

THE CONCEPT OF ECOSYSTEMS BASED ON DIGITAL PLATFORMS: BENEFITS, RISKS AND PRINCIPLES OF CREATION

Natalya N. MASYUK, Vladivostok State University, Vladivostok, Russia,
masyukn@gmail.com orcid.org/0000-0001-8055-8597/ E-3887-2016

Marina A. BUSHUEVA, Plekhanov Russian University of Economics (Ivanovo branch), Ivanovo, Russia, bush.mar@yandex.ru orcid.org/0000-0002-2512-4769/ E-4006-2016

Zinaida V. BRAGINA, Kostroma State University, Kostroma, Russia,
bragzv@yandex.ru, orcid.org/0000-0003-3457-4574

Anna S. ILUKHINA, Kostroma State University, Kostroma, Russia,
institut-eco@yandex.ru

Aleksandr A. BOGOMOLOV, Vladivostok State University,
Vladivostok, Russia alex9780@mail.ru

Abstract. The digital economy, represented by new technologies, is rapidly developing and is increasingly being integrated into all spheres of the economy and society. The concept of ecosystems based on digital platforms is increasingly in demand by researchers to explain the processes taking place in the economy of enterprises, regions and countries in connection with the rapid development of digital technologies. This article is devoted to the conceptual foundations of the functioning of ecosystems based on digital platforms. It is noted that each platform is based on a very simple idea: to organize interaction between the producer and the consumer in the digital space. It has been convincingly proven that the modern economy is largely of an intermediary nature, since digital platforms carry the semantic load of organizing the interaction between suppliers and consumers. The expediency of the transition to the platform business and the inevitability of embedding in the ecosystem are argued. The risks of using platforms are identified. The principles of creating a platform business are formulated.

Keywords: digital platforms, ecosystems, platform business model, network effects.

Introduction. In recent years, the Internet, big data, cloud solutions, artificial intelligence, waiting and other technologies have accelerated innovation, becoming more and more integrated into the whole process of economic and social development. The digital economy is developing at a rapid pace, has a wide range of observations and an unprecedented evaluation score, becomes a key vital need to transform serious resource factors, change the global economic structure, and change the global competition pattern. An important role in the development of the digital economy is played by digital platforms (Denisov, Polozhishnikova, Kuttybaeva and Petrenko, 2020).

A platform as a business is an association of two or more active parties to participate in achieving the goals of each group. From the point of view of the economic essence of this phenomenon, the digital platform acts as an intermediary. Unlike unwanted business models, intermediaries do not need to purchase raw materials, the products they distribute. Instead, they recruit members to their platform and then produce them

with others. It can be said that these people are the “raw material” due to which they become infected with intermediary services.

Classical business works differently. He himself attracts to his property and sells its interests. Toyota builds its own cars and markets them through a network of dealers. The volume of income for Toyota directly depends on the number of cars produced. In the case of Uber and other business platforms, the amount of code written has no direct correlation with the outcome from the platform site.

Method and methodology. The methodological basis of the study is a comparative content analysis of global trends in the field of ecosystems and platform solutions, as well as a conceptual approach to the development of ecosystems based on digital platforms and the study of the opportunities that digital platforms provide to users, businesses and the owner of a digital platform, taking into account network effects.

Results. Platform business models and ecosystems have become an objective reality of the digital economy (Masyuk, & Temnova, 2021). Studies of the processes taking place in the economy in recent years increasingly include the concept of "ecosystem" (Jacobides, Cennamo, Gawer, 2015). This direction is reflected in the works of many scientists, including the most significant works of such authors as Moore, 1993; Moore, 1996; Iansiti, Levien, 2004; Tece, 2007; Adomavicius, Bockstedt, Gupta, Kauffman, 2007; Adomavicius, Bockstedt, Gupta, Kauffman, 2008; Adner, Kapoor, 2010; Wareham, Fox, Cano, 2014; Isenberg, 2014; Androsik, 2016; Adner, 2017; Doroshenko, Shelomentsev, 2017; Jacobides, Cennamo, Gawer, 2015; Jacobides, Cennamo, Gawer, 2018; Dementiev, 2018; Kleiner, 2018; Markova, 2018; and etc.

G.B. Kleiner considers an ecosystem as a spatially localized complex of hierarchically uncontrolled organizations, business processes, innovative projects and infrastructure systems that interact with each other in the course of the creation and circulation of material and symbolic goods and values, capable of long-term and independent functioning due to the circulation of these goods and systems (Kleiner, 2019).

In the work (Dementiev, Evsyukov, Ustyuzhanina, 2017), the most common forms of business organization and ways of coordinating intercompany interactions are investigated and systematized. The authors came to the conclusion about the development of a trend of combining both hard (within the system of possessory control - a system of control by the owners of assets) and soft forms of integration (based on the benefits of cooperation). Under these conditions, researchers turn to such a unit of economic analysis as an ecosystem, which is a network of collaborating and competing firms that offer related products and services (Jacobides, Cennamo, Gawer, 2015; Adner 2006; Iansiti, Levien 2004; Moore 1993).

The development of digital platforms leads to the formation of ecosystems (Muegge, 2013; Evans, 2016; Parker, Van Alstyne, Choudary, 2016; Muegge, 2017). Platform revolution: How networked markets are transforming the economy and how to make them work for you. W. W. Norton & Company. Few people fully realize how deeply this phenomenon has penetrated our lives. The boundaries between industries are gradually blurred. New markets are being formed, and existing ones are being actively transformed. This can be explained by the theory of disruptive innovations proposed by the American scientist K. Christensen and his colleagues, which are technologies or inventions that change the ratio of values in the market. “The power of technology lies in how it performatively relates to the cultural and social norms of society as a whole. Therefore, technology in itself is not destructive or supportive, but is potentially a productive result of networking with other social and material elements. This makes old products simply useless” (Christensen, Bower, 1995).

In this regard, to ensure the availability of a coastal company, it is necessary to have such forms of doing business that are found in large enterprises of cooperation with other organizations (Kopeikina, 2008; Kalenov, 2021). One form of such collaboration is digital platforms. The digital platform allows you to

become part of the innovation ecosystem. At the same time, the digital platform economy is characterized by consolidation, which, in the absence of regulation, can be represented as monopolization in the limit.

The concept of an innovation ecosystem has not yet been specified, and the content of the various defined options depends on whether the concept of one or the other is being discussed, for example, in a business or spatial presence. Although an ecosystem can exist without a digital platform, their presence significantly increases its productivity and activates the network interactions of its participants (Markova, 2018).

Autio and Thomas defined an innovation platform ecosystem as “a network of connected organizations located on the territory of firms or enterprises that include both external actors in production and use and create new representatives through innovation” (Autio, Thomas, 2014, p. 205). According to Jackson, “an innovation ecosystem models economic dynamics with complex rules that develop between options or options, a functional goal to be addressed in the course of technology and innovation development” (Jackson, 2011, p. 2).

In thinking about the search for an ecosystem in its original meaning, it is vital to identify the interconnectedness and interdependence of the various parts of the system. To describe the business and innovation environment, it is also necessary to identify the organizational relationship. The correct definition here is related diversity, which, according to James and Halkier (James, Halkier, 2016), refers to the presence of different when there is enough difference among themselves for new recombination of knowledge, but not to such an extent that communication and cooperation between ordinary actors was impossible (Frenken, Van Oort, Verburg, Boschma, 2004). An important role is played by the creation of an institutional regulatory environment (Masyuk, Bushueva, Bragina, 2020).

Each platform participant receives the value for which he came to the ecosystem (What is...? 2021). Let us consider in more detail the tripartite cooperation of the platform participants and the motivation of each of the parties.

1. What does the consumer get?

The consumer usually gets a lot of things that he can't get from a regular assembly line company:

- a large selection of providers on the platform. A wide range of assortment makes it possible to choose more attractive conditions;
- many searches tool. Various filters, selections, etc.;
- risk mitigation through the operation of the platform in terms of checking the reputation of suppliers. It is beneficial for the platform that only reliable suppliers work on it. Any negative due to the supplier also affects the platform.
- free elements for the consumer - due to the fact that the platform earns on other services. For example, Google searches for information for free, Facebook gives you the opportunity to communicate for free, AliExpress gives you the opportunity to quickly pick up the right product from a trusted supplier for free without having to go anywhere.

2. What does the business get from the platform?

Business gets access to narrow segments of consumers who have a formed need. Clients come with their requests. The platform must correctly redirect this interest to suppliers that can meet this demand. Business does not need to spend money on marketing and promotion of goods. This is done by platform services. The business must place its goods and services, and the task of the marketplace is to bring the consumer to these services. A business can receive additional digital services for its work. For example, it could be a CRM to track time bookings when signing up for services, or it could be a complex services calculator. A business can reduce risk when working with a client. The platform guarantees the business that it will receive money while performing its duties. An example is a safe transaction on freelance exchanges.

3. What does the platform (i.e., its owner) get?

The platform itself receives many advantages over competitors of the classical type:

- a) Low cost of resources to provide services. AirBnb does not need to buy hotels, does not need to invest in renovations. They simply invite property owners to their site. Site expansion costs virtually nothing for the site itself. What does Uber need to connect 1 more city? Create a couple of records in the

database, launch advertising and decide on organizational issues. What if it's a taxi service? You need to hire people, buy cars in a new city. Quite a global project with large investments.

- b) One of the advantages of platform companies is the ability to grow quickly. A platform business can grow rapidly - the costs of growth are relatively low. At the same time, there are great opportunities for experimentation - changing the interface of the site is easier than remodeling the building. The digital world is a more malleable material than the real one. At the same time, any action on the site leaves a trace that can be analyzed. This allows many growth hypotheses to be made and tested.
- c) The ability to study information on the interaction of market participants and make decisions on optimizing these interactions also plays an important role for the platform owner. This information allows you to sell even more effectively compared to a single seller. The platform knows exactly what is popular and what is not, what are the trends in the behavior of buyers.
- d) The platform owner has the opportunity to provide a more complete service to the consumer. It is easier for the platform to build a whole line of services for the buyer, which will cover the spectrum of needs.

The concept of ecosystems also takes place in the regional economy, which is discussed in detail in our earlier works related to the representation of a cluster as an ecosystem (Bushueva, Masyuk, Bragina, Petrukhin, Grishanova, 2017; Bushueva, Masyuk, Bragina, 2017b).

Separately, it is necessary to consider the diversification of risks. There are many sellers on the site from different segments. If one of them burns out, it will not affect the site in any way. Moreover, you can analyze its results and draw conclusions. The stability of the site depends on the stability of the entire market. An additional positive point for the site is that it does not incur large costs for physical infrastructure. Take AirBnb during the 2020 pandemic. Yes, their profits have probably declined. But the site itself does not bear the cost of maintaining a large number of hotels or houses. This is the owner's risk. They are the ones suffering from the pandemic. For AirBnb, this is a less painful moment. Their profits are certainly reduced, but they do not bear the losses that property owners have.

The active development of platforms and ecosystems in the world generates a number of risks/challenges:
1. Rapid changes due to the introduction of modern technologies and the development of digital platforms / ecosystems increase the requirements for the speed of response and the formation of regulatory policy on the part of the state.

2. The risks arising from the development of ecosystems/platforms, the acquisition and abuse of their dominant position, are similar to those of a classic business, but may have their own peculiarities in terms of regulation.

3. The development of ecosystems/platforms may exacerbate issues of dominance, in particular, there may be risks of data monopolization.

4. It is required to take into account the specifics of digital risk mitigation mechanisms, i.e. reducing the likelihood of occurrence of risky products/services and the characteristics of ecosystems/platforms during the development of an event and minimizing the consequences of its possible occurrence.

5. The risks associated with ecosystems/platforms are exacerbated by the possible cross-border nature of interactions within an ecosystem/platform.

The risks associated with the spread of ecosystems can be grouped into categories.

1. For a citizen:

- Abuse of customer relationships, such as sales by deception, solicitation of goods and services, lack of accountability of platforms for end products and services, infringement of consumer rights.

2. For business:

- Practices of unfair competition, also to be clarified in the context of ecosystem/platform development.

3. For the economy and the state:

- a) In the absence of competitive national ecosystems and platforms and taking into account the cross-border specifics of interaction, the development of foreign ecosystems/platforms leads to a decrease in the competitiveness of the national economy, the tax base and creates risks of losing control over the use of data, including personal and commercial.

- b) Cyber risks, technological risks and risks for the security of personal data of customers of digital ecosystems and platforms.

These risks form a request for the development of state policy in the field of regulating the activities of digital platforms and ecosystems and the formation of a secure digital environment, including the development of national ecosystems and platforms.

To ensure the conditions for the development of digital markets, the functioning and development of digital ecosystems and platforms, the following principles must be observed:

- security of the digital environment;
- seamlessness of tools and support mechanisms;
- preferential conditions for the conduct of activities by national market participants over foreign ones;
- prevention of regulatory and tax arbitrage, including in favor of foreign platforms and ecosystems;
- healthy competition between national ecosystems/platforms;
- transparency of the conditions for consumer access to the services of the digital ecosystem and platform, which do not allow unlimited discretion of the owner of the ecosystem;
- freedom of transition of users between digital platforms, ecosystems;
- freedom of disposal by users of their data stored and processed by the digital platform, ecosystem;
- preventing platforms and ecosystems from imposing their own services, creating discriminatory conditions;
- avoidance of restriction of consumer's choice;
- openness;
- balance of mutual interests (Concept of general regulation..., 2021).

Conclusion. The concept of platform-based ecosystems opens up new possibilities for information technology-based platform management and ecosystem management. This is a new significant contribution to management that has been obtained as a result of the application of the ecosystem concept. This integrated model can help researchers, designers, and ecosystem managers understand the elements of an ecosystem. Platforms contribute to the collaboration of all participants, increase the efficiency of ecosystems through more intensive and productive interaction of all economic agents located on the platform. From the point of view of a platform as an ecosystem centered on interactions among participants, the process and performance of value creation are not only direct business performance such as sales and profit, but also the size and scope of the user base and the degree of commercialization of ideas. A very important asset of the platform is the community and the resources that its members possess. Thus, the focus of the strategy shifts from resource control to resource coordination, from optimizing internal processes to facilitating external interactions, and shifts from expanding customer value to maximizing ecosystem value.

References

Adner, R. (2017) Ecosystem as Structure: An Actionable Construct for Strategy. *Journal of Management*, 43, 1, 39–58 (In Russ.).

Adner R., Kapoor R. (2010) Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal*, 31, 3, 306–333.

Adomavicius G., Bockstedt J., Gupta A., Kauffman R.J. (2007) Technology roles and paths of influence in an ecosystem model of technology evolution. *Information Technology and Management*, 8, 2, 185–202.

Adomavicius G., Bockstedt J., Gupta A., Kauffman R.J. (2008) Making sense of technology trends in the information technology landscape: a design science approach. *MIS Quarterly*, 32, 4, 779–809.

Androsik, Yu.N. (2016) Business ecosystems as a form of cluster development. *Proceedings of BSTU. Economics and Management*, 2007, 38–44.

Autio, E., & Thomas, L. D. W. (2014) Innovation ecosystems: Implications for innovation management. In M. Dogson, D. M. Gann, N. Philips (Eds.), *The Oxford Handbook of Innovation Management* (204–228). Oxford, UK: Oxford University Press.

Bushueva, M.A., Masyuk, N.N., Bragina, Z.V., Petrukhin, A.B., Grishanova, O.A. (2017a) Presenting the business model of the textile cluster as an innovative network ecosystem. *Izvestiya Vysshikh Uchebnykh Zavedenii, Seriya Tekhnologiya Tekstil'noi Promyshlennosti* , 1(367), 10–17.

Bushueva, M.A., Masyuk, N.N., Bragina, Z.V. (2017b) Conceptual framework for building a business model of a regional cluster as an innovative network ecosystem. *Azimuth of Scientific Research: Economics and Administration*, 6, 2(19), 39-42.

Christensen, C. & Bower, J. (1995), Disruptive technologies: catching the wave. *Harvard Business Review*, 73 (1), 43-53.

Dementiev, V.E., Evsyukov, S.G., Ustyuzhanina, E.V. (2017) Hybrid forms of business organization: to the question of the analysis of inter-firm interactions. *Russian Journal of Management*, 15, 1, 89–122. (In Russ.).

Denisov, I.V., Polozhishnikova, M.A., Kuttybaeva, N.B., Petrenko E.S. (2020) Digital entrepreneurial ecosystems: business platforms as a means of increasing efficiency. *Issues of innovative economics*, 10, 1, 45-56. (In Russ.). doi: 10.18334/vinec.10.1.100662.

Doroshenko, S.V., Shelomentsev, A.G. Entrepreneurial ecosystem in modern economic research. *Journal of Economic Theory*, 4, 212–221. (In Russ.).

Evans, D. S. & Schmalensee, R. (2016). *Matchmakers: The new economics of multisided platforms*. Harvard Business School Publishing.

Frenken, K., Van Oort, F. G., Verburg, T., & Boschma, R. (2004) Variety and regional economic growth in the Netherlands. Final report to the Ministry of Economic Affairs.

Iansiti M., & Levien R. *The Keystone Advantage: What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability*. Harvard Business School, 2004, Press: Boston, MA.

Jackson, B. D. J. (2011). What is an innovation ecosystem? Retrieved from http://erc-assoc.org/sites/default/files/download-files/DJackson_What-is-an-Innovation-Ecosystem.pdf

Jacobides M., Cennamo C., Gawer A. *Industries, Ecosystems, Platforms, and Architectures: Rethinking our Strategy Constructs at the Aggregate Level*. Working paper, London Business School, 2015.

Jacobides M., Cennamo C., Gawer A. Towards a Theory of Ecosystems. *Strategic Management Journal*. 2018. Vol.39, Issue 8, pp. 2255–2276.

James, L., & Halkier, H. (2016). Regional development platforms and related variety: Exploring the changing practices of food tourism in North Jutland, Denmark. *European Urban and Regional Studies*, 23(4), 831– 847.

Kalenov, O.E. (2021) Development of the concept of ecosystems in economics. *N Bulletin of the Russian University of Economics G. V. Plekhanov*, 18, 1 (115), 37-46. (In Russ.). DOI: <http://dx.doi.org/10.21686/2413-2829-2021-1-37-46>

Kleiner, G. B. (2019) Ecosystem Economics: A Step into the Future. *Economic revival of Russia*, 1 (59), 40–45. (In Russ.).

Kopeikina L. (2008) Ecosystem for innovative business. *The Angel Investor*, January 10-13. (In Russ.).

The concept of general regulation of the activities of groups of companies developing various digital services based on one "ecosystem" (May, 2021) (In Russ.). [Online], [Retrieved July 21, 2022]. Available: URL: <https://www.garant.ru/products/ipo/prime/doc/400731439/>

Markova, V.D. (2018) Business models of companies based on platforms. *Questions of Economics*, 10, 127–135. (In Russ.).

Masyuk, N.N. Bushueva, M.A., Bragina, Z.V. (2020) The Institutional Regulatory Environment of the Digital Ecosystem: Theoretical Approach and Russian Experience. *Innovative Economic Symposium 2019 – (IES2019) - Potential of Eurasian Economic Union. SHS Web Conf.* 73, 01019. <https://doi.org/10.1051/shsconf/20207301019>. [Online], https://www.shs-conferences.org/articles/shsconf/abs/2020/01/shsconf_ies_2019_01019/shsconf_ies_2019_01019.html

5. Masyuk, N. N., Temnova, N. (2021) Platform Business Models as Objective Reality of Digital Economy. In & N. Lomakin (Ed.), *Finance, Entrepreneurship and Technologies in Digital Economy*, 103. *European Proceedings of Social and Behavioural Sciences* (pp. 588-595). European Publisher. <https://doi.org/10.15405/epsbs.2021.03.74>. [Online], [Retrieved July 21, 2022]. Available: URL: <https://www.europeanproceedings.com/article/10.15405/epsbs.2021.03.74>

Moore J.F. *Predators and Prey: A New Ecology of Competition*. Harvard Business Review, 1993, May/June, pp. 75–86.

Moore J. *The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems*. HarperBusiness: New York, NY, 1996.

Wareham J., Fox P., Cano G. Technology ecosystem governance. *Organization Science*, 2014, Vol. 25, No. 4, pp. 1195–1215.

Muegge, S. (2013) Platforms, communities, and business ecosystems: Lessons learned about technology entrepreneurship in an interconnected world. *Technology Innovation Management Review*, 3(2), 5-15.

Parker, G. G. & Van Alstyne, M. W., Choudary, S. P. (2016) *Platform revolution: How networked markets are transforming the economy and how to make them work for you*. W. W. Norton & Company.

Platforms: Bigger, Faster, Stronger. ING Bank: Innovation Analysis, 2017.

What is a platform business, creating a marketplace platform for the industry? Business model Platform. (In Russ.). [Online], [Retrieved July 21, 2022]. Available: URL: <https://falconspace.ru/blog/cto-takoe-platfornenny-biznes--sozdanie-platforny-marketpleysa-dlya-otrasli--biznes-model-platforna>