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## THEORETICAL AND PRACTICAL ASPECTS OF COMPETITION IN THE INFORMATION ECONOMY

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### ABSTRACT

The article considers the institutional mechanism of the influence of information technologies on the competitive strategies of firms, identifies the main characteristics of firms in the information competitive environment, systematizes the basic principles of competitive behavior of the firm in the information economy, considers monopolistic models of behavior of institutional consumers in the information economy, considers the information costs of firms, price and non-price competition in conditions of informatization of the social and economic sphere in foreign countries, the authors consider the transformational strategy of the Republic of Belarus in the innovation sphere

**Keywords:** information technologies, information economy, competition, institutional mechanism, innovation

### Introduction

Creation and distribution of information technologies make changes in the competitive mechanism. Both an enterprise capable to do without any new technological achievements and any industrial competition between such enterprises make up the sphere of primitive mass services, today.

Under modern conditions, it is necessary to differentiate competitive market advantages of the companies applying information technologies (on the one hand) and a competitive situation of the companies operating within standard production (on the other) [1].

In the former case, information technologies being applied allow to automate planning and accounting in a firm as well as to react to the market situation and intra corporate changes adequately. The following competitive advantages with regard to using computers and information systems are most often noted in the relevant literature:

- an expansion of and quality improvement in a customer service due to the economy of office employees' time (time reduction for recording data and increase in the information accuracy);
- service personalization (the interactive mode gives a chance to consider the clients' requests in the best possible way);
- a possibility to receive accurate data followed by making proper management decisions.

It is to be particularly noted, that making competition Internet-like can bring about the scenario

when it is not the producers of top goods who always win, but rather those who in the best possible way explain the idea of the product to a potential buyer.

### Main part

The main characteristics of firms' activity in an information competitive environment are as follows:

1. An information economy's activity results in an increase rather than decrease in the firm's profitability. The fundamental law in terms of operating networks is known as the law of the increasing return. Intensive initial investments are to be made into the necessary scientific research, development and equipment, but the production capacities increase right after launching this production, which comes cheap. As the number of the produced hi-tech goods increases, the costs of production decrease, which results in a profit growth.

2. Unlike an industrial economy where any increase in returns is a result of the efforts of certain firms, a network economy enjoys an increase in returns as a result of the efforts of all the network's members (agents, users). In the latter case, this increase in returns is distributed between all the members (unequal distribution of the increased returns is possible). Anyway, competition becomes more intellectual and suggests creating a special mechanism of cooperation.

3. The laws of demand and supply do not work, particularly because many non-material goods such as consulting services, professional training, education, entertainments are created by both producers and consumers together.

4. The company creating knowledge-intensive products is capable to gain profit because of externalities of a wide circulation of a product [2, 3].

A complete version of the competitive model of information economy is described by K. Shapiro and H. Verian. These authors formulated the basic principles for the firms competing in an information economy. Understanding of these principles is a key aspect of forming an effective competition policy.

The basic principle of a firm's competitive behavior in an information environment is unstoppable innovative activities. No company can afford to stand still, no matter what is concerned – the development of microprocessors, telecommunication services, software engineering or other information designing. Besides, the stability of companies' position depends on making the period between coming up with the idea and introducing the product to the market as short as possible. Here, the updating rate is something that essentially influences the firm's market standing and becomes the mode of their daily business activities.

High rates of changes that are impossible to avoid allow for concluding about the aggravation of a competitive struggle. In a society the dominant characteristic features of which are an unlimited variety of benefits and the fragility of their value, the economic environment becomes tough and ruthless. It is obvious that high rates of changes in products and business models reduce the planning horizon: only a planning period of no more than 5–12 months makes sense for firms representing some information sector.

Another principle of the competitive strategy is intellectual property rights. Alongside the traditional forms of protection, other methods of protection against piracy in the Internet are becoming important: the antipathy of patents, cross-licensing, production secrets, careful protection of source codes of the programs, etc. A variety of versions meant for different customer groups can also deliver many benefits and increase gross profit margins (for example, an improved version of any software product for new users, a full version for specialists, a business version for networks of a certain location, etc.).

In a traditional economy, a large-scale production of goods to supply them for free would hardly promote the evolution of the firm. In an information economy, the principle "to start up with being ever-present and inescapable" earns high profits. This way, the Netscape company distributed the first 40 million copies of their software product for free. The SUN corporation provided the Java programming language for free. These companies developed, at first having established the standard, and then, – selling the updated or expanded versions. Basic changes in the scale of the economic activity (able thanks to the development of networks) positively influence the competition level and explain, for example, why the largest violent "Microsoft" aims to take electronic commerce under control. Even one hundredth part of the cent earned from each transaction can result in huge profits [4].

Providing one's own production with complement goods is of no less importance for taking stable competitive positions. The cooperation of Microsoft

and Intel is one of the most striking examples of this type of partnership. Collaboration of firms producing complementary goods usually promotes competition, increases innovative capacities.

Alongside the intensification of the competitive confrontation, it is convergence and cooperation which appear to be the leading tendencies in an information economy: global standards are set, technologies and products become universal. For this reason, separate exclusive decisions grow in popularity very quickly. Hi-tech firms constantly ally themselves, set standards together, sign license and cross-license agreements to ensure a continuous operation of the product cycle in the system. The main players of this market segment participate in setting standards. Before entering the market, the new technology is to be thoroughly "fine-tuned". One of the examples of the joint developments is the Bluetooth technology that has integrated more than one thousand companies and engineers.

An essentially new ideology cannot be introduced in this market without integrated supporting efforts of the equipment producers and software suppliers. It is easy to predict the market future of the producers that don't want to meet these requirements. A small producer's attempts to independently control even a very small market niche, after having blocked some unique technology from other developers, are likely to culminate in the product's getting unpopular.

The Apple company can be an example. Many things (e.g., its competitive price, graphic interface available in the first models of the mid 1980s, and color screen – in the later models, built-in sound synthesizer, almost no defects of internal hardware compatibility) helped this platform to become the market leader that all the developing computer industry of that time were ready to look up to. However, the early 1970s' license withdrawal for the build of "Apple mac", which was done by third-party firms, a desire to control all hardware inventions, a small range of the peripheral equipment slowed down and nearly stopped perspective projects, as a result of which "Apple" will hardly be ever able to become the leader in the sphere of the development of personal computers. However, the company have recently been vividly demonstrating a focus on the user (their platform support for many peripheral PC devices, diversification of the computer component parts, introduction of different unique accessories). These trends helped the firm to almost entirely win back the polygraphic and prepressing industrial segments.

Open compatibility standards also change the nature of competition. Clients appreciate a popular product more than an unpopular one. Approved standards facilitate the expansion of the network's external effects, reduce technological risks that consumers face (otherwise, consumers would be afraid to choose an unsuccessful technology and to get in trouble). Genuinely "open" standards will never make consumers be confined to one seller. Approved standards shift the competition course: non-inconsistent systems compete for the market, consistent products compete within the market and make it to a great extent a price-related competition.

In certain cases, "openness" is a part of the market strategy of the firm. It is mainly characteristic of the firms developing the software. In any information economy, monopolies are still powerful. J. Schumpeter pointed that monopolism is inevitable in the innovation sphere. He believed that major companies have such advantages as resources and favorable conditions for innovations.

In fact, in terms of supply, distributing information involves a powerful large-scale economy, and at the same time production of new goods requires significant fixed R&D expenses. In terms of demand, the network effect favors popular goods and established networks. Many researchers pay attention to the fact that the spending system of an information network economy (almost zero marginal costs for a production expansion) does not allow a lot of competitors to survive in one segment of the market; that's why only the most powerful producers survive. All these things taken together create a base for a market power.

50–70% of the total sales and over 90% of all the profits are said to usually belong to the market leaders of their own software, especially in sectors of operating systems and infrastructure middleware. However, if you want to become that powerful, you have to overcome high barriers; but if you want to maintain your power, you have to constantly expand the assortment, improve the quality of your products and reduce prices. Besides, you should be ready for your income's being not really high. As K. Arrow pointed out: "As knowledge is somewhat like a public benefit... a period of a monopoly's existence cannot be very long, but can be quite short in comparison with the period of a monopoly's operation in the sphere of a product production; and therefore the value of knowledge which the producer gains can be small".

It is undoubtedly to be recognized that the competitive mechanism demonstrates a symbiosis of a perfect market's characteristics (within a worldwide network there is a single (uniform) market environment making enormous information arrays equally available for all the agents) and monopolies' rise due to the network effect.

Monopolies in an information sphere find themselves under the conditions of a very tough competition. That is why they are constantly searching for the most effective solution to the production and managerial problems.

On the one hand, the market is inevitably monopolized, but, on the other hand, monopolies start demonstrating perfect competitors' behavior. J. Schumpeter, an outstanding Austrian economist of the beginning of the 20<sup>th</sup> century, introduced a monopoly-related theory – the theory of "creative destruction" according to which the monopoly can stimulate technical progress and an economic growth rather than stop them, as wishing to meet the expenses, it stimulates implementing innovations.

On the contrary, the American economist P. Romer thinks that under the conditions of information technologies, monopolies play a negative role because they start gaining advantages from resisting innovations to preserve its monopolistic positions.

If we treat monopolism as a kind of control over prices and sales volumes in the market, it turns out to be effective if it has to do with transactions concerning information benefits, as it helps to maximally use ever-increasing returns: one large producer is more preferable than many small ones as here is provided a product standardization (necessary for the network's benefits) as well as the network's external effects. However, if we are talking about a new-product monopoly (K. Kelly uses the English-language term "monovation" to signify this type of monopolism), this kind of monopoly is dangerous and undesirable. It is known that monopolistic dangers have nothing to do with the fact that monopolies can raise prices (as similar actions are unacceptable for monopolies), but rather with the fact that they can slow down the innovation process, which becomes even more obvious under the conditions of high rates of innovations' distribution. The idea of the antimonopoly regulation under the conditions of a new economy is to prevent monopolies of this kind through avoiding excessive information protection, assigning the right of ownership of a number of information objects to the state as well as through taking other measures.

A short lifecycle of information products aggravates competition, which causes the oligopolistic market structure of industries of information technologies. Consider the telecommunication sphere as an example. We should take into account that the development of the telecommunication sector depends on its infrastructure the creation of which requires a great deal of time. Thus, telecommunication companies have to be as accurate as possible when predicting changes in market conditions. In recent years, most of these predictions were wrong. The system of fixed communication service is characterized by a considerable capacity excess provided by operating companies that invested just a little money in it at the period of the Internet proliferation. It resulted in a tough competitive struggle and facilitated cost savings all around. That's why, an increase in the Internet-traffic did not result in an increase in income of the operating companies. It is clear that now operators focus on attracting new clients and are not interested in the network extension.

It affects companies producing telecommunication equipment: only in 2011, the "Nortel" and "Lucent" companies (two largest producers of telecommunication equipment) reduced about 90 thousand workplaces each. Mobile network operators also made a number of mistakes while trying to predict the level of the demand for their services. After having provided the market with the services of communicating typical verbal conversations, the operating companies invested heavily into new communication services by means of the "third generation" cellular networks (3G). However, in most countries of the world, the level of demand for these services turned out to be much lower than expected. Vague perspectives of mobile operators had a negative impact on their suppliers who expanded capacities hoping for macro-contracts of equipping the new 3G networks. In the context of the decrease in demand for

the equipment of cellular networks, the Ericsson and Motorola companies had to dismiss over 40 thousand employees.

It is important to understand that the basic reason of integration, consolidation and mergers of firms as well as for creation of joint ventures and projects is companies' desire to increase their income (or, sometimes, to preserve the current income level), which is nowadays extremely difficult to do if you work on your own. In foreign practice, the term the win - win - strategy has become popular. This term signifies companies' coexistence that is based not on competition, but on interaction as a result of which both partners benefit (this strategy is widely propagandized by the Intel corporation). The business lexicon has enriched itself with the verbal hybrid "coopeition" (that is a little unusual for the Russian language) based on the English words "competition" and "cooperation" and meaning cooperation (rather than struggling) with competitors, which has become one of the most outstanding innovations of today's economy [5].

One of the executives of the Sun Microsystems company was asked a question about the way their company interacted with the Intel corporation – whether they competed or cooperated with it. He answered that the Sun was a supplier and at the same time a buyer for the Intel, a competitor and a partner, a rival and a colleague. It is an example of how usual concepts of competition and cooperation can completely change their meaning in today's economy.

Production of any goods suggests certain costs. First of all, an information economy gives an opportunity to see sharp changes in the structure of the production costs. For instance, with regard to traditional industrial goods, most costs have to do with the expenses for raw materials and labor force. As for the production of chips, costs for raw materials and labor force make up only 1% and 12% (respectively) of all the expenses while R&D costs reach 70%.

Information and knowledge being the most important resources of an information economy become the main production cost elements. The amount of the production costs starts to a great extent to depend on non-material investments: costs for scientific research, patents and licenses, software, personnel retraining, etc.

The main characteristics of information costs are as follows:

- information costs, as a rule, do not depend on the scale of production;
- in spite of the fact that information costs are constant, they cannot precisely be calculated as it is impossible to quantify the information amount used by the firm for the time being;
- it is necessary to take into account the fact that the more information the company uses as a production factor, the more returns form the information scales it will get;
- in the long run, information costs are getting lower and lower.

The process of searching for new information can soon be optimized in such a way that costs for this search will appear much lower than its useful effect. IT-

achievements reduce the costs for collecting and distributing information and make goods cheaper because the production of these goods is substantially based on information costs. Consider the technological process of electronic book publishing as it is easy to predict the outcome of its development. Electronic book publishing will some day change the whole economic process of the industry. Costs for book publishing will sharply decrease as a result of economizing on materials, labor costs, production and implementation. Readers will be provided with a wide range of books. Retail prices for books will sharply fall, and the sales volume will sharply increase.

In recent years, in France a purposeful collection of information about the competitors' opportunities and intentions (competitive intelligence) is gaining importance in the company operation. Competitive intelligence helps to estimate the advances made in the R&D sphere, the character of new technologies, the degree of legal protection of IP objects. The patent information is a unique method of assessing the competitors' scientific and technical opportunities, their most important subject areas where their business activity promotion is possible. It, in turn, allows the firm to competently develop. In a highly competitive environment, the economic rate of a modern state as well as its position in the sphere of the global labor division are greatly motivated by the ability of the country to provide intensive innovation activities in the real economy.

The radical transformations taking place in the Republic of Belarus today have to do with effective using of scientific and IT achievements by all business entities. The innovation strategy constitutes the basis for the State program of the social and economic development of the Republic of Belarus and is implemented according to the relevant legal acts and policy papers. The state scientific and technical programs are chosen to be the main instruments to achieve primary goals in our Republic. Today, the state scientific and technical programs of the fourth generation (edition) are actively being implemented. In Belarus, the Head of the State and the Government have taken a number of measures in the field of budget and tax, monetary and credit, customs and investing activities for creating favorable conditions for the innovative development. This made the technology modernization of particular enterprises of different organizational types possible and helped to increase a share of high-tech products export.

Continuous enhancement of information and communication technologies, an increase in the share of goods and services in this area, an increased level of customer demand for product quality stipulate an objective, integrated evaluation of the conditions of digital economy development at the national level. We should point out the positive experience of the Republic of Belarus. According to the recommendations of international organizations, it is essential to use collective groups by type of economic activity to measure digital economy: Information and Communication Technology Sector, Content and Media Sector, and Information Technology Industry

(Belstat). As a result, the national statistics that represents the dynamics of the evolution of digital

economy in the Republic of Belarus was offered (Figure 1) [6-8].

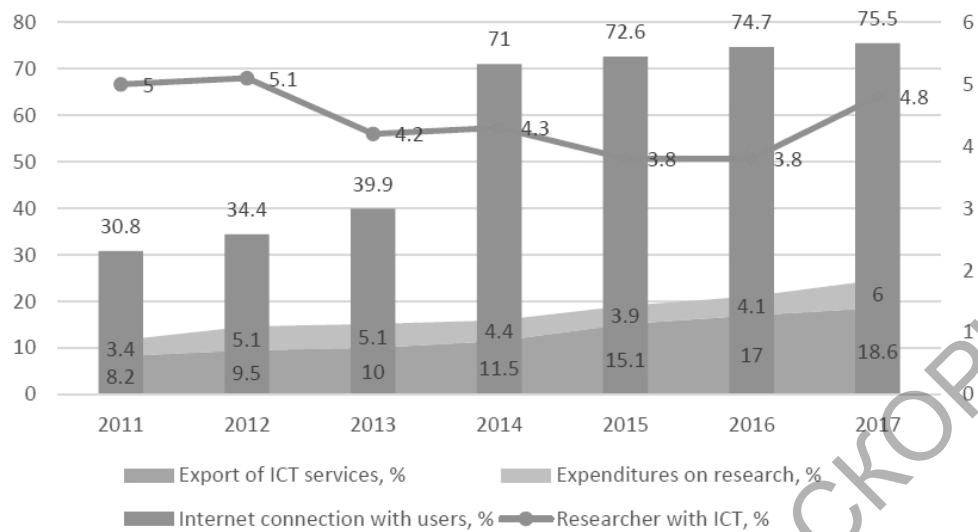


Figure 1. Dynamics of specific indicators of the development of the digital economy in the Republic of Belarus for 2011-2017, %

The system of 43 indicators is grouped into 5 clusters: Information and communication infrastructure (4 indicators); The usage of information and communication technologies by organizations and general public (11 indicators); ICT infrastructure (1 indicator); Digital transformation (17 indicators); National ICT industry (11 indicators). The annual growth dynamics of the presented indicators shows the gradual transition of the Republic of Belarus to digital economy model [9].

It is clear that the growth prospects of the country has to be built on effective innovation activities that have a great effect on the whole economy and its sectors. Thus, the developed Concept of the Program of the social and economic growth of the Republic of Belarus for 2020–2025 forecasts an essential GDP

growth, high rates of achieving performance targets of the economy of the Republic and, consequently, rise in living standards. However, alongside a number of problems in the field of scientific and technical strategies, the Republic's scientific and technical capacity is a powerful knowledge base but requiring development [10].

Overall, it seems that the paths by which the countries transit to digitalized ecosystem may be disputable. Some countries have displayed high degree of advancement, but now are at risk of falling behind. Another important issue that will ensure the effective implementation of the intended growth path of digitalized ecosystem in the country is a pertinent institutional framework (Table 1).

Table 1.

| Legal regulation of digitalization of the economies in Belarus and Russia   |   |
|---|---|
| Republic of Belarus   | Russian Federation  |
| Decree No. 8 of December 21, 2017, 'On the Development of the Digital Economy'<br>"This regulatory legal act creates favourable conditions for the development of the IT industry and gives the country a competitive edge in creating the digital economy of the 21st century".  | Order of the Government of the Russian Federation of 28.07.2017 No. 1632-p Program 'Digital Economy of the Russian Federation'<br>"The program aims at creating conditions for the development of a knowledge society in the country, improving the well-being and quality of life of citizens by increasing the availability and quality of goods and services produced using modern digital technologies, raising awareness and digital literacy, improving the availability and quality of social services for citizens, as well as security both inside and outside the country". |
| Resolution of the Council of Ministers of the Republic of Belarus of 23.03.2016 No. 235 'The State Program for the Development of Digital Economy and the Information Society for 2016-2020' "The purpose of the State Program is to improve the conditions that facilitate the transformation of human activities under the influence of ICT, including the establishment of | State Program of the Russian Federation 'Information Society (2011 - 2020) of 20.10.2010 N 1815-p' "This program aims at effective information support for the functioning of the main institutions of power: the Federal Assembly of the Russian Federation, the Presidential Administration, the Government of the Russian Federation, the Central Election Commission of the Russian Federation, the legislative and executive authorities of the subjects of the Federation".   |

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|---|---|
| digital economy, the development of information society and enhancement of e-government”.   |   |
| Strategy for the development of informatization in the Republic of Belarus for 2016–2022’, approved by the Presidium of the Council of Ministers of the Republic of Belarus (Minutes No. 26 of 03.11.2015).<br>“The Strategy defines the principles of the state policy of the Republic of Belarus in the field of informatization and the main path of development of the information society, taking into account the combination of factors affecting its progress”. | Presidential Decree of 09.05.2017 No. 203 ‘On the Strategy for the Development of the Information Society in the Russian Federation for 2017–2030’.<br>“The strategy defines the goals, objectives and measures for the implementation of domestic and foreign policy of the Russian Federation in the field of information and communication technologies, focusing on the expansion of the information society, the creation of a national digital economy, ensuring national interests and exertion of strategic national priorities”. |

In 2018, the Republic of Belarus and the Russian Federation adopted regulatory legal acts that govern aspects of the employment of digital economy model. It appears that Russian Federation demonstrated positive dynamics in the enhancement of digitalized ecosystem on the basis of a set of the main factors characterizing this transformation model. It also becomes apparent that Russia is among slowly advancing countries characterized by the break out (based on 2008–2015 data) of the general level of ‘digitalization’, which is a transitional stage to a group of rapidly advancing countries (such as Norway, Sweden, Switzerland, Denmark, Finland, Singapore, South Korea, the United Kingdom, Hong Kong, and USA).

### Conclusions

What is important here is a creation of a multi-level mechanism stimulating science, production, management and marketing interactions. A competitive struggle changes in such a way that it is an intellectual property which becomes of crucial importance. Firms compete now, first of all, not for sales markets, but for "creative teams" that are to do the following functions: to create innovations, to competently select technological concepts, to reduce and spread the risk in strategic alliances and other forms of organizations, to search for financing sources, etc. It will help firms to perform an effective innovation process [6].

Competitive advantages in the IT sphere are also facilitated by a special managerial style aiming at encouraging employees’ non-routine behavior and firms’ non-typical activities. All the management models that are known aim at unifying and standardizing people. Information economy has led to a sharp increase in the number of exclusive workplaces. The idea of no man’s being indispensable used to be very popular in the organizational hierarchy, but

nowadays it has almost lost its significance in developed countries.

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