

START-UP AS A TOOL FOR DISRUPTIVE INNOVATION

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Annotation. *One of the decisive indicators of competitiveness of the economy is innovative development. Innovation has its own embodiment infrastructure, called the innovation ecosystem. It consists of direct innovators (start-ups), investment and support institutions, and a state as a regulator. The current state of innovative development of Ukraine remains at a very low level, which is reflected by the latest positions in the leading world rankings.*

Key words: *innovation, start-up, business incubators, venture funds, ecosystem of innovation, disruptive innovation.*

We live in a world that the Americans call the VUCA (the abbreviation for volatility, uncertainty, complexity and ambiguity) world which is unstable, uncertain, complex and ambiguous [1]. This is the present-day world, and it is a very fun time for creative people, because old working models no longer work.

Today, the issue of innovative development is crucial for the future of Ukraine. Unfortunately, due to the difficult economic and political situation, not all instruments are available to our country.

The term "innovation" comes from the Latin "novatio", which means "update" (or "change"), and the prefix "in", which is translated from Latin as "in the direction", if translated literally: "Innovatio — in the direction of change". [2]

Innovation is not any innovation, it is only the one, which seriously increases the effectiveness of the current system. [3]

Innovation is the object of implementation or the process that leads to the emergence of something new.

In scientific lexicon this term was first coined by J. Schumpeter, literally meaning "the embodiment of scientific discovery, technological invention, a new technology or a new kind of product." In addition, innovation was considered by J. Schumpeter as a new function of production, its new combination.

The term "innovation" gained distribution in American management, but today it is also actively used in Ukraine. In principle, any socio-economic innovation, until it has received a massive, that is, serial expansion into the labor, production industry and management, can be considered an innovation.

In recent years there was a special kind of innovative business: risky or venture. These are primarily small firms that deal with spreading technologies in knowledge-

intensive industries, in the first place.

Innovation plays an extremely important role in the development of human civilization (e.g. known such phenomenon as "Kondratyev's waves") and, in particular, of each state separately. Correspondingly, the majority of the present-day states are trying to establish and continuously improve national innovation system to support the process of creating and implementing innovations.

Studies have shown that there are several sources of innovation. They can occur as a result of a whole set of efforts of a number of different agents, randomly, or as a result of the failure of the dominant system.

According to Peter F. Drucker, general sources of innovation comprise different changes in the structure of industry, in the structure of the market in local and global demography, in human perception, mood and sense of the amount of already available scientific knowledge and etc.

In the simplest linear model of innovation the producer of innovation is a commonly recognized source of innovation. This is an agent (person or company), who develops innovations with the aim to sell them later on.

Another source of innovation which is obtaining a wide recognition only now is the end user. This is an agent (person or company), who develops innovations for their own use (private or in the economy), because the existing products do not meet their needs. Economist Eric von Hippel has identified end-user innovation as the most important and critical. [4]

American inventor, known under the title "Father of Robotics", Joseph Engelberger, states that innovations require only three things: conscious necessity, competent people with the appropriate technology and financial support. [5]

However, innovation processes, as a rule, include identifying needs, developing competencies and searching for financial support.

Chain innovation model by Stefan Klein [6] makes emphasis on the potential needs of the market in the role of drive for innovation process and describes the complex and often iterative inverse relationship between marketing, design, manufacturing and R&D.

There are several classifications of innovations. The first classification is based on the object:

- commodity – the introduction of a new product;
- technological – the introduction of a new method of production;
- market – creation of a new market for goods and services;
- marketing – development of a new source of raw material supply;
- management – reorganization of management structure;
- social – implementing measures with a view to improving the lives of the population;
- environmental – implementing measures aimed at protection of the environment.

The second classification is based on the market-related essence of innovation:

- continuous innovation – improvements to existing products that do not make significant changes to the way they are used by consumers; [7]

- intermittent innovation (Eng. revolutionary, discontinuous, radical innovation) – completely new products, which require efforts of consumers in terms of adopting new habits on their use, but do not have a significant impact on previously existing markets; [7]

- disruptive innovation (Eng. disruptive innovation) – innovation that creates new market due to different values, which in the ultimately (and unexpectedly) apply to previously existing market and completely alterate it. [8,9]

"Disruptive Innovation" - this innovation is changing the ratio of values in the market, whereas old products become uncompetitive simply because the parameters which previously underpinned the competition are becoming unimportant.

Continuous innovation, as a rule, is innovation in technology, while disruptive innovation alterates entire markets. For example, the car was a revolutionary technological innovation, but it was not disruptive, since early cars were a luxury that did not have a significant impact on the horse-drawn carriage market. Transportation market, in essence, remained intact until the debut of cheap Ford Model T in the year 1908. Mass production of cars was a disruptive innovation, because it has changed the transportation market. Although the car itself did not constitute an innovation. [10]

"Disruptive innovation" model is the theory of Clayton Christensen, which he first introduced in 1997 in his book "The innovator's dilemma: how strong companies die with new technologies." [11]

This model can be used to describe the impact of new technologies on the functioning of the firm. Clayton Christensen studied the reasons due to which the biggest companies, worldwide leaders of the industry are rapidly losing their dominant position, stop being flagship, when new startups involving new technologies appear on the market. Everything changes at the moment when "subversive technology" finds its buyer who is willing to put up with the shortcomings of the new product and who needs new properties of this product. Having such a buyer, new technology starts to evolve, production volumes grow, and there comes a time when it starts to justify its name "a breakthrough technology" [12]. Examples of "disruptive innovations" are as follows: telephone (replaced telegraph), steamers (replaced sailing vessels), semiconductors (replaced electrovacuum devices), e-mail ("disrupted" conventional post).

From the moment of the release on the market, disruptive innovation goes through the different stages, which depend on the types of users. In order to understand how and with what speed innovative ideas and products are distributed, let us conditionally divide the way the product goes through according to the types of users:

Innovators (innovators) are loyal, that is willing to experiment and consume "raw" product, provide feedback, i.e. express wishes and point to the drawbacks of the product.

Relative innovators (early adopters) – people who also feel the presence of problems, but to a much lesser extent than innovators are able to accept new product. They also need the opinion of others to make them believe that the product really solves the problem.

The early majority (early majority) is a segment of more conservative consumers; their opinion about the innovation can be adjusted by using classical methods of marketing. For example, people who go to the store and ask about washing powder with

blue crystals.

Late majority (latemajority) – people who buy only tested and proven products.

Sloth (laggards) – that sector of consumers who buy innovative product only if they can not refuse to buy it. For example, in 1996, mobile phones began to appear in Ukraine and initially they did not have a short messaging service in them, however, even if desired, it is now difficult to find a phone without an integrated short message service.

Startups represent the companies that develop and innovate. Startup (eng.) is a recently created company (possibly officially unregistered yet, but seriously planning to become official) that builds its business on the basis of innovation or innovative technologies with a limited a set of resources, which has not entered the market yet, or is just emerging in the marketplace. [1]

The term "startup" is used especially often used in relation to Internet companies and other companies that operate in the field of IT. However, this notion is also common for other fields of activity.

Innovations, which form the basis of the business startups, can be both global (i.e. worldwide innovations), and local (that is, to constitute an innovation in one country, but at the same time in the other countries this technology is no longer innovative). An example of local innovative technology can be scoring technology for potential bank credit users based on the analysis of their credit histories. For Ukraine, this technology is innovative, whereas for the other countries, such as the US, it is no longer an innovation.

There is a variety of criteria and definitions for a startup company:

A startup is a company or temporary organization created to find a repeatable and scalable business model. The main product of the startup is in fact the company that eventually has to be sold. [14]

Startup is a newly established organization, which is engaged in the development of new products or services under the conditions of extreme uncertainty. [15]

Startup is a company which is in the initial stage of its activity; organized on the founders' funds and seeks to increase the capitalization along with developing the product in the hope that it will generate demand. [1]

Despite the differences in wording, it is easy to notice that in the heart of the concept of "startup" lies the concept of "innovation". It is impossible to create a startup without innovative ideas or technology. Startup is a tool for bringing innovations to the market, in the first place.

Thus, only a company that runs through the full cycle of development, from designing a prototype and fundraising to its market launch, can be called a startup. A company that will grow with the idea that at the end of its life cycle, it will be acquired by a larger company, or it will merge with other businesses, or become a joint-stock company.

Therefore, we need to consider the stages of the life cycle of a startup. A reduced classification of startup evolution stages is often referred to, whereby it undergoes 5 stages: seed stage, startup stage, growth stage, expansion stage and exit stage.

Sometimes a more extensive classification is used:

Pre-startup stage:

- Pre-seed stage
- Seed stage
- Prototype
- Working prototype
- Alpha-version of a project or product (alpha)
- Closed beta-version of project or product (private beta)
- Public beta-version of a project or product (public beta)
- Launching a project in operation or a product into production
- Startup stage
- Launch or early-startup stage
- Working with first customers, or late startup stage (first customers, or late startup stage)

stage)

Post-startup stage

- Growth stage
- Expansion stage
- Exit stage

RE-IPO stage (when launched through IPO) [1]

A startup can not earn money right away. It takes time to develop a prototype, time to test the idea on the first leads and further refinement. Experience shows that the first 2-3 years of a startup require far more money than it can earn. This is the first phase of the lifecycle, the so-called "dead zone", when it simply absorbs resources without any profitability. But if the idea survives, then a rapid growth follows up. For example, if invested \$1 million during the first three years, the fourth year the company will earn \$15 million revenue.

Unlike a traditional business, a startup can not do without assistance or attract bank loans. No credit institution provides loans for research and development. So, the only way out for a startuper is to find an investor who will agree to invest in exchange for part of the business. The investor is not a creditor, he is a risk-sharing partner. There is no need to return investment funds, but in exchange for them, the founder loses the sovereignty of his/her business and must obtain approval from the investor in decision-making. Risks related to running an innovative business are so high that a specific infrastructure of organizations participating in the innovation process has developed, which may include business incubators, business angels and venture capital funds.

Business Incubator is an organization that provides, under certain conditions and for a certain time, specially equipped premises and other property to small and medium-sized enterprises that start their business in order to facilitate their financial independence [17]. A separate type of business incubators is innovative business incubators.

A business incubator is a structure that specializes in creating favorable conditions for the emergence and effective operation of small innovative (venture) companies that implement original scientific and technical ideas. This is achieved by providing these companies with material, information, consulting and other necessary services. [18]

The most important functions of business incubators are:

- leasing of offices / workshops, often (in some cities / centers) at the prices lower than market prices and with flexible extra space available upon request
- administrative and technical services (telephone, copying, conference / meeting rooms, secretariat, etc.)
- consulting / business planning for beginners and potential entrepreneurs. A wide range of other (consulting) services, technology transfer, seminars and training offers, etc. are also possible.

Business Angel (Angel Investors) is a private investor investing in innovative projects (startups) at the stage of the company creation in exchange for the return of investments and equity share (typically a blocking but not controlling interest) [1]. As a rule, the Angels invest their own funds, unlike venture capitalists who manage third-party money pooled in venture funds. A small but growing number of business angels are forming networks or groups to work together to find investment objects and to pool capital.

Venture Fund (Venture) is an investment fund focused on working with innovative enterprises and projects (startups). Venture funds invest in securities or shares of high or relatively high-risk enterprises with an expectation of extremely high returns. As a rule, 70-80% of the projects do not pay off, but the profit from the remaining 20-30% covers all the losses. [1]

The peculiarity of funds of this type is the legislative authorization to carry out more risky activities: absence or sharply reduced need for risk diversification; they are allowed not only to buy corporate rights, but also to lend to companies (for example, through the purchase of promissory notes). The only thing which is prohibited is to invest in the banking, insurance and investment industries.

It is advisable to involve different institutions at every stage of the startup development.

Given the sources of funding, the stages can be divided into 3 zones.

The first zone combines the seed and launch stages. At this stage, the idea should come to its logical conclusion, become a set of documents (business plan, terms of reference, etc.), in which all sides of the issue are transparent, comprehensible and attractive. The first prototype is then created. The prototype may be, for example, the design and functionality of the site. Funding at this stage comes from seeding capital, which has two main sources: business angels and 3F investors (ironic decoding of the FFF abbreviation which stands for "family, friends, and fools"). At this stage, the startup "burns" money and is in the "dead zone", so it is difficult for an entrepreneur to attract professional investment. Experts advise to manage their own money at this stage, or to look for an "angel" who is not a professional investor. The end of this zone is to break even.

The second zone combines the stage of growth and expansion. This is the stage of the growth of the company, profits, etc.; at the stage of expansion the staff increases, struggle for markets is enhanced, new branches are opened, etc. This is the tipping point when funds are essential. Here, in addition to promotion, the project management begins

to look for partners and clients. The project is already becoming a serious company working on its development. The third and last zone is the exit stage, it is also called a post-start stage. The one who has led the project from scratch to this stage should sell it, partially or completely, as close as possible to the highest value of the company. [19]

The latest and the greatest player in the field of innovation is the state. State regulation of the innovation process at the present stage is one of the main conditions for economic development.

Based on the facts and experience of the world, successful scientific and technical activities are impossible without a system of effective state support. The need for state regulation of innovation processes is preconditioned, first of all, by the scale of financial costs for research and the implementation of its results. Improvements in the processes of scientific knowledge are increasing the costs of research and development. New scientific results are being achieved by highly qualified and, therefore, highly paid personnel, with the advancement of the capital-labor ratio of the scientific field. Implementation of the innovations entails even more costs.

First, large expenses require expertise, patenting, certification of new products, etc., which is beyond the power of individual market operators.

Secondly, many innovations can be economically effective with an implementation scale beyond a critical minimum, and availability of sufficient market capacity. For example, the Pentagon-created Internet system is used by more than 44.8 million citizens in the United States alone. The work within the Internet system is a sphere of production activity for many companies, comprising program development, creating reference sites, catalogs, specialized and popular magazines, etc.

Thirdly, the isolated implementation of innovation leads to significant losses not only for the company, but also for the economy as a whole. In addition, there are innovative processes that are not commercially viable. These include basic scientific research, the results of which cannot be commercialized, as well as innovations aimed at meeting the needs of society as a whole (ecology, defense, law enforcement, etc.). The costs of these components of innovation processes are borne by the whole society.

These and other features of innovation processes indicate that an effective innovation strategy for the development of national enterprises cannot do without the support from the state being rendered.

The state creates favourable conditions for innovative activity, forming unified civilized rules and mechanisms that contribute to the development of all subjects of the innovation sphere. The main directions of state regulation of innovative activity include the following:

1. Accumulation of financial resources for research both at the expense of the budget and through the creation of special funds.
2. All-encompassing promotion of the development of science, including applied science, and formation of small innovative entrepreneurship (start-ups).
3. Formation of government contracts for R&D, which provide initial demand for innovation and then get spread in the economy.

4. Coordination of innovation activities.

5. The state promotes the cooperation and interaction of different institutions in the implementation of innovations through the formation of a single technological space (synchronization of the innovation cycle in time and space), which ensures the compatibility of innovations.

6. Encouraging the innovation process and innovation activity through competition, as well as the use of economic methods of direct and indirect action, such as: financial subsidies, benefits, insurance against the impact of innovation risks, etc.

7. Creating the legal basis for innovation processes through the formation of the necessary regulatory framework.

8. Staffing innovation through the creation of appropriate training programs in public educational institutions that would enhance the creative potential of the nation.

9. Formation of scientific-innovative infrastructure, information systems, advisory and legal services.

10. Institutional support for innovation processes through the creation of state organizations and units that carry out research and development and innovate in the public sector (defense, health, education).

11. Improving the social status of innovation activity through the promotion of innovators, ensuring their social protection, promulgating scientific and technological achievements.

12. Regional regulation of innovation processes through rational allocation and use of innovative potential.

13. Regulation of the international aspects of innovation processes through the definition of economic and innovation strategies aimed at international scientific and technical cooperation. [20]

Thus, as we can see, the role of the state cannot be underestimated. Although innovation is undoubtedly something that cannot be created administratively, in a planned manner, the favorable conditions for the emergence of innovation need to be fostered at the state level. Back in the day, each developed country adopted a parliamentary decision to hold a course for innovative development. Moreover, it is extremely important to understand that the regulation of innovation activity is not limited solely to the role of the state. For example, one of the factors that facilitate innovation is the appreciation of the resources. We know that in developed countries energy and even water have a much higher absolute price than in Ukraine. And the Norwegian government is deliberately raising the price of oil in the domestic market for entrepreneurs to adapt to the search for new energy-saving technologies. Human labor is the most important resource, so raise in wage is also an impetus for innovation. Although, according to neoclassical theory, the first stage of wage growth without productivity gains will inevitably lead to high levels of unemployment and bankruptcy of uncompetitive enterprises, but as the experience of countries that have undergone the "economic miracle" shows, a qualitatively new generation of innovative enterprises is formed in the next stage which take the national economy to a new level of development.

Therefore, we see that the state has the tools and levers of influence on the economy and innovative development in particular, which makes it crucial for the innovation process.

To recapitulate this study, the following conclusions can be drawn:

Innovative development in the modern world is a decisive indicator of the competitiveness of the national economy in the world arena. Innovation penetrates to all spheres of human life and has its own embodiment infrastructure, which is called the innovation ecosystem. The innovation ecosystem consists of direct innovators (startups), institutions providing investment and support (business incubators, venture funds) and the state as a regulator. The state's need for an innovation ecosystem is driven by both the need to stimulate it and the need to control the risks of the innovation process, including systemic, social and ethical risks.

The current innovative development in Ukraine remains at a very low level, which is reflected in the bottom positions in the leading world rankings. This is partly caused by the fact that the innovation industries and ecosystems are still immature, and partly by the general crisis and economic climate that is not conducive to entrepreneurship. Among the main problems of Ukraine are extremely high levels of corruption, inefficiency of public administration, uneven access to resources, poor quality of education. Among the competitive advantages, the first is human capital assets. Ukraine's status quo has been consistently worsening over recent years, and we are now losing our advantage in the form of human capital assets. This is partially explained by the outflow of highly qualified personnel, but in addition, Ukraine is experiencing a demographic crisis. We rank first in Europe in terms of mortality rate, and second in the world. According to forecasts, unless proper measures are taken, in 50 years the population of Ukraine will decrease to 12 million.

As a way to overcome the demographic crisis and at the same time enhance the innovation and competitiveness of the Ukrainian economy, it is proposed to foster startups focused on social impact, in particular aimed at preventing cardiovascular disease, which is mainly the cause of mortality with working-age population. This tool requires relatively little investment and is the key to intensive economic development, as it will give impetus to self-organization of the innovation ecosystem and further innovation process.

In addition to such urgent measures to overcome the crisis, a general economic recovery is desirable. What is needed for the resource economy to gravitate towards high-tech and production of the final product? Over the past three years, since the state's attempts to positively influence the development of innovative industries, such as information technology, began, it became clear that some tax benefits were not enough to create competitive advantages for Ukrainian IT companies. Based on this research, we can provide the following recommendations for innovation policy:

First and foremost, it is required to provide a favorable environment for business development, overcoming problems as follows:

- high levels of corruption, especially in governmental structures such as Bureau of

Technical Inventory, Tax Service, Customs Service, etc. ;

- imposition of superfluous services by the authorities and overpricing of administrative services;
- simplifying procedures such as registration and liquidation of businesses, VAT refunds, patenting and licensing.

As innovative development is inextricably linked to education and science, Ukraine needs to address a number of problems in this area:

- to give autonomy to universities so that they can, in particular, introduce their own admission rules;
- to create a system for tracking plagiarism and to extend this system to all Ukrainian educational institutions;
- change some of the criteria for evaluating the quality of work of teachers and scholars, including the criterion for the number of publications in scientific publications in order to evaluate quality instead of quantity;
- to promote the profession of a lecturer and teacher, in particular in the field of information technology, as for the time being mostly elderly people teach in this field who do not possess the latest information and cutting-edge technology;
- to foster business collaboration with universities and other research and development institutions.

A strategic sector for Ukraine's innovation is the information technology industry, so special attention should be paid to the development of IT entrepreneurship, which requires:

- a set of measures that allow to reach a new level of functioning of the industry (so far most companies are focused on working with foreign customers, and the domestic market remains in its infancy);
- purposeful protectionist policy of the state aimed at Ukrainian developers;
- rules that prioritize the supply of domestic product developed by Ukrainian companies in the public sector and local authorities;
- encouragement by the state of purchases of domestic product by private enterprises through partial subsidization or reduction of tax burden for their work with Ukrainian development companies;
- support for the start-up movement, which creates the foundation for new approaches and trends, allows to become the cradle of big business in the future;
- creating an environment for the physical comfort of the IT market players.

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