

PAPER • OPEN ACCESS

Digital platforms as the basis of a new ecological system of socio-economic development

To cite this article: Timur Ablyazov and Viktoriya Ravgof 2019 *IOP Conf. Ser.: Mater. Sci. Eng.* **497** 012002

View the [article online](#) for updates and enhancements.

Digital platforms as the basis of a new ecological system of socio-economic development

Timur Ablyazov^{1*} and **Viktoriya Rapgof**¹

¹ Saint Petersburg State University of Architecture and Civil Engineering, Vtoraja Krasnoarmejskaja ul., 4, St. Petersburg, 190005, Russia

* E-mail: 3234969@mail.ru

Abstract. Development of information and communication technologies gave people an opportunity to exchange information, services, content and ideas leading to occurrence of new business-models, formation of new trends of socio-economic development of society. Innovations do not determine future, but they offer choices and formulate questions to be responded by the new generation. Challenges associated with labour productivity, economic growth and reduction of expenses correlate with unemployment, total control and deep penetration of digital technologies into everyday life of a human being. The article describes development features of digital platforms, the method of value creation of digital interaction by means of integration of clients and service providers, manufacturers and buyers of goods and also partners on ecological system by formation of network effect. Digital platforms have more reliable sources of competitive advantage that provides higher potential for future growth not of individual companies only, but of national economies as a whole.

1. Introduction

The modern world economy features technological plurality of influence on formation of economic processes. This opens way to radical changes in the principles of socio-economic interrelations, creation of product value and service value, and also competition in global markets. New principles of interaction cover wide circle of economic activities, in which digital assets are used as key factors of entrepreneurship. BIG-data, cloud calculations, artificial intelligence and other innovative digital technologies are used for data collection, storage, processing and exchange.

Due to the fact that information and communication technologies shape the basis of new interaction principles, one can make a conclusion that digital platforms are a key tool of such interaction: with technical capability available, they are accessible at any place and any time for all the subjects of socio-economic relations.

2. Electronic platforms

The first digital platforms were made in the 1990s due to rapid growth of Information and Communication technologies and global development of the Internet. At the same time, science started developing in relation to formation of digital platform concept. J.-Ch. Tirole and J. Rochet form the competition model on the platform with bilateral markets [1]. J. Moore states for radical shift in business strategy of organisations from competition to cooperation via digital platform around common niche [2]. In their works, A. Tiwana [3], D. Evans [4], G. Parker and others [5] state



viewpoints on how platforms form business and organisation models and practically transform economy depending on information ecological system architecture. Scientific views associated with digital platforms are at the stage of development, as fundamental hypotheses gain more and more formal shape both in studying industrial innovations [6, 7] and economic literature [8].

High degree of influence of digital platforms on national economies is confirmed by the fact that they started to use this term in the national regulatory acts and official documents.

In the documents of the European Commission, the term “digital platform” is used in relation to function: “search systems, social networks, platforms for e-commerce, application shops and price comparison sites” [9].

In the Russian practice, in accordance with report, Deputy Head of Design Office on Implementation of the Programme “Digital Economy of the Russian Federation”, V. Mesropian, digital platform is a tool of digital transformation of traditional branches and markets, the central notion of global digital agenda delineating digitalisation (digital automation) strategies and digital transformation [10].

In accordance with Rostelecom research data, digital platform this is a system of algorithmic mutually beneficial relationships of significant quantity of independent participants of economy branch (or area of activity) implemented in a single information environment leading to decrease of transactional expenses by application of package of digital technologies of operation with data and changes of labour sharing system [11].

3. Types of electronic platforms

Digital platforms redesign relations between clients and providers of services and goods, employees and employers, the state and society, as ICT penetrate almost all the spheres of our life: from purchasing casual goods and receiving state services to fulfilment of complex professional tasks. As computational power grows, and more people in the world participate in digital economy, it is necessary to more deeply analyse features, principles and advantages of digital transformations to minimise the deadlines of integration of new interaction tools.

Despite the fact that digital platforms have common essence, companies integrate and use them in the market in a different manner. As a result, P. C. Evans and A. Gawer pointed out 4 types of digital platforms in accordance with their key functions:

- transaction platforms, acting like a medium making easier exchange or transactions between various users, buyers or suppliers;
- innovation platforms, used as the basis for other companies (not in the best way integrated in the innovation ecological system) to develop complementary technologies, products or services;
- integrated platforms, being simultaneously a transaction platform and innovation platform. This category includes such companies as Apple which have App Store platform and a big out resourced ecological system of developers which supports creation of a content on this platform;
- investment platforms, consisting of companies which developed platform portfolio strategy and act as a holding, an active platform investor or both [12].

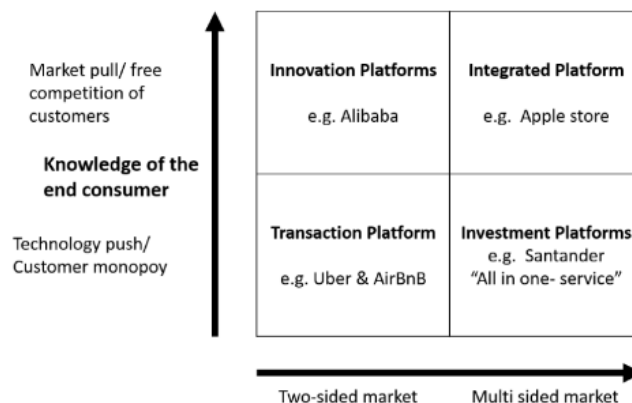


Figure 1. Digital platform types [13].

The main feature of digital platforms as a tool of socio-economic interaction is network effect: increase of value of product or company service, increase of positive (or negative) effect at increase of the number of users. The phenomenon itself appears not only in digital environment, but in everyday life as well. For example, with company enlargement in a specific territory, and, accordingly, increase of working places, the number of inhabitants in the neighbourhood increases as well. However, with the use of digital platforms, the rate of network effect spread increases by geometric progression [14].

4. First results and growing points

The network effect is not only a feature, but also the main factor of development of designs based on the principles of user network interaction. The influence level of this factor is sometimes higher than the level of technology development. Already in 1908, chairman of AT&T, Theodore Vail, pointed out to the shareholders in his annual report that the cost of company is mainly based on their network, and not on their telephone technology [15].

Generation of network effects is crucial from the point of view of significance of platform in the market, as without users the platform appears to be useless. This paradox generates the key issue to be responded prior to platform creation: “are there any users, and is platform being created?” or “is platform being created, and will there be users?”

At the present stage of technology and society development, one should separate the notions “virus effect” and “network effect”: the first one is related to the method of user attraction, the second one, to useful result. Alongside with that, virality is one of the cheapest tools to attract users using internal and not external motivation. Due to that, platforms shall have the functionality of spreading the product or information about it via horizontal social connections by ICT.

5. Results

In accordance with the report 018 Global Digital [16], more than 4 billion people use ICT worldwide. The number of social network users made 3.196 billion people in 2018 that is 13% more than in the previous year. Now users spend about 6 hours each day using devices for getting information and services via Internet. From this research one can also see that digital platforms have penetrated into all the spheres of social life.



Figure 2. User's expenses via digital platforms by purchase categories [18].

This fact is also confirmed by the data on company market cost. As to the research Fortune Global 500, in the US market, by March 2018, Walmart is the leader on the volume of proceeds (more than 500 billion per year) having digital platform for online trade as the basis of business model. As to capitalisation level, Apple Inc. is the first having as their business tool the integrated digital platform. At that, their market value is thrice higher than the next company in the rating of oil and gas sector, ExxonMobil [17].

Also, in accordance with Bearing Point Institute Research [18], companies that diversified and added digital platforms into business models, improved their market value by 65% in 2016 if compared to those who supported the traditional business monomodel. Besides, from 2011 to 2016, companies with hybrid models demonstrated growth rates of 8% instead of 4% corresponding to companies with traditional models.

One should highlight the role of interaction of subjects of socio-economic relations via ICT in labour market transformation. Despite the fact that for majority of citizens digital platforms remain a sporadic source of secondary income, they have more and more influence on them. As per report [19], in EC, 2% of adults work for more than 20 hours per week or gain not less than half of their profits via online platforms. Among the countries that have participated in the research, in Great Britain, the largest part of people work mainly on digital platforms (4.3%), the Netherlands (2.9%) and Germany (2.5%) go after GB. The lowest indices are in Finland (0.6%), Romania (0.8%) and Slovakia (0.9%). In the US this index also remains low: from 0.5 to 1% [20]. However, despite low current indices, it is expected that employment via digital platforms will grow. In Malaysia, Nigeria and other developing countries, to increase adaptation of employable population to digital transformations, strategies of employees' stimulation using digital business models are accepted.

6. Discussion

In accordance with the Report on World Investments UNCTAD 2017, "Investments and Digital Economy 2017", the following is stated: 75% out of 100 largest digital multinational corporations including Internet platforms, e-commercial companies and digital content are under third countries jurisdiction. Sixty are in the USA, the rest fifteen are in Great Britain and Germany. At that, digital multinational companies make about 70% of their sales abroad, and only 40% of their assets are located abroad [22]. Absence of regional variability shapes digital discontinuity in global investments which has impact on socio-economic development of developing countries.

Research results described above show that digital platforms provide interaction between subjects of socio-economic relations both at the national and the international level and contribute to attraction of financial and labour resources, and also material and non-material assets that is a powerful tool of development of the territories and countries as a whole.

To strengthen the strategy of digital transformation, the Programme “Digital Economy of the Russian Federation” [23] has been adopted in Russia, which is the basis for creation and maintenance of favourable regulatory base for digital company activities. One of the key indices of this Programme is creation and successful functioning of not less than 10 branch (industrial) digital platforms for the main subject areas of economy (including digital public health, digital education and “smart city”). These will be innovative or integrated platforms shaping ecological system of digital development of the country's economy. This fact testifies that digital platforms are recognised as a key tool of socio-economic interaction which will support other programmes and strategies of development of Russia under conditions of shaping the sixth process way.

The significant result of undertaking measures on support of digital transformations is conclusion at Eastern Economic Forum 2018 of an agreement on strategic partnership between the Russian Foundation of Direct Investments, Alibaba Group, Megaphone and Mail.Ru Group within which a major joint-venture in the area of social commerce in Russia and CIS will be founded to integrate key consumer Internet and e-commerce platforms in Russia [24].

7. Conclusions

The digital era transforms all aspects of social life: access channels to markets and the description of products, manufacturing methods, deliveries and payments, capital volume necessary for work at a global level, and also needs in human capital. At that, interaction via digital platforms provides increase of productivity reducing direct expenses and transactional expenses.

Distribution and importance of digital platforms operating as multi sided markets increase rapidly. Shaping complex socio-technical systems determine necessity of development of conceptual and methodological basis for innovation development.

Digital platforms allow companies to reduce production cycles and deadlines of their new product introduction in the market. As it has been practically shown, the state might use platform potential to solve the tasks not only of economic development of the country, but of solving social problems relating to health, transport, demography, efficiency of resources usage and safety as well. Digital tools of socio-economic interaction can provide access to state-of-the-art technologies, global markets for developing countries and reduce digital investment discontinuity.

Acknowledgements

The article was prepared as part of the work on the grant of the President of the Russian Federation NSh-4028.2018.6

References

- [1] Rochet J-C and Tirole J 2003 *Journal of the European Economic Association* **1** (4)
- [2] Moore J C, Rao H R, Whinston A, Nam K and Raghu T S 1997 *Information Systems Research* **8** (2)
- [3] Tiwana A, Konsynsky B and Bush A A 2010 *Information Systems Research* **21** (4) 675–687
- [4] Evans D S 2003 *Review of Network Economics* **2** (3) 191–209
- [5] Parker G G, Van Alstyne M W and Choudary S P 2016 *Platform Revolution: How Networked Markets are Transforming the Economy and How to Make Them Work for You* (New York: WW Norton & Co.)
- [6] Gawer A 2014 *Research Policy* **43** (7) 1239–1249
- [7] Thomas L D W, Autio E and Gann D M 2014 *Academy of Management Perspectives* **28** (2) 198–219
- [8] Parker G G and Van Alstyne M W 2005 *Management Science* **51** (10) 1494–504

- [9] European Commission 2018 Digital Economy, <https://ec.europa.eu/growth/sectors/digital-economy/>
- [10] Mesropian V 2018 Digital Platforms as a New Market Power, <https://www.econ.msu.ru/sys/raw.php?o=46781&p=attachment>
- [11] Rostelecom 2018 Digital Platforms: Approaches to Determination and Type Assignment, http://files.data-economy.ru/digital_platforms.pdf
- [12] Evans P C and Gawer A 2016 *The Rise of the Platform Enterprise A Global Survey* (New York: The Center for Global Enterprise)
- [13] WisdomJunkie 2018 Digital Platforms, <https://wisdomjunkie.blog/2018/02/07/digital-platforms/>
- [14] Van Vliet B 2018 *Economics Letters* **165** 70–72
- [15] American Telephone and Telegraph Company 1908 Annual Report of The Directors of American Telephone and Telegraph Company, https://beatriceco.com/bti/porticus/bell/pdf/1908ATTar_Complete.pdf
- [16] We are Social Ltd 2018 Digital in 2018: World's internet users pass the 4 billion mark, <https://wearesocial.com/blog/2018/01/global-digital-report-2018>
- [17] IPO Centre publication 2018 Global Top 100 companies by market capitalisation, <https://www.pwc.com/gx/en/audit-services/assets/pdf/global-top-100-companies-2018-report.pdf>
- [18] Re-thinking the European Business Model Portfolio for the Digital Age https://www.bearingpoint.com/files/009_01_DEM_Re-thinking_the_European_Business_Model_Portfolio_for_the_Digital_Age.pdf&download=0&itemId=495678
- [19] Pesole A, Urzi Brancati M C, Fernandez Macias E, Biagi F and Gonzalez Vazquez I 2018 *Platform Workers in Europe Evidence from the COLLEEM Survey* (Luxembourg: Publications Office of the European Union)
- [20] Farrell D and Greig F 2016 *The Online Platform Economy Has Growth Peaked?* (New York: JPMorgan Chase & Co.)
- [21] Graham M, Hjorth I and Lehdonvirta V 2017 *Transfer: European Review of Labour and Research* **23** (2) 135–162
- [22] United Nations Conference on Trade and Development 2017 Digital radically changes global investment patterns, says World Investment Report 2017, https://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1497&Sitemap_x0020_Taxonomy=UNCTAD%20Home;#6;#Investment
- [23] The Russian Federation Government 2017 Order dated 28 July 2017 No. 1632-p on Approval of Programme “Digital Economy of the Russian Federation”, <http://static.government.ru/media/files/9gFM4FHj4PsB79I5v7yLVuPgu4bvR7M0.pdf>
- [24] Roscongress Fund 2018 The Summary of Eastern Economic Forum – 2018, <https://forumvostok.ru/news/itogi-raboty-vostochnogo-ekonomicheskogo-foruma-2018/>