

REPUBLIC OF AZERBAIJAN

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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

**DIRECTIONS OF DEVELOPMENT OF
ENTREPRENEURSHIP IN THE
INFORMATION AND COMMUNICATION
TECHNOLOGIES SECTOR OF AZERBAIJAN**

Speciality: 5304.01 - Types of economic activity

Field of science: Economic sciences

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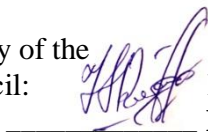
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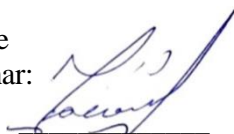
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GENERAL CHARACTERISTICS OF WORK

Relevance and level of study of the topic. In modern times, the information and communication technologies (ICT) sector is rapidly developing in the world. The experience of world countries shows that the development of the sector has a positive effect on the competitive development of the economy and increase productivity.

The main strategic line of economic policy pursued by our state is to achieve the development of the non-oil sector. The ICT sector plays an important role in achieving these goals.

Necessary structural reforms have been carried out and the relevant legislative base has been created for the establishment of the information society in the republic. The directions, as well as goals and objectives for the development of the ICT sector in the near future are widely reflected in a number of documents of state importance. Providing issues such as meeting the needs of the information society, increasing the development potential of the ICT sector, supporting and expanding innovation activities, improving sustainable ICT infrastructure and services, integration into the world market etc. were identified as key targets in the Development Concept “Azerbaijan 2020: Vision for the Future”, in the “National Strategy for the Development of the Information Society in the Republic of Azerbaijan for 2014-2020”, in the “Strategic Roadmap for the Development of Telecommunications and Information Technologies in the Republic of Azerbaijan”.

The future economic development of our country, especially the development of the non-oil sector, depends on the private sector, or rather, entrepreneurial activity. The formation of the entrepreneurship in the ICT sector, which is one of the new industries, is considered to be one of the main directions in terms of future development of the economy, increasing the share of the non-oil sector. Recent economic reforms in our country have enabled the formation of entrepreneurship in the ICT sector and the growth of its role in the country's economy. At present, the share of the private sector in the field of ICT in Azerbaijan is significant compared to the public sector. The share of the private sector in the ICT sector has been higher than 60% in the country since

2000, and more than 80% since 2014. This figure was 82% by the end of 2018.

Entrepreneurial activity in the ICT field is of great economic importance. Although the country has a favorable environment for the development of entrepreneurship in the ICT sector, there are some obstacles and shortcomings in this area. Thus, such problems as cases of unfair competition, the activities of monopolistic enterprises, lack of funding for innovative entrepreneurship, lack of investment in the sector, weak development of the manufacturing sector, deficiencies in the regulation of the sector, high prices for services, etc. still remain. The above confirms that the identification of key areas of development of entrepreneurship in the field of ICT in Azerbaijan is a topical issue.

Entrepreneurship has been the main focus of research of many scientists for many years, and the theoretical and practical issues of this topic are widely substantiated. From foreign scholars who expressed opinions about entrepreneurship A.Smith, R.Cantillon, D.Ricardo, J.Say, J.Bodo, A.Marshall, M.Veber, J.Clark, W.Sombart, F.Knight, J.Keynes, J.Schumpeter, F.Hayek, L.Mises, R.Hisrich, R.Ronstadt, D.McClelland, C.McConnell, S.Brue, as well as russian economists A.Busigin, A.Asaul, A.Semenenko, N.Kruglova, V.Gorfinkel, Y.Starostin, M.Lapusta, A.Pornshev and others can be mentioned.

Thoughts on the content, main aspects, features, formation, management, regulation and importance of entrepreneurial activity in our republic are reflected in the works of a number of well-known economists. Among them A.Alirzayev, Sh.Akhundov, Z.Samadzade, A.Alasgarov, G.Manafov, M.Meybullayev, G.Ganjiyev, A.Abbasov, V.Niftullayev, A.Nuriyev, T.Aliyev, I.Ibrahimov, H.Hasanov, S.Rizayeva, A.Hasanov, E.Bayramova, M.Zeynalov, R.Aliyev and others can be mentioned.

Well-known scientists A.Danilin, V.Inozemtsev, D.Bell, E.Toffler, P.Druker, Y.Masuda, F.Machlup, M.Castells, W.Rostow, M.Porat, V.Trapeznikov, A.Abramova and others have made important contributions to the study of methodological issues of information and communication technologies that form the basis of information society.

Azerbaijani scientists A.Abbasov, R.Aliguliyev, A.Aliyev,

R.Mahmudov, A.Huseyn, A.Muradov and others conducted researches in this field and noted the issues related to the information society, the ICT sector and the existing problems and their solutions in this area in their works.

It should be noted that in our country the ICT sector has been studied by a number of researchers. Without diminishing the importance of the research, it should be noted that entrepreneurship in the ICT sector and its main directions of development have not been comprehensively studied. This factor makes issues such as the studying the main features of entrepreneurship and existing problems, also identifying effective regulation of entrepreneurial activities and perspective directions in the ICT sector in our country as a necessary factor. The lack of research on this topic highlights the relevance of the dissertation.

Purpose and objectives of the study. The purpose of the research is to study the current state of the entrepreneurial activity in the ICT sector in Azerbaijan, to identify existing problems, eliminate them and develop recommendations for the further development of this area.

To achieve this goal, the following problems were identified and implemented:

- to study the impact of information and communication technologies on socio-economic development;
- to study the place and role of the ICT sector in economic development in the world practice;
- to identify the development features of the ICT sector in Azerbaijan and assess its role in the country's economy;
- to study the current state of entrepreneurship in the ICT sector;
- to identify the directions on support of ICT sector and entrepreneurial activity in this field and state regulation mechanisms;
- to identify ways to increase competitiveness in the field of entrepreneurship in the ICT sector and to develop the recommendations on the main directions of entrepreneurship development.

Research object. The object of research is the information and communication technologies sector in the Republic of Azerbaijan.

Research subject. The subject of the research is entrepreneurial activity in the information and communication technologies sector,

regulation, development and improvement of economic relations in this area.

Research methods. Comparative, statistical analysis, systematic approach, correlation analysis, econometric evaluation methods were used in the dissertation.

The scientific novelty of the research is as follows:

- for the first time in Azerbaijan, entrepreneurial activity in the ICT sector has been comprehensively studied;
- the current state of entrepreneurial activity in the ICT sector has been analyzed and evaluated, the existing problems have been indicated;
- the market share of monopolistic enterprises operating in the ICT market has been determined;
- the impact of changes in communication tariffs on changes in the number of subscribers has been assessed by econometric model;
- scientifically substantiated recommendations have been developed to stimulate the development of entrepreneurship and increase competitiveness in the ICT sector in Azerbaijan.

Theoretical and practical significance of the research. The scientific works of local and foreign economists, scientific researches and theories of classical and modern scientists, Laws of the Republic of Azerbaijan, Decrees and Orders of the President of the Republic of Azerbaijan, Decisions of the Cabinet of Ministers of the Republic of Azerbaijan, other documents and normative-legal acts, as well as press materials forms the theoretical basis of research.

The dissertation is the first research work devoted to the current state, problems, development peculiarities and prospects of entrepreneurship in the ICT sector in Azerbaijan. The main provisions of the dissertation, scientific generalizations, results and recommendations can play an important role as a theoretical and practical basis for the organization, regulation, development, improvement of entrepreneurship in the ICT sector in Azerbaijan, as well as to increase competitiveness in entrepreneurship. Also, the main scientific provisions of the research can be used in further research in this area.

Research database. In the work official data of the State Statistics

Committee of the Republic of Azerbaijan, the Ministry of Transport, Communications and High Technologies, reports and statistics of leading international organizations such as the United Nations, the Organization for Economic Cooperation and Development, the International Telecommunication Union, the World Economic Forum, the World Bank, also materials of a number of research centers, monographs, articles and theses published at international and national scientific-practical conferences, internet materials etc. was used.

Approbation and application of research results. The main provisions, results and recommendations of the dissertation were reported at conferences organized by Azerbaijan Business University, Azerbaijan University of Architecture and Construction, Sumgayit State University, Georgian Foundation for Strategic and International Studies, Institute of Economics of ANAS, etc. as well as published in scientific journals and collections. 17 scientific works (3 abroad), including 11 scientific articles and 6 theses in the volume of 10 printed pages were published on the content of the research.

The dissertation was carried out at the **Institute of Economics of ANAS**.

Scope and overall structure of the dissertation.

Dissertation, consisting of introduction (11095 characters), 3 chapters (I chapter - 85439 characters, II chapter - 82803 characters, III chapter - 53030 characters), 9 paragraphs, conclusion (9237 characters), list of used literature in 211 titles, appendixes, list of abbreviations, is overall 241604 characters (161 pages). 30 tables, 36 graphs, 6 appendixes are given in the dissertation.

STRUCTURE OF DISSERTATION WORK

Introduction

CHAPTER I. Theoretical and methodological bases of entrepreneurship and information and communication technologies

- 1.1. Theoretical bases of formation of entrepreneurial activity
- 1.2. Information and communication technologies and their impact on socio-economic development
- 1.3. The place and role of the ICT sector in economic development

CHAPTER II. Analysis and assessment of the current state of entrepreneurship in the ICT sector of Azerbaijan

- 2.1. Assessment of the role of the ICT sector in the country's economy
- 2.2. Analysis of the current state of entrepreneurship in the ICT sector
- 2.3. Econometric assessment of the impact of communication tariffs on changes` in the number of subscribers

CHAPTER III. Directions for improving entrepreneurship in the ICT sector of Azerbaijan

- 3.1. Directions for improving the mechanisms of regulation of the ICT sector
- 3.2. Effective mechanisms to support and regulate entrepreneurship in the ICT sector
- 3.3. Prospects for the development of entrepreneurship in the ICT sector

Conclusions

List of used literature

Appendices

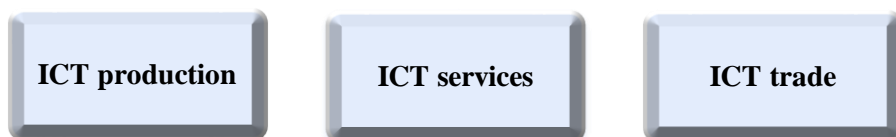
List of abbreviations

KEY PROVISIONS OF THE DISSERTATION

1. The place and role of the ICT sector in increasing the economic competitiveness of the world countries has been studied. As a result of the assessments, it was determined that there is a positive and close relationship between the development of the ICT sector and the competitive and innovative development of countries.

The ICT sector plays an important role in the development of the world economy. According to the International Telecommunication Union (ITU), today the ICT sector accounts for about 6% of world GDP and 4-12% of advanced countries. The global ICT market is growing. World ICT revenues doubled from \$2.5 trillion in 2005 to \$4.9 trillion in 2019. These revenues are projected to exceed \$6 trillion by 2022. The share of ICT workers in total world employment increased from 1.8% in 2010 to 2% in 2018. This figure is between 2.2-5% in the world's leading countries.

The ICT sector consists of 3 main fields: ICT production, trade and services (Figure 1). The classification of the ICT sector by fields was adopted in accordance with the purpose of the Organization for Economic Cooperation and Development (OECD), defined in accordance with the International Standard Industrial Classification for all economic activities.



Graph 1. ICT sector fields¹

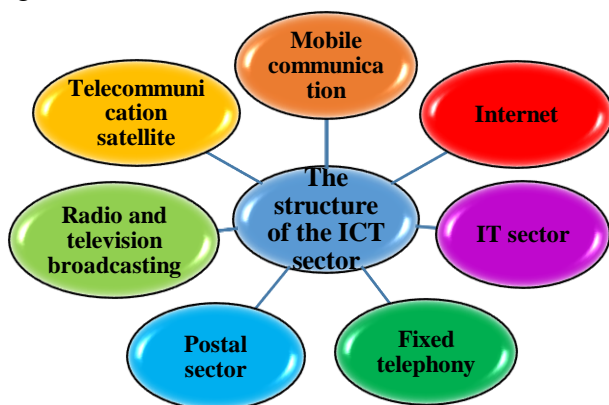
The services market plays an important role in the development of the ICT sector, and 80% of the value added in the sector falls on services, and the majority of employees in the sector have worked in the service sector. Compared to 2010, global exports of ICT services

¹ Spiezia, Vincenzo. ICT Sector and Products. New Classifications based on ISIC Rev. 4 and CPC Ver. 2. OECD. Geneva, 2008. 20 p., p.8-9.

in 2017 increased 1.7 times, from \$313.8 billion to \$536 billion. The share of global ICT services export in the export of all services increased from 8.6% in 2010 to 10.5% in 2017. The production sector in the ICT sector has a relatively small share compared to the service sector. Today, South Korea, China, Japan, Sweden, Finland, the USA, Ireland, Taiwan, Hong Kong and Singapore are the leaders in the production of information technology and electronic equipment.

International trade in ICT products has expanded rapidly in recent decades. ICT products mean equipment that processes data electronically, including recording, transmitting and displaying physical events, as well as monitoring physical processes. In 2018, the share of imports of ICT goods in the structure of total imports of goods in the world was 12.9%, the share of exports of ICT goods in total exports was 11.4%, and the total export of ICT products was more than \$2 trillion.

The structure of the ICT sector includes fixed telephony, mobile communication, postal sub-sector, Internet, radio and television broadcasting, telecommunication satellite, IT sub-sector (Graph 2).



Graph 2. The structure of the ICT sector²

In 2018, the number of fixed telephone subscribers in the world amounted to 944 million people, of which was 48.3% in developed, 50.9% in developing and 0.8% in less developed countries. Since 2009,

² The graph was compiled by the author herself.

the number of fixed telephone network subscribers in the world has continued to decline. The reason is the widespread use of mobile phone network. According to the GSMA Association, the mobile industry contributed about \$3.9 trillion (or 4.6%) to global GDP in 2018, with 32 million people working directly or indirectly in the sector. In 2018, the total number of mobile subscriptions was 7.91 billion, the number of mobile phone subscriptions per 100 people was 104. The total number of net mobile subscribers was 5.1 billion, and the penetration rate of the world population was 61%. The number of Internet users in the world in 2018 was 3.9 billion people (51.4% of the world's population). 1.1 billion of them had high-speed Internet access. The number of mobile broadband subscribers in 2018 was 5.3 billion and the global penetration rate of this Internet was 69.3 per 100 people. According to the Universal Postal Union, there are more than 5.3 million postal workers in the world and about 690,700 post offices. Global postal revenue increased by \$14 billion compared to a year ago and amounted to \$409.8 billion in 2018. Radio is available in most parts of the world and in 75% of developing countries. There are about 44,000 radio stations in the world. Global television revenue in 2018 was \$265 billion. The IT industry is one of the strongest in the world. According to analyst firm Gartner, the USA accounted for 31% of global revenues in 2018. The countries with the largest number of satellites are the USA (2526), China (414) and Japan (186). Today, every 1 euro invested in the satellite industry generates 47 euros of direct or indirect income. The results of research show that the ICT sector has played an important role in the development of the world economy in recent decades.

The analysis based on the correlation between the ICT Development Index and the Global Innovation Index, based on the scores of the world's countries, leads to the conclusion that there is a close relationship between the two indicators ($R^2=0.8361$). Today, the leading countries in the field of innovation also have a high ICT sector (e.g, Singapore, USA, Japan, Germany, Switzerland, the Netherlands, Finland, South Korea, etc.).

Development of the ICT sector has a positive impact on increasing

the competitiveness and comparative advantage of the country's economy. The results of the analysis show that there is a positive correlation between the ICT Development Index and the Competitiveness Index, and this correlation is quite high ($r=0.9410$). The economies of countries with developed ICT infrastructure are also competitive [13].

2. The importance of the ICT sector in the development of the Azerbaijani economy has been studied. The results of the analysis show that the ICT sector has a high impact on the country's economy, and dynamic growth and development trends are observed in this area.

Special attention is paid to the ICT sector in achieving the development of the non-oil sector in our country. The volume of value added created in the ICT sector increased 11 times in 2000-2018 and amounted to 1.3 billion manat. In 2018, the share of the sector in GDP was 1.6%, and in non-oil GDP - 2.7%. One of the main reasons for the low share of the sector in GDP compared to other sectors of the economy can be explained by the rapid growth of other sectors of the economy compared to the ICT sector. In 2000-2018, the total amount of revenues in the ICT sector increased 12.6 times and amounted to 18.9 billion manat. The cost of services provided to the population in the sector was 1050.3 million manat. This means that 72.6% of the services provided in the sector are consumed by the population. In 2018, 1.2% of 1551.7 thousand employees in the country's economy, ie 19 thousand people worked in the ICT sector. In general, the share of employees in the sector in all sectors of the economy ranged from 1.2 to 1.4%, which was lower than the world average (2%).

In Azerbaijan, the production sector is underdeveloped compared to the service sector in the ICT sector. Revenues from services rendered have a significant share in the formation of revenues in the sector. In addition, the import of ICT products repeatedly exceeds the export of products of the same name. In 2018, the share of exports in the trade sector was 0.8% and the share of imports was 99.2%. The country is dependent on the import of ICT products. The share of exported ICT products in the value of all types of products exported from the country

is very small (0.02% in 2018). The main reason for this is the small number of production-oriented enterprises. In this regard, the ICT industry should be expanded, the number of enterprises producing local ICT products (computer hardware, software and network equipment) should be increased, and measures should be taken to improve work in this area [7].

In 2018, the number of fixed telephone network subscribers in the country was 1.7 million, and the number of fixed telephone subscribers per 100 people was 16.9, which is 34.1% more than the world average (12.6 people). The number of mobile phone subscribers in the mentioned year was 10,339,700, the number of mobile subscribers per 100 people was 105. With this indicator, Azerbaijan has surpassed the world average (104). Radio and television programs of about 30 state, public, private and regional TV and radio companies are broadcast in the country. In 2018, the total number of television channels was 23, and radio channels were 14 units, and 13 of both television and radio channels were received by satellite. In 2000-2018, the volume of services provided in the postal sub-sector increased 11 times and amounted to 58.5 million manat.³ The share of the service and trade sector in the country's IT sub-sector is more than 80%, and the rest falls on the production sector. IT enterprises produce and assemble a small number of computer and electronic equipment, telecommunications and radio equipment. Most companies provide services related to software development and implementation, as well as Internet resources. The space industry is developing and our country already has 2 telecommunication satellites (Azerspace-1 and Azerspace-2) and 1 remote observation satellite (Azersky). In general, research on the current state of the sub-sectors of the ICT sector shows that the measures taken to develop the sector have yielded positive results. Areas of the sector such as mobile communications, internet, satellite communications have a high rate of development [3].

3. Entrepreneurial activity in the ICT sector in Azerbaijan has

³ ARSSC. Telecommunication and Post in Azerbaijan. Statistical Yearbook. Baku, 2020. 80 p., pp. 6-16.

been comprehensively studied, the current situation in this field has been analyzed and evaluated.

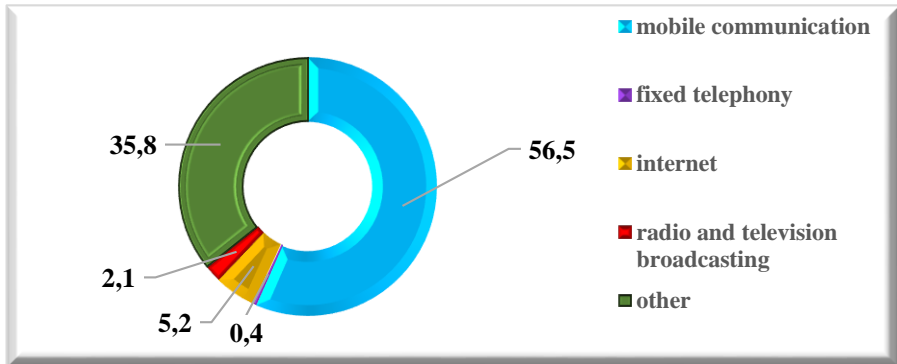
The role of entrepreneurship in the ICT sector is growing. At present, the activity of the private sector in the ICT market is dynamic. There are many private enterprises, operators and providers in this field. According to 2018 data, 50% of fixed telephony operators, 93% of Internet providers, 98% of postal operators, 74% of television channels and 57% of radio channels were private channels. All mobile and IT companies are privately owned (Table 1).

Table 1
Number of public and private enterprises in the main sub-sectors of the ICT sector in 2018⁴

Sub-sectors	Total	public	private
Mobile communication	4	0	4
Fixed telephony	6	3	3
Internet	42	3	39
TV and radio; including:	37	12	25
TV	23	6	17
Radio	14	6	8
Post	41	1	40

The share of the private sector in the ICT market has been over 60% since 2000. In 2018, the share of the public sector in the sector was 18%, while the share of the private sector was 82%. Revenues in the private sector of the ICT sector increased from 97.9 million manat to 1.6 billion manat in 2000-2018. In the private sector, the first and main source of income is mobile communication with 56.5%. In 2018, the volume of mobile revenues amounted to 878.3 million manat, revenues from Internet services - 80.4 million manat, radio and television broadcasting - 33.2 million manat, fixed telephone network - 5.5 million manat, postal services - 10.8 million manat (Graph 3).

⁴ ARSSC. Telecommunication and Post in Azerbaijan. Statistical Yearbook. Baku, 2020. 80 p., p.71.



Graph 3. Revenue structure in the private sector of the ICT sector in 2018, %⁵

Research shows that the share of the private sector in investments in the ICT sector is higher than the public sector. Most of the investments in the sector fall on the mobile network sector. Azercell, the country's leading mobile operator, is one of the leaders in this field. Thus, the volume of Azercell's investments from the company's inception to 2018 amounted to 1.527 billion manat. Azercell is also the second taxpayer after the oil company and the largest in the non-oil sector. The company paid 94.5 million manat in taxes to the state budget in 2018 and 1.732 billion manat over 22 years [12].

4. Analysis of the current situation with tariffs for communication in Azerbaijan shows that GNI per capita in our country is low compared to neighboring countries, and tariffs are high.

One of the main ways to increase the competitiveness of entrepreneurship in the sector is to improve the quality of services and reduce prices. The results of the analysis of communication tariffs in our country show that mobile communication tariffs were reduced from 1.70% of the average monthly GNI in 2014 to 0.92% in 2018, mobile broadband tariffs from 1.41% to 1.39%, and fixed broadband tariffs from 2.02% to 1.74%. According to the results of comparative analysis

⁵ ARSSC. Telecommunication and Post in Azerbaijan. Statistical Yearbook. Baku, 2020. 80 p., p.71.

with neighboring countries, in Russia, where the GNI per capita (\$10,230) is 2.5 times higher than in Azerbaijan (\$ 4,050), the mobile broadband Internet tariffs (1.03%) is 1.3 times lower in contrast to our country (1.39%). Also, although the GNI per capita in Turkey (\$ 10,380) is 2.6 times higher than in our country, the tariffs are 1.1 times lower. In Iran, which is ahead of our country in terms of GNI per capita (\$ 5470), the tariff was 1.9 times lower. A similar situation is observed with fixed broadband Internet tariffs. It is also noteworthy that in 2018, mobile tariffs in Azerbaijan was higher than in all neighboring countries. This, in fact, shows that the tariffs in our country are not low compared to the countries where the standard of living is high [11].

5. The impact of changes in communication tariffs on changes in the number of subscribers was assessed by establishing an econometric model. The results of the assessments show that both the reduction in mobile and fixed broadband internet tariffs and the increase in GNI per capita have a positive impact on the increase in the number of users of these types of communications.

1). According to the EViews application software package, the relationship between the impact of mobile tariffs and the GNI per capita on the number of mobile users was as follows:

$$\text{LOG(MOBILABUNE)} = 0.698736545771 - 0.230467799579 * \text{LOG(MOBILTARIF)} + 0.466194330807 * \text{LOG(HNUMG)} (1)$$

Here, (mobilabune) is the number of mobile users, (mobiltarif) is the mobile tariff, and (hnumg) is the GNI per capita in dollars. The Determination coefficient in the model was 0.7703, which shows that about 77% of the change in the number of mobile subscribers during the analysis period can be explained by changes in mobile tariffs and incomes of the population. The fact that the probability of error in the value obtained for the Fisher test is equal to 0.005807 indicates that the Determination coefficient is significant. It can be concluded that, while other variables remain stable, a 1% reduction in mobile tariffs will increase the number of mobile subscribers by about 0.23%, a 1% increase in GNI per capita increases the number of mobile subscribers by about 0.47%.

2). According to the EViews application software package, the

relationship between the impact of fixed broadband internet tariffs and GNI per capita on the number of fixed broadband internet users was as follows:

$$\text{LOG}(\text{SABGENISZOLINABUNE}) = -7.74558180783 - 0.812530986387 * \text{LOG}(\text{INTTAR}) + 1.15170661849 * \text{LOG}(\text{HNUMG}) \quad (2)$$

Here, the variable (sabgenişzolinabune) indicates the number of fixed broadband internet users, the variable (inttar) indicates the fixed broadband internet tariff, and (hnumg) indicates the GNI per capita. The fact that the value of the probability of the Fisher statistic F is 0.000064 shows the importance of the Determination coefficient ($R^2=0.9690$). It can be concluded that, while other indicators remain stable, a 1% reduction in fixed broadband internet tariffs increases the number of fixed broadband internet users by 0.81%, a 1% increase in GNI per capita increases the number of fixed broadband internet users by about 1.12%. In our opinion, it would be expedient to continue the process of reducing communication tariffs. This would be of great importance in terms of ensuring the sustainable and further development of the communications sector in the country [14].

6. The current situation with the financing of new innovative enterprises in the ICT sector was analyzed and opportunities to benefit from international experience were studied.

Great attention and support is paid to innovative ideas, intellectual entrepreneurship and startups in our country. The State Fund for Development of Information Technologies, which operated in 2012-2019, played an irreplaceable role in setting up private businesses of entrepreneurs through 3 main financial mechanisms such as grant financing of innovative projects, providing low-interest, soft loans, and term investment in enterprises. (The Innovation Agency, which started operating in September 2019, performs the functions of the Fund). The Fund, financed from the state budget, was allocated 5 million manat in 2015 and 4 million manat in 2016, but no funds were provided for the 2017 fiscal year. In the same year, the Fund received 1.9 million manat from the principal and interest debts on soft loans issued in previous years. In 2018, the amount of funds allocated from the budget to the Fund amounted 1.85 million manat, in 2019 - 1 million manat. In our opinion, this amount is not enough to finance innovative

entrepreneurship at a time of rapid development and the formation of a large number of new startups. From this point of view, it would be expedient to continue state funding in the amount of half of the funds of previous years (2-2.5 million manat).

For the development of entrepreneurship and startups in the field of ICT, the involvement of the private sector in financing should also be in the focus of attention. One of the best ways to do this is to create public-private funds based on international experience. Research shows that over the past 30 years, Europe, as well as Israel, Canada and other countries, have used a public-private partnership model to invest in startups and attract foreign funding. For example, in the early 1990s, at the initiative of the Israeli government, 10 public-private funds, each worth about \$20 million, were established. In Ukraine, in order to create a public-private partnership fund to finance technology startups, the government has agreed to provide 10% of the \$100 million fund from the state budget. Today, one of the most widely used sources of funding for startups and small businesses in international practice is venture capital. The amount of venture capital investments of a number of leading countries in the world is measured in millions of dollars. For example, in 2018, the total amount of US venture capital investments was \$137.9 billion. In modern times, international cooperation is also preferred to finance research and innovation. In this regard, joint funds are being established (for example, a joint fund with an annual volume of more than \$1.5 billion - the Korea-Israel Research Foundation). In our opinion, referring to the experience of foreign countries in this field and taking into account the conditions and potential of our country, it would be expedient to establish such funds in our country. As a result of expanding public-private cooperation, there will be opportunities to increase the number of startups in the field of ICT and organize their effective activities. This, in turn, will create the basis for the emergence of new business enterprises [8].

7. The market share of monopolistic enterprises operating in the ICT market has been determined, ways to increase the competitiveness of entrepreneurship in the sector have been recommended.

One of the main factors determining the development of the ICT sector is competition. In terms of studying the current state of competition in the field of ICT, “Internet and telephony competition” index, which is prepared by the UNDP (Global Knowledge Index) and allows to determine the level of competition in the field of fixed broadband internet, mobile phone, international gateways and international fixed long-distance call services and to analyze countries in a comparative framework, is particularly noteworthy. The index measures the level of competition for economies as monopoly, partial competition and full competition, and countries score on a scale of 0-100 and are ranked.

Table 2
“Internet and telephony competition” index ⁶

Countries	2017		2018		2019	
	point	place	point	place	point	place
Georgia	100	1	100	1	100	1
Armenia	100	1	100	1	100	1
Russia	75	91	100	1	100	1
Turkey	93.9	68	90	81	90	82
Azerbaijan	88.5	80	88.5	84	88.5	85
Iran	50	112	79.2	94	79.2	95

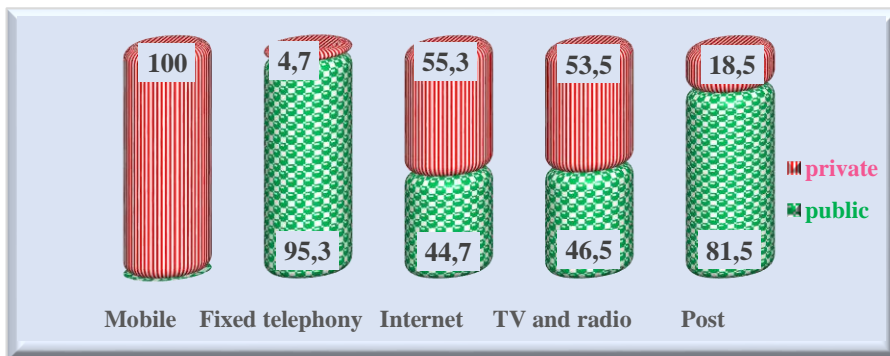
According to the table 2, Georgia and Armenia are the most competitive countries in the communications sector. The country that improved its position in a short time was Russia. Although our country looks ahead compared to Iran, where competition between mobile and Internet operators is weak, in fact, this should not be considered satisfactory. Azerbaijan, which has fallen 5 places in 3 years, ranked 85th out of 138 countries in 2019. It can be concluded that the competition in the field of Internet and telephone communication in our country is not strong enough, or rather, there is partial competition.

In our opinion, the main problem in ensuring full competition in the communications sector in our country is the enterprises that have managed to suppress other enterprises by maintaining the majority of

⁶ Internet & telephony competition: [Electronic resource] / URL: <https://knowledge4all.com/Scorecard2020.aspx?language=en>

the market and thus pursue a monopoly policy. It should be noted that according to the Law on Antimonopoly Activity, the market share of the monopolist was set at 35%. There is a monopolistic tendency, which is the main reason for the restriction of competition. The market shares of the state provider Bakinternet in 2016 exceeded 35%. In 2018, there were 984.1 thousand fixed broadband Internet users in the country, one third of which fell to Aztelekom. The market share of these two state providers is often higher than 60%. Access to the international network in the country's Internet market is controlled by two operators (Delta Telecom LLC and Azertelecom). Delta Telecom LLC owns 90-95% of the market, and the rest belongs to Azertelecom. It should be noted that the fire that broke out on November 16, 2015 in the DATA Center of the country's main Internet provider Delta Telecom LLC left most of the country without Internet. This event is a clear example of the negative impact on the country's economy of the monopoly in the Internet market. In the field of fixed network telephone services in 2018, most of the revenues (95%) came from 3 state operators (Aztelekom, Baku Telephone Communication, Azeurotel), and the remaining 5% from 3 private enterprises (Ultel, Catel, TransEvroCom). In the mentioned year, the total capacity of ATS in the country amounted to 1962.5 thousand numbers, of which 95.2% (1868.6 thousand numbers) accounted for its share of state-owned fixed-line operators and 4.8% (93.9 thousand numbers) private. This can be explained by the fact that state-owned enterprises had the majority of subscribers.

In 2018, 1 state and 40 private enterprises operated in the postal sub-sector. This shows that the share of private enterprises dominates in the postal sector. However, in the same year, 81.5% of revenues were generated in the public sector, government revenues exceeded private revenues by 4.4 times. Such a significant difference between revenues is explained by the fact that Azerpost LLC, the sole state postal operator in the country, has a wider network, and most of the revenues fall to this company.



Graph 4. Share of public and private sector in the revenues of the main ICT sub-sectors in 2018, %⁷

The analysis shows that the ICT sector is dominated by state-owned enterprises in the field of fixed telephone network, broadband Internet and postal services and their share in the market is high. This leads to the suppression of private enterprises and the weakening of competition. The main reason for this is that the Ministry of Transport, Communications and High Technologies (MTCHT) is in charge of enforcing and controlling regulations. In order to further develop the principles of healthy and free competition in the ICT sector, it is necessary to carry out liberalization measures, accelerate the measures of partial or full privatization of market-dominant state enterprises, and the entry of new operators into the global Internet market, the division of the functions of the national operator among other operators [16].

8. The necessity of establishing an Independent Regulatory Body for effective regulation of the ICT sector and improving the position of Azerbaijan in international rankings in the field of ICT has been substantiated.

Regulation of the ICT sector is one of the important issues. The institutional structure currently used in the ICT sector in most countries is as follows: an independent regulatory body (IRB) is established to be responsible for the implementation and management of the

⁷ ARSSC. Telecommunication and Post in Azerbaijan. Statistical Yearbook. Baku, 2020. 80 p., pp. 8;11;71.

regulatory framework and the responsibility for policy implementation in the sector rests with the ministry operating in that area. In the world practice, there are two main ways of financing the budget for IRBs: allocations from the state budget and fund created by IRBs by accepting payments from operators for license fees, fines arising as a result of fulfillment of obligations, etc. IRB's functions include price regulation, distribution of radio frequencies, standardization, broadcasting, cyber security, internet, connection level and speed, licensing, dispute resolution among market participants, quality control of services etc. One of the main factors for the effective functioning of the IRBs is to ensure the financial and structural independence of the institution. This reduces the likelihood of his political capture.

In recent years, IRBs have been established in many countries, including in neighboring Georgia, Turkey, Iran and Armenia. The MTCHT, established on the basis of two ministries, implements state policy and regulation in the ICT sector in our country. The telecommunications regulator in Russia is the Ministry of Digital Development, Communications and Mass Media (Minkomsvyaz). In addition, the Federal Supervision Service (Roskomnadzor) and the Federal Communications Agency (Rossvyaz) are involved in the regulation of communications, information technology and mass communications. IRBs may be responsible for regulating one or more areas. For example, in Armenia, the Public Services Regulatory Commission deals not only with the ICT sector, but also with the electricity, natural gas, water and railway transport sectors. In Georgia, Iran and Turkey IRB operate only in the ICT sector.

According to the ICT Regulatory Tracker, an annual ITU rating that assesses regulation in the ICT sector, the countries with the lowest scores in the first group “Regulatory Authority”, which focuses on the activities of a separate regulatory body, are Azerbaijan and Russia, in both countries the ICT sector is regulated by the ministry, rather, IRBs have not yet been established in these countries. These two countries also lag behind in the ranking of the second group, the “Regulatory Mandate”, which measures by which institution the various functions

are performed on sub-sectors included in the sector. The same situation is observed with the “Regulatory Regime”, which determines what kind of regulation exists in key areas. The low scores in the first 3 groups resulted in our country ranking 5th among 6 countries. The reason can be explained by the lack of IRB. In our opinion, this situation once again demonstrates the need to establish the IRB in our country.

Table 3

ICT sector regulation assessment rating, 2018⁸

Countries	Regulatory Authority (0-20 point)	Regulatory Mandate (0-22 point)	Regulatory Regime (0-30 point)	Competititon Framework (0-28 point)	Overall score (0-100)
Turkey	19	17,5	30	26	92,50
Georgia	18	16,5	30	28	92,50
Armenia	19	19	20	27	85,0
Iran	19	19	28	16	84,00
Azerbaijan	8	13,5	20	24	67,50
Russia	4	9	13	21	47,00

One of the main functions of the IRB is to ensure an effective competitive environment in the market. Based on the assessments conducted around the world countries, it was determined that the correlation between the Regulatory Authority Sub-Index and the Competition Sub-Index is positive and the dependence is higher than average ($r=0.6969$). This suggests that the ICT sector has a more fertile and efficient competitive environment in countries regulated by the IRB than the ministry operating in this area.

Our country is one of the few countries that does not have a regulatory body in the field of ICT. In our opinion, in order to be free from the influence of political and private interests, as well as to ensure financial and structural independence, it would be expedient to establish the IRB, financed not from the state budget but from fees paid for its activities and performing regulatory functions only in the ICT sector. Also, based on the experience of neighboring countries, it is necessary

⁸ ICT Regulatory Tracker 2018: [Electronic resource] / URL: <https://www.itu.int/net4/itu-d/irt/#/tracker-by-country/regulatory-tracker/2018>

to transfer the regulatory functions under the authority of the MTCHT to the IRB. Such an institution could ensure effective regulation of the ICT sector by creating and enforcing rules aimed at reducing any inequality arising from unequal competition. Thus, including in the Regulatory Sub-Index, the position of our country in the “ICT sector regulation assessment rating”, as well as in the “Internet and telephony competition” index will be increased [9].

The main provisions of the dissertation, obtained results and recommendations are reflected in the following published articles and theses of the author:

1. Sahibkarlıq fəaliyyəti elmi tədqiqat obyektı kimi // AMEA İqtisadiyyat İnstitutu, Elmi Əsərlər. Bakı, 2015. №5, s.148-157.
2. Azərbaycanca informasiya-kommunikasiya texnologiyaları sektorunda sahibkarlıq mühitinin müasir vəziyyətinin təhlili və qiymətləndirilməsi // **AMEA-nın Xəbərləri, İqtisadiyyat seriyası.** Bakı, 2017. №5, s.63-70.
3. Azərbaycanca informasiya-kommunikasiya texnologiyaları sektorunun müasir vəziyyəti // AMEA İqtisadiyyat İnstitutu, Elmi Əsərlər. Bakı, 2017. №5, s.125-130.
4. Dünyada və Azərbaycanda informasiya-kommunikasiya texnologiyaları sahələrinin müasir durumu // AMEA İqtisadiyyat İnstitutu, Elmi Əsərlər. Bakı, 2017. №6, s.102-108.
5. İnformasiya-kommunikasiya texnologiyaları sektorunda sərmayə yatırımının iqtisadi səmərəliliyi // **AMEA-nın Xəbərləri, İqtisadiyyat seriyası.** Bakı, 2017. №6, s.39-46.
6. Müasir şəraitdə Azərbaycanda informasiya-kommunikasiya texnologiyalarının əsas inkişaf problemləri // **AMEA-nın müxbir üzvü, iqtisad elmləri doktoru, professor Akif Musayevin anadan olmasının 70, elmi-pedaqoji fəaliyyətinin 50 illik yubileyinə həsr olunmuş “Strateji iqtisadi islahatlar: qabaqlayıcı vergi siyasəti” mövzusunda beynəlxalq elmi-praktik konfrans materialları.** Bakı, 12 oktyabr 2017, s.57-58.
7. İnformasiya-kommunikasiya texnologiyaları sektorunda rəqabətqabiliyyətliliyin yüksəldilməsi istiqamətləri // Sumqayıt

Dövlət Universitetinin yaradılmasının 55 illiyinə həsr olunmuş “İqtisadiyyatın rəqabətqabiliyyətliliyinin yüksəldilməsi yolları” mövzusunda Respublika Elmi konfransının materialları. Sumqayıt, 17-18 oktyabr 2017, s.32-33.

8. Azərbaycan Respublikasının informasiya-kommunikasiya texnologiyaları sektorunda özəl bölmənin inkişaf xüsusiyyətləri // AMEA-nın Xəbərləri, İqtisadiyyat seriyası. Bakı, 2018. №4, s.64-78.
9. Azərbaycanda informasiya-kommunikasiya texnologiyaları sektorunun tənzimlənməsinin təkmilləşdirilməsi istiqamətləri // AMEA İqtisadiyyat İnstitutu, Elmi Əsərlər. Bakı, 2018. №6, s.115-123.
10. Влияние инфраструктурных показателей информационно-коммуникационных технологий на экономический рост // Экономика и предпринимательство. Москва, 2018. №9 (98), с.1270-1274. (включен в Перечень ВАКа РФ, в базу Agris, в базу РИНЦ).
11. Azərbaycanda rabitə xidmətlərinin inkişaf xüsusiyyətləri // AMEA İqtisadiyyat İnstitutunun 60 illik yubileyinə həsr olunmuş “İqtisadi artım və ictimai rifah” beynəlxalq elmi-praktik konfransın materialları. Bakı, 18 oktyabr 2018, s.496-503.
12. Development features of mobile communication sector in Azerbaijan // Материалы международной научно-практической конференции “Наука сегодня: опыт, традиции, инновации”. Вологда, 30 июля 2018, с.57-58.
13. İnformasiya-kommunikasiya texnologiyaları sektorunun iqtisadi inkişafda yeri və rolu // AMEA-nın Xəbərləri, İqtisadiyyat seriyası. Bakı, 2019. №3, s.48-55.
14. Azərbaycanda rabitə tariflərinin abunəçilərin sayının dəyişməsinə təsirinin ekonometrik qiymətləndirilməsi // AMEA İqtisadiyyat İnstitutu, Elmi Əsərlər. Bakı, 2019. №4, s.173-181.
15. İnformasiya-kommunikasiya texnologiyaları sektorunda müəssisələrin fəaliyyət xüsusiyyətləri // **Azərbaycan xalqının Ümummilli lideri Heydər Əliyevin anadan olmasının 96-cı ildönümünə həsr olunmuş** “Azərbaycanın qeyri-neft sektorunun

inkışaf perspektivləri” mövzusunda Respublika Elmi konfransının materialları. Sumqayıt, 26 aprel 2019, s.37-39.

16. İnformasiya-kommunikasiya texnologiyaları sektorunda rəqabət mühitinin yaxşılaşdırılması yolları // **Azərbaycan Respublikası Təhsil Nazirliyi. Azərbaycan Respublikasının İqtisadiyyat Nazirliyi. Azərbaycan Memarlıq və İnşaat Universiteti. “Sənayenin müasir vəziyyəti və inkışaf problemləri: texnoparkların və sənaye məhəllələrinin ölkənin iqtisadi inkışafına təsiri” mövzusunda respublika elmi-praktik konfransın materialları. Bakı, 30 aprel, 2019, s.118-120.**
17. Evaluation of the role of entrepreneurship in the development of ICT services in Azerbaijan // Материалы II международной научно-практической конференции “Актуальные вопросы развития современной науки и образования”. Москва, 24 июля 2019, с.120-124.



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