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## Modern development and management of telecommunications network in the Republic of Kazakhstan

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**Abstract.** *In modern conditions of the socio-economic development of the state, the issues of the development of information and communication technologies within the framework of the world economy are significant. In the article, the authors focus on topical issues of the formation and functioning of the real sector of the economy of the Republic of Kazakhstan - the telecommunications network, which in recent years has been dynamically developing at a high level, considering global trends. From an economic point of view, the stability of the industry is considered in the meaning of the demand and supply of telecommunications services by enterprises present on the domestic market. On the example of a leading service provider, the activity of «Kazakhtelecom» JSC is shown, an economic assessment of the production and commercial activity of the enterprise is carried out. According to the results of the study, the authors made the appropriate conclusions.*

**Keywords:** *telecommunications network, services, market, enterprise, infrastructure, communication, technology.*

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### Introduction

Telecommunications of Kazakhstan is a multi-level multifunctional market structure of data transmission, which has developed based on telecommunications of the Kazakh SSR towards fixed and mobile communications, TV / radio, and the Internet under the state regulation of the Committee for communications, informatization and information Ministry of Industry and Infrastructure Development and has a specificity due to geo- and demo factors of the country.

Telecommunications of Kazakhstan in the 90s developed on the telecommunications base of the former USSR. Then, at the beginning of the new millennium, the process was streamlined by the State Program based on the Decree of the Government of the Republic of Kazakhstan

«On the Concept of Development of the Telecommunications Industry of the Republic of Kazakhstan» dated 4.12.2001, according to which the demonopolization of the market began in 2004 and private players appeared along with state-owned companies. Mainly for regional coverage of telecommunications services. In the first decade of the 2000s, the laying of fiber-optic communication lines (FOCL) began in the megalopolises of Kazakhstan, instead of MMDS lines, which still prevail in the republic, and the 4G format also spread. Until 2013, the International Central Asian Telecommunications Exhibition Kitel was held annually in Kazakhstan. In 2013, the government approved a new telecommunications program «Information Kazakhstan - 2020», aimed at the development and availability of TC to the population of the

country. Since the 2000s, independent associations of the telecommunications market have been operating in Kazakhstan [1].

An analytical assessment of the development of a telecommunications network in the Republic of Kazakhstan, considering its patterns and features, identifying problematic issues and ways of solving them in relation to modern economic conditions.

*Formulation of the problem.* At present time, according to the recognition of representatives of international business circles, Kazakhstan occupies a leading position among the CIS countries in carrying out economic reforms.

New economic conditions of management require adequate reforms in all spheres of social production, including telecommunications, which is the most important component of the country's social and production infrastructure.

Institutional transformations in the telecommunications sector, demonopolization of the communications industry, privatization and corporatization of state-owned enterprises provided operators with sufficient economic freedom to carry out production and commercial activities, because of which telecommunications during the period of economic liberalization developed much more stable and efficiently than other sectors of social production. Researchers Amanzholova K.B. [2], Efremov A.A. [3], Aliev T.I. [4], Fedotov A.V. [5], Drokina K.V. [6] indicate fundamental changes in the general economic conditions for the functioning of telecommunications associated with the transition to market relations; radical changes and conditions of activity of economic entities united in an interconnected network of the country; technical, technological, and organizational and economic ties in the formation of a state development strategy.

## Methodology

In the author's research, the method of analysis and the statistical method were applied. Using these methods, the dynamics of the development of the telecommunications industry has been studied. The graphical method is used

for clarity. Diagrams and graphs were used. Based on the study, the authors carried out an economic assessment of the current development of the industry and showed the mechanism for managing innovations in a specific industry segment.

## Discussion

The main medium-term trends that are noticeable at the end of 2020 in the telecommunications services market in Kazakhstan. First, the growth of traffic in networks - Internet access revenues remain the flagship of telecommunications services (they exceed revenues from mobile communications and for the first time in history exceeded 21 billion tenge per month - the weighted average exchange rate of tenge in US dollars is 419) - the bulk of smartphone users (60.7 %), consumes more than 6 GB of the Internet monthly, and the share of such users has grown by 48.7% compared to last year. The second important trend is the continued growth in the share of smartphones. According to various estimates, it ranges from 55 to 60%.

The service market for 2020 was mainly formed by mobile communication services, the Internet, and other services (Figure 1).

There are four mobile operators and over one hundred telecommunication companies operating in the republic today, the largest of which is «Kazakhtelecom» JSC. It is actively developing a unified public telecommunications network, introducing advanced technologies and equipment.

At present, «Kazakhtelecom» JSC accounts for the most significant investments in this sector of the Kazakh economy. The market for communication services of JSC is shown in Table 1.

**Table 1**  
Communication services market, billion tenge

name	2020	share, %
Mobile communication (voice, Internet)	256	26.23%

Internet	337	37.51%
ICT	183	18.9%
Telephony	56	6.36%
TV (incl. satellite)	41	5%
Data connection	54	6%
<b>Communication services</b>	<b>927</b>	<b>100%</b>

The volume of mobile communication services from 2015 to 2019 decreased from 246 billion tenge to 256 billion tenge.

Despite the growth from 2017 to 2019, the market has been declining in average annual terms by 2.1% for 5 years.

The number of cellular subscribers has decreased from 25,534 thousand units to 24,293 thousand units in 5 years. The average annual rate of decline was 1.5%. We note that in connection with the appearance of tariff proposals on the market, as well as the possibility of switching to other mobile operators without changing the number, the demand for additional SIM cards is decreasing.

The growth dynamics of Internet services is positive, from 2016 to 2020 the volume of services increased from 206 billion tenge to 336 billion tenge. The average annual growth rate for 5 years was 8.3% (Figure 3).

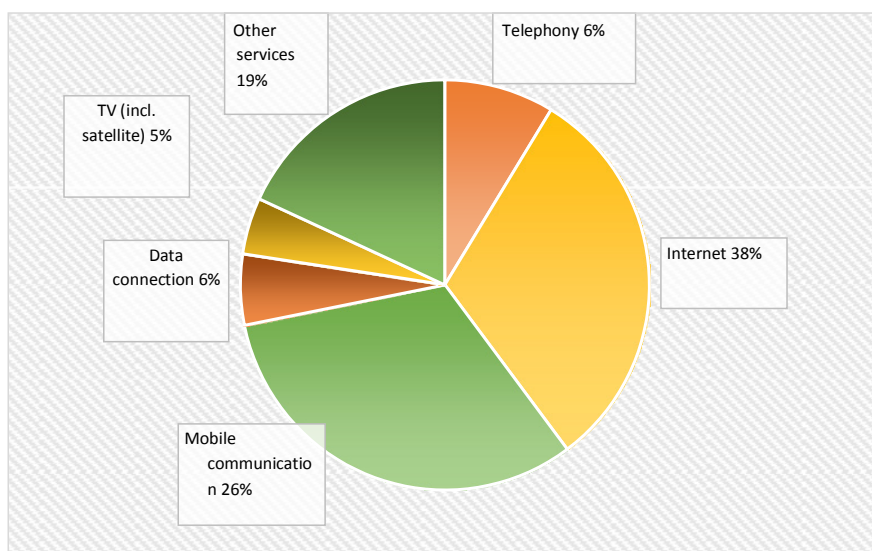
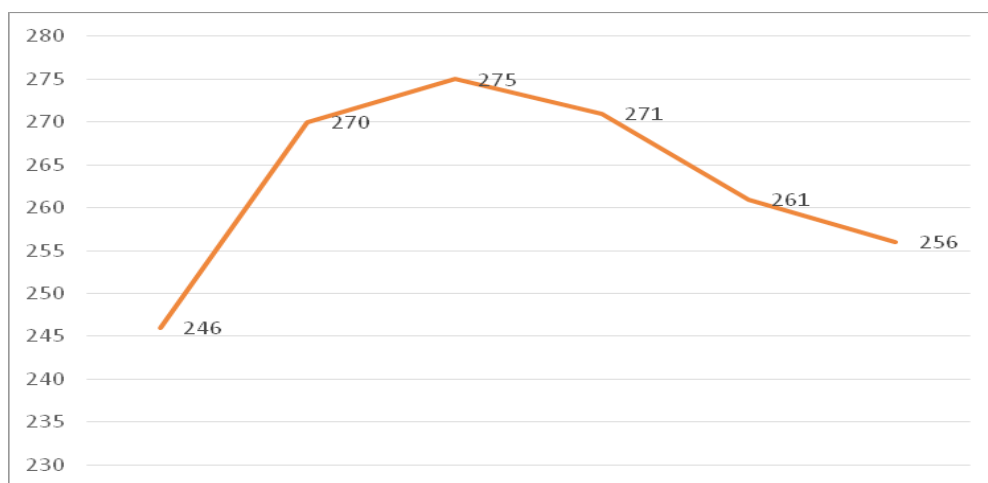
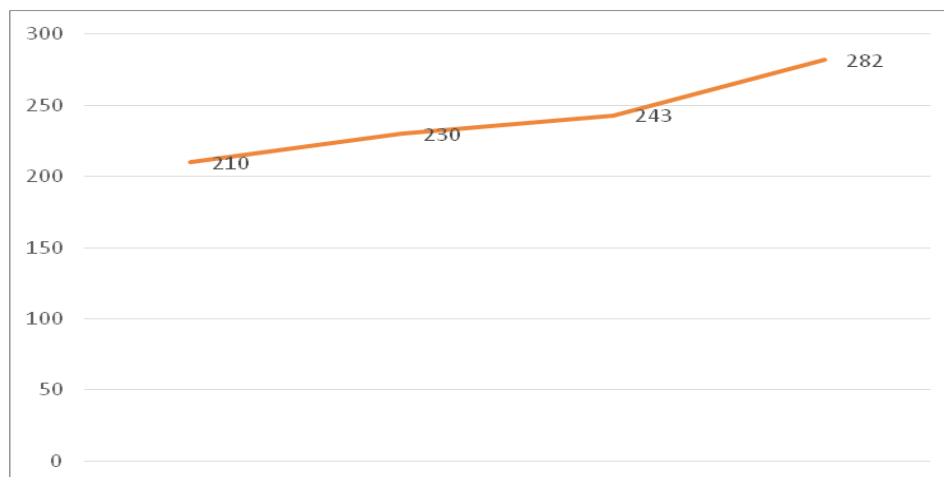


Figure 1 – Market structure for 2020, %



Source: Statistics Committee of the MNE

Figure 2 – Mobile connection, million tenge



Source: Statistics Committee of the MNE

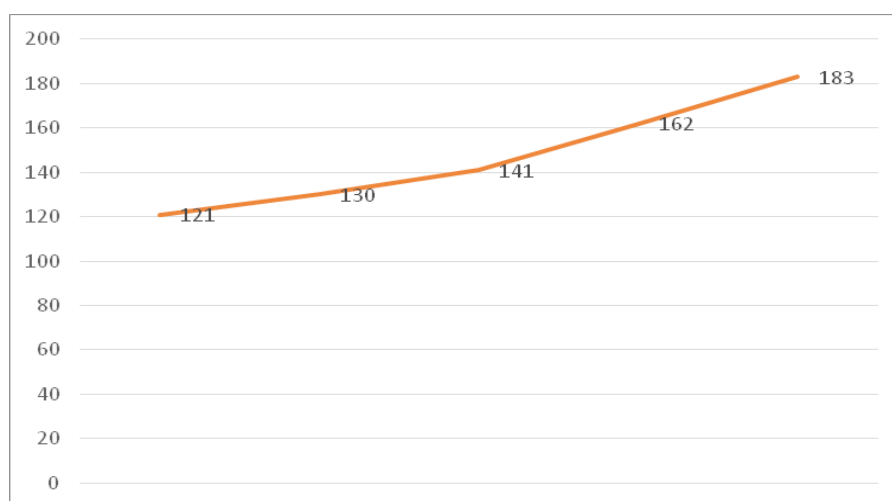
**Figure 3** – Internet, million tenge

Other services technologically related to the provision of telecommunications services for connecting and connecting other telecommunications operators to the telecommunications network, services for organizing subscriber access to the telecommunications network, services for the provision of leased lines, services for the maintenance and repair of telecommunications equipment and network infrastructure elements, services for leasing telecommunication equipment, network infrastructure elements and traffic transmission services (interconnect) for telecom operators.

Other services have increased from 121 to 183 billion tenge from 2016 to 2020. The average annual growth rate of other services was 8.7% (Figure 4).

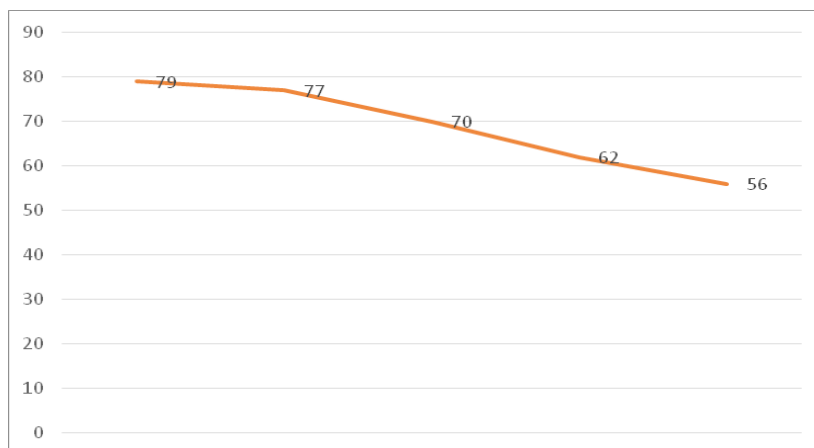
The volume of telephony services from 2016 to 2020 falls steadily. If in 2016 the volume of services rendered was 79 billion tenge, then in 2020 the figure was 56 billion tenge. The decline in the telephony market in average annual terms was 6% (Figure 5).

The decline in the fixed-line telephony market is also confirmed by the decrease in long-distance and international outgoing telephone traffic. The number of million minutes decreased from 2016



Source: Statistics Committee of the MNE

**Figure 4** – Other services, million tenge



Source: Statistics Committee of the MNE

**Figure 5 – Telephony, million tenge**

to 2020 from 2,584 to 772. The average annual rate of decline was 13.6%

«Data transmission service» refers to the activities of a communications operator in receiving and transmitting data, which can be carried out both through specialized and non-specialized telecommunication networks, both through switched and non-switched networks.

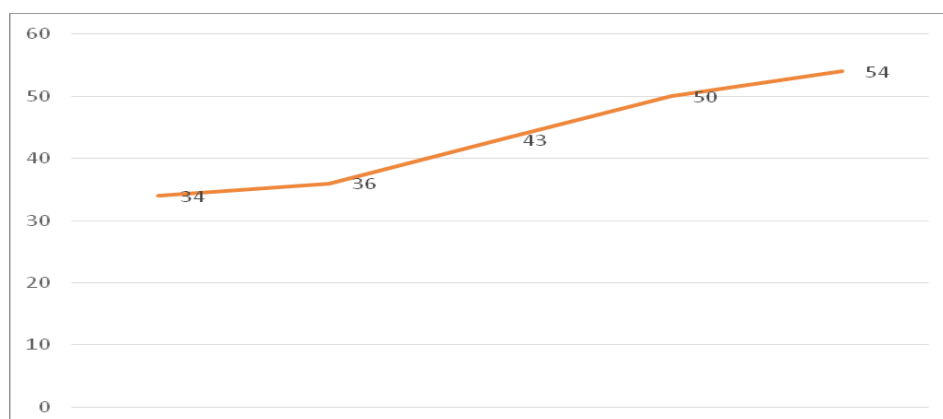
Data connection services increased from 2016 to 2020 from 34 billion tenge to 54 billion tenge, in this regard, the average annual growth rate was 16% (Figure 6).

Television showed positive dynamics, from 2016 to 2020 the volume of services in this segment increased from 29 to 41 billion tenge. The market in average annual terms grew by 10.4% (Figure 7).

### Results

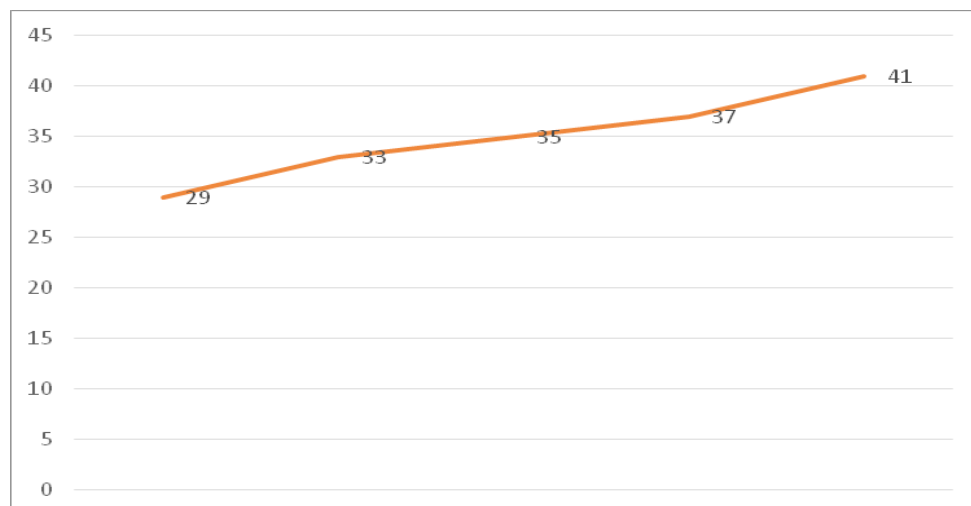
In 2019, almost 470 rural settlements were provided with broadband access to the Internet, and by the end of this year, 2020, this project will cover more than 800 villages with a total population of almost 2.5 million people.

In total, there are more than 6 thousand villages in Kazakhstan, while part of rural settlements has already been connected to fiber - 1.2 thousand, and after the implementation of the project there will be 2 thousand such villages, that is, a third of rural settlements can be automatically involved in the construction of such integrated network. Another 3-3.5 thousand villages can be connected to this system through a radio access system using LTE800 technology.



Source: Statistics Committee of the MNE

**Figure 6 – Data connection, million tenge**



Source: Statistics Committee of the MNE

**Figure 7** – TV (incl. satellite), million tenge

Thus, while implementing the project for the construction of fiber-optic communication lines, «Kazakhtelecom» is simultaneously creating the infrastructure for future connections of villagers to this single integrated network. FOCL is becoming the basic infrastructure on the basis of which it will be possible to vary technical solutions, use other types of equipment for various types of connections for the population of other rural settlements [7].

The acquisition in mid-2019 of a 49% stake of the Swedish mobile operator Tele2 AB in the joint venture Khan Tengri Holding B.V. also played a positive role in the activities of «Kazakhtelecom» OJSC. It is these steps taken to integrate and jointly use the technical capabilities of cellular operators that gave «Kazakhtelecom» the opportunity to fully implement many projects in the country due to the synergy of the potential of the two cellular companies. Including the construction of the first 5G network in the region.

It is these steps taken to integrate and share the technical capabilities of cellular operators that will allow Kazakhstan soon to replicate Smart City projects - smart cities.

## Conclusion

Considering the market of Internet services in the regional aspect, we can note the dependence

of the number of users on the level of economic development of a particular region or city.

To date, the republic has adopted the laws “On informatization” and “On electronic documents and electronic digital signatures”, as well as several decrees of the government of the republic, regulating relations in the field of informatization. Along with this, the Agency is developing normative acts concerning the use of electronic document management and electronic digital signatures, as well as regulating relations in the development of the national segment “kz” of the global Internet.

One cannot but consider the fact that today in Kazakhstan alternative technologies of Internet access are being introduced more and more actively, which can also affect the price conjuncture.

The growth of the Kazakhstani segment of satellite television is expected at the expense of 50% of the rural population, which is still without access to cable TV. The expansion of the national TV market players to the regions of the country begins by merging with local operators. The demand for the mobile Internet is increasing due to the more and more frequent use of a mobile device by the population instead of a PC. At the same time, the fixed data transmission market is still relevant in the business environment.

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### Қазақстан Республикасында телекоммуникациялық желіні басқару және қазіргі заманғы дамыту

**Аннотация.** Мемлекеттің әлеуметтік-экономикалық дамуының қазіргі жағдайында әлемдік экономика шеңберінде ақпараттық-коммуникациялық технологияларды дамыту мәселелері маңызды болып табылады. Мақалада авторлар Қазақстан Республикасы экономикасының нақты секторын қалыптастыру мен жұмыс істеуінің өзекті мәселелері, яғни соңғы жылдардағы әлемдік тенденцияларды ескере отырып, жоғары деңгейде қарқынды дамып келе жатқан телекоммуникация желісіне назар аударады.

Экономикалық тұрғыдан алғанда, саланың тұрақтылығы отандық нарықтағы кәсіпорындардың телекоммуникациялық қызметтерге сұранысы мен ұсынысының маңыздылығымен қарастырылады.

Жетекші қызмет көрсетушінің мысалында «Қазақтелеком» АҚ қызметі көрсетілді, кәсіпорынның өндірістік-коммерциялық қызметіне экономикалық бағалау жүргізілді. Жүргізілген зерттеу нәтижелері бойынша авторлар тиісті қорытынды жасады.

**Түйін сөздер:** телекоммуникациялық желі, қызметтер, нарық, кәсіпорын, инфрақұрылым, байланыс, технология.

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### Современное развитие и управление телекоммуникационной сетью в Республике Казахстан

**Аннотация.** В современных условиях социально-экономического развития государства значимыми являются вопросы развития информационно-коммуникационных технологий в рамках мировой экономики. В статье авторы акцентируют внимание на актуальных вопросах формирования и функционирования реального сектора экономики Республики Казахстан – телекоммуникационной сети, которая в последние годы достаточно на высоком уровне динамично развивается с учетом мировых тенденций. С экономической точки зрения устойчивость отрасли рассматривается в значении спроса и предложения телекоммуникационных услуг предприятиями, присутствующими на отечественном рынке. На примере ведущего поставщика услуг показана деятельность АО «Казахтелеком», проведена экономическая оценка производственно-коммерческой деятельности предприятия. По результатам проведенного исследования авторами сделаны соответствующие выводы

**Ключевые слова:** телекоммуникационная сеть, услуги, рынок, предприятие, инфраструктура, связь, технологии.

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