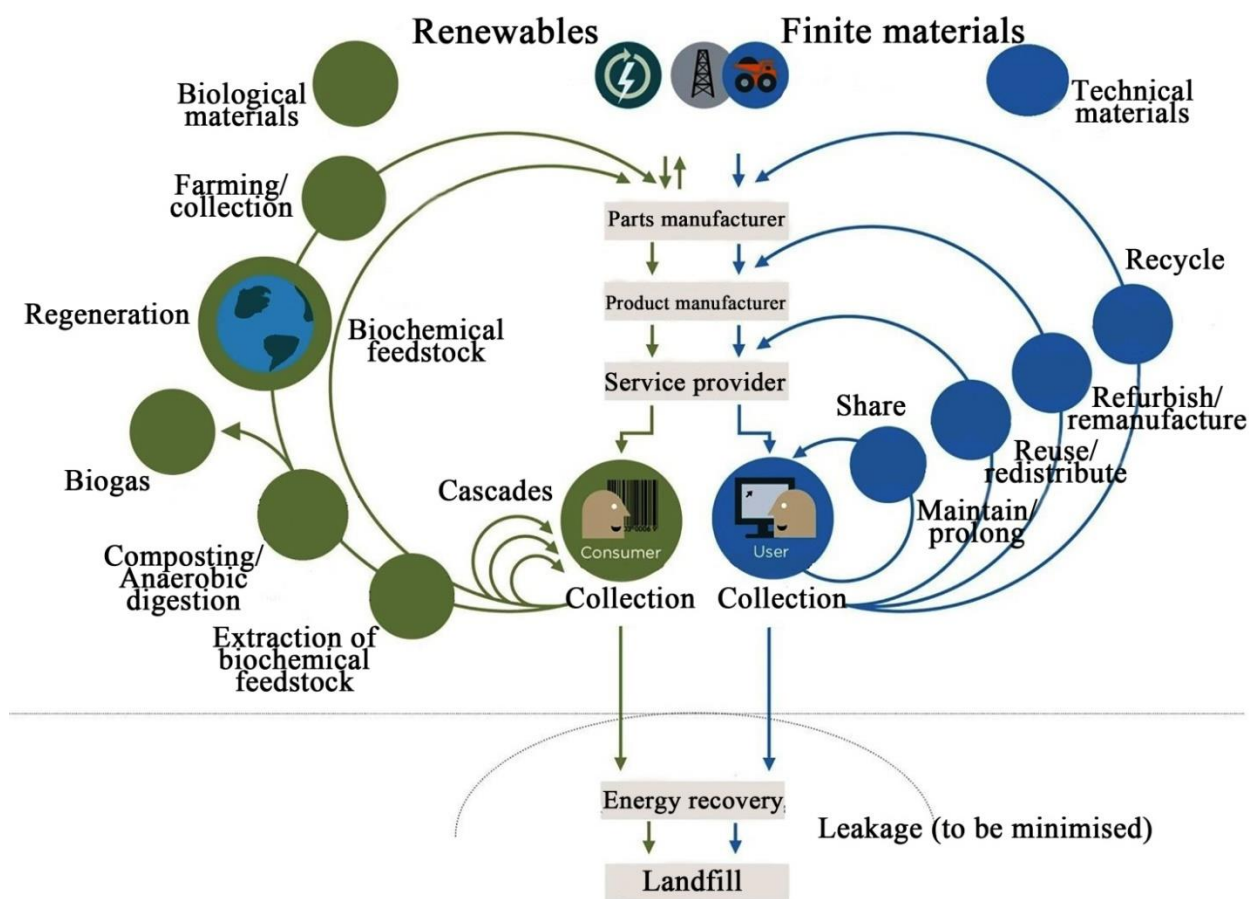


Fig. 2. Model of circular economy

Source: *Towards a Circular Economy: Business Rationale For An Accelerated Transition* / Ellen MacArthur Foundation

According to this model, circular economy is aimed at ensuring gradually resource efficiency reproducing and self-sustainability. In order to achieve that goal, the separation into biological and technical vicious cycles has taken place. Thus, one of the conditions for existing and proper operation of a given system is two cycles consistency in circulation processes.

Since independence, Ukraine has repeatedly stated and confirmed by practical actions its willingness to cooperate with the world community in particular with the European Union on the preservation and protection of the environment.

In a preamble of the law of Ukraine “About the environmental protection” it’s mentioned that “environmental protection, rational utilization of natural resources, environmental security for human life are essential conditions for sustainable economic and social development of Ukraine”. Ecology and economy are increasingly intertwined to form complex set of reasons and consequences. The ecological situation in Ukraine, which can be characterized as state of ecological crisis along with the increasing of global social, economic and political challenges, requires stopping dangerous trends and change the course of modern economic development. One of the main points of disagreement is a collision between economic growth and the necessity of restriction of its resource intensity. The solution of this complex problem demands the consolidation of political will and efforts from partner countries and also paradigm shifts in

the Ukrainian economy which consists in the transition from primary-products economy to scientific and industrial activity, implementation of innovations and development of international scientific and technical cooperation.

In November 2017 the National strategy of waste management in Ukraine up to 2030 has been emerged. It also mentions the unsatisfactory state of waste management in Ukraine and places as main objective the “implementation of system approach of waste management at the State and regional levels, reduction of waste amount and increasing of recycling and reuse,” i.e. approximation to the main principles of circular economy. In developing a strategy, the EU Directives regulated the waste handling in European countries were taken into account with maximum consideration.

An implementation of waste-free technologies is a one way of addressing this problem. Waste-free technology is a production and technological process which achieved minimal amount of waste materials and emissions to the environment. It is impossible to create totally waste-free production that’s why in the present case one should talk about resource efficient low-waste technologies. Creation of such technologies provides for qualitative changes in the production aimed at complex realization of technology of raw materials processing using all their components.

In the recent past the term business-model in circular economy has emerged. These models propose the

possible innovative ways in business connected with resilience problem. It helps to change product oriented business-models. Analysis of scientific researches has found out single circular economy business-models classification described as foreign.

This classification (Fig. 3) has been presented by international consulting company Accenture as one of the results of their investigations within the framework of the work «Circular economy: Innovative Business Models and Technologies to Create Value in a World without Limits to Growth».

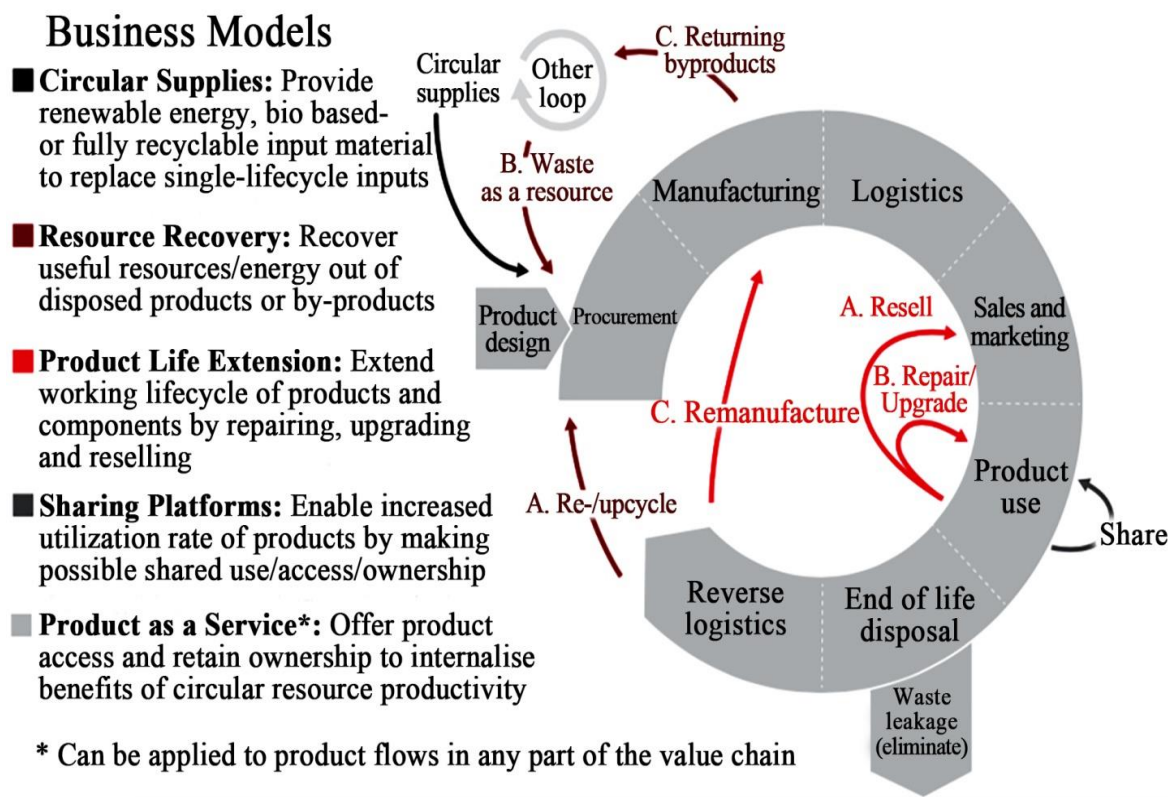


Fig. 3. Main models of a circular economy.

Source: Accenture: *Circular Advantage: Innovative Business Models and Technologies to Create Value in a World without Limits to Growth*.

This classification is based on circular economy model represented resources vicious cycle: product design -> resource supply -> manufacturing -> logistics -> sales and marketing -> use of the products -> end of use -> back logistics which returns products and materials on a new cycle.

Let's dwell on more detail description of models forming Circular economy.

Circular Suppliers

Business-model of circular suppliers is based on delivery of fully renewable and suitable for recycling resources that underlie the manufacturing and consumption systems. For them companies change the linear approach to resources and gradually cease the use of limited resources in so doing to reduce costs and eliminate inefficiency.

This model is the most powerful for companies that deal with scarce commodities or those with the significant environmental footprint.

The example of such business-model is the modernization project of Zaplazkiy sugar mill (Odessa

region) of the group of companies "Ukrteplo." Company plans to obtain bioethanol of straw and corn stems. The designed capacity accounts for 50 thousand ton per year. Bioethanol is more ecological fuel comparing with oil or coal emissions. Through this development besides reduction of amount of manufacturing waste and emissions polluted the atmosphere company might set up more than 600 relating workspaces [4].

2) Resource Recovery

Business-model of resource recovery places the product value at the end of its life cycle for its further return to delivery chain and further waste material transformation through innovative recycling or upcycling. Based on traditional recycling markets this business-model uses new technologies and possibilities for nearly any product's restoration to any value level which is equivalent or even higher than initial investment level. Decisions under this model vary from industrial symbiosis to integrated vicious cycles and concept based on the idea of waste-free production systems Cradle-to-Cradle® which provides for recycling into new goods.

A striking example of such circular economy business-model in Ukraine is an unique company Möbius [6] that deals with rubberized-fabric and polymer products disposal and useful resources production: synthetic crude oil, carbonic sorbents and metallic building materials. Möbius is also a member of ETRA.

Waste materials are subjected to thermal destruction. Special treatment called pyrolysis for today is the most cost-effective and environmentally justified tire recycling method. It not only addresses the problem of secondary raw materials recycling, but allows obtaining a fuel in fact out of the trash. Low temperature pyrolysis (depolymerisation) allows lying out the rubber on constituent components and to use it on the special appointment. As a result of pyrolysis, finished products could be obtained which are then processed into the vast range of useful goods: technical carbon as feedstock for charcoal briquettes and as well as high-quality absorber, thermolysis gas, which is an analogue of natural gas for heating the furnace during the process of pyrolysis, steel wire (metal cord) used in tire manufacturing is the transmutation it into pressed metal for metallurgical industry or tie wire used in construction industry and synthetic crude oil, which is of the same quality as natural oil and can completely replace it.

3) Product Life Extension

Product Life Extension model allows companies to increase the life cycle of products and assets. The value that would otherwise be lost by material discarding is used instead by company for supporting or even for improvement of its products by repairing, modernization, restoration or product remarketing. Due to the product life extension the additional income is created. Using this model company guarantees that products remain economically valuable as long as possible and product renewal are more purposeful (e.g not a product entirely but only outdated component is replaced). This model is suitable for commonly most capital-intensive segments B2B (industrial equipment) and B2C-companies [7] which maintain selling or reselling markets or those companies whose new products commonly consists only of partial additional benefits for clients comparing with the previous version.

PJSC “ZTR” is an example of such business-model functioning in Ukraine.

The service activity of ZTR [8] is directed on ensuring the reliable and long-term exploitation of equipment delivered to customers during all service life. Service center within the enterprise operates as a contemporary scientific and industrial complex with the own technical department, commercial service, complex project department and mobile diagnostic laboratories. Service center provides services for modernization and prolongation of equipment operation time (modernization projects elaboration of old transformers, increasing of transformer capacity on 10-15%; implementation of modern containment system; cooling system modernization with transition to systems which do not require maintenance, changing of inputs and switches to modern counterparts of world’s leading producers;

installation of monitoring systems of different functionality including top level; installation of explosion and fire prevention system “SERGI”).

4) Sharing Platforms

Business-model of Sharing Platforms contributes to creating a platform for joint use by private persons as well as entities They facilitate joint use of extra capacities or under-utilization, increasing productivity and customer’s value creation. Helping to maximize the usage, this model could be beneficial for companies characterized by a low coefficient of using or possessing. Therefore, nowadays this model is most common among the non-production companies specialized on product usage coefficient increasing while posing troubles for traditional manufactures.

The international online service (marketplace) “Busfor” of searching and sale of bus tickets on intercity and international routes is an example of implementation of such models in the Ukraine circular economy. It is a member of the holding of the same name who, until 2000 was called GillBus. This company isn’t a carrier, but aggregates bus transportation service propositions on the market.

According to the company for the end of 2015 tickets on routes of more than 300 carriers were sold on Busfor site and nearly 500 agencies channeled them into the ticket distribution system (GDS). Based on 2016 Busfor has cooperated with more than 5000 carriers. In 2017 the total amount of selling tickets on BUSFOR exceed 1 million.

Online service has been emerged in [9]. Busfor team has elaborated the technological solutions range that covers all bus ticket sale chain: AMS BUSFOR is a system of inventory (shedule, tariffs etc.) management for carrier, GDS BUSFOR is a ticket distribution system that ensures monetary transfer between inventory consolidators and ticket agents, sites and mobile apps BUSFOR is an online ticket searching and selling service, agent station BUSFOR is a set of ticket sale tools by offline and online agents and partners of BUSFOR.

In 2014 the company has obtained first investment flows amounting to \$3,000,000 from InVentures Partners, Intel Capital and Finsight Ventures Foundations. Until this company has developed on the means of founding members. In October 2016 Baring Vostok Capital Partners and Elbrus Capital Foundations have invested in company \$20,000,000. From 2012 to 2016 the Busfor’ share of the online bus ticket sales market increased to 50%. Nowadays within the service tickets are available in 20000 directions and 30 countries (Eastern Europe and UIC).

5) Product as a Service (PaaS)

Business-model “Product as a Service (PaaS)” is an alternative to traditional model “buy and possess.” Products are used by single or multiple clients for a lease payments or usage charge. This business-model turns incentives for product durability and its modernization upside down by changing the priority from amount to productivity/efficiency (performance). According to this

model the product's durability, reuse and joint use are no longer seen as dismantling risks, but as factors of income increasing and cost to reduce. This model could be attractive for companies with expensive exploitation products and those who've got advantages in product service comparing with competitors.

For example the world leading tire manufacturer Michelin has achieved significant success in the adaptation of this model for creation of innovative program giving clients to lease rather than buying the tires. According to this program Michelin effectively sells "tires as a service" [10]. Clients pay for mile; they don't own tires. They don't deal with puncture problems or maintenance. By adopting the product model as service Michelin stimulates elaboration of long-term exploitation tires. When returning worn-out tires it is in the interest of the company to make a separate choice of materials out of tires through design for subsequent processing in valuable materials for new tires or into something completely different. It should be noted that the PaaS model in Ukraine is still at an embryonic stage and only a few producers are at an early stage of implementation and meanwhile majority are still trying to figure out how to use a new model to their advantage.

Conclusions

Circular economy is a new economic model and should base not on changing individual behaviour but on changing the system.

On the conference of scientific youth #YSC 2.0 "Economical Future of Ukraine" held on 5 April 2019 by the Ukrainian Association of The Club of Rome (UACR) together with the Kyiv International Economic Forum (KIEF) G. Jacobs (American writer, researcher and consultant of business management, economic and social development, education and global management, full member of Rome Club) has reflected on state of sustainable development of Ukraine in this way [11]: "Please, don't forget: those who begin last not necessarily finish last. To make a "quantum leap" you need is certainly not so easy. It is insufficient to read manuals written 20 years ago and tell you right how to implement this in Ukraine. Sure, we can learn much from the experience of those countries that have passed through that period. Now it is important for us to understand the laws and environment which encourages entrepreneurship and encourages people with required productive skills and to ensure access to capital investments and to open markets, but there's still greater component that needs the development – it's the economy for the sake of the future. It's the multi-component economy, which works not only for a few rich people that control the overwhelming majority of the world. We need sustainable economy that does not plunder or drain natural resources. But our environment: land, air, water and all natural wealth are invaluable and any economical calculations can't depict this."

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