

## SOCIAL CONSEQUENCES OF DISSEMINATION OF TELECOMMUNICATIONS INFRASTRUCTURE IN 5G TECHNOLOGY

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*5G technology changes the approach to ownership, capital and scarce resource by that part of society that is located in the areas of high quality digital data transmission. Observations made during the implementation of 1G, 2G, 3G and 4G technologies can be extrapolated to 5G, taking into account the specifics of this technology: cognitive radio, spectrum efficiency, the Internet of Things, mobile telecommunications. Consumers turn private property into the use of things, capital is global, media viewer and listener begin to pay only for consumed intellectual property, subscriptions and fixed payments are lost.*

*Keywords: 5G, Internet of Things, cognitive radio, spectral efficiency, antenna system.*

### Introduction

There is a growing demand for quantity and quality of the transmitted data. It is connected with the natural demographic process, according to which generations, who do not use digital devices, die and their place is occupied by the generations, who from the youngest years are using this technique. Due to the mobility of employees, the openness of borders speeds up the process of taking up education and work outside the emigrant's residence. To balance the demand for digital data transmission with the supply of telecommunication channels, investing in old technologies is not enough. They are unprofitable. Technology needs to be changed. At the current stage of technology development it is a transition from 4G to 5G.

### Review of the literature

The 3GPP Release 15 of telecommunications infrastructure into 5G technology has been described in [7]. This description includes the concept of a physical layer for a cellular network. High quality data transmission is obtained by cognitive radio, which performs call on the channel with a highest signal-to-noise ratio (SNR). Spectral efficiency of digital data is closely linked to the SNR [2]. The 5G technology network cell can be in three sizes [1]. The sizes of these cells depending on the SNR is different. The largest cell with a diameter of 25 km, 700 MHz carrier frequency and 10 MHz bandwidth is used to implement the concept of the Internet of Things. The medium one, with a diameter of 2 km, 3.5 GHz carrier frequency and 100 MHz bandwidth is used for the implementation of mobile broadband Internet access. The smallest cells have a diameter of 250 m, a carrier frequency of 26 GHz and a bandwidth of 1 GHz. These are used for video transmission, i.e. mobile TV, even in the 4K standard. The parameters of the 5G technology are described in [2]. In Poland, it is planned to build such networks in large urban areas and transportation routes [3]. The fastest return on invested capital in the construction of the 5G network, telecommunications operators (licenses on frequencies) will receive anywhere where the demand for data transmission equals supply [1]. The use of 700 MHz frequency forces the digital terrestrial TV to be switched off in these areas due to the collision of bands [2]. For connecting base stations we use a broadband fiber-optic network, which has been built in Poland for several years and its construction will be continued in the following years [4]. The construction of a mobile network in 5G technology allows autonomous vehicles to be able to move [7]. Recently, another document appeared: "Assumptions for AI strategy in Poland", from which we learn how the network will deal with the large amount of data caused by the growing of the Internet of Things [4]. Throughout the literature, a lot of attention is paid to the security of digital data transmission to ensure its integrity, confidentiality, and non-repudiation.

### Research method

Upon learning about the forecast of the effects of implementing 1G, 2G, 3G and 4G technologies and about the actual effect their implementation had, we found them reliable to the direction of change, but the scope of these changes has exceeded even the most far-reaching forecasts. This statement applies to the entire ISO/OSI model of the digital data transmission network from the physical layer to the application layer.

You can't simply transfer these experiences to forecast the effects of implementing 5G technology, because the transitions between previous technologies did not allow the integration of services in one transmission channel, as is the case with 5G technology. Forecasts of the effects of the implementation of 5G technology in large areas can be checked by extrapolating the effects of the implementation of pilot networks in selected cities and selected communication routes.

#### **A change of approach to ownership**

The Internet of Things enables communication with objects at any distance not only fixed but above all mobile. You can observe the operational parameters of their consumption, control failures and services. This will facilitate the rental items to the extent so that you will not need to be the owner subject to reasonable use. The purchase of consumer goods will cease to be an investment and will become an unnecessary financial burden for the user. If the manufacturer is able to control the parameters of a car, motorcycle, plane or TV remotely, then on the basis of this knowledge it will be easier to diagnose the cause of the failure and carry out repair service of the operating service. A user who is relieved of caring about the technical condition of an item will stop seeing it, and will only use it. From today it is necessary to amend the law to manage social processes that will bring a new approach to ownership.

#### **Mobile capital**

The use of telecommunications infrastructure in 5G technology will give the owner access to their capital in real terms 24 hours a day, 365 days a year. Electronic money more and more become the basis of turnover in the economy. Cyber security engineers are planning to put the greatest emphasis on the security of digital data transmission when switching from 5G to 6G technology in the construction of telecommunications infrastructure. 5G technology will greatly facilitate the transfer of capital remotely between people.

#### **Media**

The network made in 5G technology is ideally suited for the transmission of radio and television programs of the highest quality standards. Thanks to the return channel, audio and video become interactive. Any viewer or listener can reach out to other listeners and viewers with multimedia information. Satellite and cable transmission remains for classic television. Networks in 5G technology will not cover agricultural and forest areas. A lot of local, amateur creators presenting their work through the 5G network will appear. The equipment for high-quality image and sound recording is becoming more available to the general consumer. Educational television is not accepted in our culture, we realize e-learning via the Internet.

#### **Conclusions**

The implementation of Release 15, 5G documentation is not yet a complete set of rules for the construction and operation of telecommunications infrastructure in 5G technology. Work is underway on the implementation of Release 16, which is planning to approve the ITU in 2020. Regardless of the political situation, social effects will lead to increasingly full globalization, as the telecommunications infrastructure will take over the ability to transfer payment means, translate texts from different languages, transfer intellectual values to any distances and collect fees for such transfers.

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Рыхлик А.

#### **Социальные последствия распространения телекоммуникационной инфраструктуры в технологии 5G**

*Развитие телекоммуникационной инфраструктуры, которая на сегодняшнем этапе развития носит название 5G, меняет подход к собственности, капиталу и ограниченным ресурсам той части общества, которая находится в областях передачи цифровых данных высокого качества. Наблюдения, сделанные в периоды внедрения технологии 1G, 2G, 3G, 4G, могут быть экстраполированы на 5G с учетом особенностей новой технологии: когнитивное радио, спектральная эффективность, Интернет вещей, мобильная связь. Потребители превращают частную собственность в использование вещей, капитал становится глобальным, в средствах массовой информации зритель, слушатель начинают платить только за потребленную интеллектуальную собственность, подписки и фиксированные платежи теряются.*

*Ключевые слова: 5G, интернет вещей, когнитивное радио, спектральная эффективность, антенная система*

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