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ANALYSIS AND ASSESSMENT OF ICT INNOVATIONS IMPACT ON COMPETITIVENESS OF FOREIGN ECONOMIC RELATIONS: AZERBAIJAN'S EXPERIENCE

Considering that the modified and improved ICT service becomes a commodity in the domestic and foreign markets, it can be said with complete certainty that the improved service in the domestic market, i. e. as a commodity, meets the demand of domestic consumers. But the updated and improved ICT services' entering foreign markets necessarily complete with other similar services available in those markets. Thus, the object of the study is new innovative ICT services that join the competition in the field of foreign trade and act as the main criterion for measuring the competitiveness of international economic relations.

Different factors affect a competitive economy, which include the innovation activity, investment environment, effective spending, existing infrastructure, business security, human capital, social stability, political stability.

World experience demonstrates that the competitiveness indicator of developed countries is based on technological advantages, while the competitiveness indicator of developing countries is based on resource advantages. The study aims to analyze and assess of Azerbaijan's ICT innovations impact on competitiveness of foreign economic relations. In this article are studied:

1) the role of innovations in the ICT sector like as high-tech field of economy;

2) the disclosure of the position of the ICT sector in the foreign economic activity field;

3) analysis and assessment of ICT innovations impact on competitiveness of foreign economic relations in Azerbaijan.

In conclusion, author suggested some recommendations for Azerbaijan ICT sector activity improving by innovations in sphere of foreign economic relations.

Author used to foreign statistical sources, as well as state statistical collections of Azerbaijan in this article.

Keywords: *innovations, foreign economic activity, ICT sector of Azerbaijan, competitiveness influence, competitiveness assessment.*

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1. Introduction

The social and political stability, business security, investment environment are the external influence factors, but innovation activity, effective spending, existing infrastructure, human capital demonstrate the characteristics of internal influence factors.

Currently, such a concept is accepted by economists – the level of technological development of the country, the potential for innovative development is the main criterion of its competitiveness. In recent times, the indicator of the volume of foreign direct investments proposed by authors of paper [1] has been accepted as the main criterion affecting the country's competitiveness.

Countries with low-level technologies and labor-intensive industries are net importers of foreign direct investment (FDI), which occurs in stage 1. In the 2nd stage with the development of capital-intensive and high-tech production, the volume of foreign direct investment increases, and first the export of mining industry products begins to increase, and then in the 3rd stage, the production of export-oriented products with high added value increases. Thus, in the 4th stage typical of developed countries, FDI exports exceed FDI imports, which are accompanied by a high level of competitiveness indicators of national companies and leads to the realization of strategies that are consistent with foreign investment policy. In the 5th stage, the path of investment development is observed by creating a balance between FDI export and FDI import. Such level of investment development is characteristic of countries that have occupied leading positions in capital-intensive and high-tech sectors around the world.

ICT sector of economy has got the high-technological intensity. In this case author would like to investigate the

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role of ICT sector in innovations whose influence to competitiveness of foreign economic activity in world. Author considers this research in case of Azerbaijan ICT sector activity such as Azerbaijan had got two satellites since 2013. Now, despite the pandemic situation, Azerbaijan is preparing to use their ICT sector's opportunities more effectively.

Thus, *the object of research* is new innovative ICT services that join the competition in the field of foreign trade and act as the main criterion for measuring the competitiveness of international economic relations. *The aim of research* is to analyze and assess of Azerbaijan's ICT innovations impact on competitiveness of foreign economic relations.

2. Material and Methods

Author used to statistics of world sources. In chapter 3.1 author applied observational, statistical grouping and comparative analysis methods. In chapter 3.2 author used SWOT and PEST expert assessment analysis together with analytical research.

3. Results and Discussion

3.1. Global Innovation Index (GII) of Azerbaijan in sphere of foreign economic relations. If to look at the economic potential of the former USSR countries, it is possible to see that Russia, Ukraine, Belarus and Kazakhstan [2] have got the high competitiveness indices when comparing different innovation indices. Azerbaijan's position in the economy and application of innovations remains at an average level (Table 1).

In 2019 Azerbaijan occupies the 58th position according to the global competitiveness index and the 80th position according to the global innovation index [3–8]. In that period Azerbaijan's high technology export index was established at 89 places. Azerbaijan will take 93rd place among 132 countries in 2022 [9, 10]. Within 5 years the position of Azerbaijan has decreased by 13 points. Currently, the share of science-intensive products of Azerbaijan, such as machine building, in the world composition is 0.1 % [11].

According to [11], the share of science-intensive engineering industry products in world trade is 0.1 % (2017–2021 database). As can be seen from Table 1, Azerbaijan's global competitiveness index occupies the 58th position, which once again confirms the very low level of scientific and technological development. Let's take a look at the dynamics of Azerbaijan's GII score/value around the world in Table 2.

As can be seen from Table 2 the import of ICT services (share of total import, %) increased (+0.1), export of ICT services (share of total export, %) has decreased over 5 years (–0.2 %), Table 3. Net FDI inflows (weighted in GDP, 5 year average) decreased by (–4.9) points. The share of exports with high technological intensity increased to 13.6 %, and imports with high technological intensity had risen to 2.3 %. This is one of the best indicators achieved by Azerbaijan in 5 years.

Table 1

Comparative innovation development indices for former USSR countries (2020)

Country	Global Innovation Index (GII) (index/position)	Level of complexity economy (index/position)	Index of economy weakening (index/position)	Global competitiveness index (index/position) (2019)	Government efficiency index
Azerbaijan	28.4/80	–1.19/120	70.1/38	58 (62.7)	44.71
Belarus	32.6/62	0.83/31	61.0/95	–	23.08
Georgia	32.4/63	–0.01/63	77.2/12	74 (60.6)	75.48
Kazakhstan	28.6/79	–0.32/78	71.1/34	35/55 (62.9)	60.10
Kyrgyzstan	24.5/98	–0.04/65	63.7/78	96 (54.0)	32.69
Latvia	40.0/38	0.67/37	72.3/30	38/41 (67.0)	76.92
Lithuania	39.9/39	0.79/33	76.9/15	30/39 (68.4)	82.69
Moldova	32.3/64	–0.16/68	62.5/85	86 (56.7)	36.06
Russian Federation	36.6/45	0.12/52	61.5/92	45/43 (66.7)	54.81
Tajikistan	23.9/103	–0.74/97	55.9/134	104 (52.4)	24.52
Turkmenistan	–	–0.70/95	–	–	12.02
Ukraine	35.6/49	0.30/47	56.2/127	54/85 (57.0)	38.94
Uzbekistan	27.4/86	–0.48/87	58.3/108	–	34.13
Estonia	49.9/21	0.92/29	78.2/8	26/31 (70.9)	88.46

Note: based on data [3–7]

Table 2

2018–2022 analysis of the position of Azerbaijan in terms of the score/value given to the indicators of the global innovation index (GII) for imports

Indicators	2018	2019	2020	2021	2022	Increase/reduction in 5 years
5.3.2. Imports with high technological intensity (share in total imports, %)	4.0	2.8	3.0	5.2	6.3	+2.3
5.3.3. Import of ICT services (share of total import, %)	0.5	0.5	0.7	0.4	0.6	+0.1
5.3.4. Net FDI inflows (weighted in GDP, three-year average)	7.3	8.8	8.5	1.4	2.4	–4.9

Note: based on data [3–7]

Table 3

2018–2022 analysis of the position of Azerbaijan in terms of the score/value given to the indicators of the global innovation index (GII) for exports

Indicators	2018	2019	2020	2021	2022	Increase/reduction in 5 years
6.3.2. Export with high technological intensity (share in total exports, %)	0.1	0.1	0.1	12.3	13.7	+13.6
6.3.3. Export of ICT services (share of total export, %)	0.4	0.4	0.5	0.1	0.2	–0.2
6.3.4. Net FDI flows abroad (weighted in GDP, three-year average)	5.6	6.4	5.2	0.3	0.4	–5.2
7.2.1. Export of cultural and creative services (share in total export, %)	0.2	0.1	0.0	0.1	0.1	–0.1
7.2.5. Export of creative goods (share in total export, %)	0.0	0.0	0.0	0.0	0.1	+0.1

Note: based on data [3–7]

As can be seen from Tables 2, 3, during 2018–2022, imports with high technological intensity (share in total imports, %) advanced by 17 points. But Azerbaijan's position on other indicators has worsened. The position of the import of ICT services in Azerbaijan has decreased by 3 points, the export of cultural and creative services by 15 points, the net FDI flows abroad by 98 points, the highly technologically intensive export of ICT services in Azerbaijan has decreased by 4 points. Export of creative goods increased by 25 points for 2022.

Currently, information technologies (Internet, Google search network, social networks – Meta, Instagram, Tiktok, etc.) and ICT (telecommunications devices, Wi-Fi devices, mobile phones) due to the frequency of distribution in high-tech products and services not only in the world, but also in Azerbaijan, (TVs, tablets, laptops, etc.) products. Thus, ICT products and services are innovation-oriented as well as science-intensive and technology-intensive products [12].

In 2020, due to the pandemic, the volume of services exported by Azerbaijan in the field of telecommunications worldwide increased by 1.2 % compared to 2018, but decreased by 30 % compared to 2016. Also, the volume of services imported by Azerbaijan in the field of telecommunications decreased by 21.2 % compared to 2016. As can be seen from Table 4, the volume of services imported and exported by Azerbaijan in the field of information services around the world has also decreased. Only the volume of import and export operations on computer services had continuing to grow since 2016. In 2020 imports increased by 1.5 times and exports increased by 167.8 % compared to 2016.

To compare [11] data, let's take a look at [9–11] data. It should be noted that according to the statistical indicators of Azerbaijan (Table 5), the import of ICT products during the years 2015–2021 has increased by 3 times. The increase in the import of computer and peripheral equipment in 2021 compared to 2015 was equal to 301.5 %, in the import of telecommunication equipment – 328.9 %, and in the import of electronic equipment – 338.3 %.

Azerbaijan's exported ICT services continue to grow, despite the fact that they are about 100 times less than imported ICT services. As can be seen from Table 6, this increase in the export of computer and peripheral equipment was 212.9 %, in the export of telecommunication equipment it was 128.3 %, and in the export of electronic equipment a 5.5 times increase was observed.

If to look at to Table 7, wit is possible to see that Internet communication, mobile phone communication service, telephone communication, as well as the sale of computer and peripheral equipment have the main share in the volume of product release and service provision in ICT sector of Azerbaijan.

Table 4

Information services of Azerbaijan in import-export operations around the world, thousand USD

Indicators	2016		2018		2020		In 2020 compared to 2016, %	
	import	export	import	export	import	export	import	export
Telecommunication services	24331	54642	31740	37971	19172	38429	78.8	70.3
Computer services	29889	7779	33141	6742	436330	13058	increased 14.6 times	167.8
Information services	42417	10417	34603	34282	27498	13668	64.8	131.2

Note: based on data [11]

Table 5

Import of ICT goods, thousand USD

Indicators	2015	2017	2019	2021	In 2021 compared to 2015, %
Total:	261742.6	328372.6	530317.3	637180.1	243.4
Computer and peripheral equipment	58491.1	97867.5	116530.7	176328.4	301.5
Telecommunication equipment	97248.0	141773.8	269511.4	319900.1	328.9
Electronic equipment	33134.2	58013.6	104331.9	112085.2	338.3
Another ICT equipment	72869.3	30717.7	39943.3	28866.4	60.4

Note: based on data [13]

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Table 6

Export of ICT goods, thousand USD

Indicators	2015	2017	2019	2021	In 2021 compared to 2015, %
Total:	2430.1	2912.0	3985.6	5176.0	212.9
Computer and peripheral equipment	868.1	1523.5	1652.3	2340.3	269.6
Telecommunication equipment	1316.5	1027.6	1343.6	1689.4	128.3
Electronic equipment	101.3	188.6	528.4	555.1	547.9
Another ICT equipment	144.2	172.3	461.3	591.2	409.9

Note: based on data [13]

Table 7

Azerbaijan ICT sector's producing outputs and services, million AZN

Indicators	2015	2017	2019	2021	In 2021 compared to 2015, %
Total:	1589.3	1688.0	2089.2	2249.6	141.5
From them: Internet communication	112.5	132.7	157.1	249.0	221.3
Other communication activities	137.1	174.5	264.9	260.1	189.7
Mobile phone communication service	874.3	857.0	912.2	980.9	112.2
Phone communication service	222.3	194.5	196.9	224.3	100.9
Sales of computer and peripheral equipment	27.3	22.3	35.5	46.0	168.5
Computer manufacturing	0.01	1.7	8.0	17.0	17

Note: based on data [13]

As can be seen from Table 7, the share of mobile phone communication in the export of ICT products and services is equal to 43.6 %, the share of internet communication – 11.0 %, the share of other communication activities – 11.6 %, and the share of telephone communication – 10.0 %. In 2021 compared to 2015, computer production increased 17 times, and internet communication increased by 221.3 %.

In 2010–2018, despite a 10 % decrease in ICT sector investments, ICT goods' production in Azerbaijan increased by 1.5 times, and import by 4.9 times. VAT increased by 56 %, and the volume of investments decreased by 10 % [13].

Recording Table 8, the import of ICT products has increased by 4 times, and its share among the products imported into the country has increased by almost 2 times. The volume of capital investments decreased by 60.1 %. ICT product output has increased about 41.6 %, but the volume of added value has risen about 71.4 %.

As shown in the «Azerbaijan industry» state statistic collection, the production volume of computer, electronic and optical products that underwent significant changes or were newly applied due to the level of innovation was 27.9 % of all industrial products in 2019, and 5.7 % in 2021. The weight of significantly changed or newly applied products in the machine-building industry was 1.1 % in 2019 and 0.1 % in 2021 [14].

It is necessary to have continuous scientific and research activities in the ICT sector (Table 9). One of important conditions for ICT efficient operation is the presence of scientific research work not only in state enterprises, large organizational institutions (Azerbaijan Ministry of High Technologies and Communications, ICT parks, STP, etc.), but also in additional small and medium ICT institutions. In 2019 and 2020, the expenses incurred for scientific-research works in micro, small and medium enterprises in the field of information and communication have a variable (with a tendency to increase and decrease) dynamics [9, 10, 15].

And finally, author give the assessment to Azerbaijan ICT sector's import-export operations and its actively influence to Global Innovation Index by SWOT analysis (Table 10).

Table 8

Dynamics of technical and economic indicators of Azerbaijan ICT sector, million AZN and %

Indicators	2015	2017	2019	2021	In 2021 compared to 2015, %
Product (service) output	1589.2	1688.0	2083.2	2249.7	141.6
The amount of added value created	970.7	103.1	1293.3	1663.8	171.4
The share of created added value in GDP, %	1.8	1.5	1.6	1.8	–
Investments focused on fixed capital	338.4	170.2	294.7	135.0	60.1
Import of ICT products	268.6	565.1	901.6	1083.2	403.3
Specific weight of imported ICT products in the value of products entered the country, %	2.8	3.7	3.9	5.4	–
The number of employees working in the ICT sector, thousand man	20.1	18.1	19,3	21.1	104.9
The ratio of workers in ICT sector to the number of workers in the economy, %	1.3	1.2	1.3	1.4	–

Note: based on data [13]

Table 9

Expenditures for scientific research in the field of information and communication in Azerbaijan, thousands of AZN and %

Indicators	2019				2020			
	Total:	micro	small	middle	Total:	micro	small	middle
Thousand AZN								
On economic activity	47678.4	386.3	5282.8	42009.3	15643.1	1288.1	6596.5	7758.5
Industry	10779.3	–	2417.3	8362.0	2975.4	–	2317.2	658.2
Manufacturing industry	8290.6	–	9.3	8281.3	774.9	–	202.0	872.9
Information and communication sector	20223.5	2.1	41.4	19810.0	609.9	–	609.9	–
Specific weight, %								
On economic activity	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Industry	22.6	–	45.8	19.9	19.0	–	35.1	8.5
Manufacturing industry	17.4	–	0.1	19.7	4.9	–	3.1	0.9
Information and communication sector	42.4	5.4	0.8	47.2	1.5	–	9.3	–

Note: based on data [16]

Table 10

SWOT analysis of changes in import-export operations and GII in Azerbaijan ICT sector

Strengths	Weaknesses
– starting a business in ICT sector contributes to the development to small and middle size enterprises (documentation on market development, ease of obtaining loans, microfinancing conditions, as well as the existence of ICT and creative organizational models); – cooperation of universities and ICT sector's enterprises contribute to the best position of Azerbaijan for creating high Global innovation index (GII); – the increase in the specific weight of net FDI import and export in GDP will affect the production of hi-tech products in Azerbaijan and will lead to further improvement of Azerbaijan's position on GII	– despite the increase of net FDI inflows (weight in GDP, three-year average) by 1.2 point change the position of Azerbaijan by 1 point positively. But indicator decreased again and remained at its previous position. Therefore, the growth of Net FDI inflows may or may not lead to positive changes in the position of Azerbaijan; – the increase in the import of high technologies can have a very slight effect on the position of Azerbaijan; – the increase in the export of high technologies can have a very slight effect on the position of Azerbaijan; – the position of Azerbaijan may improve or deteriorate, regardless of whether the export of cultural and creative services (share in total export, %) as well as the export of creative goods (share in total export, %) increases or decreases
Opportunities	**Threats**
– the specific weight of the import of ICT services in the total trade has increased. As a result of the increase of 0.2, the position of Azerbaijan among the world countries has increased by 22 points. This means that any slight increase can further improve Azerbaijan's position; – when the specific weight of ICT services exports in total trade increased by 0.1 points, Azerbaijan's position among the world countries increased by 2 points. This means that any slight increase can further improve Azerbaijan's position; – the increase and decrease of net FDI flows abroad (weight in GDP, three-year average) have a slight effect on the position of Azerbaijan among the world countries	– innovative approaches cannot be applied in universities due to the fact that spending on education in GDP is low; – global companies in Science and Research are almost non-existent. It would be good if such companies operate not only in strategic facilities, but also in non-oil sectors of the national economy; – projects financed from abroad have a low specific weight in GDP, and it becomes difficult for enterprises to introduce innovations on their own with little cash; – the specific weight of both imports and exports of knowledge economy, hi-tech and creative products is very low, which indicates a low application of both process and product innovations

The results of the assessment are:

1. Due to the small amount of spending on education in the GDP, innovative approaches cannot be effectively applied in institutions and universities. The government should pay special attention to this issue and apply legal and financial support mechanisms to the import of equipment aimed at increasing the industrial potential of Azerbaijani entrepreneurs for the production of export-oriented products based on innovation.

2. The specific weight of both imports and exports of knowledge economy, hi-tech and creative products is very low, which indicates a low application of both process and product innovations.

3. Foreign-financed projects on the creation of innovation-based science-intensive products and distribution of services have a small weight in Azerbaijan's GDP. This, in turn, makes it difficult for it to introduce innovations on its own with little money.

3.2. Impact of Azerbaijan ICT sector's to development of online services during the pandemic. In recent years, the increase in internet usage in Azerbaijan has created an important infrastructure for the development of effectively online services. This is due to the fact that the Internet is undergoing a change towards innovation, its application in many business models that include new management methods. Through these, internet users become an important part of online services' infrastructure.

During the pandemic, the increase in the use of the Internet in Azerbaijan creates an important infrastructure for the development of online services' infrastructure. This is due to the fact that the Internet is undergoing changes aimed at innovation, the introduction of new management methods in many business models. Through them, Internet users become an important part of online services (Table 11) [13].

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Table 11

Volume of information and telecommunication services in Azerbaijan, AZN

Indicators	2015	2017	2019	2021	In 2021 compared to 2015, %
Total:	1623550.0	1731752.0	2229982.0	2391079.0	147.3
Documentary electrical communication service	617.0	1600.0	1108.0	680.7	110.3
Intercity and international relations service	115359.0	63395.0	45447.0	34143.0	70.4
Mobile phone communication service (thousand AZN)	873396.0	857034.0	9112166.0	980960.0	112.3
Internet service (thousand AZN)	122018.0	132692.0	157102.0	249071.0	204.0

Note: based on data [13]

Compared to 2015, documentary telecommunication service increased by about 47.3 % in 2021, mobile phone communication service by 12.3 %, internet services by almost 2 times, and long distance and international communication decreased by 29.6 %. The decrease in the volume of intercity and international communication is due to the wide spread of Internet and the growth of social networks. The communication services provided to population make up about half of the communication services for the whole country and decreased from 61.2 % in 2015 to 52.1 % in 2021 (Table 11).

The share of the population in electronic communication from 76.4 % in 2015 to 100 % in 2021, mobile phone communication from 96.3 % in 2015 to 99.0 % in 2021, the Internet in 2015 increased from 38.8 % in 2021 to 62.2 %. The share of the population on long-distance and international communication decreased from 9.3 % in 2015 to 9.0 % in 2021 [13].

Recently, information technologies are showing their impact not only on the economic, but also on the social sphere. In the last two years, in the pandemic situation, all people turned to the Internet not only for economic matters, but also for social communication. This once again shows that the use of information technologies has increased during the pandemic, so the Internet has affected the functioning of many infrastructures – banking, healthcare, education, etc.

As can be seen from Azerbaijan Statistic collection [13, 14] in 2015–2021 years the documentary electric communication service for population has increased by 59.4 %, mobile electric communication – by 45.1 %, and internet service – by 15 times. The volume of intercity international telephone communication service for population has decreased 15 times.

If to look at to the costs incurred for servicing equipment in the ICT field (Table 12), it is possible to see that these costs increased by 68.1 % during the years 2019–2021, and this indicator increased by 37.2 % only during the pandemic period (2020–2021). During 2019–2021, the technical support costs are about 83.8 %, during the pandemic period (2020–2021) – 42.0 %, Internet connection costs are 43.2 and 22.1 %, respectively, and the costs of purchased licenses are 116.7 % and 98.8 %. ICT equipment spending costs increased by 8.3 % during the 2019–2021 period, while during the pandemic period (2020–2021) the spending costs decreased by 2.8 %.

During the pandemic, online trading opportunities have become highly dependent on information technology. One of the most important factors for the sustainable development of online operations is the number of Internet users in the country.

The main factors influencing the development of online operations in Azerbaijan are:

1) almost no infrastructure;
2) weakness of the telecommunication system;
3) failure to meet customer demand in the electronic space.

It should be noted that the ICT sector suddenly started to play a special role in population activities and activities of business subjects with a sudden leap during the pandemic. However, certain psychological barriers prevent the adoption of economic, technological and social innovations in ICT. Such obstacles include the following:

– distrust of citizens in the banking system, in general, in non-cash payments, in particular, as a result of the instability of the economic situation in the country;
– unresolved organizational and legal issues of electronic payments;
– mistrust of electronic signatures;
– uncertainty about the security of transactions through the Internet.

The specific list of necessary reforms for each country is determined by the characteristics of its current healthcare model and the weaknesses identified during the COVID-19 pandemic. Thus, for the development of online operations, the development of the ICT sector, especially its technological support, is necessary, and in the conditions of the ongoing pandemic, the population can access online e-government, e-trade, e-banking, e-medicine, e-pharmacy, e-education, etc. there is a process of socialization in areas.

Table 12

Dynamics of service costs for ICT equipment, million AZN

Indicators	2019	2020	2021	In 2021 compared to 2019, %	In 2021 compared to 2020, %
Total:	128.6	157.7	216.4	168.1	137.2
Maintenance costs	34.0	44.0	62.5	183.8	142.0
Expenditure on ICT equipment	25.4	28.3	27.5	108.3	97.2 (–2.8)
Internet service costs	19.7	23.1	28.2	143.2	122.1
Expenses incurred on purchased licenses	29.9	32.6	64.8	216.7	198.8
Other costs	19.6	29.7	33.4	170.4	112.5

Note: based on data [13]

ICT services provided to the population are reflected in online trading and e-banking operations. Let's focus on e-commerce indicators. In 2019, the turnover of e-commerce in Azerbaijan was 42255.6 AZN. In 2020, this number increased almost 2 times to 98161.2 AZN, that is, a 56.0 % increase was observed. In 2021, e-commerce turnover was 117882.1 AZN. It should be noted that due to the pandemic, the volume of e-commerce turnover in 2021 increased 9 times compared to 2015, and increased to 292.8 % compared to 2019 [17].

E-banking services also occupy a special place on the basis of online operations. In 2019 the volume of non-cash payments made with debit and credit cards was 23 billion 241 million manats, in 2020 it was 28 billion 951 million manats, and in 2021 the volume of payments made with debit and credit cards was 37 billion 434 million manats [17, 18].

The total volume of transactions conducted with the Government Payment Portal in 2020 is 3.3 billion manat, and the number is 51.9 million numbers, these indicators are 34 % and 39 % higher than the indicators of the last 3 years, respectively. During 2020 card transaction was carried out about 53.2 million USD with the Interbank Card Center. The volume of transactions with national currency was 2752 million AZN, either has been in foreign currency – 14.6 million USD and 3.1 million EUR. Compared to 2018, the total number of transactions processed in the system increased by 1.9 times, and the volume increased by 2.8 times for manat, 2.6 times for USD, and 1.6 times for EUR [19, 20].

As a result of a comprehensive analysis of external and internal factors, socio-economic indicators affecting foreign economic relations and ICT products and services with a high technological capacity in foreign and domestic market, author prepared the PEST analysis (Table 13) on the production and export of ICT products, taking into account the impact of COVID-19 on the economy of Azerbaijan and e-business sphere.

The results of the assessment are:

1. Providing the material and technical base of Azerbaijan universities with new equipment, high-speed Internet, and equipping the teacher-student staff with modern laptops is an important issue. This will also allow classes, exams, master's and doctoral theses submitting by online during the pandemic, and electronic legal support programs to spread rapidly.

2. It should be noted that there are almost no global science and research companies in Azerbaijan. It would be good if such companies operate not only in strategic facilities, but also in non-oil sectors of the national economy. There is a need to establish such companies in non-oil sectors by the state.

3. Paying attention to the sale of products and services in the fields of online trade and education, healthcare, social protection, as well as offering online services for government agencies (especially during a pandemic) is one of the important conditions for increasing the speed of the Internet and solving security issues.

4. The safety of consumers, the responsibility of parties and intermediaries in purchases made through e-commerce mediation should be taken into account in the legislative regulations:

– measures should be taken to protect intellectual property rights;

– taxation, payment and delivery methods need to be developed;

– it is necessary to take measures to protect consumers and their personal information.

5. Paying attention to making the information understandable, enjoyable and entertaining in the web site where e-commerce operations take place can increase the number of visitors and increase the turnover of the web site.

Table 13

PEST analysis on the production and export of ICT products, taking into account the impact of COVID-19 on the economy of Azerbaijan and e-business

Positive assessment	Negative assessment
Political factors	
– during the COVID-19 pandemic, Azerbaijan began to quickly realize 2 artificial satellites, as well as its ICT products and programs in foreign and domestic markets; – it has created a platform for the introduction of radical innovations in the field of ICT and telecommunications, taking into account both the geopolitical position and technological capabilities between the North and the South, as well as the West-East	– e-government, e-insurance services are not well received by population, psychological barriers still remain; – protecting the security mechanism of using the e-signature service goes hand in hand with difficult procedures of e-government
Economic factors	
– monitoring and planning of allocation of limited resources; – soon acceptance and launch of e-banking, e-insurance, e-commerce, e-trade operations; – acceptance of online applications in banks; – using the Azerbaijanian language in programs of digital technologies; – fast acceptance of online trading transactions; – application of a high rate of VAT refund for online trade transactions	– the problem of protection against secret factoring arises in e-banking operations; – difficulty in controlling cash on bank cards during electronic filing
Social factors	
– conducting teacher-student, teacher-student communication in education using high-tech programs by internet (zoom.as; team working and etc.); – conducting exams online and monitoring online; – online medical examination by e-doctor; – computerization of medical documentation	– loss of time during computerization; – internet speed slowing down; – high speed internet connection problems in the regions
Technological factors	
– increasing the quality of the used means of communication, supporting their longevity and sustainability features; – slow pace of technological changes; – need for telecommunication equipment	– lack of computer resources during online education; – limitation of technical equipment necessary for ICT services

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6. The application of the tax system applied to the field of e-commerce is sometimes dual in nature, and it is necessary and urgent to form a system for calculating tax collection in the banking system not according to goods, but according to services. The state can also organize incentive campaigns and concession mechanisms for the development of this area.

7. When shopping on e-commerce in countries around the world, a contract is signed between the buyer and the seller and the sale is made. The proposal is to formalize the purchase and sale process by signing an agreement in our country. At this time, any conflict that may arise between the parties can be legally resolved in an arbitration court.

4. Conclusions

The study showed that:

1. Azerbaijan's innovation-oriented development depends on the development of both knowledge-intensive products and services and information technologies as a process. Such areas include the creation and management of artificial satellites, chemical and machine-building industries, production of pharmaceutical and cosmetic products, as well as the field of information technologies, the ICT sector.

2. In order to actively use innovations in the field of foreign economic relations, innovative development must be developed in areas with high technological capacity, taking into account the factors affecting them.

3. The ICT sector occupies a special place in Azerbaijan's import-export operations and has a positive effect on Azerbaijan's GDP evaluation indicators. Despite the increase of net FDI inflows (weight in GDP, three-year average) by 1.2 point change the position of Azerbaijan by 1 point positively. When the specific weight of ICT services exports in total trade increased by 0.1 points, Azerbaijan's position among the world countries increased by 2 points.

4. Another direction of innovative development is the ability to actively use the state marketing policy, marketing strategies and advertising companies of science-intensive products and services exported abroad.

5. Competitive innovation development is more noticeable in the sphere of e-banking, e-commerce, e-education and other electronic services. An innovative development strategy should be developed to increase the competitiveness of foreign economic relations.

6. Should apply legal and financial support mechanisms to the import of hi-tech equipment aimed at increasing the ICT sector's potential of Azerbaijan for export-oriented services based on innovation. The safety of consumers, the responsibility of parties and intermediaries in purchases made through online operation mediation should be taken into account in the legislative regulations.

7. The specific weight of both imports and exports of knowledge economy, hi-tech and creative products is very low (the export of cultural and creative services has decreased by 15 points from 2018 to 2022), which indicates a low application of both process and product innovations. It is necessary to increase attention to this area.

Conflict of interests

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Data availability

The manuscript has associated data in a data repository.

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