

ICEST 2021**II International Conference on Economic and Social Trends for Sustainability of Modern Society****TRANSFORMATION OF INNOVATIVE ECONOMY: DIGITAL
PLATFORMS AND ID TECH SPHERE DEVELOPMENT**

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Abstract

Identification of new factors that facilitate innovative economy transformation, is one of the key tasks in setting target strategic development guidelines. The study of innovative processes that represent intensive path of economic development and their interaction with digital technologies and other opportunities provided to society by scientific and technological progress can open wide horizons for the active economic development of society. Therefore, the increased interest of the state and the business community is caused by the emergence of digital platforms. The purpose of this study is to clarify the role of digital platforms and determining their place in the economy. The penetration of platform solutions into key sectors of the innovative economy creates preconditions for sectoral breakthrough. Transforming the field and conditions of interaction between economic entities, digital platforms play a significant role in the development of EdTech market and its individual segments. As the study results show, the role of digital platforms and their prototypes in transformation of the public administration system is ambiguous, which creates preconditions for regulating this area. In Russia, state participation prevails in the economy digital sphere. This makes it possible to improve public administration processes, achieve stable rates of technology development, and make services in the social and cultural sphere more accessible.

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1. Introduction

In the era of digitalization, economic relations are becoming more efficient due to the automation of processes and the development of technologies for data processing and using. Digital technologies are changing both the business landscape and the business models of companies, becoming the source of sectoral, regional, and sometimes even global, transformations. The growing integration of all data streams is largely driven by technologies using artificial intelligence, neural networks, machine learning, cloud technologies and much more. The country's competitiveness and leading position in the world economy, to a greater extent than before, is determined by innovative structural transformations at all levels of the national economy.

Digital transformation today not only determines the leadership of countries, regions and companies, but is also one of the necessary conditions for functioning and development. The need for digital transformation around the world is determined by opportunities for increasing efficiency, including through introduction of digital platform solutions. But on the other hand: problems of ensuring digital security, development of digital culture, differentiation of regions and population social groups due to uneven implementation and use of achievements of digitalization, general problems of efficiency increasing using a new key economy resource: information.

Separate block is the problem of digitalization of economic systems as a whole. These are problems associated with violation of the country's sovereignty and increase in its vulnerability due to penetration of external IT technologies into all spheres of life. Problems of ensuring cybersecurity in sphere of economic management, finance, transport, energy infrastructure also need to be addressed. The problem of unemployment associated with robotization of processes in the economy is becoming more and more acute. The human and personnel potential depletes and threat of loss of individuality increases.

The problems of the economy digital transformation are often associated with super-intensive interaction and powerful global competition, which is accompanied by exacerbation of already traditional problems of fighting poverty, social inequality, natural environment preservation and protection, etc. The search for solution to the problems of digital transformation simultaneously creates conditions for solving the listed social problems.

The concentration of countries on finding solutions to these problems is reflected in formation of the main strategic directions of economic development, and in the setting of policy and practice priorities. So, among the most important high-rank priorities for development of the digital economy of developed countries are singled out by improvement of e-government services, development of telecommunications infrastructure, strengthening of security, stimulating adaptation of infocommunication technologies by business and socially significant industries such as education, healthcare, etc.

2. Problem Statement

One of the strategically important tasks, which solution may give a powerful impetus to the economy innovative development, is the creation of digital platforms for the economy management. The attractiveness of digital platforms is determined by the fact that they can be optimized for both integrated

and specialized solutions, and this was considered unattainable for quite a long time. The platforms also overshadow the problems of territorial disunity both within the large company and within the region.

Special place is occupied by digital platforms in development and promotion of the EdTech (Educational technology) sphere. Science and education are key industries, which development is the key to success in the knowledge economy. Platform solutions erase spatial boundaries, make the science and education segment accessible to the general public.

The experience gained by the global economy during the pandemic has convincingly highlighted the role of EdTech in digital economy. When accumulated and processed knowledge and information, embodied in the volume of innovations, become the main value, more opportunities open up to improve the quality of life for the majority of population (Houneida & Slim, 2018). Becoming manifestation and conductor of transformations of innovative development, digital platforms radically affect the quality of life not only regionally, but also globally. They are beginning to be used both as primary channels of interaction with customers, as tools for transactions, and as tool for creating innovative business models.

3. Research Questions

Most of innovations in the field of EdTech in Russia are associated with additional education, but the practice of using EdTech is much wider. It is penetrated by technological trends based on Big Data and artificial intelligence, on the use of VR and AR tools, and much more. The use of virtual simulators illustrates EdTech's penetration into the wide variety of areas: from industry and medicine to professional development of sales managers.

Given the enormous importance of EdTech sphere for development of the knowledge economy, emergence and diffusion of innovations and, ultimately, for the quality of life of people, research of the innovative economy transformation in connection with development of digital platforms becomes a priority task that needs to be addressed as soon as possible. Given that the wide range of economic relationships are organized on the basis of digital platforms, special attention should be paid to regulating relationships in the digital sphere.

4. Purpose of the Study

Digital platforms enable to collect, summarize, analyse and monetize information about users that was previously extremely difficult to obtain. This data is about behavioural features, about consumer preferences, which are necessary for building the strategy not only for business, but also for the state. Even traditional industries are no exception in this sense. In order to increase sales, both intermediaries and manufacturers can take into account information about individual preferences that remain online when potential buyers use digital platforms to compare products online before buying.

The goal set in this study is to clarify the role of digital platforms in the economy, to determine their place in the national and regional economy. When analysing of the innovative economy transformation, we will pay special attention to the field of EdTech, which is of particular importance for development of the knowledge economy.

5. Research Methods

5.1. The Role of Digital Platforms in Economic Transformation

The emergence of digital platforms in innovative economy, which are among the most valuable assets, in the context of the fourth technological revolution has become a vivid manifestation of transformations of modern development. Companies that build extensive channels of network interaction, such as Facebook, Google, Apple, Amazon and others, are very active in this direction. The success of most of these companies is taken for granted and is associated precisely with technological breakthrough in areas that are currently at the forefront of progress (Figure 1).

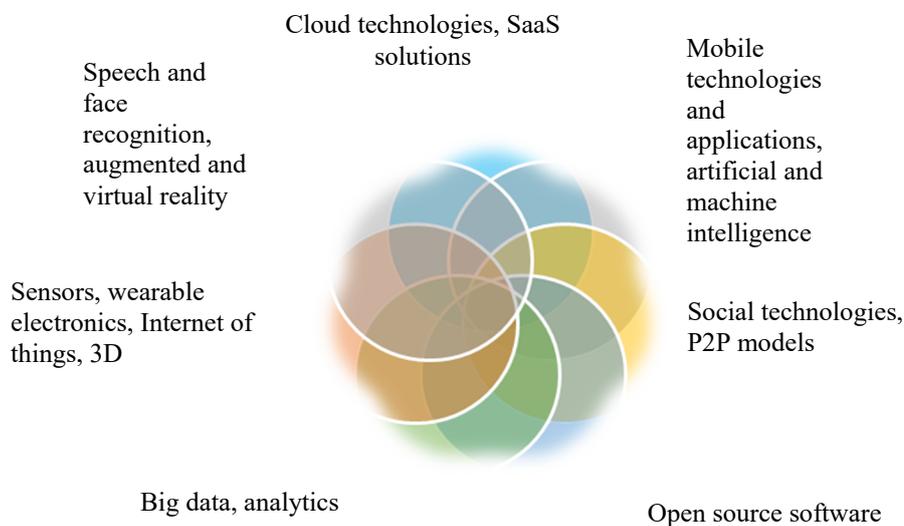


Figure 1. Areas of technological breakthrough in the IT industry

Maintaining the leading position in the future depends not only on the areas wherein are already applicable and have become necessary cloud technologies, SaaS solutions, mobile technologies and applications, artificial and machine intelligence, social technologies, P2P models, open-source software and big data, Internet of things, virtual and augmented reality, etc. Digital innovation converts almost all areas, we have become accustomed. The rapid expansion of digital potential is also evidenced by the emergence of new terminology: blockchain, wearable electronics, cloud services, web of links and sites, internet of things, smart city and much more.

The future, in our opinion, lies with industry breakthrough, that is, penetration of platform solutions into the automotive industry (sharing and drones), banking, healthcare (diagnostics, Internet of things and self-service), insurance (personalization), manufacturing and trade, law (interactive smart contracts) and, of course, education (mainly EdTech). In this regard, the technological environment will become even more intelligent, autonomous and concentrated. The 21st century society begins with intelligent digital infrastructure. Possession and successful use of disruptive IT technologies ensures the highest interaction efficiency in such major cross-industry companies as Apple, Microsoft, Amazon etc.

Digital companies are characterized by combination of low marginal costs with good scalability of IT platforms. Digital platforms create favourable conditions for formation and development of digital assets, which creates conditions for achieving maximum economies of scale in the shortest possible time. The economic benefits provided by the innovative economy transformation create high profitability for software developers, reaching over 70%. This is convincingly evidenced by the ranking of the most expensive companies in the world, whose share using digital assets at the beginning of 2021 was more than 80% (Figure 2). In terms of market capitalization, these companies have left behind the banking sector companies, most of the oil companies, etc.

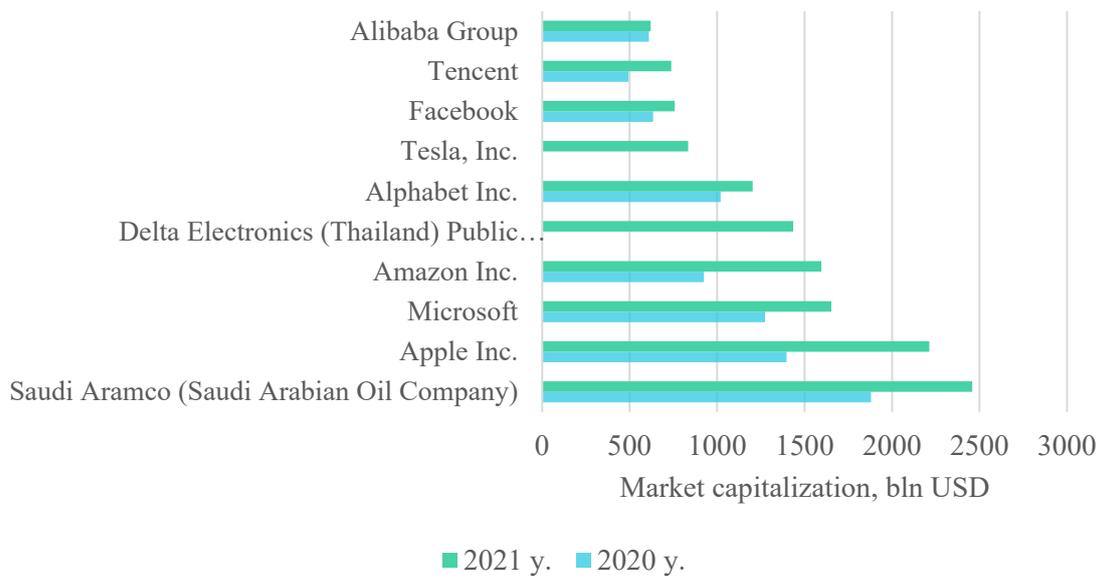


Figure 2. Market capitalization indicator (at the beginning of the year) of the most expensive companies in the world

A year earlier, we analysed the ranking of the most expensive companies in the world by market capitalization indicator (Gagulina et al., 2020). Comparing these data with the growth in market capitalization over the period from the beginning of 2000 to the beginning of 2001, we note that the companies entering the top ten companies in the world at the beginning of 2021 by this indicator are “growing” at gigantic pace. In this context, the capitalization of Amazon Inc. increased by 73%, Apple Inc. - by 58%, Tencent - by 50%. Saudi Aramco (Saudi Arabian Oil Company), Apple Inc. and Microsoft retained its leadership. During the 2020 pandemic, Amazon Inc. not only increased its capitalization by \$ 671.48 billion, but also moved in the ranking from 5th to 4th place. The insurance industry, as well as tourism, hospitality, has suffered more from the pandemic than it has gained: Berkshire Hathaway Inc., which provides insurance, finance, transportation utilities, and more, has cut its market cap by \$ 16.39 billion and left the top ten most expensive companies.

Thus, the global economy leaders by market capitalization indicator growth are companies that are firmly standing on digital platforms. They occupy a stable position in the field of electronics and information technology, software development. The listed areas of activity constitute not just the basis of the digital economy based on knowledge, but the basis for its growth and further development. Digital

platforms play a significant role in shaping the industry breakthrough in the future for leading industries (Kumaraswamy et al., 2018). The expanded application of EdTech innovation is driving a whole host of areas for new technological breakthroughs.

5.2. EdTech tools

Artificial intelligence, machine intelligence, artificial and augmented reality and a number of other innovations make up EdTech tools, being "responsible" for the industry breakthrough. Using the main provisions of systematic approach, it is easy to prove that the modern innovative economy transformation associated with the development of digital platforms and the EdTech sphere in the socio-ecological-economic system is not limited to technological and sectoral breakthroughs.

The provision of public services in electronic form promises to have a huge social effect due to increase in the satisfaction of the population, business and other participants in economic interaction in the region. The basis for emergence of economic effect, related to strengthening of the role of digital platforms, is reduction of all types of institutional costs: ranging from the costs of contracting to the costs of opportunistic behaviour.

As powerful tool for improving the economy, digital platforms not only act as agents of industry transformation, but also radically change the quality of life. Platform solutions are available to the wide range of consumers and create the basis for rationalizing consumer choice. Obtaining relevant and accessible information changes direction and scale of choice, transforming all market relations, creating a new equilibrium in industry markets.

Understanding the role of digital platforms and their prototypes in transformation of the public administration system, in optimizing internal processes of the public administration system and processes of its interaction with consumers, explains the strategic decisions that are made at the highest state level and are reflected in the adopted documents. These are the provisions of the National Strategy, the National Program "Digital Economy of the Russian Federation", the Strategy for the Development of the Information Society in the Russian Federation for 2017 - 2030.

By the Russian Federation Government Decree dated August 19 (2020), it was approved the Concept for development of regulation of relations in the field of artificial intelligence and robotics technologies until 2024. Due to development and application of artificial intelligence and robotics systems, it is envisaged to take into account a number of principles shown in Table 1.

Table 1. The principles of regulating relations in the field of artificial intelligence technologies and robotics

Principle	Table of Contents
"Stimulating As A Basis For Regulation"	stimulating the development of artificial intelligence and robotics technologies by regulatory means as the main vector for development of regulation in the indicated time period
Regulatory Impact	the impact is based on risk-oriented, interdisciplinary approach and assumes adoption of restrictive rules if the use of artificial intelligence and robotics technologies carries objectively high risk of causing harm to participants in public relations, human rights and interests of the society and the state

Extended Application	expanding the use of settlement and self-regulation tools, formation of codes (sets) of ethical rules for the development, implementation and application of artificial intelligence and robotics technologies
Application Of Human-Centered Approach	stipulates that the ultimate goal of development of artificial intelligence and robotics technologies, guided by regulatory influence from the state, is to ensure protection of human rights and freedoms guaranteed by Russian and international legislation and to improve the well-being and quality of life of citizens
Scientific Justification	impact assessment of technologies and systems of artificial intelligence and robotics on all spheres of human life, society and the state, based on scientifically verified research with involvement of the wide range of scientists
Balance Of Interests	ensuring the balance of interests of developers, consumers and other persons in the field of artificial intelligence and robotics, as well as defining the boundaries of their responsibility for the possible negative consequences of using artificial intelligence and robotics technologies
Technological Sovereignty	assumes ensuring the necessary level of independence of the Russian Federation in the field of artificial intelligence and robotics, taking into account the state policy in the field of information technology development and import substitution
Competition Support	ensuring equal opportunities for all economic actors in applying of experimental legal regimes and measures of state support, as well as for access to the data from state and municipal information systems necessary for the development of artificial intelligence and robotics systems
Critical Thinking	assessment when developing regulatory legal acts and other documents in the field of artificial intelligence and robotics of socio-economic consequences and risks under conditions of constant development of technologies, taking into account both positive and negative international regulatory experience
Acceptable Risk	obligation of reasonable risk assessment of causing harm to human life and health, implementation of threats to the country's defence and state security when using artificial intelligence and robotics and adoption of measures aimed at minimizing such risks and threats

The content of stated principles characterizes the position of public administration institutions in regulating relations in the field of artificial intelligence technologies and robotics. Considering the main functions that the state performs in the economy, its position is justified. The state acts here in the interests of society: by financing production of goods necessary for society, the state simultaneously controls their distribution and safety of their use. This is also supported by ethical standards, which observance is guided by the Concept for development of regulation of relations in the field of artificial intelligence technologies and robotics until 2024 (hereinafter referred to as the Concept):

- priority of human well-being and security, protection of fundamental rights and freedoms;
- ban on causing harm to person at the initiative of artificial intelligence systems and robotics;
- human controllability;
- designed compliance with the law, including safety requirements;
- prevention of unlawful manipulation of human behaviour.

At the same time, one cannot fail to notice that compliance with some of the principles listed in Table 1 will inevitably lead to restriction of competition, loss of flexibility and upsetting market equilibrium in the economy. Partial solution to this problem can be clarification conditions for use of artificial intelligence systems and robotics for each specific case. For example, in section 5 of the Concept, it is

proposed to identify and remove regulatory barriers to implementation of "smart city" concept that hinder automation of housing and communal services and utilities, introduction of "smart" urban transport, creation of digital platforms and services to involve citizens in the management of urban processes, introduction of intelligent public safety systems, general planning and land development planning based on artificial intelligence and the big data processed by it (Table 2).

Table 2. Areas of removing regulatory barriers in the field of artificial intelligence and robotics technologies for implementation of "smart city" concept

Regulation area	Table of Contents
Automation Of Housing And Communal Services And Utilities	accounting of meter readings and implementation of "flexible" supply of resources depending on variable indicators, automatic determination of noise level, pollution and its analysis, control of equipment operation, etc.
"Smart" City Transport	development of "unmanned" transport and development of its accompanying infrastructure - systems for photo and video recording of offenses, systems for automatic administration of urban parking space, systems for automatic control of traffic flows depending on the traffic load, systems for automatic status monitoring of roadway and road transport infrastructure, systems for drawing up public transport routes based on big data analysis, etc.
Creation Of Digital Platforms And Services To Involve Citizens In Urban Process Management	introduction of voting on specific issues, analysis with the help of artificial intelligence systems of textual appeals to identify the general attitude to the problem or the problems themselves, analysis of the expressed public opinion
Implementation Of Intelligent Public Safety Systems Land Development	video surveillance systems with biometric identification functions, etc. general planning and land development planning based on artificial intelligence and big data processed by it

Removing regulatory barriers in certain areas of application of innovative technologies creates competitive advantages for introducing and spreading of key innovations. However, easing of regulatory barriers alone is not enough to provide any industry breakthrough. The availability of qualified personnel with creative thinking and the ability to collaborate is almost essential. That is why we consider the EdTech platform as priority area for development of the knowledge economy.

The economics of the 2020 pandemic has accelerated profound changes in the processes of economic interaction driven by digitalization (Brakman et al., 2021). The most obvious was the blurring of boundaries between work and home, leisure and learning. The accelerating process of innovative economy transformation requires new knowledge, approaches and skills. This determines the prospects for EdTech market.

The capacity of the global EdTech market as of 2020 is estimated at \$ 150 billion. According to experts, with annual growth of about 18%, the EdTech market capacity in 5 years will amount to \$ 285 billion. Both the growth rate of the EdTech market and its capacity will largely depend on the state of its infrastructure, which is formed on the basis of achievements in the areas of technological breakthrough of IT industry, such as cloud technologies, SaaS solutions, mobile technologies and applications, artificial and machine intelligence, social technologies, P2P models, open-source software and big data, internet of things, virtual and augmented reality, etc.

6. Findings

In the course of our research, we came to conclusion that digital platforms are irreversibly and rapidly transforming the economies of regions and industry markets around the world. The huge innovative potential that digital platforms possess creates preconditions for formation of long-term competitive advantages both for individual economic entities and for economies of countries and regions. Companies that are digital leaders today are better at shaping and exploiting these competitive advantages. For example, Facebook is leading in facial recognition, Google is leading in language translations, Amazon is far ahead in the delivery of cloud services, etc.

We noticed that public and private structural elements of the digital economy, including the architecture of cloud services, the products of digital economy, digital platforms of business, society and citizens, federal and regional information resources on the digital economy, and much more in the digital economy space need institutional mechanism capable to ensure the highest efficiency of their work. The national program "Digital Economy of the Russian Federation" adopted in our country at the level of national projects: Regulatory regulation of the digital environment, Human resources for the digital economy, Information infrastructure, Information security, Digital technologies, Digital government regulation, orients development and use of information technologies to improve the quality of life of population and conduct business activities.

From economic point of view, the validity of results expected from implementation of national projects in the field of digitalization is explained by significant reduction in the share of almost all types of transaction costs, which in modern economy with large share of the service sector account for more than 50% of all types of all recorded costs. The growing intellectualization of production and, in the future, the transition to continuous innovation processes in most economy sectors also contributes to economic efficiency increase (Ahlstrom et al., 2020; Okrepilov, 2019).

As essential element of institutional mechanism supporting the innovative economy transformation in Russia is the Concept for Development of Regulation of Relations in the Sphere of Artificial Intelligence and Robotics Technologies until 2024. This document was developed with aim to "define the main approaches to transforming the regulatory system in the Russian Federation ensuring the possibility of creating and applying such technologies in various spheres of the economy while respecting the rights of citizens and ensuring the safety of the individual, society and the state (Gagulina et al., 2019). At the same time, the Concept goals are to create prerequisites for formation of foundations of legal regulation of new social relations that are emerging in connection with development and application of artificial intelligence and robotics technologies and systems based on them, as well as to identify legal barriers that impede development and application of these systems.

The Concept for Development of Regulation of Relations in the Sphere of Artificial Intelligence and Robotics Technologies until 2024 specifies the conditions for interaction in specific segment of the digital space and involves improving: mode of data circulation, export regime of artificial intelligence and robotics systems, development of insurance institutions with participation of such systems (Bierbrauer & Boyer, 2016). Among the sectoral areas for improving regulation of use of artificial intelligence and robotics technologies, the Concept includes: health care, state and municipal administration, transport, urban

planning activities, financial sector. Particular attention is paid to use of artificial intelligence systems and robotics in implementation of the "smart city" concept. The application of these systems in space activities and industry is noted.

Forming the wide field and conditions for interaction of economic entities, digital platforms play the significant role in development of the EdTech market and its individual segments. The most impressive is the example of building the online educational courses market as an EdTech segment based on the Coursera platform, launched in the United States in 2012. In many countries, this segment began to develop almost simultaneously. In Russia, the National Open Education Platform, Lectorium, Openprofession.ru are widely known among online education platforms. Smaller platforms concentrating local information resources are gaining more and more popularity.

7. Conclusion

The innovative economy transformation extends to markets and spheres of activity, platforms and technologies that form competencies for development of markets and spheres of activity, as well as environment that creates conditions for effective interaction within the framework of listed elements, including institutional interaction. In global markets, digital leadership belongs to the largest corporations relying on powerful digital platforms. Leadership in technology ensures market leadership for the countries where these companies are based, since increase in profits of digital leaders means increase in income of entities employed in them and subsequent increase in aggregate demand, as well as investment.

The situation in the Russian economy has its own specifics and differs in that the state acts as serious participant in the digital sector and, at the same time, one of the main consumers of high-tech products and services. The creation of new systems of state accounting, as well as the creation of new state and municipal information systems contributes to the increasing involvement of the state in the field of electronic information interaction. There is no large increase in investment from the business sector in the economy digital segment.

The prevailing state participation in the digital sphere of the Russian economy has both positive and negative consequences. Among the positive results, it is possible to note improvement of processes of state and municipal administration, achievement of stability in dynamics of the country's technological development, guarantees of use of digital solutions in target innovation segments, obtaining a number of social benefits: increasing inclusiveness, increasing the availability of public services, health care and education services. Among the problem areas, attention is drawn to the decrease in the economy competitiveness associated with strengthening of the state's monopolistic position in the digital sphere, and, as consequence, the loss of flexibility in business management, the emergence of serious barriers both at the entrance to the digital segment and at the exit from it, insufficiently high labour productivity in the digital sector. Another problem is that when investments are made in those industries that belong to the area of possible government revenues, they do not work for economic growth. For example, purchase and installation of the latest equipment for collection and administration of fiscal information, taxes and fees will certainly lead to increase in demand for data cloud processing and storage, but such investments will not become a source of multiplicative growth in household income.

Summing up, we note: the potential accumulated by digital platforms requires additional study and analysis to be able to effectively use it improving the quality of life of population

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