



THE INFLUENCE OF ECONOMY DIGITALIZATION ON THE ACTIVITY OF OIL COMPANIES

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Abstract

The oil industry in Russia and in the world is the basis of the economy, and modernizing it is of great importance in the conditions of financial resources shortage. One of the means is to increase the economic efficiency of oil enterprises performance in the digital economy environment. The process of digitalization has changed the process of doing business. The ability to handle the large bulk of information within the shortest period of time has become one of the crucial qualities that allow oil companies to be successful. The oil executives introduce digital technologies into the daily activities of the company in spite of the “special staff shortages” in this sphere. Practically at all large enterprises digitalization of the economical processes starts with analysis and reducing the office labor efforts: handling standard documents, including notices, requests, statements, reports, payments documents, declarations, contracts, i.e. the major part of the document flow and practically any work concerning the processing of information is automated. Economy digitalization complies with the program “Industry 4.0” being realized now. Its conceptual issues involve such conceptions as “cloud computing”, “Internet of things”, “big data”. A particular advantage of digitalization is an opportunity for geographically remote management teams to share their operating experience simultaneously supporting the functional competences of the teammates. The implementation of the economy digitalization requires intensive efforts and adequate management, but the value of such work will allow the oil company to foresee different scenarios of development, to put realistic goals and make appropriate plans for technological development and own scientific and technical potential to secure sustainable long-term progress.

Keywords: digitalization, digital economy, economic activity, oil companies.

1 INTRODUCTION

The oil industry is critical to the economy of the Russian Federation. Its influence can be hardly overestimated. First of all, oil is a basic raw material for a lot of industries including refinery

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and chemical sectors. Secondly, it is one of the key export items in the countries having oil reserves. In Russia, the oil industry together with other energy supplying industries is the basis of the whole economy. (Vasilieva, Peskova, & Ponomareva, 2017). Oil production has been the principal export revenue source. Therefore, problems in the development of the national oil industry are among the key issues of the current Russian economy. Under the circumstances where oil industry enterprises are short of financial resources to invest in the modification, upgrade and renovation of fixed capital, it is particularly topical to find out and define the ways of raising their efficiency. Stabilization and sustainability improvement of oil industry economic entities relate to the necessity of early modernizing a number of business aspects at the macro- and micro-levels. It is the purpose of this study to analyze economic complex of development of oil companies, the propriety of strategic lines in improving their present-day activities and formulation of recommendations on raising the economic efficiency of oil industry enterprises in the digital economy conditions.

2 ANALYSIS

The process of digitalization in Russia and overseas has changed both the everyday lives of people and business. It is impossible to work with economical processes using prior models. The most important qualities that enable oil companies to remain competitive have been flexibility, variability, ability to process the bulk of data within the shortest possible time. (Klimova, 2017) In 2017 the economy of Russia experienced a slight growth connected with the decline of the world crisis hangover in business. One of the key drivers for the development of the Russian economy was the digitalization of business in oil companies, which demonstrates their active position and openness to structural adjustments. Conventional methods of avoiding a raw-material model of economic processes in refining have been used up, now it is time to emerge from that crisis phenomenon through digitalization.

In view of acceptance and implementation in Russia of the program Digital Economy, it is planned to spend 100 billion rubles from the federal funds on industry modernization in 2018-2024. The program covers three levels of

implementation: markets and sectors of the economy; platforms and technologies forming competences and normative regulation; information infrastructure, staff, and information security.

At the conference "Petrochemistry in Russia and CIS" (April 2017, Moscow) the chief executives of the companies set the economic outlook of the industry: alongside with expansion of basic petrochemical production and laying the groundwork for development of special chemistry line, one of the utmost subjects of the conversation was staff shortages and implementation of such innovations as digitalization of economic and industrial processes (n.d., 2017). The company executives realize that the success of their business depends largely on how quickly they can cater to the needs of the market and include new digital technologies in the everyday activity of the enterprise. The adoption of digitalization is accentuated by staffing in oil companies, financing, and structure of the organizations. All the above factors are mostly internal and pertinent to the business strategy. However, it cannot be forgotten, that the role of the state in the innovative development in Russia is very important - such issues as financial support and forming an effective infrastructure cannot be carried out in the market of innovations without involvement and support of the state. The digitalization processes did not begin yesterday, banks have been involved in the "digital" industry for a long time, being engines for implementation of the payment system and various online services, that provide the dynamic development of the electronic commerce. Substantial modification and digitalization of the processes have been carried out in the work of state institutions, the portal "Gosuslugi" is a case in point. Some production enterprises use Industrial Internet Technologies.

One of the most significant trends whose scale of effect is different to imagine now is the development of cognitive technologies. Due to the cognitive technologies labor expenditures on office chores: standard paper handling including notices, requests, statements, reports, payment documents, declarations, contracts, etc., will be reduced dramatically. Thus, the main part of the document flow and virtually any job concerning information processing will be maximally automated.

In case we understand economics as a process of "production, distribution, exchange, and consumption of goods and services", all the technologies we dealt with before, only influenced

the first 2-3 links of the chain. The cognitive technologies will penetrate, interfere and cause substantial changes at all the stages including the process of consumption (see figure 1).

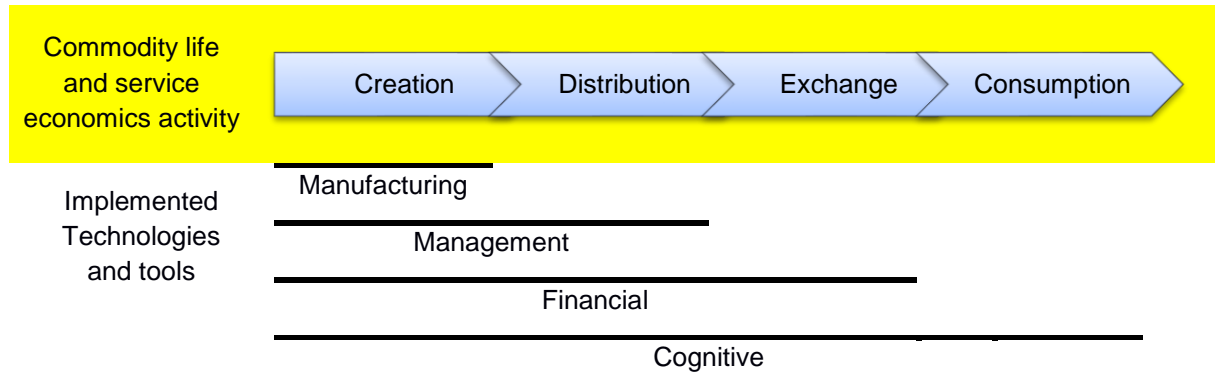


Fig. 1 Correspondence between components of economic activity and key technologies

Source: (Keshelava, et al., 2017)

The process of digitalization is considered to include several parallel processes:

1. End-to-end automation of all main economic processes in an oil company;
2. Automation of goods accounting and stores marshaling, direct data input;
3. Available reserves, supply chains, logistics, and transportation management automation;
4. Finance, budget management automation;
5. Staff management automation;
6. Customer relationship management automation;
7. Cloud office applications and cloud services for the activity of management of geographically distributed staff;
8. Cloudy communication services and virtual call-centers;
9. Accounting, tax and statistical information automation;
10. Automation of papers and data exchange with counter-parties and supervising authorities.

The technology management of Cisco are sure that the considerable increase of IT role is due to the fact that the digitalization trend interests not only IT specialists, but company executives too, and also finance and staff managers at organizations. There can be presented some examples of projects put into force by Cisco together with other companies for different production plants worldwide, and the projects related to digitalization and IT influenced particular intra-company business processes. One of the examples concerned a foreign refinery. A lot of

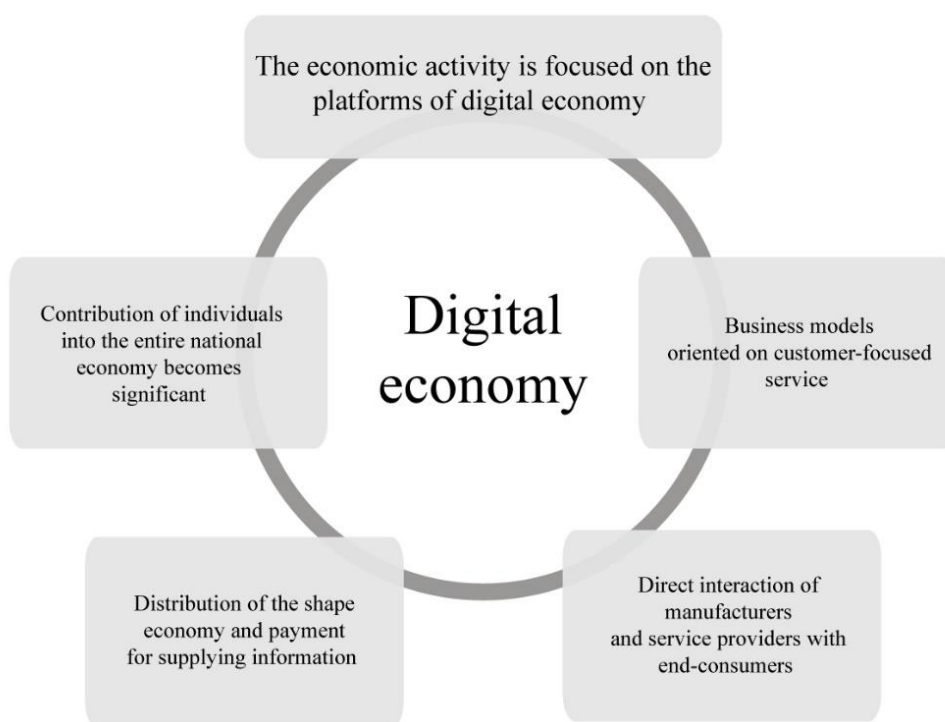
efforts were spent to persuade the management of the plant that digitalization technologies are safe as regards both information transfer from people and information transfer directly from the technological site. Having started work on the project it was found out that the human factor plays a valuable role: the operator had to walk around the units, to do statutory maintenance. The processing lines were to be removed out of service once a year or a year and a half, so the refinery produced twice as fewer oil products at this time. Not only that but the operator often shrugged off his responsibilities, the processing units were not serviced for months. When such a unit broke down, it appeared to be "repaired" just in words. That raised the task to optimize the scheduled maintenance operations. In cooperation with the companies SAP and IBM, the refinery was provided with electronic document management, which required quite a different interpretation on the part of the company officers: it was a case of using wireless technologies at a critically important facility of a country. As a result, the operating expenses were successfully reduced by 10% due to online data accessing, the expenses were cut down by 90% when new monitoring and control devices were installed, the job performance was doubled, the safety at work was significantly improved, the period of scheduled maintenance was reduced by four days (Voskanyan & Krivoshapka, 2016).

There can be no doubt that a successful business strategy is the framework of the functioning of any

enterprise, but what is more, effective strategic planning in oil companies is necessary because of the particular importance of this production sector for the world community. Strategic faults in oil companies not only cost them dearly, but they become a prelude to a variety of adverse economic, political and social processes in the society, carry a threat for the global ecological safety.

integrated management systems at the oil facility and reflect the capital gains due to more complete, reliable and up-to-date information. The key priorities are store and forward of production information by training and better techniques. It is also essential to provide an opportunity for geographically remote management teams to share their operating experience simultaneously supporting the functional competences of the team members through professional associations.

The economic aspects of the results of digitalization are connected with the use of



Industry 4.0 and information and communication technologies

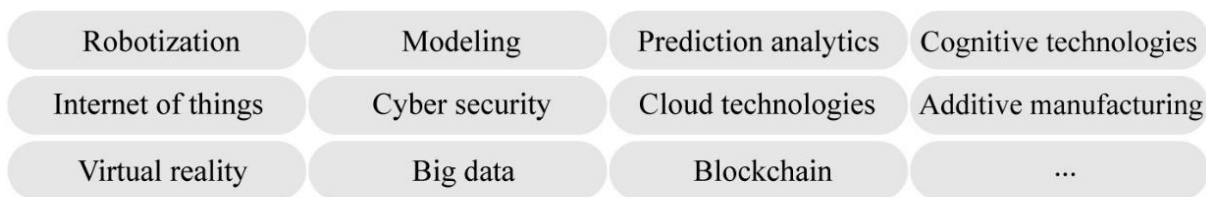


Fig. 2 Industry 4.0: and trends "of digital" economy.
 Source: (Keshelava, et al., 2017)

The developers of digital technologies should consider a number of factors which are common with "digitalization" (Gululyan A, 2017):

- conformity of the proposals on rising in value with the strengths of the company, management requirements and implementation methods;
- generation of service proposals maximizing the product cost;
- provision of the full life cycle representation including the company's confidential information, for rapid adaptation and better decision-making;
- assurance of cost monitoring throughout the project life cycle, which makes it possible to

- improve and adjust the observed processes on-line;
- careful examination of the enterprise ecosystem.

Some of the digitalization technologies addressed can be better perceived in the context of specific studies. A common example of using digital technologies in order to improve operational efficiency in the exploration and production sector over the last 10 years is creating and using integrated operation centers. As a result, the period of monitoring was reduced by 60% on adding 240 new monitoring measures within a month. Improved making decisions eventually became possible by monitoring optimization which gave the opportunity for the operators to convert to signal to monitor with the result 75% within 24 hours, 88% with advance warning less than 48 hours, and 99% with advance warning less than 72 hours. Future development will include additional online data from the field, received via mobile devices and drones, and also connecting that process to the logistics chain in the field.

Digitalization of the economical processes well blends in with the program "Industry 4.0" being implemented nowadays (figure 2). Its basic provisions are cloud computing, Internet of things, big data. (Keshelava, et al., 2017)

Cloud computing is an IT concept meaning universal and easy network access on demand to the tool scope of configurable resources which can be provided and deallocated on-line with minimum operating costs or provider calls. Examples of resources can be data transmission networks, servers, storage devices, applications, and services both combined and individual. That is to say, cloud technologies are data processing technologies in which computer resources are supplied to an Internet user on demand as an online service. It is necessary to say that cloud technologies made an enormous contribution to the foundation of the emerging "digital" economy. This contribution is not limited by the technological component but also involves economic and ideological components. The development of cloud technologies, for example, has rung up such notions as production-on-demand, software as a service and many others that will become themes of most business models in the future and principle of most economic interactions. Internet of things is a concept unifying lots of technologies, meaning

instrumentation and Internet connection of all the tools (and things in general), which allows remote monitoring, monitoring, and control of all the processes on-line (also in automatic mode).

Big Data is a collection of approaches, tools, and methods to process structured and unstructured data (including those from different independent sources), with the purpose of obtaining human-readable outputs, Big data is characterized by considerable volume, diversity and update rate, which makes standard methods and tools of data processing rather ineffective. So, the technology of Big Data is a decision-making tool based on large qualities of data. Economic activity focuses on the platforms of the "Digital" economy. The platform of "digital" economy is digital media (a hardware-software complex) with a set of functions and services, which meet the requirements of users and producers and also provides direct interaction between them. The value of the platform is in providing a possibility of direct communication and facilitation of the interaction procedure between the participants. The platforms reduce costs and provide an additional function both for supplies and consumers. They are also supposed to provide data exchange between the people involved, which should considerably improve cooperation and promote producing innovative products and decisions. "Platform" as a business model has been existing for a long time. A classical market can be a simple example, where sellers and customers (producers and users) find each other. Nowadays there are a lot of activity growing companies based on the principles of the platform business model, the brightest being Uber and Airbnb.

Studies indicate that digital technologies have become main instruments of business struggle among companies. They are a driving factor for financial inclusion, a decrease in data processing expenditures o sales channels, an increase in customer satisfaction and expansion into new markets. Digitalization in modern-day Russia is a trend which will be increasing its capabilities in oil companies. According to the last survey of "Deloitte" (Klimova, 2017), the most popular organization structure innovation "Deloitte" implemented by companies in Russia, are remote work of the staff 38%, introduction of common user centers - 37%, and creation of project offices like

"Agile" - 26%. As for process solutions the most popular nowadays are: implementation of advanced ERP-systems (42%), complete automation of a particular business process (27%) and programs of processing big data (26%). Future belongs to the oil companies with advanced technological platforms and economic models which will be oriented towards the use of intelligent systems and robotics in business processes.

The above brief overview of using digital technologies in oil and gas business has shown that it becomes more profitable for the companies to cooperate together in the innovation area due to the increasing cost of research and development including digital economy. Russian and overseas companies form joint ventures with increasing frequency, and actively cooperate with petroleum universities and research centers in this field. In addition to that researches emphasize the

importance of digitalization and automation of industrial processes, which also drive up the productivity of human capital assets.

3 CONCLUSIONS

In conclusion it should be noted that drawing an innovation strategy in economy digitalization of an oil company requires intensive efforts and adequate management to carry out prediction analysis of engineering and technological level in all the in-house production parts, linked companies and world development trends in basic and exploratory research, industry scientific and technical complex, world market of research and engineering products. Conducting such work will allow the company to foresee different scenarios, put realistic goals and make appropriate plans for technological development and own scientific and technical potential to secure sustainable long-term progress.

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