Formation of the Information Economy: Organizational and Financial Aspects

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Abstract — **The relevance of the research topic is due to the fact that the modern process of globalization of the world economy has increased the importance of information in the process of social development. Information is a dominant factor in the competitiveness of national economies. The purpose of the study is to analyze the organizational and financial aspects of the formation of a global information economy. During the writing of the article, the following methods were used: generalization, comparative analysis and statistical analysis. The authors identify the main preconditions for the formation of the information economy: the technical and technological ability to implement projects; the readiness of the society for the changes that result from the functioning of the information economy. It is noted that information technologies are a catalyst for improving existing money market technologies, have created prerequisites for the distribution of FinTech 4.0, and the emergence of new inherently digital assets. The data of countries ranking in accordance with the degree of technical and technological ability to function within the framework of information economy is generalized. The main problems and obstacles of formation of elements of the information economy in Ukraine are established.**

Keywords — *information economy, informatization, competitiveness, IT technology, cost effectiveness, digital assets*

1. Introduction

During the XX-XXI centuries, a gradual transformation of the role of information in the economy took place: from an element that reduced entropy to the most important economic factor. In the era of the 4-th industrial revolution, the economy is increasingly gaining information, and the vector and pace of its growth depend on the creation and use/interpretation of information.

The aggravation of global competition with respect to resources and markets affects the formation of an information economy for every country of the world. This is due to the fact that in today's conditions for countries it is not enough to possess natural or even material and intellectual resources because globalization reduces obstacles to their free movement.

The information economy is a new stage in the development of a national, and ultimately, supranational economy.

During the XXI century, various aspects of building the information society and economy are revealed in the studies of many scholars.

The fundamental work of F. Webster [21], in which, on the basis of a critical analysis of the main approaches to information development, the author substantiates his own vision of the role of information technology in modern society, is important in this direction.

Socio-economic implications of informatization of social relations are covered in the work of M. Castells [3]. The author examines a wide range of issues: from the transformation of the nature of labor and its productivity to the problems of ensuring competitiveness in the conditions of the information economy. As a result of the study, the author formulates the theory of information society.

The relationship between productivity and information technology is investigated by a team of scientists [2] who believe that innovative companies are actually creating new forms of organizational capital, other innovations that include new decentralized decision-making processes and transformation of business processes.

Issues related to the definition of factors that affect the price of information assets of business entities and the methods of accounting information are considered in the article [7]. The author focuses on the need for the companies to use information as efficiently as possible to improve their competitiveness.

The above studies have a significant theoretical value and practical application. At the same time, the links between the organizational and financial aspects that determine the dynamics of the information economy development are not sufficiently studied. Also, it is expedient to analyze the current trends in the functioning of the global information economy.

The purpose of this study is to analyse the organizational and financial aspects of the formation of the information economy.

2. Materials and Methods

The theoretical basis of the study is the understanding of the information economy as an imperative (mandatory condition) for further civilization development.

Using the method of comparative analysis made it possible to compare the indicators that characterize the information economy. The method of generalization allowed to determine the current trends in the formation of the information economy. In the study and comparison of digital data, the method of statistical analysis was used. Using the method of system analysis allowed to identify the structural links between elements of the information economy. Correlation analysis was used to determine the relationship between the indicators that characterize individual cryptocurrencies.

In preparation of the article, the research results and analytical materials of CoinMarketCap, Ecommerce News Europe, KPMG International Cooperative, Miniwatts Marketing Group, The United Nations, YCharts are used. The main hypothesis of the study: the development of a global information economy will lead to the transformation of the existing economic order, changes in all spheres of society.

3. Results and discussion

At the present stage of society development, it is advisable to highlight two important preconditions for the formation of an information economy:

- technical and technological ability to implement projects;
- the readiness of the society for the changes that result from the information economy functioning.

The logical question is the one of the effectiveness of the introduction of elements of the information economy by business entities. We believe that, at an initial stage, efficiency depends on the first two prerequisites. That is, the issue of economic efficiency is not a priority, but rather a promising one. This is legitimate for most sectors of the economy.

One of the basic elements of the information economy is the Internet. The rapid development of the Internet allowed solving not only the issue of improving the functioning of communication channels, but also creating a platform for virtualization of many types of business.

Implementation of the aforementioned required the availability of technical and technological capabilities, the implementation of which will increase the Internet audience. In this context, we are talking about technologies based on wired or wireless networks (WiFi) and data rates based on them. Thus, since the beginning of 2010, the share of wireless users has grown substantially, due to lower costs and ease of connection for the user and a reasonable rate of data transfer. The average data rate increased from 69.2 kbits/s in 2000 to 3990.3 kbits/s in 2010 and to 102267 kbits/s in 2017 [12].

The growth of Internet users from 362 million people (5.8% of the world's population) in 2000 to 4.15 billion people (54% of the world's population) in 2017 created the preconditions [10] for the commercialization of the Internet.

If in the 1990s the presence of business on the Internet was limited, as a rule, to information sites, then, starting in the mid-2000s, the sites became full-fledged platforms for the sale of products and services, the share of which in 2017 reached 10.2%.

Fig. 1 shows growth of e-commerce sales by 172.4% during 2014-2017. In turn, the number of buyers increased by 125.7%. These indicators show significantly better dynamics compared to non-e-commerce implementation channels.

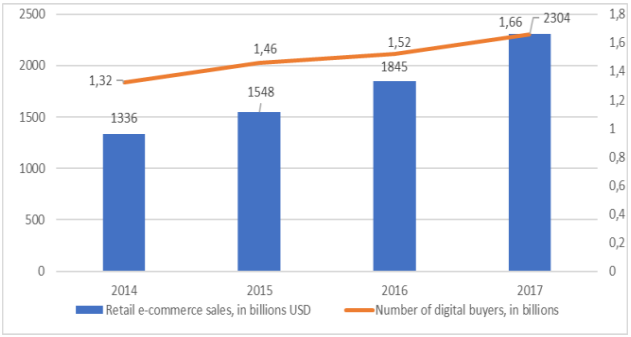

Figure 1. Dynamics of global indicators of e-commerce
Source: [16], [17]

Information from the report [22] indicates that in the structure of the e-commerce market, 86.3% is Business-to-business trade, so, it means, 13.7% - Business-to-consumer.

The most famous sites are Alibaba, Amazon, eBay. Alibaba and Amazon are developing much faster than eBay. In the third quarter of 2018, the capitalization of the above-listed companies amounted to 312.7% of the 2014 level (Fig.2).

During 2016-2018, the main e-commerce markets used to be the United States and China. In the regional aspect, the most promising market is the Asia-Pacific region, which is conditioned by demographic indicators and an increase in the welfare of citizens.

Also, processes for activating e-commerce are inherent to Ukraine. Thus, according to estimates [6], the volume

of sales of goods and services in 2017 increased by 30% compared to 2016 and amounted to 1.52 billion euros.

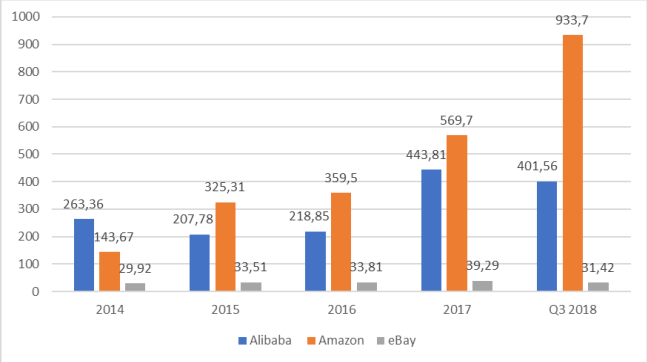

Figure 2. Dynamics of capitalization of Alibaba, Amazon, eBay sites
Source: [23]-[25]

Information technology substantially changes the monetary sphere. It is not only about improving the existing technology of the money market, but also the emergence and spread of fundamentally new in essence digital assets.

The next stage of the evolution of payment instruments began in 2008-2010 with the rapid development of crypto-currency, mobile payments, the payment card sector and the infrastructure for their use. The results of the analysis allow to determine three main tendencies of the sector of payment cards:

- increase in the number of transactions and their volume in cash;
- reduction of the number of ATM terminals (Automated teller machine) with simultaneous growth of POS terminals;
- improvement of technologies, for example, implementation of EMV technology.

Well, data that is in Fig. 3 show an increase of more than 1.7 times the volume of transactions with payment cards in the EU. Accordingly, the number of infrastructure objects has increased, in the first place POS terminals with 4.73 million units in 2010 to 13.54 million units in 2017 [15].

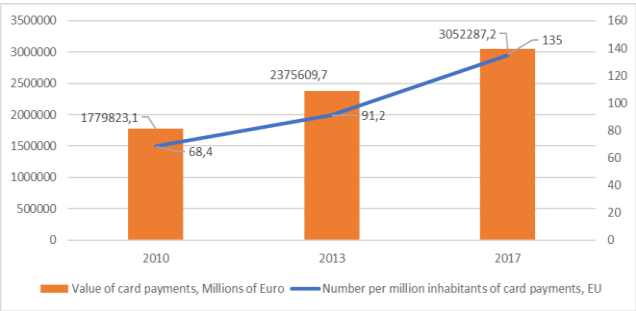

Figure 3. Dynamics of certain indicators that characterize the sector of payment cards in EU, Source: [23]-[25]

A similar situation is observed in other countries. In the US in 2017, the total amount of card payments increased by 11.3 million transactions comparing with 2016 and amounted to 123.5 billion payments, and in monetary terms - reached a value of 6.48 trillion dollars [8].

The analysis of the above-mentioned information suggests that the level of cashless payments in the world will grow, and the leaders of this process may become economically weak developed countries. In this context, it is worth mentioning the experience of M-Pesa in Kenya, which is currently spreading in Tanzania and the Republic of South Africa.

Digital assets (in this case, it refers to cryptology) have become an integral part of the information economy.

The speculative potential of cryptocurrency and technologically simple process of their lending created the prerequisites for attracting financial resources to the market. Thus, during 2015-2017, the market capitalization grew more than 110 times (Fig. 4).

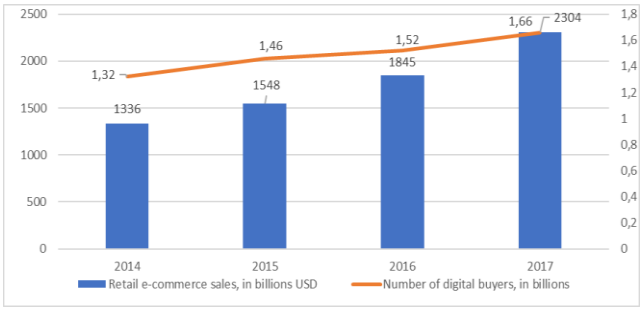

Figure 4. The dynamics of the market capitalization, USD million, Source: [4]

During 2017, the growth in prices for major cryptocurrency commodities led to an increase in the number of cryptocurrency goods. Actually, in the beginning of 2017, there were 640 of them, and in the end of this year – 1376. At the beginning of 2019, the number of cryptocurrencies grew to 2057, a significant number of which were active [4].

At the end of 2017, the cryptographic market had signs of an overheated market, speculators recorded and exited profits. The decrease in the volume of trading led to a fall in the market capitalization in 2018 by 79% (Fig. 4).

Nowadays, the situation with the functioning of cryptographic is ambiguous. On the one hand, cryptocurrencies are high-tech digital assets, most of which use blockchain technology. Their potential is not open, therefore, in our opinion, they are promising, interesting assets of the near future.

On the other hand, the expectations of a part of society regarding the performance of their functions of money, in particular as a means of payment, are not yet realistic, given the high degree of their volatility.

Thus, for example, the price of Bitcoin, crying the number one by capitalization, on December 17, 2016 amounted to $790.2. During the second half of 2017, the price rapidly increased until it reached the maximum value of $19535 in December 17, 2017. For example,on December 17, 2018, the Bitcoin price is $3288.4 [4].

The same dynamics was inherent in virtually all

cryptovolumes, taking into account the time lag.

That means that the price dynamics of the bitcoin, to a large extent, affects the price and other cryptocurrencies.

So, our correlation coefficient for Bitcoin-Ethereum pair, for example, is 0.995, for Bitcoin-Ripple pair is 0.992 and for Bitcoin-Litecoin pair is 0.99. So, the connection is very significant.

First of all, this is being explained by the dominant role of the bitcoin. It has the highest level of capitalization among the cryptocurrency (Fig. 5). Also, the bitcoin transactions are characterized by relatively low commissions (depending on a specific exchange) and at an acceptable rate.

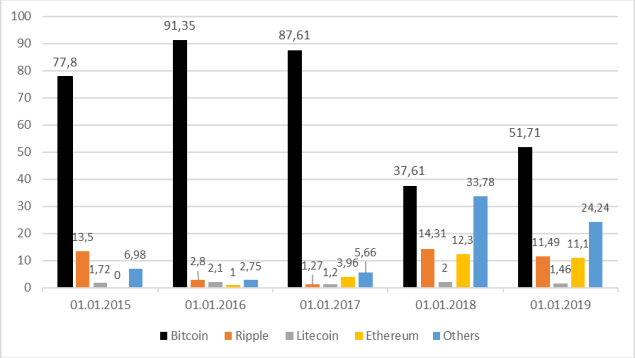

Figure 5. The dynamics of the share capitalization of individual cryptocurrencies, %, Source: [4]

That is, for today, investing in cryptovolume may be of a purely speculative nature.

Also, the legal status of cryptographic goods is not transparent enough and has significant differences in many countries of the world: from the legal status in Japan to the ban in China, not giving any status in Ukraine.

This is due to the fact that the cryptographic currency is a decentralized digital asset whose transactions have a higher degree of anonymity in comparison with money. Accordingly, state institutions can not regulate their circulation and, in fact, they are deprived of the opportunity to promptly and adequately influence the market.

Taking into account the high degree of anonymity of transactions, cryptographic transactions are used by criminals, in particular, to pay for goods / services at Darknet. Specifically, concrete examples of such use are reported in law enforcement agencies, for example [5].

To our mind, the information rating is sufficiently informative, which allows us to identify leaders regarding the technical and technological ability to function within the information economy (Table 1).

A solid analysis of the data presented in [1], [9], [11], [19] as a whole confirms the conclusion about the dependence of the level of economic development of the country and the process of formation of the information economy. Some exceptions apply to several countries, for example, Belarus, Uruguay, which have individual positions that are close to leaders.

The above data shows that Ukraine is worse off than countries with a similar level of economic development, although it is one of the world's largest software developers.

Table 1. The ranking of countries by individual indicators, which characterize the degree of informatization of the economy

Efficiency enhancers, 2018	**Networked Readiness Index, 2016**	**E-Government Development Index, 2018**	**Change readiness index, 2017**
1. United States	1. Singapore	1. Denmark	1. Switzerland
2. Singapore	2. Finland	2. Australia	2. Sweden
3. Switzerland	3. Sweden	3. Republic of Korea	3. UAE
4. Hong Kong SAR	4. Norway	4. United Kingdom	4. Singapore
5. United Kingdom	5. United States	5. Sweden	5. Denmark
6. Germany	6. Netherlands	6. Finland	6. New Zealand
7. Canada	7. Switzerland	7. Singapore	7. Netherlands
8. Netherlands	8. United Kingdom	8. New Zealand	8. Finland
9. New Zealand	9. Luxembourg	9. France	9. Germany
10. Japan	10. Japan	10. Japan	10. United Kingdom
70. Ukraine	64. Ukraine	82. Ukraine	95. Ukraine

Source: [1], [9], [11], [19]

A thorough analysis of statistical data points out that, nowadays, Ukraine has demonstrated positive trends in some high-tech sectors. Thus, the development of the IT industry in Ukraine is characterized by a significant increase (15-18% annually), which is ahead of the average growth rate of the segment in the world.

Ukrainian IT industry successfully competes on the world market and is a good source of foreign exchange income, which contributes to preserving the exchange rate of the national currency. The importance of IT services in the structure of domestic exports is also increasing (Fig. 6).

In 2015, exports of information and computer services amounted to 16.6% of total exports of services; in 2016 - 17.1%. In 2017, information and computer services exports ranked third among the export of services from Ukraine (USD 1.76 billion, representing 16.9% of total Ukrainian exports) after services for processing goods in the country and pipeline transport.

During 9 months of 2018, exports of computer services increased by 16.7% according to the same period in 2017 and amounted to 1,465.7 million USD [13], [18].

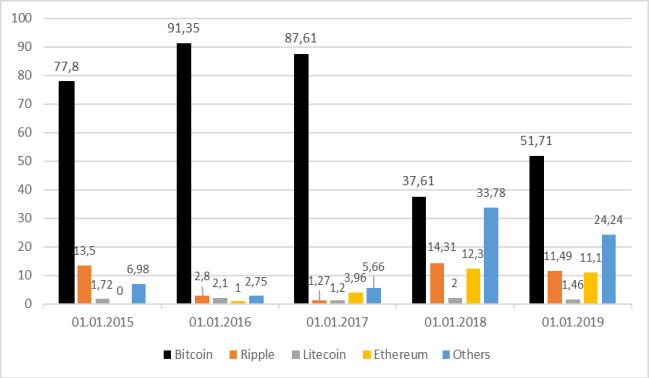

Figure 6. Share of exports of information and computer services in the general structure of Ukraine's exports of services, million US dollars, Source: [13], [18]

Exports of information and computer services in the GDP structure of the country occupy a significant place and make about 1.6-2% annually. The number of jobs provided by the industry increases annually by 2.5-4%, which is positive for the development of the Ukrainian economy [13], [18].

The key elements of IT services in Ukraine are the following areas: IT support and outsourcing; Custom Application Development; IT consulting and digitization; Outsourcing of R&D business processes.

Despite the growing performance of the IT industry, there are a number of problems that hamper the development of this industry. Among them, the important place is: lack of the required number of highly skilled personnel for the industry, which is connected with slow and not always optimal reforms of the education system; insufficient level of intellectual property rights protection; the absence of a special preferential tax regime for IT companies; slow improvement of IT and telecommunication infrastructure; low state support for the industry and lack of IT development strategy; high level of corruption in the country.

4. Conclusion

Information is the basis of the formation of a fundamentally new system of economic relations. Virtualization and digitalization of economic relations are the elements of a modern economy. Internet sites and social networks have become not only a part of communication, but also quite effective channels of sales of products and services.

The results of the analysis of the organizational and financial aspects of the functioning of the information economy in the article, as a whole, confirm the correctness of the theoretical approaches described in the fundamental writings of F. Webster [21] and M. Castells [3] and other researchers.

Ukraine is in the early stages of the information economy formation. The above is conditioned by the presence of certain problems and obstacles, among which it is appropriate to distinguish: corruption, inefficient state policy in the field of IT, low level of IT infrastructure development, etc.

The further research, focused on the development of a predictive model for the global information economy development may be the perspective and practically valuable.

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