ҚАЗАҚСТАН РЕСПУБЛИКАСЫ ҒЫЛЫМ ЖӘНЕ ЖОҒАРЫ БІЛІМ МИНИСТРЛІГІ

«Л.Н. ГУМИЛЕВ АТЫНДАҒЫ ЕУРАЗИЯ ҰЛТТЫҚ УНИВЕРСИТЕТІ» КЕАҚ

Студенттер мен жас ғалымдардың
«ǴYLYM JÁNE BILIM - 2024»
XIX Халықаралық ғылыми конференциясының
БАЯНДАМАЛАР ЖИНАҒЫ

СБОРНИК МАТЕРИАЛОВ
XIX Международной научной конференции
студентов и молодых ученых
«ǴYLYM JÁNE BILIM - 2024»

PROCEEDINGS
of the XIX International Scientific Conference
for students and young scholars
«ǴYLYM JÁNE BILIM - 2024»

2024
Астана

УДК 001
ББК 72
G99

«ǴYLYM JÁNE BILIM – 2024» студенттер мен жас ғалымдардың XIX Халықаралық ғылыми конференциясы = XIX Международная научная конференция студентов и молодых ученых «ǴYLYM JÁNE BILIM – 2024» = The XIX International Scientific Conference for students and young scholars «ǴYLYM JÁNE BILIM – 2024». – Астана: – 7478 б. - қазақша, орысша, ағылшынша.

ISBN 978-601-7697-07-5

Жинаққа студенттердің, магистранттардың, докоранттардың және жас ғалымдардың жаратылыстану-техникалық және гуманитарлық ғылымдардың өзекті мәселелері бойынша баяндамалары енгізілген.

The proceedings are the papers of students, undergraduates, doctoral students and young researchers on topical issues of natural and technical sciences and humanities.

В сборник вошли доклады студентов, магистрантов, докторантов имолодых ученых по актуальным вопросам естественно-технических и гуманитарных наук.

УДК 001
ББК 72
G99

ISBN 978-601-7697-07-5

3. Флорида, Р. Креативный класс: люди, которые меняют будущее / Р.Флорида. – М. :Классика XXI в., 2005. – 421 с.
4. [Электрондық ресурс] URL: https://liter.kz/pochemu-v-kazakhstane-ne-razvita-kreativnaia-industriia-i-kak-eto-ispravit-1695358215/
5. Ұлттық статистика бюросы сайты. URL: https://stat.gov.kz/
6. [Электрондық ресурс] URL: https://inbusiness.kz/ru/author_news/neobhodimye-usloviya-dlya-masshtabnogo-razvitiya-kreativnoj-ekonomiki

UTC 338.47

MANAGEMENT OF THE DEVELOPMENT OF HIGH-SPEED RAIL TRANSPORT IN KAZAKHSTAN

Sartay Kuanysh
ksartay2000@gmail.com
1st year of Master degree in "Management" student of ENU named after L.N.Gumilev, Astana, Kazakhstan
Supervisor - Khassenova K.K.

Fast pace of live in modern society needs technologically developed means of transportation between different cities and regions of countries. Air travelling opened many horizons for majority of people, allowing them to travel between various parts of the world in just hours. However, beginning from the second part of XX century, other mean of transportation, railway transport began to lose its passengers and became less competitive compared to air transportation and automobile transportation, due to low speed and inconvenience. The role of railway transportation in transporting of goods is enormous, however, the possibility of carrying passengers is become higher by implementation of different innovations and modern technologies. The best example of the introduction of modern technologies is high-speed railways. High-speed railways are very necessary for Kazakhstan, as they will allow passengers to be quickly transported between regions, which will spur even greater economic development of the country.

However, before discussing of prospects for the development of high-speed railways, it is worth delving into the history of the emergence of railway transportation. The world's first public steam railway was built in England by George Stephenson in 1825, between Stockton and Darlington, and was 40 kilometers (26 miles) long. The first railway between relatively large cities was opened in 1830 and connected the industrial center of Manchester with the port city of Liverpool (56 km). The line also used Stephenson steam locomotives[1]. By 1840, the length of railways in Great Britain was 2,390 km[2]. The first railway of continental Europe was built in Belgium between Mechelen and Brussels according to the design of engineers Pierre Simons and Gustave De Ridder. It opened on May 6, 1835[3]. The first public road with passenger traffic in the United States opened in 1830 in Maryland (Baltimore and Ohio Railroad)[4]. The first railway in the Russian Empire was built in 1837, connecting the capital, St. Petersburg, with Tsarskoye Selo. Then, in 1848, the Warsaw-Vienna Railway was built, after which, by 1851, the railway connected St. Petersburg and Moscow, the two largest cities in Russia[5][6]. As for the development of railway transport in Kazakhstan, the opening of the first railway on the territory of Kazakhstan took place on October 25, 1894 - after the completion of the construction of the narrow-gauge line Pokrovskaya Sloboda - Uralsk, 130 km of this railway passed through the territory of present-day Kazakhstan. An epochal event was the construction of the 1,444 km long Turkestan-Siberian Railway, which continued in 1927–1930. It connected Kazakhstan with Siberia and contributed to the intensification of the economic development of the republic and the development of many desert lands. At the moment, Kazakhstan has an extensive network of railways with a total length of about 15 thousand km, 6 thousand of which are double-track and about 5 thousand are electrified. The total length of the main tracks is 18.8 thousand km, station and special tracks are 6.7 thousand km. The importance of railway transport in Kazakhstan is very great. More than 68% of the country's total freight turnover and over 57% of

the country's passenger turnover are accounted for by railways. The railway industry employs more than 125 thousand people, which is almost 1% of the population of Kazakhstan. Most of the network is managed by Kazakhstan Railways, the rest is managed by South Ural Railways[7].

However, despite the significant role of railways in Kazakhstan, it has many issues in transporting of passengers. There are low speed of trains, outdated vehicles, poor service, old infrastructure and unpunctuality. Regarding to the speed of trains, the average speed of passenger trains in Kazakhstan is about 50 km/h. In comparison, in Russia this figure accounts 70km/h, in China 90 km/h[8]. The fastest train in operation in Kazakhstan is Tulpar-Talgo, based on Spanish railway technology, which started the operation in 2003 between Astana and Almaty[9]. The maximum operation speed of this train is 140 km/h, however, it is able to reach 200 km/h. Nowadays, Tulpar-Talgo trains have routes throughout the country, connecting all regions of Kazakhstan with convenient, rapid railway service. Despite this, Kazakhstan is inferior in terms of speeds in railways to neighbor countries, like, Russia, China and Uzbekistan. For example, in Russia in route between Moscow and Saint's Petersburg the Sapsan high-speed train is operate on maximum speed of 250 km/h. In Uzbekistan Afrosiyob high-speed train rides between Tashkent and Samarkand also on 250 km/s and it's based on Talgo technology. While in China, on dedicated high-speed railway in route Beijing-Shanghai, trains are capable of 350 km/h, which allows them to reach 1300 km in just 4 hours 18 minutes[10]. Thereby, works on increasing of average speed of passenger trains in Kazakhstan should be made. In addition, regarding the average age of vehicles in Kazakhstan, according to figures of "Passenger Transportation" JSC in 2022, 32 per cent of passenger vehicles in railways in Kazakhstan are older than 20 years[11]. However, works on updating of vehicles park are already going, thus, from 2010 to 2022, the average age of the Kazakhstan Temir Zholy (KTZ) passenger car fleet decreased from 73% to 46%. According to the national carrier of Kazakhstan, during the period from 2010 to 2022, 1,224 cars were purchased, including 676 produced using technology from the Spanish company Talgo[12]. The renewal of the passenger car fleet will continue. At the end of 2022, Kazakhstan, represented by Kazakhstan Temir Zholy JSC, entered into a deal for the supply of 537 passenger cars produced by the Swiss company Stadler. They will cost 730 billion tenge, and another 650 billion will be spent until 2040 for their maintenance. The new carriages will improve the comfort and safety of passengers during the trip[13]. The problem of poor service is comes not only due to old vehicles, but, also because of non-compliance with sanitary requirements, lack of training of staff, as well as the lack of additional services in the form of a dining car, a set of hygiene products and a set for tea or coffee. KTZ must carry out a reform in the field of passenger services on the railway. In addition, 60 per cent of railways in Kazakhstan are outdated, according to the ex-prime minister Alikhan Smailov[14]. This leads to decreasing of passenger comfort and safety during the train trip and non-compliance with the traffic schedule. Because of this, trains are often delayed by several hours, which, reduces the service. For example, delays of trains happened between November 2022 and first half part of 2023, due to outdated railways and cargo trains derailments, undermined the confidence of part of the population in railway transport as a reliable mode of transport.

In this regard, an innovative type of railway transport is needed that will attract new passengers and contribute to the economic development of Kazakhstan. High-speed trains with dedicated infrastructure for them could be such an innovative mode of transport. According to the science publications, a high-speed rail (HSR) is a type of rail transport network utilizing trains that run significantly faster than those of traditional rail, using an integrated system of specialized rolling stock and dedicated tracks. While there is no single standard that applies worldwide, lines built to handle speeds above 250 km/h (155 mph) or upgraded lines in excess of 200 km/h (124 mph) are widely considered to be high-speed[15]. Discussions of necessity of high-speed railways between two main cities, Astana and Almaty are began in 2011. It was planned to begin the construction of the Astana-Almaty high-speed railway in 2013 and finish it in 2017 by the beginning of the "World Exhibition EXPO-2017" held in Astana. Trains could cover a distance of 1200 km not in 12 hours as now, but in only 5 hours. The maximum speed would be 350 km/h[16].

If we turn to foreign experience in operating high-speed trains and railways, Japan and France are the pioneers in this direction. First dedicated high-speed rail opened in Japan in October 1, 1964

between Tokyo and Osaka, prior to the Olympic games in Tokyo. The construction of this high-speed rail(HSR) continued 5 years between 1959 and 1964. The length of Tokyo-Osaka HSR is 515 km. At first, the trains covered this distance in 4 hours at a maximum speed of 210 km/h, however, due to the increase in speed, the travel time decreased to 3 hours. Now the fastest train called Nozomi, covers this distance in 2 hours 22 minutes and reaches a maximum speed of 285 km/h[17]. Japan continued to build high-speed railways and today the total length of the high-speed railway is more than 3,000 km. The whole system of HSR in Japan called as Shinkansen, which translated as the new way[18]. In France first high-speed rail opened in 1981 between Paris and Lyon. Later, the French high-speed train network covered not only France, but also spread to other European countries such as the Netherlands, Belgium, Luxembourg, Germany, Great Britain, Switzerland, Italy and Spain. This system of HSR called as TGV(Train à Grande Vitesse), which, translated as a high-speed train. Despite this, currently, the leader in HSR length is China which has the largest high-speed railway network in the world, exceeding those in Japan and Europe combined (more than 36,000 km, which is more than 65% of the total length of high-speed railway in the world). The PRC also operates a high-speed Maglev train line with a length of 30 km from Shanghai to Pudong International Airport. Operating speed 430 km/h. The line was built in 2004 in collaboration with Siemens (Germany) using Transrapid technology[19].

Nowadays, in 27 countries of the world HSR are in operation, another 2(India and Iran) are planning construction of high-speed rail. The leaders of HSR length are China, Spain, Germany, France and Japan. Countries like Italy and South Korea are also have significant HSR networks. The Table 1 below represents the list of countries which have high-speed railway service. Some countries in this list only have modernized railway lines upgraded to high-speed. Data was taken from UIC(International Union of Railways) figures[20].

Table 1. The list of countries with high-speed railways.

Countries	In operation(km)	In construction (modernization) (km)	Whole length(km)	Maximum speed (км/h)	Notes
Germany	3641	1122	4763	300	
Spain	3762	1763	5525	310	
Italy	1467	890.96	2357.96	300	
China	42000	28000	70000	350	
Russia	650	1298.1	1948.1	250	Only modernized line between Moscow and Saint's Petersburg operated by Sapsan express(Siemens Velaro). The maximum speed 250 km/h only reaching in 60 km section, in other is 200 km/h
USA	362	1789.3	2151.3	240	Only modernized line between Boston and Washington D.C. operated by Acela express.
Poland	272.2	492.5	764.7	200	Only modernized lines operated by Pendolino. The

Countries	In operation(km)	In construction (modernization) (km)	Whole length(km)	Maximum speed (км/h)	Notes
					maximum speed in majority of lines is 200 km/h.
Uzbekistan	741	465	1206	250	Only modernized lines between Tashkent and Bukhara, Taskent-Karshi operated by Afrosiyob express(Talgo-250). In majority of the length maximum speed is 200-220 km/h.
France	3460.8	341.3	3802.1	320	
South Korea	1104.5	425	1529.5	305	
Japan	2764.6	684.3	3448.9	320	
Note: made by author on basis of UIC figures					

From the table above(Table 1) we can see that in some of represented countries the maximum speed of trains is between 200-250 km/h and others have dedicated high-speed rail network capable in 300-350 km/h. It means that Kazakhstan has a big opportunity to join to the list of countries with high-speed railways.

The most suitable railway corridors in Kazakhstan for the construction of high-speed railways are between Almaty and Shymkent with continuing to Tashkent and between Almaty and Petropavlovsk. Almaty-Shymkent HSR will pass through densely populated areas of Kazakhstan which allows to generate passenger flow, while, Almaty-Petropavlovsk will pass through large cities like Astana and Karaganda and allows to connect southern regions with northern, with modern, rapid mode of transportation. The population in Astana-Tashkent line is now about 7 million and will grow in the future, while in Almaty-Petropavlovsk is accounted as 5 million. Connecting of these densely populated corridors with HSR is strategically important task. Apart of this, connecting of Almaty, Astana and Tashkent, three largest business centers in Central Asia with high-speed rail will boost economic development and will help to increase economic cooperation. Also, the passenger flow between cities will increase by several times and this type of transport will compete not only with automobile transport, but also with air transport, due to the high speed of trains. The graph below (Figure 1) illustrates the advantages in time-saving effect of high-speed rail compared to automobile transport and aviation.

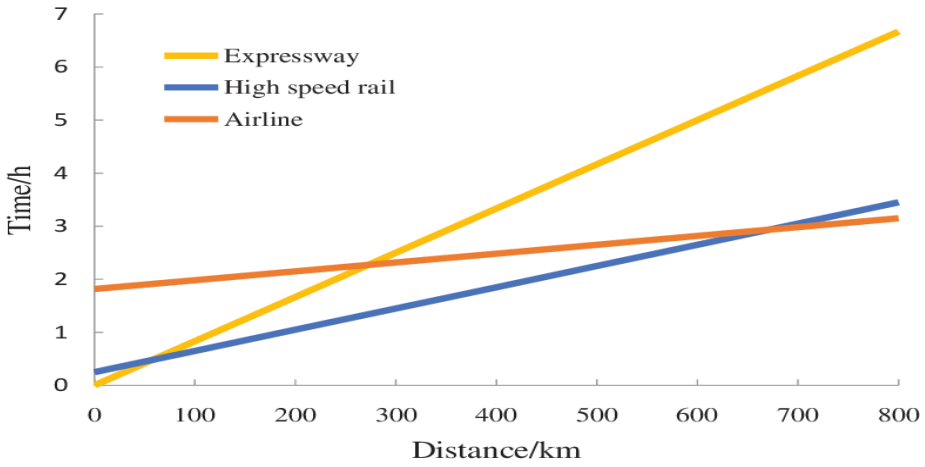

Figure 1.Time-saving effect of high-speed rail compared to other modes of transportation. Note: taken from the source[21]

From the graph above(figure 1) we can observe that for distances up to 50 km automobile transport has time advantage over HSR, but, after 50 km to 650 km HSR compete with cars and airlines. On distances more than 650 km airplanes beat high-speed trains. This data were taken by the exploring time-saving effect between cars, HSR and airplanes. First 15 to 30 minutes takes for passenger to arrive the station in city center and sit to the train in most cases, while the boarding process for airplane with getting to the airport which located out of the city, check-in and waiting takes about 2 hours in average. While, the boarding to high-speed trains usually don't need such procedures which take a lot of time.

There are many advantages of high-speed rail transportation, such as, development of business and residential areas, increasing of passenger flow and developing of tourism sector. For example, Japan experienced explosive growth of passenger flow on its Tokaido Shinkansen(Tokyo-Osaka) high-speed line from 1964, starting from 61000 passengers per day and ending by daily ridership of 420000 in 2014. Tokaido Shinkansen transported 5.6 billion passengers since opening and its annual ridership increased from 11 million in 1964 to 155 million in 2013[22]. This line serves three most populated metropolitan areas like, Greater Tokyo(Tokyo-Yokohama), Nagoya and Kansai(Osaka, Kyoto and Kobe) regions with combined population of 40 million, 10 million and 20 million respectively. Thus, this HSR line serves the most densely populated area of Japan with whole population of more than 70 million people, which accounts about 60 per cent of the whole population of Japan[23][24]. In addition, 64 per cent of national GDP is producing in this region[22]. Shinkansen high speed trains in Japan and TGV trains in France are already became a touristic attraction for millions of travelers visiting these countries. Japan facilitated using of Shinkansen trains between cities among tourists by implementation of special Japan Rail Pass, which allows them to travel by using of trains of Japan Railways(JR) lines, including Shinkansen, for 7, 14 or 21 consecutive days. The most popular routes among tourists are called as "Golden Route" Tokaido/Sanyo Shinkansen(Tokyo-Osaka-Hiroshima) and Hokuriku Shinkansen(Tokyo-Kanazawa). Another case of TGV trains which connect not only major cities of Western Europe, like, Paris, Amsterdam and Brussels, but also, northern part of France with south, Mediterranean coast(Marseille, Nice cities) and Catalonia(Spain). In distances up to 700 km TGV trains beats planes, which has already led to discontinuing Paris-Brussels airline and noticeable reduction in flights numbers from Paris to London, Amsterdam and Marseille. Analyzing of development of business and residential areas effect of HSR, we can observe many empirical studies which were conducted before. For example, studying the HSR station location typologies in Europe (see Figure 3), Hall (2009) identified three types of urban impacts of HSR depending on the location of the station[25]:

• The first type is when the station is located beside or within the traditional Central Business District (CBD). This improves or reinforces the CBD's attraction as a place for commercial investment.

• The second type of station is usually located on the edges of cities, adjacent to, but separate from, the major urban centers. This helps in developing complementary sub-centers within the urban area.

• The third type of station uses the station as a driver for a new commercial 'edge city' on the periphery of the urban area.

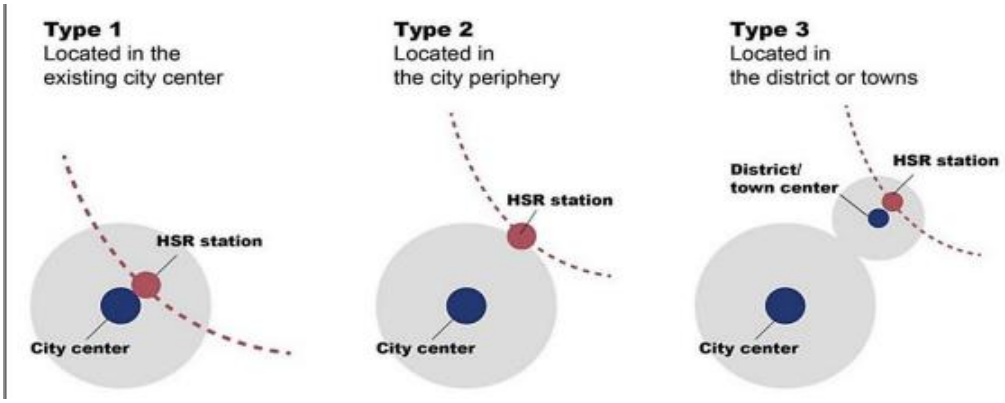

Figure 2. Types of HSR Station Location with Respect to CBD and Urban Fabric.
Note: studies of Hall (2009)

The HSR-urban interaction should be observed at an urban-regional level. The advent of HSR plays two roles in influencing the urban economy: a catalyzing role and a facilitating role. The HSR network plays a catalyzing role by drawing new activities to the urban region, and a facilitating role by impacting the cities in terms of accessibility to enhance the local economy[26]. As an example, after the opening of Shin-Yokohama station for Shinkansen service 5 km away the business center of Yokohama city, the outskirts of the station began to develop. Hence, new residential and business complexes were built near the Shin-Yokohama station[27].

In conclusion, high-speed rail transportation is really important and highly innovative type of transport, which necessary for Kazakhstan, as our country plans to enter into the list of 30 developed countries by 2050. The economic effect and convenience of using high-speed trains is impossible to underestimate. High-speed rail boost national economy, especially tourism and business, allows to developing of different areas around the HSR and increase passenger flow between the cities and regions. By studying of different cases of Japan, France and other countries we can conclude that high-speed rail transportation will change the idea of movement around passengers and will stimulate the development of other sectors of the country's economy.

Literature

1.Liverpool and Manchester. Архивировано 15 февраля 2012 года [Electronic source].

2.Статья «Промышленная революция», табл.2 на krugosvet.ru. Дата обращения: 6 октября 2010. Архивировано 6 июля 2013 года [Electronic source].

3. Марговенко, Алексей «Дороги царей». журнал «Урал» 2004 год, № 10. Дата обращения: 29 января 2008. Архивировано 9 августа 2011 года [Scientific journal].

4.Dilts, James D. The Great Road: The Building of the Baltimore and Ohio, the Nation's First Railroad, 1828-1853 p.90. — Palo Alto, CA: Stanford University Press, 1996. — ISBN 978-0804726290 [Scientific article].

5.Гудериан, Гейнц. Воспоминания солдата./Пер.с немецкого.-Смоленск:"Русич",1998.-656 с.("Мир в войнах") ISBN 5-88590-901-6 [Paper book]

6.Кислинский Н. А. Наша железнодорожная политика по документам архива Комитета министров. — Санкт-Петербург: Издание канцелярии Комитета министров, 1902. — Т. 1. — С. 29, 30. — 340 с.[Paper journal]

7.Кадыров А.С., Аманжол Ж.И., Жумабаев Б.С. ИСТОРИЯ РАЗВИТИЯ

ЖЕЛЕЗНОДОРОЖНОГО ТРАНСПОРТА // Современные наукоемкие технологии. – 2015. – № 1-1. – С. 31-35 [Scientific article];

URL: https://top-technologies.ru/ru/article/view?id=34986 (дата обращения: 19.03.2024).

8. Скоростное движение разгонит рост ВВП. Kapital news agency. Author:Borisov A. Date: 17.09.2014. [Electronic source] URL: https://kapital.kz/business/33363/skorostnoye-dvizheniye-razgonit-rost-vvp.html

9. Пассажирам испанского поезда "Тальго" не удалось добраться до Астаны из-за технической неполадки. «Kazakhstan Today» information agency. Date: 19.06.2007 [Electronic source] URL:https://online.zakon.kz/Document/?doc_id=30108069

10. China Focus: Beijing-Shanghai railway speed rises to 350 kph. Xinhua new agency. Date:21.09.2017. [Electronic source] URL:http://www.xinhuanet.com/english/2017-09/21/c_136626740.htm

11. Возраст 32% пассажирских вагонов в Казахстане превышает 20 лет. КАЗИНФОРМ. Date:11.09.2023 [Electronic source] URL:https://www.inform.kz/ru/vozrast-32-passazhirskih-vagonov-v-kazahstane-prevyshaet-20-let_a4110343

12. Средний возраст парка пассажирских вагонов Казахстан Темир Жолы (КТЖ) снизился. “Railway Supply” railway journal. Date: 07.09.2023 [Electronic source] URL: https://www.railway.supply/srednij-vozrast-parka-passazhirskih-vagonov-kazahstan-temir-zholy-ktzh-snizilsya/

13. На пенсионные казахстанцев закупят новые вагоны. “AtyrauPress” news portal. Date:30.01.2024 [Electronic source] URL:https://atpress.kz/ru/news/v-kazakhstane/na-pensionnye-kazakhstantsev-zakupyat-novye-vagony

14. Железные дороги Казахстана изношены на 60 процентов – Смаилов. Tengrinews news portal. Date:21.11.2023 [Electronic source] URL:https://tengrinews.kz/kazakhstan_news/jeleznyie-dorogi-kazahstana-iznoshenyi-60-protsentov-smailov-517559/

15. "High Speed Lines in the World" (PDF). International Union of Railways. 27 February 2020. Archived from the original (PDF) on 17 January 2021. Retrieved 18 March 2021. [Scientific article]

16. Высокоскоростную железнодорожную линию Астана - Алматы построят к 2017 году. Tengrinews news portal. Date:14.03.2013 [Electronic source] URL: https://tengrinews.kz/kazakhstan_news/vyisokoskorostnuyu-jeleznodorojnuyu-liniyu-astana-almatyi-230146/

17. Tokaido Shinkansen. Wikipedia portal. [Electronic source] URL:https://en.wikipedia.org/wiki/Tokaido_Shinkansen

18. Японское железнодорожное чудо "Синкансен". Ilya Varlamov. Date:20.06.2014 [Electronic source] URL:https://varlamov.ru/1098503.html

19. ВСМ в Китае. HSRail portal. [Electronic source] URL:http://www.hsrail.ru/press-center/news/vsmm/china

20. International Union of Railways. Homepage. [Electronic source] URL:https://uic.org/

21. Jin Weng(2020).Impact of High-speed Rail on Destination Accessibility: A Case Study of China. January 2020. Journal of China Tourism Research 16(1):1-16 [Scientific article]

DOI:10.1080/19388160.2019.1709937

22.Briginshaw,D. (2014). Shinkansen: half a century of speed. International Railway Journal. Date:10.10.2014 [Electronic source] URL:https://www.railjournal.com/in_depth/shinkansen-half-a-century-of-speed/

23.Statistics Committee of Japan. [Electronic source] URL:https://www.stat.go.jp/english/data/handbook/c0117.htm#c02

24. Major agglomerations of the world. CityPopulation portal. [Electronic source] URL:https://www.citypopulation.de/en/world/agglomerations/

25.Hall, P. (2003). Book Review: The European high-speed train and urban development: experiences in fourteen European regions. Progress in Human Geography.

https://doi.org/10.1191/030913299671882291 [Scientific article],
Hall, P. (2009). Magic carpets and seamless webs: Opportunities and constraints for high-speed trains in Europe. Built Environment. https://doi.org/10.2148/benv.35.1.59. [Scientific article]
26. Van den Berg, L., and Pol, P. M. J. (1998). The Urban Implications of the Developing European High-Speed-Train Network. Environment and Planning C: Government and Policy, 16(4), 483–497. https://doi.org/10.1068/c160483. [Scientific article]
27.Hiraishi, K. 2002. Shinkansen and Regional Development. Kotsu Shinbunsha.
Ministry of Land, Infrastructure, Transport and Tourism, Study on Regional Economic Impact by introducing High Speed Rail in Overseas. 2017. [Scientific article]

ОӘК 338.012

АҚПАРАТТЫҚ КОММУНИКАЦИЯЛЫҚ ТЕХНОЛОГИЯЛАРДЫҢ ҚАЗАҚСТАН ИННОВАЦИЯСЫНДА АЛАТЫН РӨЛІ

Сауленова Жания Аскаровна, Талғатова Асем Талғатқызы
Қаржы 2-курс студенттері
Л.Н.Гумилев атындағы Еуразия ұлттық университеті, Астана, Қазақстан
Ғылыми жетекші: Амренова Ғ.Қ., аға оқытушы

Бүкіл әлемде технологиялық инновациялар бәсекеге қабілеттілікті арттырудың шешуші факторы болып саналады. Қазіргі таңда Қазақстанда түрлі мемлекеттік органдар, даму институттары, ұлттық компаниялар мен холдингтер ұсынатын шағын және орта бизнесті, ірі кәсіпорындарды, инноваторларды, ісін жаңа бастаған кәсіпкерлерді қолдаудың бірқатар құралы бар. Сонымен қоса инноваторларға ғылыми және технологиялық инновацияларды дамытуды ынталандыруға, сондай-ақ Қазақстандық кәсіпорындардың әлемдік нарықтағы бәсекеге қабілеттілігін арттыруға бағытталған түрлі бағдарламалар мен бастамалар арқылы қолдау көрсетіледі.

Қазақстанның XXI ғасырдағы жаңаша өсу жолдарының тың белестерге көтерілуінде инновациялық экономиканы нығайтудың жаңа міндеттері, ғылым мен білімнің стратегиялық қадамдары, мемлекет басқарудың эволюциялық жүйелері көзделген. Олар – өңірлерді дамыту, тұрғындарға мемлекеттік қызмет көрсетудің сапасын арттыру, электронды үкіметті дамыту, заң жүйелерін жаңғырту, адам капиталының сапалы өсуіне қол жеткізу, тағы басқа да серпінді стратегиялық жетістіктер. Осы бағыттардың бәрінің де алға өрлеуде маңызы өте зор.

Қазақстанның инновациялық дамуы «ақылды экономиканың» құрылуымен, қоғамды цифрландырумен, жаңа экономикалық бағытпен байланысты. Қазақстан Республикасының Үкіметі ғылым, технологиялар және инновациялар (ҒТИ) саласындағы даму үдерісін анықтау мен қолдауда негізгі рөл атқарады. Елде ҒТИ-ны дамытудың көптеген стратегиялары мен бағдарламалары қабылданды, оларды жүзеге асыру үшін көптеген мекемелер құрылды. Пандемия – Қазақстанда ғылымның, технологиялар мен инновациялардың дамуы үшін ақпараттық өзара іс-қимылды баяулата отырып, көптеген мәселелер, қауіптер мен кедергілер тудырды, бұл дәстүрлі түрде елдегі инновациялық дамудың жеделдеуіне ықпал еткен негізгі қозғаушы күштердің бірі болды. Қазіргі уақытта ғылым, технология және инновация саласындағы күш-жігердің көп бөлігі елдің тұрақты дамуын қамтамасыз етуге бағытталған.

Қазақстан экономиканың әртүрлі салаларында: энергетика, ауыл шаруашылығы, медицина, ақпараттық-коммуникациялық технологиялар (АКТ), ғарыштық технологиялар, көлік және логистика салаларында инновациялық жобаларды белсенді түрде дамытып жатыр. Дегенмен соңғы жылдары АКТ индустриясы қарқынды дамып келеді, яғни цифрландыруға болатын барлық саланы цифрландыру, әртүрлі нарықтарды, әсіресе IT мен жасанды интеллектіге қатысты барлық нәрселерді цифрландыру. Жасанды интеллектті дамыту ерекше назар аударуды қажет етеді – «Сарапшылардың бағалауы бойынша, 2026 жылға қарай әлемдегі кәсіпорындардың 80%-дан астамы жасанды интеллект құралдарын пайдаланады (бүгінгі таңда