

## **The State of the Economic Aspect of the Introduction of Digital Broadcasting in the Republic of Uzbekistan**

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**Abstract:**As President Sh. Mirziyoyev repeatedly noted in his speeches, one of the priority tasks for the consistent socio-economic development of Uzbekistan is the widespread introduction of ICT and digital technologies. It is digital technologies that are the effective tool that can ensure the qualitative reform of economic sectors and spheres of public life. One of the central places in the January Message of President Sh. Mirziyoyev to the Parliament and people of Uzbekistan in 2020 was given to issues of digital development. It is also symbolic that 2020 in Uzbekistan was declared the Year of the Development of Science, Education and the Digital Economy. It was during this period that the fundamental documents were adopted that laid the legal foundation for further digital reforms. This study analyzes the issues of digitization of radio broadcasting in Uzbekistan. First of all, the prospects of digitization will be considered, the technologies of digitization of radio broadcasting, world experience, recommended cases, practical work carried out in our country and future plans, as well as economic aspects of radio broadcasting will be discussed.

**Keywords:** Digital broadcasting, radio, economic aspect, ICT, DAB+, DBR+, digital project, FM.

### **INTRODUCTION**

Today, the importance of digital technologies in society is growing. Their widespread introduction and the development of the digital economy have become a serious vital issue for any country today. According to experts, in the next 3 years, 22% of the world's jobs will be created through the use of information technology through the digitalization of the economy.

The digital economy, first of all, creates opportunities to work in a region free of corruption. He is a key ally of the "shadow economy." Because numbers seal everything, they store it in memory. It provides information quickly when needed. In this case, it is impossible to hide any information, to conclude secret agreements

As a result, the legal resources that will be directed to the economy in the future will be spent in the right direction. In particular, the timely calculation and payment of taxes, transparency of budget allocations, funds allocated for the social sphere, schools, hospitals, roads will be fully delivered to their destinations will be guaranteed. Therefore, it is reasonable to say that digital technology is the shortest path to development.

The main task is to implement the concept of "Digital Uzbekistan-2030", which covers all areas and sectors. The implementation of such a large project will contribute to the complete and comprehensive transformation of the economy of our country, to ensure competitiveness [1].

Development does not stand still. Early radio systems that used the principles of mechanics did not have much better image quality than the current sizes, so viewers could

barely see the faint ghosts on the screen. But these were temporary difficulties. The active development of television began only when it was completely electronic. The familiar analog electronic television gradually became of such quality that it seemed that there was no other way to improve it. However, the idea of replacing the analog transmission of information did not go unnoticed by television. Digital television is slowly being replaced by analog television.

### **MATERIALS AND METHODS**

Radio broadcasting, which began its commercial existence in the 20s of the last century, remains the most popular source of information to this day. According to statistics, 60% of the information received by mankind through the media falls on the share of radio. The indispensability of the radio is explained, first of all, by the fact that it is practically the only form of presenting information that allows you to perceive it in the background, without interrupting the main work.

Digital broadcasting systems (DBR) can either outperform analog broadcasting systems (at frequencies above 30 MHz) in terms of RFS (radio frequency spectrum) use efficiency, or provide significantly higher service quality standards in analog broadcasting bands. The benefits of digital implementation are also based on the rate of performance improvement, cost reduction and power consumption reduction [2].

Digital broadcasting came to prominence in 1995 when pilot broadcasts were started in the VHF (very high frequencies) band in the UK and the Scandinavian countries in the T-DAB standard. Currently, the following digital audio broadcasting technologies are being introduced all over the world to operate in the LW (long waves), MW (medium waves), SW (short waves), MW (meter waves) and L bands: DRM, Eureka-147 ( DAB), DVB, DARS, ISDB, IBOC (HD Radio), IP, AVIS, etc.

The distribution of DVR technologies over the range is as follows:

- Long, medium and short waves (<30MHz) - DRM30 (Digital -Radio Mondiale);
- Band I (47-68 MHz) - DRM +;
- Band II (87.5-108 MHz) - FM, DRM+, HD Radio;
- Band III (174-230 MHz) - DAB, DVB-T, DMB;
- Range IV and V (470-862 MHz) - DVB-T/DVB-H;
- L band (1452-1490 MHz) - DAB, DMB, Satellite radio.

In view of the obvious prospects, the priority for the introduction of digital radio technologies is given to the technologies of the pan-European standards Eureka 147 / DAB and DRM (respectively, in the VHF and UHF (ultra-high frequencies) and at frequencies below 30 MHz), which incorporate the latest achievements in digital audio broadcasting technology [3].

DAB digital broadcasting (Eureka 147) was recommended by the International Telecommunication Union in 1995. The digital audio broadcasting system DAB (Digital Audio Broadcasting), or "Digital System A" according to the classification of the European Broadcasting Union (EBU), was developed as part of the international research project Eureka 147.

Terrestrial DAB digital broadcasting system has a number of features such as: high reliability in mobile reception (up to 300 km/h); the ability to build SFN; audio with MPEG Layer II (192-256 kbps for good stereo quality, 128 kbps for normal quality); data transfer services; more than 350 receiver models costing \$25 and up.

There is also an updated version of DAB+ which has a number of benefits in terms of providing additional services, such as: good sound quality at low speeds (64 kbps for good stereo quality, 48 kbps for normal quality) - more audio programs and other services ; DAB+ uses the HE AAC v2 method for data compression, and one DAB+ multiplex can

accommodate from 12 to 18 channels; DAB+ reception is uninterrupted; DAB+ receivers can receive all DAB signals.

DRM has two main types of standards: the DRM30 standard for use in the short and medium wave bands (up to 30 MHz), and DRM+ for frequencies from 30 to 174 MHz [4].

The use of DRM30 allows the broadcaster to provide the listener with greatly improved audio quality and service reliability. As a result, international broadcasters can broadcast on HF and MW with sound quality comparable to local FM broadcasts.

DRM+ is an extension of the standard to frequencies up to 108 MHz. The new system uses the logical structure and existing developments of the DRM standard, only the parameters of OFDM modulation for a bandwidth of 96 kHz have been changed. For audio coding, an algorithm from the MPEG4 standards group is used. The DRM+ system supports bit rates from 40 to 186 kbps. Up to 4 programs can be transmitted in a DRM+ signal multiplex (when using audio signal encoding (AAC HE), 2 music programs can be transmitted at 64 kbps and 2 speech programs or additional data can be transmitted at 24 kbps).

Modeling the coverage area when transmitting a signal in the DRM+ format (16 QAM) and an FM signal showed that the power of a digital signal transmitter can be 12 dB less than the power of an FM signal transmitter with the same coverage area. Using 4QAM subcarrier modulation of the OFDM digital signal, the power difference can be up to 20 dB.

With the development of digital technologies, there have been fundamental changes in the production and distribution of electronic media and mass communication systems. This is mainly due to the transition from analog signal processing methods to digital ones, the development of compression, coding and multiplexing systems for digital streams, the emergence of multimedia environments, interactive services, the development of the Internet and mobile communications [6].

It is known that more than 10 years have passed since the start of trial operation of digital television broadcasting in Uzbekistan (first in Tashkent and Bukhara). Thanks to the great painstaking work within the framework of the "State Program for the Technical and Technological Transition to Digital Broadcasting in the Republic of Uzbekistan", to date, digital television broadcasting has covered the entire territory of our country. Despite these successes, the issue of transition to digital broadcasting has not yet been resolved. In this regard, the question arises of developing a new "State program for the technical and technological transition to digital broadcasting in the Republic of Uzbekistan".

An analysis of incoming complaints and appeals from the population showed that today there is a great need to increase the number of broadcasting stations in all regions of the republic. The population in the regions makes reasonable demands for equal access to receive more commercial broadcasting stations. At the same time, it is known that the main part of the stations is concentrated in the city of Tashkent and only some of them are located in large regions of the republic (Samarkand and Ferghana regions). The owners of private broadcasting stations are not interested in relaying the signals of their radio stations in other, less populated regions of the country due to the high costs associated with the purchase (rent) of a broadcasting transmitter, payment for broadcasting services, payment for electricity, operating costs, etc.). Considering that the main source of income for a commercial broadcasting station is advertising, in general, advertising revenue is not enough to cover the costs of broadcasting. The state, as the main reformer and guarantor of ensuring equal access to a larger number of commercial broadcasting stations, must create the necessary conditions for the support and development of commercial radio stations, develop effective incentive mechanisms for owners of commercial radio stations to increase the broadcasting area.

Taking into account the above, it is interesting to consider the possibilities of developing the DAB+ (Digital Audio Broadcasting) digital broadcasting standard in our country.

DAB+ is one of the modern developments of Europe's first DAB standard. The DAB+ system uses the MPEG-4 HE AAC v2 audio coding method, which can reduce the digital audio signal transmission rate by about 3 times while maintaining sound reproduction quality, as well as increase the number of audio programs transmitted in one signal. In addition, DAB+ has a number of advantages in terms of providing additional services, such as good sound quality at low speeds, reception of DAB+ radio signals without any interference, the ability of DAB+ receivers to receive all DAB signals.

Reception of radio signals is more reliable and reliable, especially for mobile listeners, that is, in cars, trains, etc., which makes them one of the most promising and numerous groups of consumers of DAB + digital broadcasting services. The reasons for this lie in the fact that with mobile reception, the greatest trouble is caused by interference (superposition) of radio waves, as well as the Doppler effect, which leads to a change in wavelength depending on the speed of the receiver relative to the transmitter.

Digital methods of signal transmission allow the use of noise-immune coding, which makes it possible to correctly restore the transmitted information after exposure to interference. In addition, digital receivers are able to automatically select the strongest signal.

## **RESULTS AND DISCUSSION**

An important condition for the successful development of the DAB+ digital broadcasting standard in Uzbekistan is the availability of a free radio frequency band. Taking into account that the range of 88-108 MHz in Tashkent is almost completely occupied by local broadcasting stations, and in some areas by the signals of stations of neighboring states (Fergana Valley, Syrdarya region), it would be advisable to consider the possibility of allocating a radio frequency band in the range of 175-230 MHz for DAB+ digital broadcasting standard. It is important to note here that on July 17, 2017, a resolution of the Cabinet of Ministers "On further measures to switch to digital television broadcasting and stop terrestrial analog television broadcasting" was adopted, according to which terrestrial analog television broadcasting in Tashkent will be turned off on July 15, 2018, and throughout Uzbekistan - until December 5, 2018.

To date, online stores already have various types of digital DAB + receivers for cars connected to the cigarette lighter or USB connector of the car audio system.

With the launch of the DAB+ digital broadcasting standard system in Uzbekistan, dozens of new types of DAB+ digital receivers will be delivered to the country, the cost of which, due to the economies of scale, will be quite affordable for the population. At the same time, it is also possible to consider the issue of launching local production of digital DAB + receivers for cars and in stationary versions.

The disadvantages of digital broadcasting include the high complexity of signal processing in the radio receiver, which is reflected in its cost. But in the modern era of widespread development of high-tech microelectronics, this circumstance turns out to be not very important: all conversions are implemented using specialized microcircuits, and as a result, the receiver becomes consisting of only a few inexpensive nodes.

Today, DAB+ digital broadcasting is carried out in China, Indonesia, the Republic of Korea, Germany, Australia, Switzerland, Denmark, Norway and a number of other European countries.

For Uzbekistan, the introduction of the DAB+ digital broadcasting standard is a very topical issue, since it not only makes it possible to significantly increase the number and quality of programs and additional services to the population, but also contributes to a more

efficient use of the radio frequency spectrum, reducing the energy consumption of radio stations, as well as creating new jobs in as part of the localization program.

Today DAB+ digital broadcasting is carried out in China, Indonesia, South Korea, Germany, Australia, Switzerland, Denmark, Norway and a number of other European countries.

For the Republic of Uzbekistan, the introduction of the DAB+ digital broadcasting standard is very relevant, as it not only makes it possible to significantly increase the number and quality of programs and additional services to the population, but also contributes to a more efficient use of the radio frequency spectrum, reducing the energy consumption of radio stations, and creating new jobs within the framework of localization programs, i.e. mass production of digital receiving equipment. The future is digital broadcasting.

### **CONCLUSION**

Currently, SW (short waves) band and FM bands are used for analog sound broadcasting. The following frequency bands have been allocated for broadcasting in this range in Uzbekistan: 68 - 74 and 87.5 - 108 MHz. In Tashkent, the 87.5 - 108 MHz band is full, in other cities the number of radio stations varies from 1 to 10. As a result, at the moment there are 52 radio stations in the FM band in the republic with 438 frequency assignments involved.

At the present time, in order to study the prospects for the introduction of the CRV in the Republic of Uzbekistan, research work is being carried out. It is assumed that the results of this research work will be useful for resolving issues related to the organization of the RTC in the Republic of Uzbekistan. The organization of digital sound broadcasting in Uzbekistan must be carried out taking into account the global trends in the introduction of new technologies. Therefore, it is very important for Uzbekistan to choose a DRM system and start implementing a long-term plan for the introduction of DAB networks. In conclusion, we note that DRM and DAB are not competing, but complementary technologies. Since the basis of both technology developers are the same companies, the goal of the companies is the development of both systems. To select a specific technology for the purpose of introducing a digital real estate system, it is necessary to choose taking into account the individual capabilities and purposes of a particular technology.

The State Unitary Enterprise "Center for Radio, Broadcasting and Television", located in Uzbekistan, is the largest network in Central Asia. From here, 127 antenna-mast facilities, 114 high-power TV transmitters, 359 low-power TV transmitters, 121 high-power radio transmitters, 260 low-power radio transmitters transmit television and radio programs to the population day and night.

Despite a number of high indicators of digitalization (Internet penetration and use of Internet resources, development of public online services, access to broadband Internet, implementation of large-scale digital projects), Uzbekistan is just beginning to expand its capacities aimed at developing digital technologies and products. Therefore, in the development of the digital economy, Uzbekistan is far from being a leader. Western countries have long been oriented towards the development of digital technologies and their introduction into the business space and large organizational companies. Hence their place can be traced as the first number in digital processes and realities. However, having a huge potential, Uzbekistan in the coming years can catch up with its partners in the digital sector. Focusing on modern processes of integration, the introduction of technologies in industry, education, science, the service sector and business will systematize all promising industries and direct their activities to obtain the best result.

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