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APPLICATION OF SUCCESSFUL ECO-STARTUPS IN UKRAINE AND WORLDWIDE ON THE WAY OF SUSTAINABLE DEVELOPMENT

The world is on the brink of ecological catastrophes and global changes caused by anthropogenic activity. Solving a number of environmental, social and economic problems in the context of sustainable development requires innovative solutions. The development of innovations in the environmental sphere today is developing in the environment of startup ecosystems (Sytnyk N, 2017, pp. 119–120).

The startup ecosystem is an innovative and developed region where a set of institutions functions, including higher education institutions, research institutes, technology parks, giant companies in the field of information and communication technologies, organizations whose activities are aimed at supporting business initiatives in the technology sector and innovations, which increases the probability of successful implementation of eco-startups. A peculiarity of the startup ecosystem is a close relationship with applied science (Valto L., 2016).

A special type of innovation is environmental start-ups, the implementation of which aims to achieve results for the growth of the economy, as well as environmental goals. Eco-startups combining business and technology are designed to solve global problems - from plastic waste recycling to renewable energy. Environmental startups mainly attract venture capital and popular crowdfunding platforms (Kickstarter, Ulule, Crowdculture, Goteo, Derev, Wemakeit) (Kopytko M., 2019).

Today, a number of innovative environmental projects based on domestic eco-startups are being successfully implemented in Ukraine, which are aimed at solving the problems of sustainable development, in particular the issues of processing waste from plastic, leaves and paper, the production of alternative electricity, as well as its savings, the reuse of technical water, the production biodegradable bags and packaging material, production of charging stations for electric cars, technologies for extracting clean drinking water from the air (Babyachok R., & Kulchytskyi I., 2018).

The purpose of the article was to highlight the development trends of eco-startups in Ukraine, as well as the prospects for their entry into international markets. Identify the most promising eco-startups, which have already gained favor in the world and are developing rapidly, and their production is rapidly scaling up in Ukraine and abroad.

Ukrainian inventors have many promising ecological developments. Each environmental startup has an individual approach to solving environmental problems. And not only large companies, but also small startups are trying to make the world a better place. Many of them won prizes at

international competitions and were honored with awards and prizes (for example University Startup World Cup). In recent years, dozens of Ukrainian eco-startups have gained great popularity, leaving an impressive mark in the industry (Moiseyeva M., & Golinata A., 2019).

Recycle Map –is an online interactive map on which waste recycling points are marked in Ukraine. The main goal of the startup is to popularize the sorting and recycling of household waste, and therefore to reduce the amount of garbage that ends up in landfills. On this map you can find out, for example, where in Ukraine you can drop off batteries, cardboard, accumulators, PET bottles, organic waste, glass containers and other types of waste.

Stock-Factory – online platform for the sale of problematic goods. The service helps to quickly sell or donate generally high-quality goods that have damaged or missing packaging or are nearing their expiration date. In this way, the startup contributes to reducing the volume of destruction of goods in trade networks. In 2018, the Stock-Factory team won the global competition for "green" business ideas Climate Launchpad in the nomination "Decision-making systems and finance" and received 5 thousand euros for the development of the project.

EcoInfo – e-platform for monitoring atmospheric air at the point of stay. Egap Challenge Demo Day 2017 startup competition winner. The service offers users information about the level of atmospheric air pollution, draws attention to environmental problems and can thus increase the eco-awareness of Ukrainian citizens. At the moment, four useful eco-layers have been implemented.

Eco-City – the network distributes cheap devices for public monitoring. Eco-City stations measure air pollution once a minute and send them to the server. On the server, these data are stored in a database, and users can view them on the site as a pollution map that is updated online. Depending on the configuration, the station can measure various indicators, but the main ones are temperature, humidity, atmospheric pressure and micro dust (PM 2,5 та PM10).

Animal-id. – a social network for pets that helps find lost pets using an ID token with a QR code, is chipping animals. Digital IDs protect animals from loss and are integrated with the world's leading animal microchip databases.

Znaydeno – visualization e-service for monitoring and control of land use, deforestation, unauthorized waste disposal. The Znaydeno project compares cadastral and forestry boundary data with satellite images and then displays changes in natural surfaces on a geoportal. The system compares the newly received satellite image with the previous one and signals a violation. Drones, which record the facts of crimes, determine the exact places of felling.

S.Lab. – the technology of production of ecological products from industrial hemp and mushroom mycelium, the basis of which is chitin and cellulose. The products are completely environmentally safe, retain water, heat, have a certain strength, and the most important thing is that

they naturally decompose in the soil in a short time.

HelioPulse – highly efficient solar collector-concentrator for home and industrial use. The system allows you to heat water up to 80-120 °C (and oil even up to 250 °C). This is achieved by concentrating the sun's rays hitting the mirror and directing it to a tube that is constantly in focus.

Ukrainian startup FoodBIOPack develops biodegradable and edible packaging, tableware and cutlery. Developers say: the basis of all products are natural food components that contain proteins, polysaccharides and fats.

SolarGaps – these are window blinds with solar panels attached. The blinds are controlled via a mobile app, and the device itself also automatically tilts the panels to get as much energy as possible. These "smart" blinds generate clean energy with the help of photovoltaic modules. 1 m^2 of SolarGaps can produce 100 W/h. The received energy can be used to charge small household gadgets.

ECOISME – power saving system. The Ecoisme device connects to the electrical switchboard and the Wi-Fi network, and measures the electricity consumption in the house. All data on energy consumption is sent to the mobile application and helps the owner to control consumption. The company cooperates with such well-known brands as T-mobile, Virgin Media and Bosch. Ecoisme has received wide recognition, many awards (winner of the CES Best of Innovation Award and EDF Pulse).

RE-leaf PAPER – eco-paper production technology from fallen leaves. In 2020, the innovative development was implemented by the Zhytomyr cardboard plant, which produced the first batch, and later launched the industrial production of paper from fallen leaves. "As a result, we received 1.5 tons of paper with a density of 90 and 100 g/m^2, a thickness of 0.2 mm, and a compression resistance value of 285 kPa," wrote the founder of the technology Valentyn Frechka

GO TO-U – an international platform with charging stations for electric vehicles. Go To-U has created an online platform that brings together environmentally responsible businesses that offer free electric vehicle charging services to their customers. The platform already covers about 12,000 charging stations in Ukraine, Austria, Portugal, other European countries, Thailand and Kazakhstan. The goal of the startup is to reduce environmental pollution from CO^2 emissions.

Ukrainian startup Effa created an ecological disposable toothbrush from recycled paper. Effa brushes will primarily be useful to those who travel a lot without harming nature. The startup was also selected for the business program of one of the largest paper producers - Stora Enso. The company entered the top five climate startups in the world at the Clim@ competition in Germany in 2018.

RE-BEAU – jewelry from recycled plastic is created by Ukrainian designer Maria Sorokina. This year, Re-beau products complemented the looks of models at the Ukrainian Fashion Week, in cooperation with the Roussin brand.

Ukrainian startup UGrid has developed a service for building energy microgrids based on

conventional networks, which will help local energy supply organizations to reduce the use of fossil energy sources and avoid overpayments for energy supply.

NUKA – an eternal notebook and a pencil that never ends. Ukrainian startup Nuka believes in the model of smart consumption. The startup was successfully presented at the CES exhibition in Las Vegas. The peculiarity of the startup is a pencil that never erases, so it does not need to be sharpened. The eternal notebook can be rewritten an infinite number of times, and with the help of a special napkin you can remove all inscriptions.

TOKA – is a network of publicly available charging stations for electric vehicles. The main task of the company is to make owning an electric car as comfortable as a car with an internal combustion engine, and the number of charging stations more accessible.

WATER CLOUD UA – a device for collecting water from the air in the form of condensate. According to the authors of the project, even in the desert there is about 15% water in the air. For our climate, this is approximately 50-60%. Collected water goes through several stages of purification, after which it can be drunk.

JOLLYLOOK – ecologically safe camera for instant pictures. The Jollylook folding camera is made entirely from recycled paper and cardboard. No electronics - just paper, a couple of lenses and mini cartridges for instant photos.

Ochis coffee – glasses made of coffee beans. The world's first waste-free glasses were invented by Maxim Gavrylenko from Kyiv. The glasses are made of biopolymer based on natural coffee and flax. Ochis Coffee frames are completely collapsible. When the glasses fall into the ground or water, they turn into fertilizer.

Leaf & Roof – energy- and resource-efficient farm for growing vegetables on the roof. The idea behind the Leaf & Roof project is to grow environmentally safe vegetables and herbs on the roofs of urban high-rise buildings.

Delfast – it is a bicycle with an electric battery, in which you can turn the pedals if you wish. In 2017, the bike set a world record at the Kyiv cycle track, having traveled 367 kilometers on a single battery charge. The Delfast Prime bicycle "lasts" more than 300 kilometers without recharging [4].

Clean water – an interactive map of river pollution in Ukraine based on data from the State Water Resources Agency. There are more than 400 river water control points on the map. On the map, you can view up to 16 parameters of pollution, as well as find out how its level has changed over five years.

SaveEcoBot – the first ecological bot in Ukraine for monitoring information about permit documents and procedures of industrial and other environmental polluters. SaveEcoBot is a volunteer project of the Save Dnipro initiative group. The only environmental chatbot in Ukraine that combines

data on pollution, polluters and environmental protection tools.

The chatbot can easily find and organize the following information for you: monitoring of the register of environmental impact assessment (environmental impact assessment), which displays the stages of the environmental assessment procedure of planned activities of enterprises; data on permits for emissions of harmful substances into atmospheric air by stationary sources of group 1, 2 and 3 polluting enterprises; data on special permits for subsoil use; data on permits for special water use; data on licenses for hazardous waste management; information about business entities that have a tax debt; data on licenses for the production of particularly dangerous chemicals; data on waste declarations.

Dozens of successful eco-startups created in Ukraine are recognized in the world today, enjoy great interest and scale. In order to strengthen the innovative competitiveness of Ukraine on the world market, it is necessary to attract new investments, considerate and effective state support for small businesses and wide public information. The peculiarity of eco-startups is that they are created not only for the purpose of making a profit, but primarily to solve the problem of environmental protection in the context of sustainable development. Implementation of ecological startups completely depends on the level of development of startup ecosystems.

The startup ecosystem of Ukraine is at the stage of active formation, and in recent years its development has been characterized by positive dynamics. There is an increase in the total number of startups, which is accompanied by an increase in the number of ecosystem life support entities and, at the same time, their more active participation in the ecosystem.

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