

Theoretical and Practical Research in Economic Fields

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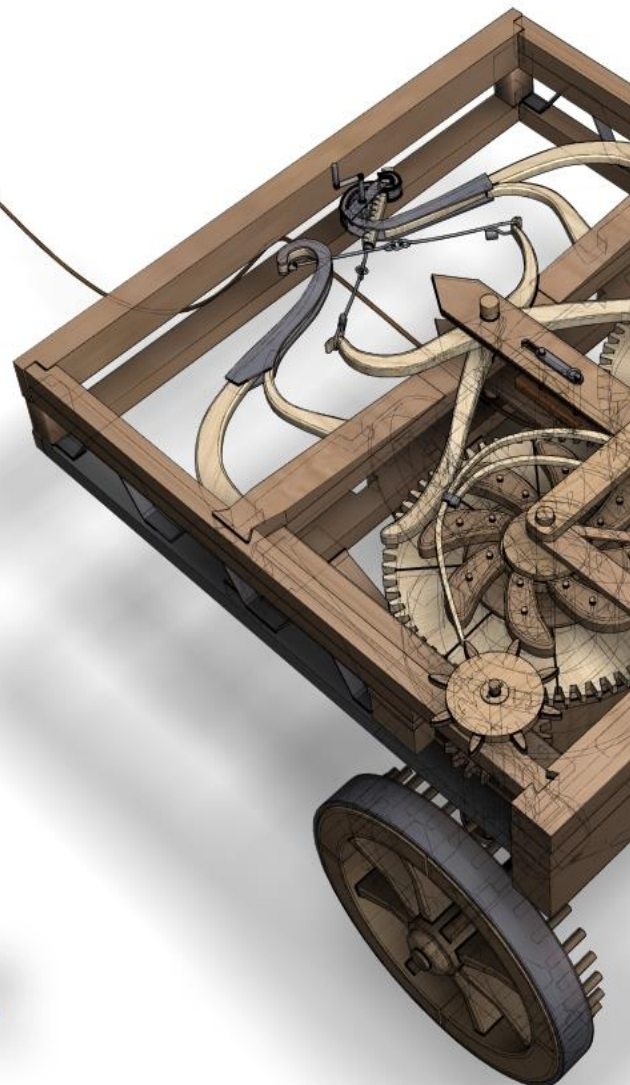
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Many economists today are concerned by the proliferation of journals and the concomitant labyrinth of research to be conquered in order to reach the specific information they require. To combat this tendency, **Theoretical and Practical Research in Economic Fields** has been conceived and designed outside the realm of the traditional economics journal. It consists of concise communications that provide a means of rapid and efficient dissemination of new results, models, and methods in all fields of economic research.

Theoretical and Practical Research in Economic Fields publishes original articles in all branches of economics – theoretical and practical, abstract, and applied, providing wide-ranging coverage across the subject area.

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This Special Issue was created at the request of a group of researchers from Ukraine. It is a response to the challenging situation of Ukrainian scholars due to the Russian invasion as well as the growing demand for knowledge on Ukrainian issues.

We would like to express our endless thank to our colleagues, scholars from Ukraine who are working amid the war on topics that are important for all. Also, we thank all our international authors for their valuable contributions to this Issue.

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Assessment of the Current State and Prospects for the Development of the Digital Economy of the Republic of Azerbaijan

Kamran ABDULLAYEV

Department of Economy of Services Areas
Institute of Economics of the Ministry of Science and Education of the Republic of Azerbaijan, Azerbaijan
ORCID: 0000-0003-4901-4342
k_abdullayev@outlook.com

Sevda BADALOVA

Department of Digital Technologies and Applied Informatics
Azerbaijan State University of Economics (UNEC), Azerbaijan
ORCID: 0000-0001-7794-9829
sevda.badalova@hotmail.com

Asif MUSTAFAYEV

Department of Theoretical Basis of Economic Policy
Institute of Economics of the Ministry of Science and Education of the Republic of Azerbaijan, Azerbaijan
ORCID: 0000-0002-3989-1598
mustafayev_asif@outlook.com

Mahir ZEYNALOV

Department of Regulation Problems of Business Environment and Entrepreneurs Development
Institute of Economics of the Ministry of Science and Education of the Republic of Azerbaijan, Azerbaijan
ORCID: 0000-0002-3518-1812
mah.zeynalov@hotmail.com

Aynur BABAYEVA

Department of Economics
Baku State University, Azerbaijan
ORCID: 0009-0003-7822-6501
ayn_babayeva@outlook.com

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Abstract: Azerbaijan, along with other advanced countries in the world, is currently characterised by the intensive development of digital economies. That is why the issue of the main directions of development of the information and technology environment in the Azerbaijani economy is relevant. The research aims to study and summarise aspects of the current state and peculiarities of the development of the digital economy of Azerbaijan. The study used the induction, deduction, analysis, systematisation, SWOT analysis methods. Azerbaijan is a fairly developed industrial and agricultural country, but the country's economic environment is unstable. The development of the digital economy is negatively affected by a decrease in funding and a decline in the production of high-tech goods. However, the biggest problem is the low level of digital literacy of the population. Accordingly, the main directions for the development of digitalisation of economic processes in Azerbaijan should be measures to expand education in the field of information and computer technologies with the involvement of foreign specialists and introduce mandatory courses to improve the skills of digital specialists. The main factors in the development of Azerbaijan's digital economy are foreign investment and human capital. Thus, the practical significance of the study is that the main established directions of formation of the digital economy in Azerbaijan can be used in further works of scientists to improve digitalisation in the country, and the established main educational direction can be used by the Azerbaijani authorities to bring the country to the world level following digital technologies.

Keywords: digital economy; global innovation index; innovation; human capital.

JEL Classification: O33; O14; C01; R11.

Introduction

Nowadays, economic activity carried out with the use of digital technologies is referred to as the digital economy, but it is not only the digitisation of existing processes and financial transactions but also a significant revolution concerning the traditional economic model. Social media, falling technology costs, combined with trade liberalisation, have broken down information asymmetries, leading to innovative markets where consumers can also act as producers, while platforms are becoming the dominant business entity. Such dynamics have a shift from supply to demand, where all companies have to participate in the turnover of consumers and competitors (Abdullayev 2022; Korsunskaya *et al.* 2022; Khotamov 2019).

Globally, digital technologies are the main means of innovative development for every country (Kurhan *et al.* 2023; Piddubna and Gorobyanskaya 2023). The more digitalised a country and its economy are, the higher the standard of living and the better the financial situation. In other words, today, the well-being of any country is closely dependent on its digitalisation. After all, the development of technology contributes to the automation of work processes, which further ensures the health of citizens and the preservation of the environment, and enables fast and high-quality information exchange. The digital economy in this case not only ensures high-quality financial transactions but also overcomes corruption and other types of criminal economy. Azerbaijan needs to improve the development of the digital economy.

Gultakin (2021) noted that Azerbaijan's digital economy is currently experiencing rapid growth. These trends are driven by the introduction of new innovative financial technologies in older markets, such as the use of online payments and money transfers, which are typical for developing economies, and, on the other hand, investment insurance, lending, and management. Financial innovations that increase the level of competitiveness and introduce new business models are quite important in Azerbaijan's digital economy.

Khankishiyeva (2021) noted that the large-scale changes taking place in Azerbaijan and at the global level are bringing the country into the greatest technological period in history, *i.e.*, the time when natural resources cease to be the main means of improving the economic situation, giving way to science and technology. Sufficiently active use of information and communication technologies ensures an improvement in the economic situation, provided that the level of environmental protection is improved, and physical consumption is intensively reduced in favour of information and knowledge capitalisation. The new digital economy can be characterised by the presence of high growth rates of knowledge implementation in new products and services, increasing importance of innovation and education, globalisation, and sustainable development in the country ().

Khankishiyev (2021) determined that the introduction of a large-scale digital competitiveness rating, which focuses on the presence of opportunities and the degree of readiness of the country for digital transformation, is quite important for the development of the digital economy in Azerbaijan. The creation of a system of motivation for citizens that will ensure that they acquire the necessary skills to participate in the digitalisation of economic processes is considered to be an auxiliary means for the establishment of the country's digital economy. It is important to ensure that the education system is in line with new trends and that measures are taken in all areas to train highly qualified digital economy specialists. Azerbaijan's transition to the 4th industrial revolution is quite significant, which is accompanied by the need to develop and apply innovative methods. It is higher education institutions that face the main task not only to train qualified specialists but also to ensure that the educational process complies with the rules of innovation.

Abdullayev *et al.* (2022) have established that in recent periods, all countries of the world can be characterised by high growth rates in the digital economy. Accordingly, Azerbaijan similarly increases its economic position every year following the indicators of economic development. These trends are caused not only by effective economic policy but also by the development of the digital economy and the promotion of foreign investment (Horoshko *et al.* 2021). However, it is noted that Azerbaijan has certain problems in the development of the digital economy, as it is difficult to introduce information and computer technologies in all sectors of the economy and there is a high volume of exports of modern digital technologies. Accordingly, the digital economy in Azerbaijan is effectively regulated based on international experience.

Accordingly, based on the unstable external economic environment, the research aims to summarise the peculiarities of the current state and formation of the digital economy of Azerbaijan, to determine further directions of its development, considering strengths, weaknesses, opportunities, and threats. The main tasks of further research should be to review the current state of the economy and digitalisation in Azerbaijan, analyse the features and prospects for the development of the country's digital economy, and conduct an econometric study of the dependence of the formation of digital technologies on the country's economic development. Determining the peculiarities of the current state of the economy and digitalisation in Azerbaijan will be the main means for

conducting further research to determine the prospects for the development of the digital economy. It is important to analyse the strengths and weaknesses of the country's digital economy and identify its opportunities and threats, which will be the main means of shaping the prospects for the development of the digital economy of Azerbaijan. An econometric study of the dependence of the formation of digital technologies on the economic development of the country will allow us to formulate the peculiarities of the impact of economic processes on the development of digitalisation in the country.

Digitalization of the national economy in modern developed countries enables the development of business areas and the creation of a favorable business environment. This process can stimulate the development of innovative activities of companies. The digitization process allows to improve business activity in economic areas. In addition, the digitalization of the national economy accelerates the integration of local manufacturing companies into international markets. As a whole, the digitalization of the national economy and the improvement of the quality of digital services have a positive effect on the improvement of the business environment. Digitization of business areas allows to optimize the performed operations, reduce transport and logistics costs, and increase the quality of services.

1. Materials and Methods

The following methods were used in the study. The method of deduction, which was used to move from a general to a specific concept, was used to establish the specifics of the meaning of the category 'digital economy' determine the essence of the structure of the digital economy and establish its main characteristics.

The method of analysis, which allows to highlight the peculiarities of the dynamics of indicators, was used to determine the peculiarities of the economic situation in Azerbaijan in 2018-2022. The systematisation method, which helps to separate data, was used to systematise the indicators of Gross Domestic Product in the US dollar exchange rate as of 01.01.2019-01.01.2023, GDP per capita, inflation, GDP deflator, consumer price index, imports and exports of goods and services, general unemployment rate, total reserves (including gold), foreign direct investment, and the amount of external debt. This method was used to study the state of development of Azerbaijan's digital economy and to consider indicators of the global innovation index, the amount of net official development assistance received, high-tech exports, exports of information and computer technology goods, the information disclosure index, the number of fixed broadband subscribers, the number of secure Internet servers, the credit information depth index, the number of ATMs and the number of commercial bank branches.

The study also used the SWOT analysis method. This method allowed for strategic planning of the direction of the formation of Azerbaijan's digital economy. The SWOT analysis identified the strengths, weaknesses, opportunities, and threats to the country's digital economy. This method was used to assess the internal and external factors of Azerbaijan's digital economy and to identify areas for improvement and potential problems of the research object. The study took the strengths and weaknesses of Azerbaijan's digital economy as internal factors. The strengths were identified as the competitive advantages of Azerbaijan's digital economy, and the weaknesses were identified as its shortcomings that need to be improved or have no competitive advantage. Opportunities and threats to Azerbaijan's digital economy were selected as external factors using this method. Opportunities in this study include methods that are necessary to improve the state of Azerbaijan's digital economy. The threats are the factors that negatively affect the development of the country's digital economy.

An induction method, which allows one to move from a specific concept to a general one, was used to identify the main directions of the country's digital economy based on a preliminary analysis of the state of Azerbaijan's digital economy and the identification of weaknesses, strengths, opportunities, and threats. This method was used to identify the main areas of development of the digital economy through the implementation of measures to expand education to create experienced professionals and raise the digital awareness of citizens. Using the method of mathematical modelling, the specifics of the dependence of high-tech exports and secure Internet servers, as indicators of the development of the digital economy, on the economic situation in Azerbaijan were determined.

The research theory is based on the main expert studies on the digital economy and information and computer technologies of Azerbaijan. The basis for the study of Azerbaijan's digital economy was the World Bank's data on indicators of economic development, information technology, the Internet, information availability, and the number of researchers on the development of the financial sector's operating environment.

2. Research Results

2.1. A Study of the Current State of the Economy and Digitalisation in Azerbaijan

After the collapse of the Union of Soviet Socialist Republics, Azerbaijan joined the post-Soviet countries and was characterised by a crisis economy, as the country's GDP fell by 52.6% between 1990 and 1994 (Kuklina and Babayev 2019). Later, the situation in the country stabilised somewhat, and since 1998, Azerbaijan's economy has been on a growth path. Then, starting in 2000, the growth rate of economic indicators slowed down. The development of technological support for the functioning of Azerbaijan's economic sectors can be one of the main factors in improving the country's economic situation. Today, Azerbaijan is a fairly developed industrial and agricultural country (Tkachenko *et al.* 2020; Stender *et al.* 2024). At the same time, the country's heavy industry sector is widely developed, mainly based on oil and gas production. The machine building, light industry and food production sectors are also gaining importance in Azerbaijan's industry. In addition, the country has a diversified industrial base, dominated by the energy sector, manufacturing and chemical industry. The processing industry, which produces mineral fertilisers, kerosene, petrol, herbicides, synthetic rubber, industrial oil and plastics, has developed quite a bit. In terms of foreign economic activity, Azerbaijan is a major exporter of chemicals, machinery, food (grapes and other fruits and vegetables), beverages, oil and natural gas, non-ferrous metals, iron, and steel (GDP (current US\$) 2022). Let consider the dynamics of the main indicators of Azerbaijan's economic situation over the past six years (Table 1).

Table 1. Dynamics of economic indicators of Azerbaijan in 2018 – 2023

Indicator	2018	2019	2020	2021	2022	2023
GDP (billion USD)	47.11	48.17	42.69	54.83	78.72	76.64
GDP per capita (current US dollars)	4739.8	4805.75	4229.91	5408.05	7736.7	7126.2
GDP deflator (annual %)	12.18	-0.24	-7.4	21.59	37.25	-
Inflation, consumer prices (annual %)	2.27	2.61	2.76	6.65	13.85	8.22
Imports of goods and services (% of GDP)	37.58	36.77	36.39	29.8	27.03	-
Exports of goods and services (% of GDP)	54.09	49.05	35.62	46.49	60.05	-
Total unemployment rate (% of total labour force) (ILO modelled estimate)	4.94	4.85	7.16	5.95	5.46	5.6
Total reserves (including gold, billion USD)	6.67	7.04	7.63	8.31	11.29	-
Foreign direct investment, net inflow (USD billion)	1.4	1.5	0.51	-1.71	-4.47	-5.7
Total external debt (USD billion)	15.3	16.21	15.84	15.81	14.64	21.0

Note: some indicators are missing due to lack of updated data for 2023

Source: compiled by the authors based on GDP (Current US\$) (2023), GDP per Capita (Current US\$) (2023), Inflation, GDP Deflator (Annual %) (2022), Inflation, Consumer Prices (Annual %) (2023), Imports of Goods and Services (% of GDP) (2022), Exports of Goods and Services (% of GDP) (2022), Unemployment, Total (% of Total Labor Force) (Modeled ILO Estimate) (2023), Total Reserves (Includes Gold, Current US\$) (2022).

Table 1 shows the GDP level in Azerbaijan tended to increase, and GDP per capita also increased, which indicates a decrease in the poverty level of the country's citizens. At the same time, there are negative changes in pricing, as the GDP deflator and the consumer price index had intensive growth rates during 2018-2022. Azerbaijan's trade balance had a positive trend during the analysed period, as exports of goods and services increased, while imports of goods and services decreased (Tukhtabaev *et al.* 2023). At the same time, there is an increase in the unemployment rate in the country, which is accompanied by an increase in poverty. Also, during the analysed period, there was an increase in total reserves, which indicates an increase in the country's financial stability. Foreign direct investment at the end of 2022 was negative, indicating an outflow of foreign funding and the development of domestic investment in other countries. A positive trend for the country is observed in the amount of external debt, as it decreased during the analysis period, which indicates a decrease in the debt burden on the Azerbaijani budget. Thus, in general, the country's economic environment is unstable for the country's population, although it has positive changes for the development of the budget.

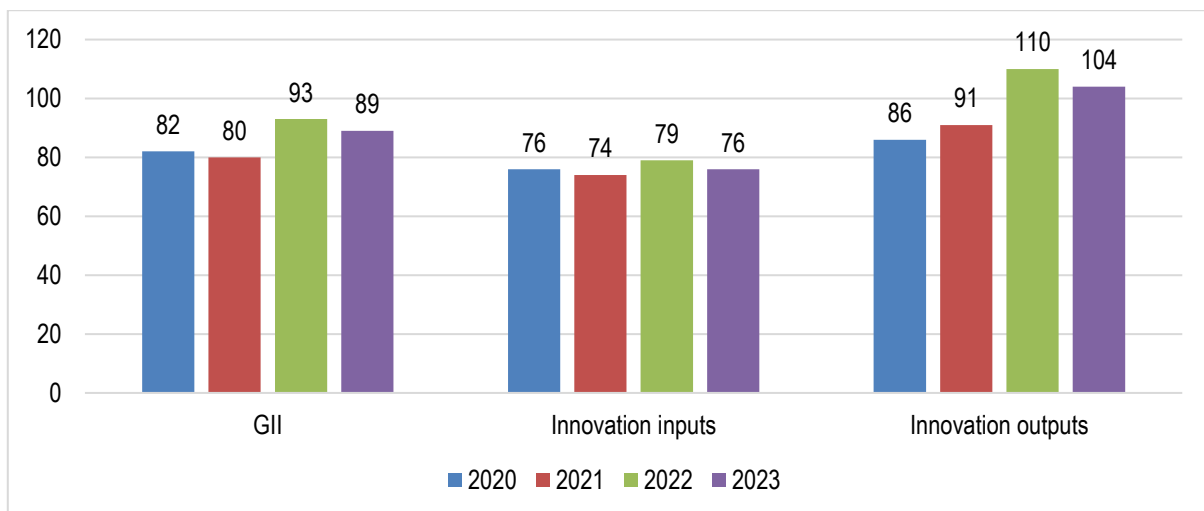
As of 2023, Azerbaijan's economy shows some signs of moderation following a post-pandemic surge in growth. Notably, oil production has declined while non-hydrocarbon growth has slowed, suggesting a shift in the economic structure. This shift is part of broader efforts to diversify the economy, including increasing non-hydrocarbon revenues and promoting green energy initiatives. Despite these changes, the economy still faces

significant inflation risks, both from potential external shocks and ongoing strong domestic demand, though inflation has eased somewhat recently, returning to the target band of 4 ± 2 percent. The digital economy in Azerbaijan is also a focus, with considerable efforts towards digitalization, especially in public services and the financial sector. There has been notable growth in areas like secure internet servers and internet penetration, suggesting an improvement in digital infrastructure and services.

As for the digital economy, its development is a priority for Azerbaijan. The focus is primarily on the centralisation of electronic services and the digitisation of public services. Digital transformation is also one of the main directions of the government's socio-economic strategy. It is planned to increase the population's connection to the Internet by 2024. At the same time, the country's cybersecurity strategy, which focuses on data privacy legislation, is aimed at supporting the country's digitalisation. To implement a rapid technical assistance mechanism in Azerbaijan, the European Union (EU) Bank financed an Administrative Agreement in cooperation with the World Bank. This three-year programme supports and responds to the government's priorities, which include digital connectivity and Smart Villages. The EU and the EBRD have provided a loan of up to USD 50 million to support the construction of a state-of-the-art broadband infrastructure for more than 280 thousand households in Azerbaijan. The loan aims to bridge the digital divide between the capital and rural areas, focusing on supporting network expansion to improve speed and capacity (Foreign Direct Investment, Net Inflows... 2022).

Considering the dynamics of the Global Innovation Index, which reflects the innovative capabilities of world economies, Azerbaijan ranked 93rd among 132 economies in 2022 according to the country's digitalisation development ranking. This indicator is much worse than in 2020 and 2021. However, in 2023 the situation was better (Figure 1).

Figure 1. Dynamics of the Global Innovation Index of Azerbaijan in 2020-2023



Source: compiled by the authors based on Azerbaijan (2024).

Based on the results of 2022, Azerbaijan is characterised by better indicators of innovative investments than innovative results. At the end of the analysed period, Azerbaijan ranks 79th in terms of innovation, which is a decrease compared to the previous two years. Azerbaijan also ranks 110th in terms of innovation, which is also a decrease compared to 2021 and 2020. At the same time, the country ranks 32nd among 36 upper-middle-income groups and 16th among 19 economies in North Africa and West Asia.

In comparison to 2022, the year 2023 paints a slightly different picture of Azerbaijan's innovation landscape. While 2022 was characterized by better indicators of innovative investments than results, leading to a lower ranking in terms of innovation, the dynamics in 2023 suggest a remarkable improvement. This turnaround could indicate a strategic shift or the fruition of prior investments into tangible outcomes. Moreover, relative to GDP, Azerbaijan's innovation development is below the expected level of development. Also, Azerbaijan produces fewer innovative products following the level of investment in innovation. The negative aspect of this trend is that the country has sufficient resources for the development of the digital economy, but uses them inefficiently, which is accompanied by a slowdown in the pace of digitalisation in Azerbaijan.

Table 2 shows that innovation development in Azerbaijan is losing support from external sources, as the indicator of net official development assistance received has significantly decreased during 2018-2022. This indicator consists of loans received by the country on favourable terms, grants attracted by official institutions of the Development Assistance Committee, and various institutions to promote economic development and welfare in

the country. At the same time, high-tech exports have also declined, reflecting the narrowing of production of products with a high level of research and development, such as aerospace, computer manufacturing, pharmaceuticals, scientific instruments, and electrical machinery in the country. In 2023, the sharp rise in innovation outputs in the face of stagnant innovation inputs could suggest a more efficient utilization of the available resources or a surge in sectors like IT and communication, where Azerbaijan might have directed its innovative efforts. However, exports of information and computer technology goods tended to increase slightly, reflecting the country's focus on computer and peripheral equipment, communication equipment, electronic consumer technology software, electronic parts, and other information technology goods.

Table 2. Dynamics of indicators of digital economy development in Azerbaijan in 2018 – 2022

Indicator	2018	2019	2020	2021	2022	Growth rate, %
Net official development assistance received (USD million)	123.53	87.42	119.09	122.74	9.24	-92.52
High-tech exports (% of industrial exports)	3.3	4.35	4.95	7.07	2.1	-36.47
Exports of ICT goods (% of total exports of goods)	0.02	0.02	0.02	0.14	0.02	23.42
Disclosure level index (from 0 – less disclosure to 10 – more disclosure)	10	10	10	10	10	0
Fixed broadband subscriptions (per 100 people)	17.92	18.63	18.99	19.4	19.93	11.21
Secure Internet servers (per 1 million people)	101.87	259.49	329.38	368.8	299.31	193.83
Credit information depth index (from 0=low to 8=high)	6	8	8	8	8	33.33
Cash machines (ATMs) (per 100,000 adults)	32.16	32.85	34.49	35.17	37.43	16.39
Branches of commercial banks (per 100,000 adults)	10.66	7.06	7.02	6.23	6.5	-39.02
Researchers in RandD (per million people)				1718.8	1734.85	0.93

Source: compiled by the authors based on Net Official Development Assistance Received (Current US\$) (2021), High-technology Exports (% of Manufactured Exports) (2022), ICT Goods Exports (% of Total Goods Exports) (2021), Business Extent of Disclosure Index (0=Less Disclosure to 10=More Disclosure) (2019), Fixed Broadband Subscriptions (per 100 People) (2022), Secure Internet Servers (per 1 million People) (2020) Depth of Credit Information Index (0=Low to 8=High) (2019), Automated Teller Machines (ATMs) (per 100,000 Adults) (2021), Commercial Bank Branches (per 100,000 Adults) (2021), Researchers in RandD (per Million People) (2021).

The information provision and accessibility of information in Azerbaijan is at the highest level, as the disclosure index had the highest value during the study period. In other words, the country's business environment provides full access to information for doing business, as the degree of investor protection through disclosure of ownership and financial information is quite high. At the same time, there has been an increase in high-speed access to the public Internet, which in turn ensures the development of digitalisation in the country. In addition, the use of encrypted transactions, where digital signatures on certificates are successfully verified, is increasing, as the rate of secure Internet servers has grown significantly during the analysed period (). These trends indicate the development of security in the digital economy of Azerbaijan.

Considering the trends in the development of technology in the country's financial sector, a positive trend in the digitalisation of operations is evident. The credit information depth index increased to its maximum value in 2018-2022, which indicates the availability and quality of credit information generated by public or private credit registers. This means that Azerbaijan has a high level of additional credit information available to facilitate lending decisions. At the same time, the number of ATMs in the country has increased, reflecting the development of technological support for the financial sector and the improvement of the digital economy. Accordingly, the number of bank branches in Azerbaijan has decreased amid the automation and digitalisation of the operating environment of the country's banking market.

Human capital is crucial in the digital economy. Scientists also play an important role in the creation and implementation of innovation processes (Musayeva *et al.* 2022). According to the World Bank, the number of researchers is only available for 2021 and 2022. During this time, the number of professionals conducting research and improving or developing concepts, theories, modelling equipment, devices, and software of operational methods in Azerbaijan has increased. This trend indicates the prospects for the development of the country's digital economy.

2.2. Analysis of the Features and Prospects for the Development of Azerbaijan's Digital Economy

Let's analyse the peculiarities of the digital economy in Azerbaijan based on a SWOT analysis (Table 3).

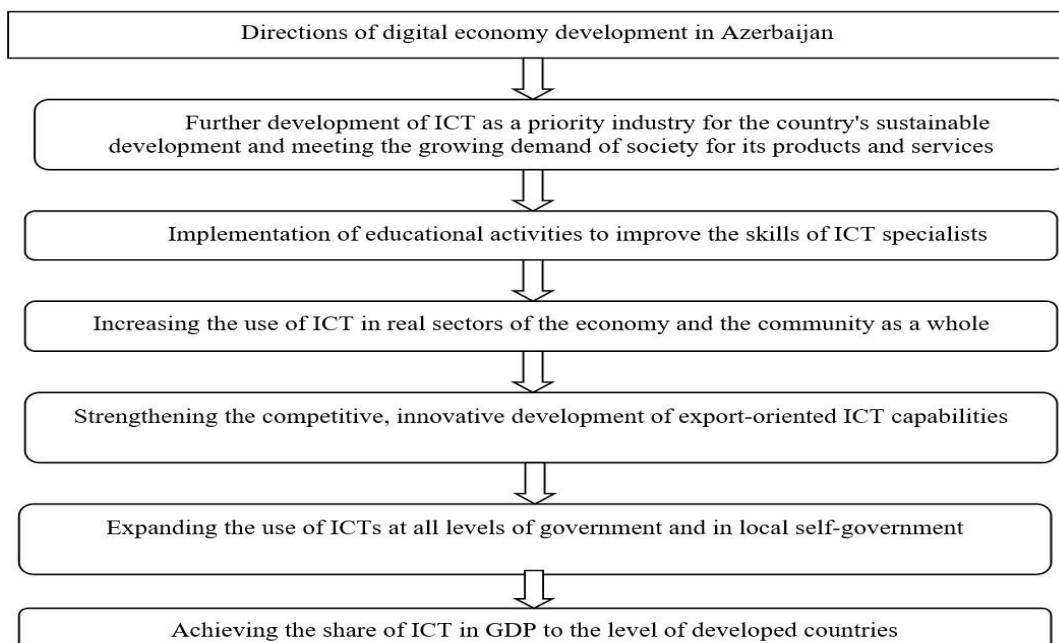
Table 3. SWOT analysis of digital economy development in Azerbaijan

Advantages	Disadvantages
Favourable economic environment. High level of information availability. Regulatory and legal support for the need for digitalisation. Focusing the government on the need to support the information and computer technology industry. Introduction of e-governance.	Low funding for innovation development. Low level of human capital in the development of information and computer technologies. Innovative investments outweigh innovative results.
Possibilities	Threats
Organisation of training to improve the digital competence of specialists. Enhanced development of e-governance. Empowerment of the financial sector. Automation of production, accounting and information exchange between enterprises and the state. Increase in the country's investment attractiveness.	Cyberattack threat. Insufficient computer literacy of all participants in management processes and the population. Increased price levels in the country.

Source: compiled by the authors.

In general, Azerbaijan has rather great prospects for the development of the digital economy. The country is characterised by a more or less stable economic situation and a high level of openness to information. The country's authorities are also beginning to develop information and computer technologies and are introducing e-government. However, there is currently insufficient funding for the development of digital technologies. And, according to the study, even the investments made in digitalisation are not effective. After all, the main problem with the formation of the digital economy is the low level of education in this area. Accordingly, the country has an insufficient level of specialists to implement the development of innovations in the digital economy. In addition, the insufficient level of computer literacy of the population slows down the digitalisation process, and the threat of cyberattacks creates the risk of information outflow and unplanned expenses. At the same time, the instability of inflationary processes in the country leads to a decline in demand for technology. That is why it is important to conduct training to improve the digital literacy of specialists. In addition, the introduction of full e-government will bring Azerbaijan to a new level of digital economy development. According to the analysis of the formation of Azerbaijan's digital economy, it is appropriate to highlight its main directions (Figure 2).

Figure 2. Directions of digital economy development in Azerbaijan



Source: compiled by the authors.

The main directions for the development of the digital economy in Azerbaijan should be the introduction of processes to strengthen the targeted use of information and computer technologies and the application of measures to rapidly increase the number of Internet users. At the same time, the authorities need to respond with high speed to innovative changes in the world and meet modern requirements to maintain the necessary level of international cooperation. The e-services sector of the legislative and executive state authorities and management is one of the main means of organising the implementation of the technical system in the country's digital economy and is one of the main methods of combating the shadow economy (Blikhar *et al.* 2022; Yudina *et al.* 2024). E-services in Azerbaijan should be carried out in parallel in close cooperation and based on common principles and models (Babayev 2018; Ghrachorloo *et al.* 2021; Isayeva 2023).

Currently, the low level of digital awareness of the Azerbaijani population is a major obstacle to the development of the digital economy. In a world where more than 65% of the population has basic IT skills, Azerbaijan is at the bottom of its regional peers in terms of the proportion of people with standard and advanced digital skills. After all, only 0.7% of citizens in Azerbaijan have advanced information and computer technology skills, which include knowledge of programming languages and the ability to write a computer program (OECD 2022). This figure is significantly lower compared to the EU-8 and OECD averages of 4.4% and 6.8%, respectively. At the same time, digital skills in Azerbaijan are mostly acquired through self-study, which indicates the narrow capacity of the education system to provide its population with an adequate level of digital literacy. That is why, first of all, the country's authorities should organise and implement measures to improve the digital skills of the entire population. Another important element in the development of the digital economy is human capital. In Azerbaijan, the main problem today is the lack of qualified specialists in the field of information and computer technology, which leads to inefficient investment in innovation. That is why it is necessary to ensure the expansion of education in the field of digital technologies, where it is advisable to attract foreign specialists. It is also recommended to introduce compulsory courses to improve the skills of information and computer technology specialists.

2.3. An Econometric Study of the Dependence of the Development of Digital Technologies on the Economic Development of the Country

Since the main indicator of the development of Azerbaijan's digital economy is the state of digitalisation of the country, it is advisable to establish the peculiarities of changes in the indicators of high-tech exports and secure Internet servers, considering the influence of the country's economic factors, to establish further prospects for its development. Today, due to the decline in technology development in the country, there is a decline in high-tech exports. That is why, in the course of the study, when building a one-factor regression, the indicator of high-tech exports of Azerbaijan was taken as the first effective indicator (Table 4).

Table 4. The results of building one-factor regression models of the dependence of high-tech exports of Azerbaijan on the country's economic development

X	a	b	Correlation coefficient	Determination coefficient	Link proximity
GDP (billion USD)	7.86	-0.06	0.5	0.25	Average
Inflation, consumer prices (annual %)	5.16	-0.14	0.38	0.14	Average
Imports of goods and services (% of GDP)	3.64	0.02	0.05	0.003	Weak
Total unemployment rate (% of total labour force)	-0.27	0.82	0.41	0.17	Average
Foreign direct investment, net inflow (USD billion)	4.45	0.16	0.22	0.05	Weak

Source: compiled by the authors.

Table 4 shows the average level of dependence of Azerbaijan's high-tech exports on the dynamics of the level of Gross Domestic Product, inflation, and unemployment. The regression equation of the dependence of high-tech exports on the level of GDP shows that with the growth of GDP by one unit, there will be a decrease in high-tech exports. As the country's financial situation improves, the focus on improving the country's development increases and exports in general decrease, and high-tech exports decline accordingly. Also, as the inflation rate increases by one-unit, high-tech exports decline, because the higher the prices in a country, the lower the level of demand for goods. At the same time, the results of the econometric analysis show that as the overall unemployment rate increases by one unit, the level of high-tech exports increases, because, with the lack of human capital, technological developments are mostly exported. The study also showed that Azerbaijan's imports of goods and

services and net foreign direct investment inflows have a weak impact on the country's high-tech exports. At the same time, as the country's imports of goods and services grow, the volume of high-tech exports also increases, which can be explained by the country's balancing trade balance. The growth of net foreign direct investment in Azerbaijan is also accompanied by an increase in high-tech exports, as foreign investment is mainly directed at the production of internationally traded goods. In general, an overview of the specifics of high-tech exports as an indicator of the development of the digital economy is not enough. That is why authors will further consider the trends in the regression dependence of the ratio of secure Internet servers in Azerbaijan as one of the main indicators of digitalisation on the country's economic development (Table 5).

Table 5. The results of building one-factor regression models of the dependence of secure Internet servers in Azerbaijan on the country's economic development

X	a	b	Correlation coefficient	Determination coefficient	Link proximity
GDP (billion USD)	182.31	1.65	0.23	0.05	Weak
Inflation, consumer prices (annual %)	227.33	-7.9	0.38	0.14	Weak
Imports of goods and services (% of GDP)	677.3	12.1	0.56	0.314	Average
Total unemployment rate (% of total labour force)	-114.03	-68.02	0.62	0.39	Average
Foreign direct investment, net inflow (USD billion)	260.71	19.97	0.49	0.24	Average

Source: compiled by the authors.

Table 5 shows a medium degree of correlation between secure Internet servers and imports of goods and services, total unemployment, and net foreign direct investment. The regression equation shows that as imports of goods and services increase by one unit, the indicator of secure Internet servers in Azerbaijan increases. After all, attracting goods of foreign origin brings the country to the international level and increases the degree of digitalisation in general. The constructed one-factor model of the dependence of the effective indicator on the overall unemployment rate shows that with an increase in the unemployment rate by one unit, there is a decrease in secure Internet servers. These trends can be explained by the fact that as the level of labour intensity in the country decreases, the need for digitalisation of the economy decreases. Accordingly, the results show that with an increase in net foreign direct investment inflows, there is an increase in secure Internet servers, which is accompanied by an improvement in the level of Azerbaijan's digital economy. The low density of connection with secure Internet servers in Azerbaijan is characterised by the dynamics of GDP and inflation, as they indeed indirectly affect the development of digitalisation in the country. It was found that with the growth of GDP per unit, the number of secure Internet servers increases, as the improvement of the country's financial situation allows allocating resources for the development of technological support. The increase in inflation per unit is also accompanied by a decrease in the number of secure Internet servers in Azerbaijan, as the growth of prices in the country leads to a low level of availability of resources, including digital ones.

3. Discussion

The issue of the formation of the digital economy has been previously studied by many scholars, but the main directions of its further functioning are currently uncertain. This can be explained by the intensive development of financial technologies and the lack of innovative educational activities aimed at improving the skills of employees.

The issue of the formation of the digital economy has been previously studied by many scholars, but the main directions of its further functioning are currently uncertain. This can be explained by the intensive development of financial technologies and the lack of innovative educational activities aimed at improving the level of skills of the Adner *et al.* (2019) examined the compatibility of two competing platform owners that generate revenue both through the sale of equipment and royalties from the sale of content. The researchers considered a game-theoretic model in which two platforms offer different digital services to users. Incentives towards one-way interoperability were found to be based on differences in their profit focus. One-way interoperability is found to increase the asymmetry between the profit focuses of platform owners and given the large difference in autonomous means, provides a larger amount of profit for both platform users. Overall, the authors concluded that to increase the degree of formation of the digital economy, it is necessary to create conditions for the formation of proper infrastructure, effective management, and comprehensive organised use of digital technologies. Their study also notes that, along with the expansion of the scientific and technical basis for the development of information and computer

technologies and the scope of their application, the nature and scale of potential threats to information security in the areas of the digital economy are changing. Accordingly, there is an urgent need to constantly update, revise and create new measures, methods, and tools to calculate the volume of these losses. Increasing the degree of trust and security in the digital economy is the main means for approving appropriate management decisions regarding the functioning of information systems and areas for protecting the resource base. As a result of the study, the authors identified the main areas of information security in the digitalisation of the economy and established methods to ensure its security and increase the level of trust in it (). The researchers also identified the peculiarities of the impact of exclusive content and users of digital technologies only, which affect the promotion of their compatibility with the economic environment. In other words, the authors only consider the priority areas of ensuring the security of the digital economy and the peculiarities of compatibility of two competing platform owners, respectively, the issue of the development of the digital economy of the country under study was not raised in this paper and the peculiarities of the relationship between the economy and digitalisation were not considered.

Abdelli and Shahbaz (2023) conducted a study on the main trends in the digital economy, energy, and sustainable development. The researchers determined that the field of information and communication technologies is one of the main areas of the non-oil sector, and therefore its development is one of the most important areas of the state's economic policy, energy, and sustainable development. The main principle of the policy of innovative development is to build a favourable business environment for the efficient and stable functioning of energy enterprises. The authors also determined that during the study period, the development of the digital economy should be based on the fourth industrial revolution, which will become the main revolutionary transformation in the global economic system and strengthen the trends of sustainable development. The study found that digital technologies are the main means for business and energy, which allow making changes and managing a company in real-time without the involvement of human resources and are based on full automation of corporate business processes. The impact of the COVID-19 pandemic on business was a vivid example of the usefulness of the digital economy, as companies that did not have a high level of digitalisation were forced to shut down their operations. At the same time, firms that were able to quickly implement digital technologies and were customer-focused remained in the market and improved their information technology base. The publication also emphasises the importance of technology for achieving the Sustainable Development Goals. The researchers considered only the specifics of the digital economy trends along with the energy sector and their role in sustainable development, and the issue of further prospects for the development of the digital economy itself was not considered. Compared to the study, this study does not identify the strengths and weaknesses of the country's digital economy.

Dabbous *et al.* (2023) examined the peculiarities of the impact of digitalisation on business activities and sustainable competitiveness. The authors examined the extent to which the overall level of digitalisation of the economy affects its sustainable competitiveness. The results also highlight the aspects of digitalisation that are quite important for ensuring sustainable competitiveness. The study highlights the need to ensure extensive, fast, and reliable connectivity within a country; encourage use for transactions, communication, and content sharing; and promote greater digital integration as the three factors that have the greatest impact on sustainable competitiveness. Scientists determined that, in general, the development of the digital economy allows for a significant expansion of entrepreneurial activity at various levels (Abukhader 2008; Chen 2020; Cong *et al.* 2021; Hosan *et al.* 2022). In addition, the digitisation of the economy provides enormous opportunities to improve its overall efficiency and creates conditions for sustainable growth, although it is not accompanied by a reduction in sectors, but rather by their expansion, which generally opens up new opportunities for more stable development of the country. Accordingly, such trends strengthen the country's overall competitiveness in the international arena. The authors (Pürhani *et al.* 2022) also noted that the digital economy provides opportunities for the growth of the overall level of human capital by providing opportunities to increase personal financial capabilities and reproduce their entrepreneurial ideas and projects. The results also suggest that the presence of digitalisation is important, as countries need to increase their digital readiness to promote sustainable competitiveness. Thus, entrepreneurship and digitalisation should be a major focus of government development programmes and should be prioritised for accelerated economic, social, and environmental improvement. Although the authors examined the main advantages of the digital economy in the country, the study did not address the directions of the digital economy and did not highlight the peculiarities of the interdependence of technology development and economic processes.

The literature review was based on the study by Li *et al.* (2020), which is based on a critical assessment and research agenda of the Asian digital economy. The study addresses the global digital economy, clearly pointing to the need for Asian countries to update their traditional business processes to support better growth, increase the availability of technological innovation for transformation, develop public policies that support new models of social interaction to enhance national economic growth and continue to encourage high potential for digital

entrepreneurship and successful start-ups. The authors highlighted the specifics of digital identification services and the access of public institutions to relevant data and information that citizens can obtain and noted that this is a long-standing issue of serious concern in most Asian countries, as well as in developing countries. Among the different sectoral models of the digital economy, it is electronics that is developing in a way that allows people to have equal access to information and public services (Alexiou 2009; Berdar and Yevtushevska 2021; Bukht and Heeks 2017; Okumura *et al.* 2019; Saridoğan, and Kaya 2019). The authors explained that the digital economy has made it so that no place is remote or inaccessible anymore. Although the study does not directly address the main directions of the digital economy, cyber risk insurance may be identified in the future as one of the aspects of improving the functioning of this sector of the economy.

Atici (2021) examined the peculiarities of the digital and digitised economy in developing countries, focusing on Turkey. The author attempted to highlight the transformation of the economy and the role of creative disruptors in the development of digital technologies. It was also noted that Covid-19 has become a major factor and accelerated the transition to a new digital norm. In addition, central bank directives on digital currency, cryptocurrency and distributed ledger technology play a prominent role in the development of the digital economy. The author also focuses on cases of blockchain use in business. It was also established that developing countries are trying to benefit from digitalisation to bypass developed countries and take their positions in the digital competition. The researcher also noted that there are challenges that need to be addressed, such as identifying new technologies, regulatory structure, tax collection, cybersecurity, fraud, and energy consumption in digitalisation. This study considers only the main trends of the digital economy in terms of its impact on the development of the country, namely, the main directions of the digital economy, compared to the studies by Gomes *et al.* (2022), David and Wynand Grobler (2020), Habibi and Zabardast (2020), Lopes *et al.* (2021), Mayer *et al.* (2020), Abdullayev *et al.* (2023), Leontyev and Ketners (2023), Korsunskaja *et al.* (2022), have not been established in this case.

Thus, the studies on the digital economy have shown that there are only indirect studies, and the main directions for further development of the digital economy have not been identified.

Conclusions and Further Research

Thus, the study of the digital economy of Azerbaijan established that this area, as in all countries of the world, is characterised by rapid development, but at the same time has several problems. The development of technological support for the functioning of Azerbaijan's economic sectors may become one of the main factors in improving the country's economic situation. Today, Azerbaijan is a fairly developed industrial and agricultural country. The study also showed that the country has positive dynamics in GDP accumulation, trade balance, reserves, and external debt. At the same time, inflation and unemployment are rising and foreign investment is outflowing. In other words, the country's economic environment is unstable. At the same time, the country's digital economy is developing, as the authorities are focusing on centralising electronic services and digitising public services. There are also plans to increase the population's internet connectivity.

Although Azerbaijan has sufficient resources for the development of its digital economy, it uses them inefficiently, which is accompanied by a slowdown in the pace of digitalisation in the country. This is also facilitated by a decrease in funding for information and computer technology and, accordingly, a decrease in the production of high-tech goods. On the other hand, information provision and accessibility of information and the development of the operating environment for technological financial services are at the highest level in Azerbaijan. Also, a slight increase in the number of researchers in the country indicates that the country's digital economy is still developing. That is why the main directions for the development of the digital economy in Azerbaijan should be measures to strengthen the targeted use of information and computer technologies, the application of measures to rapidly increase the number of Internet users, and management actions to improve the digital skills of the entire population. It is also recommended to expand education in the field of information and computer technologies with the involvement of foreign specialists and to introduce compulsory courses to improve the skills of digital specialists.

The conducted econometric study has made it possible to establish that changes in Azerbaijan's high-tech exports are moderately influenced by the level of gross domestic product, inflation, and unemployment, while imports of goods and services and foreign direct investment have a minor impact. It was found that with a one-unit increase in the level of GDP, there will be a decrease in high-tech exports. On the contrary, an increase in the overall unemployment rate by one unit leads to an increase in high-tech exports. If authors consider the peculiarities of the relationship between secure Internet servers in Azerbaijan and the country's economic development, it is important to note that the average impact on the development of digital technologies is exerted by the indicators of imports of goods and services, the overall unemployment rate, and the net inflow of foreign direct investment. It was also found that with the increase in imports of goods and services and the level of net foreign direct investment,

there is an increase in secure Internet servers, which is accompanied by an improvement in the level of Azerbaijan's digital economy. However, the increase in unemployment harms the object of study.

Further research on the main directions of development of Azerbaijan's digital economy should be based on the development of measures and methods to improve the level of education in the field of information and computer technologies and digital literacy of the country's population.

Credit Authorship Contribution Statement

Kamran Abdullayev: Writing – review and editing, Methodology, Supervision, Project administration;

Sevda Badalova: Writing – original draft, Investigation;

Asif Mustafayev: Writing – original draft, Methodology;

Mahir Zeynalov: Writing – review and editing, Formal analysis;

Aynur Babayeva: Writing – original draft, Data curation, Visualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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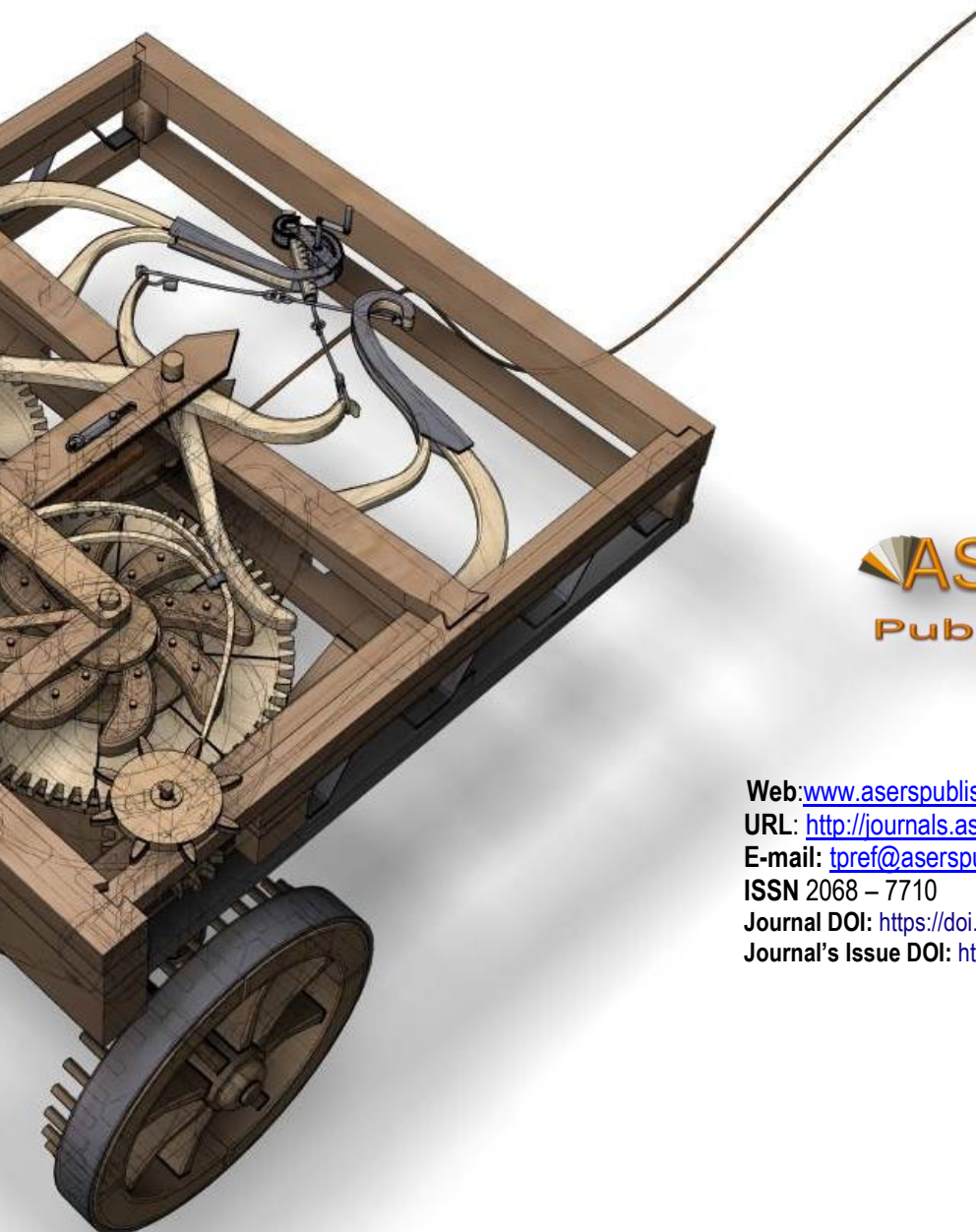
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