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OPPORTUNITIES OF DIGITAL ECONOMY AND DATA ANALYTICS FOR UKRAINIAN ENTREPRENEURS

The article discusses the basic concepts of the digital economy, analyzes its role in the development of business, including small and medium-sized enterprises, identifies trends that indicate the digitalization of various spheres of public life. Also presented are the results of a study by the International Research and Consulting Company IDC on the dynamics of digital transformation of small and medium-sized enterprises in 13 countries. Two main approaches to data-driven company management are considered: data-driven and data-informed. The role of Big Data in the process of applying data analytics in management is studied. Answers to questions are given - when and why to use Big Data technologies? The main industries that benefit most from the implementation of Big Data in enterprises are considered. The focus is on such areas as retail, education, banking, healthcare and manufacturing. The main methods of data analytics, most often working in different fields, are highlighted. The advantages of introducing tools for working with Big Data and data analysis using modern technologies and artificial intelligence methods for business are determined.

Keywords: digital economy, digital transformation, small and medium enterprises, business, digital technologies, Big Data, data analytics, artificial intelligence.

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МОЖЛИВОСТІ ЦИФРОВОЇ ЕКОНОМІКИ ТА АНАЛІТИКИ ДАНИХ ДЛЯ ПІДПРИЄМЦІВ УКРАЇНИ

У статті розглянуті основні поняття цифрової економіки, проаналізовано її роль у розвитку бізнесу, в тому числі суб'єктів малого та середнього підприємництва, визначені тенденції, які свідчать про цифровізації різних сфер суспільної життєдіяльності. Також представлені, і результати дослідження Міжнародної дослідницької та консалтингової компанії IDC, присвяченого динаміці цифровий трансформації суб'єктів малого і середнього підприємництва в 13 країнах світу. Розглянуто два основні підходи до управління компанії на основі даних: data-driven і data-informed. Вивчено роль Big Data в процесі застосування аналітики даних в менеджменті. Дано відповіді на питання - коли і навіщо застосовувати технології Big Data? Розглянуто основні галузі, які найбільше виграють від впровадження Big Data на підприємствах. Зроблено акцент на таких сферах як рітейл, освіту, банкінг, охорону здоров'я і виробництво. Виділено основні методи аналітики даних, найбільш часто працюють в різних сферах. Визначено переваги від впровадження інструментів роботи з Big Data і аналізу даних з використанням сучасних технологій і методів штучного інтелекту для бізнесу.

Ключові слова: цифрова економіка, цифрова трансформація, малі та середні підприємства, бізнес, цифрові технології, великі дані, аналітика даних, штучний інтелект.

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ВОЗМОЖНОСТИ ЦИФРОВОЙ ЭКОНОМИКИ И АНАЛИТИКИ ДАННЫХ ДЛЯ ПРЕДПРИНИМАТЕЛЕЙ УКРАИНЫ

В статье рассмотрены основные понятия цифровой экономики, проанализирована ее роль в развитии бизнеса, в том числе субъектов малого и среднего предпринимательства, определены тенденции, которые свидетельствуют о цифровизации различных сфер общественной жизнедеятельности. Также представлены, и результаты исследования Международной исследовательской и консалтинговой компании IDC, посвященного динамике цифровой трансформации субъектов малого и среднего предпринимательства в 13 странах мира. Рассмотрены два основных подхода к управлению компании на основе данных: data-driven и data-informed. Изучена роль Big Data в процессе применения аналитики данных в менеджменте. Даны ответы на вопросы - когда и зачем применять технологии Big Data? Рассмотрены основные отрасли, которые больше всего выигрывают от внедрения Big Data на предприятиях. Сделан акцент на таких сферах как ритейл, образование, банкинг, здравоохранение и производство. Выделены основные методы аналитики данных, наиболее часто работающие в разных сферах. Определены преимущества от внедрения инструментов работы с Big Data и анализа данных с использованием современных технологий и методов искусственного интеллекта для бизнеса.

Ключевые слова: цифровая экономика, цифровая трансформация, малые и средние предприятия, бизнес, цифровые технологии, большие данные, аналитика данных, искусственный интеллект.

Great development of IT influences the economy. Many activities are increasingly being transferred to the Internet. In addition, there are many ways to automatically obtain a variety of data about the world (satellite images, digital photos and videos, GPS signals, sensor readings, etc.), the Internet of things, which has significantly expanded the amount of available data. In many areas of economics (for example, insurance, healthcare, science, agriculture), earlier gathered information is being intensively digitized. This way allows to generate large volumes of data (Big Data), which becomes an additional area of socio-economic, technical, scientific analysis, that allows to establish new logical patterns and make management decisions based on them.

Thus, it is obvious that in the modern world global changes are taking place that are associated with the emergence of new digital infrastructures, the rapid development of digital communications and the improvement of computer technology. To maintain competitiveness, entrepreneurs need to accelerate the implementation and use of digital technology in their companies. The integration of these technologies in the economic and socio-political life of society indicates the formation of a new system of the global economy - digital.

Almost all EU countries have already approved and implemented their own digital strategies, and many of them, for example, Germany, France, Sweden, have been implementing their key components over the last 5-7 years as a public policy priority in many areas of life and sectors of the economy. A good digital agenda is a strategy to achieve the country's goals quickly, relatively cheaply and in quality, both economically and socially using digital technologies. In the modern world the digit is the same tool or even competing instruments that helps quickly, cheaply and with new quality, achieve the goals for any country (GDP, employment, etc.). Ukraine has just begun to develop and implement key positions in the digital economy [1].

The demand for digital services and talented developers abroad is thousands of times higher than the demand for such services in Ukraine. It means that foreign countries, economies and companies are currently undertaking digital projects and transformations, so they are becoming more efficient and competitive in the global arena. Unfortunately, this also means that the Ukrainian economy is not doing so yet, and therefore there are risks that it will continue to lag and become more resource-intensive.

So, the fourth industrial brought "digital transformation technologies" such as the Internet of Things, robotics and cyber systems, artificial intelligence, big data, paperless technologies, additive technologies (3D printing), cloud and fog computing, mobile-, biometric-, quantum- and identification-technologies, blockchain and others (the list is not exhaustive and is supplement – according to analytical reports of the Davos Economic Forum). While in the days of the Third Industrial revolution, they coped well with the automation and informatization business as it is, then in our time, the Fourth Industrial, these digital technologies are transforming business into qualitatively new forms of activity.

Terms “digital economy” and “digital transformation of the economy” are increasingly used today by various researchers, representatives of the global business community, politicians, and journalists, but their contents are still vague. Let's look at some ideas about what the digital economy is.

In the classical sense, "digital economy" is an activity in which the key factors of production are digital data and their use, which can significantly increase efficiency / productivity in various types of economic activity. The term "data economy" is often used today.

There are more specific explanations, for example, the "digital economy" is called an economy that consumes digital technologies and services. The sphere that creates, implements and services digital technologies, is called the digital industry or “IT sector” of economics.

In fact, the digital economy can be built on paper, but the real results will come when ideas, actions, initiatives and programs related to digital transformation are integrated into national, regional and sectoral development strategies and programs, and the most importantly, they will be implemented as a priority. In this perspective, some countries generally resort to the principle of digital by default. According this principle the maintenance and development of any physical system is carried out only in the absence of a digital alternative. That is, the physical system becomes an alternative and the digital system becomes a normal state of functioning of the system, or according to the theories of the Swiss Business School IMD it becomes a new digital normal.

Ukrainian digital strategy “UKRAINE 2030 - A DEVELOPED DIGITAL ECONOMY” gives the next definitions. The digital economy is a type of economy where the key factors and means of production are digital data (binary, information, etc.) and network transactions, as well as their use as a resource, which can significantly increase the efficiency and productivity of activities and value for products and services received [2].

According to the Development Strategy of the Russian Federation Information Society for 2017-2030, approved in Russia on May 9, 2017: "Digital Economy is an economic activity in which data in digital form, processing large volumes and using the results of the analysis are the key factors of production. with traditional forms of management can significantly improve the efficiency of different types of production, technology, equipment, storage, sale, delivery of goods and services” [3].

In the glossary of the Eurasian Economic Commission (EEC) the digital economy is defined as: “Economic activity based on digital processes, models, technologies, digital goods (services), included produced by e-business” [4].

According to Meshcheryakov R.V., there are two approaches to defining the concept of "digital economy". The first approach is the classical one, according to which "the digital economy is an economy based on digital technologies, while correctly characterizing exclusively the field of electronic goods and services." The second approach, an extended one, defines the digital economy as “economical production using digital technologies”.

Thus, we can conclude that the digital economy is an activity that is directly related to the development of digital computer technologies, including various services for providing online services, crowdfunding, e-commerce, electronic payments, and others.

The term "digital economy" is usually considered in the context of "digital transformation of the economy", the essence of which is defined in the glossary of the Eurasian Economic Commission. So, "digital transformation of economy" is:

– change of economic style, change of traditional markets, social relations, public administration, connected with penetration in them of digital technologies;

– a fundamental change in the main source of added value and structure of the economy through the formation of more efficient economic processes provided by digital infrastructures;

– the transition of the leading mechanism of economic development to institutions based on digital models and processes [4].

According to the Ukrainian digital strategy, Digital transformation (digitalization) is the transformation of existing analog (sometimes electronic) products, processes and business models of an organization that underlies the effective use of digital technologies.

The existence of the phenomenon "digital transformation of the economy" is driven by trends signaling that modern society is indeed experiencing the digitization of all areas of its activity:

–Various national and state programs of the Digital Economy, such as e-Government, e-customs, e-health, etc are creating;

–Healthcare is becoming digital with the help of modern information systems that allow to control the quality of medicines, create digital profiles of patients, etc.

–Blockchain technology is used for orderly storage of data in a publicly available database, thereby reducing the level of financial fraud;

–The transport sphere is also changing dramatically, as different intelligent transport systems, the latest satellite technologies, and drones are used;

–In agriculture with the help of modern technologies there is an opportunity to predict the results, and therefore quickly change the situation;

–Due to the introduction of modern technologies, specialists of different fields need to transform their knowledge in order to be able to work in the conditions of transformation of all vital activity, and for this purpose training programs for specialists in the field of IT are created;

–Due to the widespread use of the Internet, modern businesses can sell goods and services in a completely new way online;

–"Smart cities" are created for the most efficient management of urban property.

As the result, it becomes apparent that the world is changing its economic landscape due to the introduction of digital technologies in all areas of society. Accordingly, "digitalization of the economy" provides new unique opportunities for business, but also presents new requirements. Digital Transformations create a field for large-scale, exciting, drive projects and initiatives. When Ukraine becomes a landmark of digital transformation, it will attract investors' attention and, step by step, it will become an innovative leader. Human capital will

have opportunities for realization. The migration of intelligence abroad will decrease. The market and the Ukrainian brains will do their thing. And life in the "digital" economy will give citizens new opportunities for business and their own realization, education, creation, recreation.

Thus, modern enterprises are forced to adapt to the requirements of the digital economy, otherwise they risk becoming uncompetitive or even ousted from the market. The company management should apply IT technology in the development of business strategies, use digital technology when interacting with customers, timely respond to various changes in the IT environment and use them to increase competitiveness.

According to a global study on the dynamics of digital transformation of small and medium-sized enterprises in 13 countries conducted by the company IDC, 4 out of 5 small and medium-sized enterprises recognize the benefits of digital transformation. These advantages are increased turnover, simplified access to information, reduced costs, increased employee productivity and customer service. However, really, the situation is the following:

- less than 7% of small and medium-sized enterprises fully completed the integration, that is, the potential of digital transformation is not yet fully disclosed;
- 44% of small and medium-sized enterprises invest in technologies that instantly transform current processes;
- 46% of the surveyed medium-sized enterprises and 38% of small ones pay great attention to the long term. They believe that in the coming years, the survival of companies depends on their active participation in the digital economy;
- Small businesses have made digital transformation easier with the cloud;
- Among subjects of small and medium-sized businesses, software for managing customer relations and e-commerce applications is very popular;
- 73% of organizations that have already implemented digital technologies report that investments in this area have met or exceeded their expectations;
- A third of the respondents allocated additional resources for digital transformation to ensure the development of their small and medium-sized businesses along with the development of the digital economy [5].

Nowadays there are two main approaches in data management process: Data-driven and Data-informed. Data-driven is an approach to management, where the main criterion for decision making is the results of a measurable experiment. Data-informed, however, implies the use of data as only one of many factors in making decisions.

The numerical data is very powerful, as it is very specific. For most entrepreneurs with technical education, empirical data is more important than most other factors (experience, consultants' advice) when making decisions. But it’s very simple to go too far in this approach and this is the difference between the data-informed and data-driven approaches. It is important to understand the essence of each of the approaches and to know which to apply to each specific situation.

The company Go Practice recommends using the following rules dealing with data:

- apply data-driven approach for optimization tasks;
- if at some point the optimization approach has been not corrected or not applicable, then raise the task to a higher level;
- if there are several high-level tasks that cannot be solved using the data-driven approach, use the data-informed approach for them (data becomes only one of the factors among others)

– other factors may include the following: qualitative research, insights from communication with users, business interests, strategic goals.

Specific modern category of data is Big Data represented by a structured and unstructured data of huge volumes and variety, as well as processing methods that allow distributed analysis of information. Such data is effectively processed using scalable software tools that became an alternative to traditional databases and Business Intelligence solutions [6]. Modern digital technologies are rapidly evolving, the amount of information is growing, and at the same time, opportunities for using Big Data in real projects are expanding. IDC Digital Universe estimates that in 2020 the total amount of data on the planet will be 40 ZB, which is equivalent to 5200 GB for every inhabitant of the Earth.

Using huge amounts of information that are effectively and rationally captured, processed and analyzed, companies can: gain a better understanding of the business; analyze their competitors; find out something new about your customers. Thus, the use of Big Data contributes to:

Increasing of sales;

Improvement of the level of service;

Reducing costs;

Improving a product or service.

Implementing Big Data and analyzing data using AI techniques will add a number of benefits to businesses, including:

• Simplify the planning process and improve its accuracy.

• Increasing the speed of launching new projects and increasing their productivity.

• Increasing the project's chances of being in demand.

• Improving the quality of customer satisfaction rating and increasing customer satisfaction.

• Finding and engaging target audience more effectively.

• Accelerating customer and counterparty engagement.

• Optimization of integration in the supply chain.

• Improving the quality of customer service and speed of customer interaction.

• Increasing the loyalty of current customers [7].

There is a set of practices and skills for effective management of modern marketing tools and predictable business growth: Digitization of business, Collection and data analysis in practice; Lean approach to improvement; Implementation of data-driven management and others. Let's look the areas that can benefit from technology implementation [8].

Retail. Retailers use collected Big Data information to build long-term and friendly relationships with customers. And the profit reflects the result of the marketer's work. Another advantage of big data technology – it can be used to predict business risks. For example, starting a new point is now impossible without the advice of a robot. The machine analyzes the average check in the districts of cities and gives advice to the retailer: whether to open a store there. The accuracy of the forecast can reach 80 percent, it all depends on the quality and quantity of collected information.

Education. Teachers will be able to modernize the school system, motivate pupils and students of higher education institutions to work more successfully. It will also be easier for the trainer to identify trainees who are lagging, to make sure the topic is understood by the audience, and to implement a more effective assessment system.

Banking. Every day, bankers are faced with a great amount of information coming from different sources. Proper handling of available information flows will increase customer satisfaction, minimize credit risks and prevent fraud (detecting abnormal behavior). Banks

usually make credit scoring decisions. One of the main key functions of banks is to enable individuals and companies to make expenditures before they can afford them. A credit scoring model is a mathematical model used to estimate the probability of default, which is the probability that customers may trigger a credit event (i.e. bankruptcy, obligation default, failure to pay, and cross-default events). A customer scoring model is the component of customer relationship management (CRM) programs that refers to various metrics used to help companies predict the long-term financial value of customers. These models are very popular and useful in banking activity today. That's why financiers are interested in finding new innovative ways to use Big Data.

Health care. Disease histories, treatment plans, clinical analyzes, genetic studies, and physician prescriptions can all be combined into one database. The analytics of the collected data will help to draw new conclusions about the applied methods of therapy and to improve the care of patients. The main analytical tool of health care is Survival analysis that defines as a set of methods for analyzing data where the outcome variable is the time until the occurrence of an event of interest and the event can be death, occurrence of a disease, marriage, divorce.

Production. Among all applications of Big Data, the production is particularly desirable. In a highly competitive market, it is important to minimize raw material costs and improve product quality. Predictive analytics will help to solve these problems [9].

To summarize, it should be noted that in the modern world, the "digital transformation of the economy" is becoming more obvious and has a huge impact on the development of various forms of business. Companies are responding differently to digital transformation: some are actively introducing digital technologies, some are feeling the need, but are only trying to implement on individual projects. However, some of them are resisting digital transformations and do not take the role of innovation in the development of the business environment, respectively, their business is developing sluggish and becoming uncompetitive. For small and medium-sized enterprises, digital technologies are creating an opportunity to enter global markets, but it also requires appropriate policy measures from states that could help create an enabling digital business environment.

Subsequent scenario of Ukraine's digitalization involves elimination of legislative, institutional, fiscal, tax monetary barriers that hinder the development of the digital economy, taking powerful measures to stimulate the digitization of economic and business sectors, and initiating state-wide transformation digital initiatives and projects, based on modern models of public-private partnership [10]. The main motivation of the state to provide digitalization should be the ability of digital technologies to influence the productivity and efficiency of economy and business. The industries they use are growing 2-4 times faster than the average industry. Bright examples are fintech, agrotech and many others. The life spheres (education, medicine, transport, etc.) that are being upgraded with the help of digital technologies are becoming much more efficient and creating new value and quality that very often lead to a complete transformation of the old system.

Therefore, the key tools for stimulating and motivating digitalization are: first of all – initiatives to ensure financial accessibility of digital technologies for consumers such as tax breaks for large scale digital transformation projects, accelerated depreciation, R&D attribution to cost of production, incremental tax credits [11]. These are world-renowned and proven tools identified, for example, in Ernst & Young Worldwide R&D incentives reference guide 2014-2015 to stimulate innovation in general. And the second tool is initiative to ensure the availability of financial resources for the procurement or lending of digitization projects for business and industry.

Digital dividends as the results of digital transformations, according to World Bank analytics are nationwide economic growth, acceleration of the economy, business, and hence tax revenues, GDP growth, new investment inflows etc. Both digital consumers and manufacturers will benefit from the digitalization of the economy, and as the result it will growth the digital industry. The emergence of the internal market will create new opportunities for Ukrainian IT companies, digital "brains" will be able to create products and services locally to meet the internal demand.

Thus, working with the internal market should be a key strategy for digitalization, and motivation and needs for digital technologies should be key initiatives for consumers – business, government, citizens.

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