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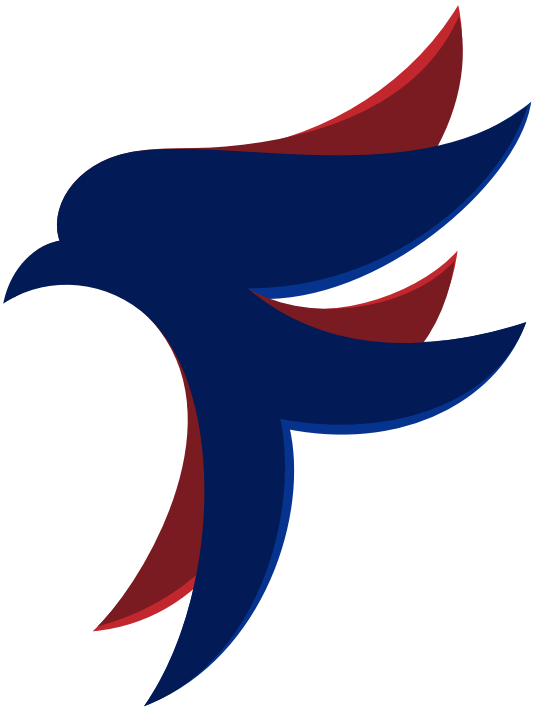
RUSSIA'S TRANSITION TO 5G:
STUCK IN A REGULATORY TUG OF WAR

Janis Kluge



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Russia's Transition to 5G:
Stuck in a Regulatory Tug of War

About the Author

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Executive Summary

Mobile communications in Russia is an economic success story. Four competing operators have built state-of-the-art networks, relying on foreign technology and capital. However, as the sector prepares for the transition to 5G, it is facing strong headwinds: The security apparatus is unwilling to relinquish the most promising radio spectrum, 3.4-3.8 GHz, for 5G licenses. At the same time, Russia's telecoms regulator is urging operators to build a single, shared 5G network with state participation, an idea that the privately-owned carriers strictly oppose. Additionally, import substitution lobbyists are working hard to make 5G infrastructure "Made in Russia" mandatory.

Russia's telecommunications sector is stuck in a regulatory tug of war that is delaying the widespread introduction of 5G for years and could dampen the country's digitalization hopes. At the same time, the slow-moving, multi-stakeholder bargaining process has so far prevented disruptive political interventions by the Russian state. Russia's privately-owned network operators have defended their independence and rebuffed strict import substitution regulation, keeping the market open for foreign technology partners such as Ericsson, Nokia, and Huawei. However, a radical policy shift, triggered by domestic developments or by future sanctions cannot be ruled out. It would result in less market competition and innovation and potentially deepen Russia's technological dependency from China.

INTRODUCTION

The mobile communications sector has been an unlikely success story for the Russian Federation's economy in the era of Vladimir Putin. It has developed rapidly, driven by four fiercely competing network operators. Relying on international know-how, equipment, and capital, they have built cutting-edge mobile communications networks across Russia. The sector has been crucial for facilitating Russia's progress in the digitalization of its economy. It is flourishing despite many challenges: a highly regulated environment, an increasing state presence, and constant tightening of import substitution and surveillance requirements

However, as the world's leading economies are embracing the fifth generation of mobile communications standards (5G), Russia's transition is lagging behind. Putin has repeatedly called for a speedy introduction of 5G: "It is our task for the very next years to organize comprehensive access to broadband internet, and start the operation of fifth-generation networks" he said in his 2019 Presidential Address to the Federal Assembly[1]. Prime Minister Mikhail Mishustin, who took over the position in January 2020, has announced he will prioritize digitalization in all spheres of the economy. However, even though the Kremlin launched the trillion-ruble "Digital Economy" program, virtually no progress has been made on 5G for two years, as all stakeholders are bogged down in negotiations over the right path ahead.

Three issues currently block full-scale 5G deployment in Russia:

First, Russia's digitalization ambitions are colliding with the interests of its security elites. The radio spectrum most widely used for 5G internationally, 3.4-3.8 GHz, is—for historical reasons—densely occupied by military and secret service applications. So far, Russia's siloviki are unwilling to retreat.

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Second, given that available 5G radio spectrum is scarce, Russia's telecoms regulator has pushed for the idea of a rolling out a single 5G network, to be commonly owned and used by all market participants. This idea is vehemently opposed by Russia's private operators, who fear losing their position in the market and eventually their independence from the state.

Third, international dependencies connected to the use of foreign 5G equipment have become an issue. Economic sanctions have supercharged Russia's import substitution lobbyists, who are trying to make network equipment "Made in Russia" mandatory. Again, Russia's operators resist, as a Russian alternative to Huawei, Ericsson, or Nokia is

1 "Putin poruchil v techeniye blizhayshikh let nachat' ekspluatatsiyu setey 5G v Rossii," *TASS*, February 20, 2019, https://tass.ru/ekonomika/6138142 (accessed July 31, 2020).

nowhere in sight.

Russia's 5G struggle raises fundamental questions about Russia's long-term perspectives of economic modernization. Will the Kremlin strike the right balance between the interests of security elites and the country's chances for a modern digital economy? Can Russia sustain private entrepreneurship and competition, which has been key to innovation, in an increasingly strategic high-tech sector?

The introduction of 5G could also become a crossroad for Russia's international dependencies. Will Russia manage to temper its ambitions for economic self-sufficiency and constrain the narrow interests of sprawling state companies to enable the use of cutting-edge, but foreign (including Western), technology? And will China continue to expand its role in Russia's mobile communications market, deepening Moscow's dependency on Beijing?

RUSSIA'S "BIG FOUR"

Russia's mobile communications sector has come a long way since the 1990s. Investment and know-how from European operators were crucial in the deployment of Russia's first networks. When mobile phones became affordable to the masses in the early 2000s, the market increasingly consolidated with three large federal operators: Mobile TeleSystems (MTS), Vimpelcom, and Megafon. A subsidiary of Swedish discounter Tele2 successfully challenged the incumbents in the late 2000s. Today, the subsidiary is controlled by state-owned Rostelekom, completing the Big Four, the quartet of network carriers dominating Russia's market.

Each privately owned network carrier is controlled by one of Russia's well-known billionaire businessmen. First, there is Vladimir Yevtushenkov, who controls MTS. MTS was founded in 1993 as a joint venture between the Moscow telecoms monopoly, Germany's Siemens, and Deutsche Telekom. When the telecoms monopoly was privatized in 1995, Yevtushenkov acquired 33% of it in an insider deal arranged by Moscow Mayor Yuriy Luzhkov. [2] Within five years, MTS grew to become Russia's largest mobile operator and held its IPO at the New York Stock Exchange in 2000. The reach of Yevtushenkov's personal network in today's political elites in Russia is uncertain. His fortune dwindled when he was investigated for money laundering and had to give up his oil assets in 2013.[3]

The billionaire behind the second mobile operator, Vimpelcom, is Mikhail Fridman, one of the few banking billionaires of the Boris Yeltsin era who was able to retain his wealth under Vladimir Putin. He is not particularly close with Russia's current leadership, but knows how to skillfully navigate and exploit Russia's political and institutional environment.[4] Vimpelcom was founded in 1992 and became the first Russian company listed at the New York Stock Exchange in

2 David E. Hoffman, *The oligarchs: Wealth and power in the new Russia* (New York: Public Affairs, 2011), 266.

3 Courtney Weaver, "Moscow court seizes Yevtushenkov's Bashneft shares: Move fuels fears Moscow will attempt to seize the billionaire's take control of oil company," *Financial Times*, September 26, 2020, https://www.ft.com/content/27620c38-457a-11e4-9b71-00144feabdc0 (accessed July 31, 2020).

4 One example was his long-standing feud with minority shareholder Telenor: In 2009, Fridman initiated a highly suspicious lawsuit against Telenor and managed to have Telenor's shares arrested. Only after Norwegian Prime Minister Jens Stoltenberg intervened by appealing to Vladimir Putin were the shares released. Telenor eventually sold all of its remaining shares in Veon (the holding that owns Vimpelcom) in 2019. Andrew E. Kramer, "Telenor Ruling Stirs Fear of Court Shopping in Russia," *New York Times*, April 10, 2009, https://www.nytimes.com/2009/04/11/business/global/11ruble.html (accessed July 31, 2020).

The BIG FOUR

1996. Norwegian Telenor became a strategic partner and key investor in the company in 1998. Fridman bought a controlling stake in Vimpelcom from its Russian founders in 2001.

Finally, there is Alisher Usmanov, who controls the third private Russian operator, Megafon. The Uzbekistan-born businessman rose to wealth thanks to his role at Gazprom in the beginning of the Putin era. Over the years, the Kremlin has trusted Usmanov with many politically delicate business assets (e.g., in mass media). Megafon fell into Usmanov's lap in 2010. The company has its roots in the operator "North-West GSM," which was set up in St. Petersburg in 1993 with the help of a trio of Scandinavian investors: Sonera (Finland), Telia (Sweden), and Telenor (Norway).[5] The offshore holding behind the Russian stake in Megafon has often been linked to Leonid Reyman, who later became communications minister under Vladimir Putin. Reyman left politics in September 2010, the same month Usmanov bought out the offshore holding's stake.[6] Usmanov's Megafon is less transparent than its competitors and more often shows loyalty to the state. The operator is reluctant to openly challenge the authorities and regularly cooperates with state-owned companies.

The fourth network operator in Russia, Tele2, is controlled by state-owned Rostelekom. Tele2 Russia used to be a subsidiary of Swedish Tele2 AB. Rostelekom has retained the rights to use the Tele2 brand in Russia. The Swedes were successful as a cheap alternative to MTS, Vimpelcom, and Megafon in the late 2000s, but ultimately lacked the political clout to secure radio spectrum licenses for 3G and 4G broadband internet. The company was sold to a consortium of Russian investors led by state bank VTB in March 2013, and later merged with Rostelekom's mobile business. The firm's struggles with the regulatory authorities ended soon afterwards.[7]

5 "Kak zakalyalas' stal' [How the steel was tempered]," *ComNews Standart* 65, no. 6 (2008), https://www.comnews.ru/standart/article/52121 (accessed July 31, 2020).

6 Vladimir Lavitskiy, "Leonid Reyman ushel so svyazi [Leonid Reyman went offline]," *Kommersant*, September 13, 2010, https://www.kommersant.ru/doc/1503272 (accessed July 31, 2020).

7 A detailed description of the Tele2 case can be found in Janis N. Kluge, "Foreign direct investment, political risk and the limited access order," *New Political Economy* 22, no. 1 (2017).

Chart 1: Number of mobile devices registered in Russia

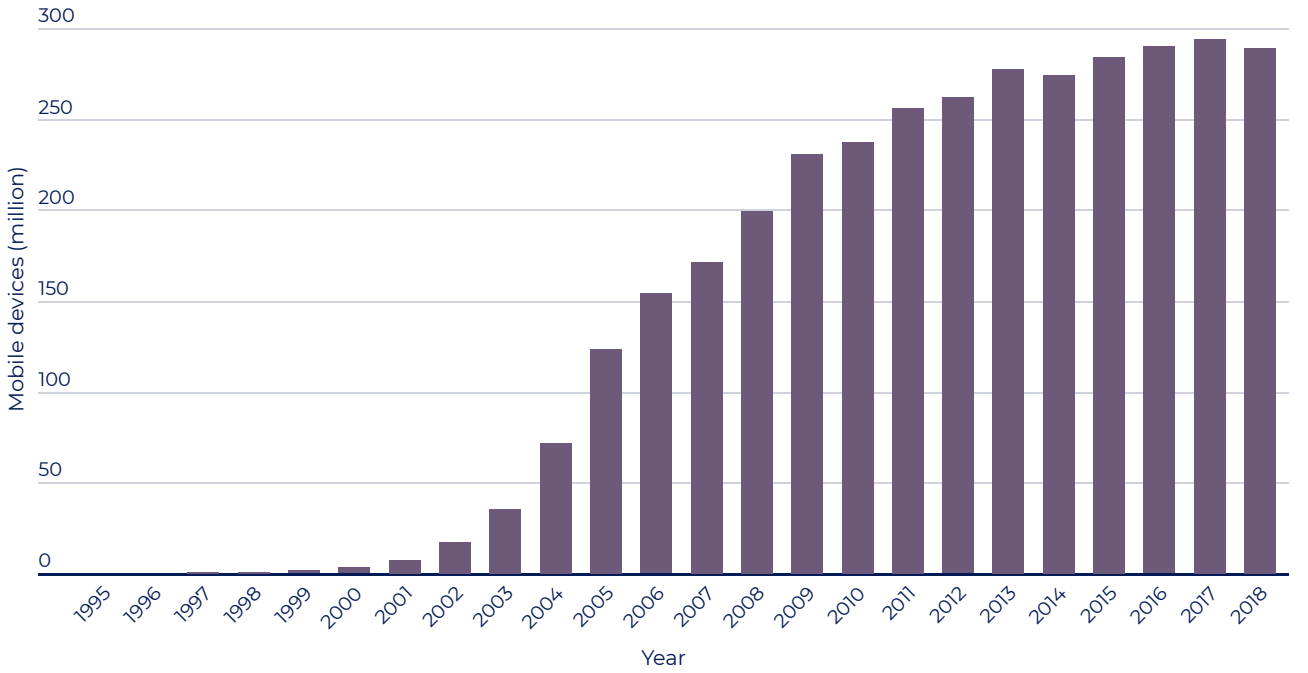


Chart based on data from: Federal State Statistic Service, "Informatsionnoye obshchestvo [Information society]," https://www.gks.ru/folder/14478 (accessed July 31, 2020).

Chart 2: Mobile internet data transfer in Russia (gigabytes per quarter)

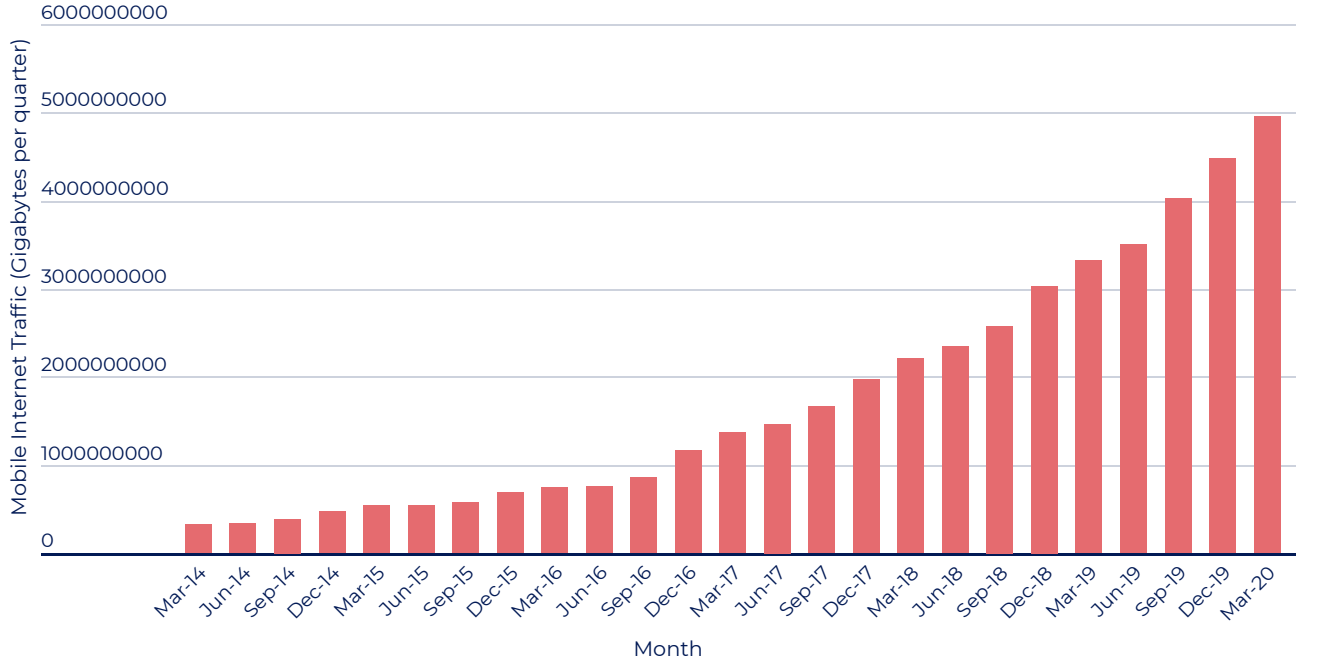


Chart based on data from: Ministry of Digital Development, Communications and Mass Media of the Russian Federation, "Ob"yem informatsii, peredannoy ot/k abonentam setey podvizhnoy svyazi pri dostupe v Internet [Volume of information, transmitted from/to users of wireless networks during internet access]," https://fedstat.ru/indicator/45521 (accessed July 31, 2020).

DOES RUSSIA NEED 5G?

The introduction of 3G and 4G mobile communication networks in Russia lagged behind most Western countries by several years. Much of this delay has been due to the slow allocation of radio spectrum to Russian carriers. While the first auctions for 3G (UMTS) spectrum took place in large European markets around 2000, Russia's State Commission for Radio Frequencies (GKRCh) allocated the first nationwide 3G licenses only in 2007.[8] When the first nationwide 4G (LTE) spectrum was allocated in Russia in 2012,[9] Russia had reduced the gap, but was still several years behind.

As rollouts of 5G networks become more common around the world, Russia's operators are impatiently waiting to start their 5G deployment. They are driven by the desire to defend market shares and differentiate themselves from their competition. Russia's networks are also increasingly challenged by rapidly growing mobile internet traffic. While the number of registered mobile end user devices in Russia stopped its explosive growth in 2013 as the market reached saturation, the wide availability of 4G networks at affordable prices led to a surge in mobile internet usage over the last five years. Mobile traffic continued its exponential growth in early 2020 and further accelerated during the COVID-19 pandemic.

AS ROLLOUTS OF 5G NETWORKS BECOME MORE COMMON AROUND THE WORLD, RUSSIA'S OPERATORS ARE IMPATIENTLY WAITING TO START THEIR 5G DEPLOYMENT.

The average 4G connection speed in Russia strongly fluctuates during the day, reflecting the increasing mobile data traffic congestion. In 2019, the average 4G transfer speed in Russia was 12.3 mbit/s during the busiest hour (usually 9 pm), compared to 25.5 mbit/s around 3 am. The overall speed is similar to 4G networks in the U.S. (15.3 – 28.8 mbit/s), but much slower than, e.g., in South Korea (40.8 – 55.7 mbit/s). [10] According to Gulnara Khasyanova, the executive director of LTE Union, a lobbying group run by Russia's four network carriers, transfer volumes will continue to triple every three years, and the possibilities to accommodate the growth without 5G are practically exhausted.[11]

In the longer run, there is much more at stake for Russia than additional bandwidth. The new standard is expected to enable the development of new digital services, and

8 Yuliya Belous, "Operatoram vystavyat bally [Operators get rated]," December 25, 2006, https://www.vedomosti.ru/newspaper/articles/2006/12/25/operatoram-vystavyat-bally (accessed July 31, 2020).

9 ""Rostelekom", MTS, "Megafon" i "Vympelkom" poluchili LTE-litsenzii [Rostelekom, MTS, Megafon and Vimpelcom got LTE licenses]," RIA Novosti, July 12, 2012, https://ria.ru/20120712/697755982.html (accessed July 31, 2020).

10 Ibid.

11 The statement was made in October 2018. Leonid Konik, "5G-seti v RF poluchili plan razvitiya [5G networks in the Russian Federation got a development plan]," November 7, 2018, https://www.comnews.ru/content/115672/2018-11-07/5g-seti-v-rf-poluchili-plan-razvitiya (accessed July 31, 2020).

5G IS WIDELY BELIEVED TO DEEPLY CHANGE NOT ONLY THE MOBILE COMMUNICATIONS INDUSTRY, BUT ALSO NEARLY ALL SECTORS OF THE ECONOMY. CONSIDERING RUSSIA'S RELATIVE STRENGTH IN DIGITAL TECHNOLOGIES, AND THE DEVELOPMENT HOPES THAT IT PINS TO DIGITALIZATION, THE ULTIMATE PRICE OF MISSING THE 5G TRAIN WOULD BE HIGH.

(Adobe Stock)

could become crucial for technologies in which Russia is already experimenting, such as self-driving cars.[12] 5G is widely believed to deeply change not only the mobile communications industry, but also nearly all sectors of the economy. Considering Russia's relative strength in digital technologies, and the development hopes that it pins to digitalization, the ultimate price of missing the 5G train would be high. As former Vice Prime Minister Maksim Akimov, who oversaw Russia's National Project "Digital Economy," has repeatedly pointed out, without quick progress on 5G, "We would condemn ourselves to technological backwardness." [13]

RUSSIA'S MEANDERING 5G DEBATE

The introduction of 5G in Russia is in many ways a replay of the 3G and 4G rollouts. The deployment of each new standard needed several years of high-stakes bargaining among carriers, the security apparatus, the Ministry for Communications and Mass Media ("Communications Ministry"[14]), and other regulatory authorities such as the Federal Anti-Monopoly Service (FAS). Much like during the introduction of 3G and 4G, the most contentious question during the transition to 5G is the allocation of scarce radio spectrum to mobile operators.

Most of the regulatory bargaining takes place behind closed doors and is difficult to analyze, especially where the interests of the siloviki are affected. Still, the market stakeholders have produced a plethora of 5G concepts and roadmaps since 2015. At any given time, there are several conflicting documents and strategies under development, making it impossible to pin down "the" official Russian strategy on 5G.

5G in Russia's National Project "Digital Economy"

The first tentative exploration of the potential of 5G for Russia was undertaken by the Communications Ministry in 2015 when it commissioned an "Analysis of the perspectives of 5G networks development in Russia" from the Radio Research and Development Institute (NIIR).[15] In 2017, more substantial efforts to formulate a national 5G strategy were started within the framework of the state program "Digital Economy

12 Nadezhda Tsydenova and Alexander Marrow, "Yandex races ahead with driverless car plans," *Reuters*, February 14, 2020, https://www.reuters.com/article/uk-russia-yandex-results/yandex-races-ahead-with-driverless-car-plans-idUSKBN2081ZN (accessed July 31, 2020).

13 Rossiya 24, *Vitse-prem'yer Maksim Akimov: v obshchestve rastet zapros na bezopasnost' tsifrovykh dannykh [Vice Prime Minister Maksim Akimov: in the society there is a growing demand for digital data security]* (2019), Youtube.com, https://youtu.be/XnRa1qveMJc?t=1063 (accessed July 31, 2020).

14 The ministry was renamed to "Ministry of Digital Development, Communications and Mass Media of the Russian Federation" by President Vladimir Putin after his reelection in 2018. "Minkomsvyaz' pereimenovana v Ministerstvo tsifrovogo razvitiya, svyazi i massovykh kommunikatsiy [Minkomsvyaz was renamed to Ministry of Digital Development, Communications and Mass Media of the Russian Federation]," *Kommersant*, May 15, 2018, https://www.kommersant.ru/doc/3629435 (accessed July 31, 2020).

15 Polina Zimina, "Minsvyazi of the Russian Federation orders analysis of the perspectives for 5G networks development for 6.9 mln rubles (Minsvyazi RF zakazhet za 6,9 mln rubley analiz perspektiv razvitiya setey 5G)," *Cableman*, June 2, 2015, https://www.cableman.ru/content/minsvyazi-rf-zakazhet-za-69-mln-rublei-analiz-perspektiv-razvitiya-setei-5g (accessed July 31, 2020).

5G milestones in the December 2018 outline of the National Program "Digital Economy"

Milestone	Deadline	Progress
A concept for the development of 5G networks in Russia is approved	March 2019	Delayed
The radio spectrum for 5G networks in Russia is defined	September 2019	Delayed
A plan for freeing up the radio spectrum for 5G is approved	December 2020	Unlikely to be met
5G pilot projects in five sectors of the economy and one megacity	December 2020	Unlikely to be met
Conditions are in place for 5G development in 10 megacities	December 2021	Unlikely to be met

of the Russian Federation."[16] In 2018, the "Digital Economy" program was repurposed to become one of Russia's 13 "National Projects," a flagship investment initiative for Putin's third term in office.

5G milestones in the December 2018 outline of the National Program "Digital Economy"
Source: Outline of the National Program "Digital Economy" and experts' estimates.[17]

Traditionally, Russian telecommunications regulators have closely cooperated with the network providers. To facilitate the exchange between the industry and state actors within the "Digital Economy" project, an "autonomous non-commercial organization" (ANO) was set up by the Communications Ministry in 2017 ("ANO Digital Economy"). The organization is an integral part of the National Program's governance, and changes to the project's goals and timelines, including decisions on 5G, must be approved by a majority vote in the respective working group within the organization.[18]

The 5G rollout mainly falls into the responsibility of the ANO working group "Information Infrastructure". In this forum, the interests of MTS, Vimpelcom, Megafon, and Rostelekom are well-represented. The group's chairwoman is Anna Serebryanikova from Megafon.[19] However, 5G is also part of discussions in the parallel working group "Digital Technologies," which is concerned with advancing Russia's domestic hardware and software industry.[20] Here, the network operators have a weaker voice, and the group is dominated by state corporations in the tech sector, such as state corporation Rostec, which are lobbying for subsidies and import substitution requirements, which often runs counter to the operators' interests.

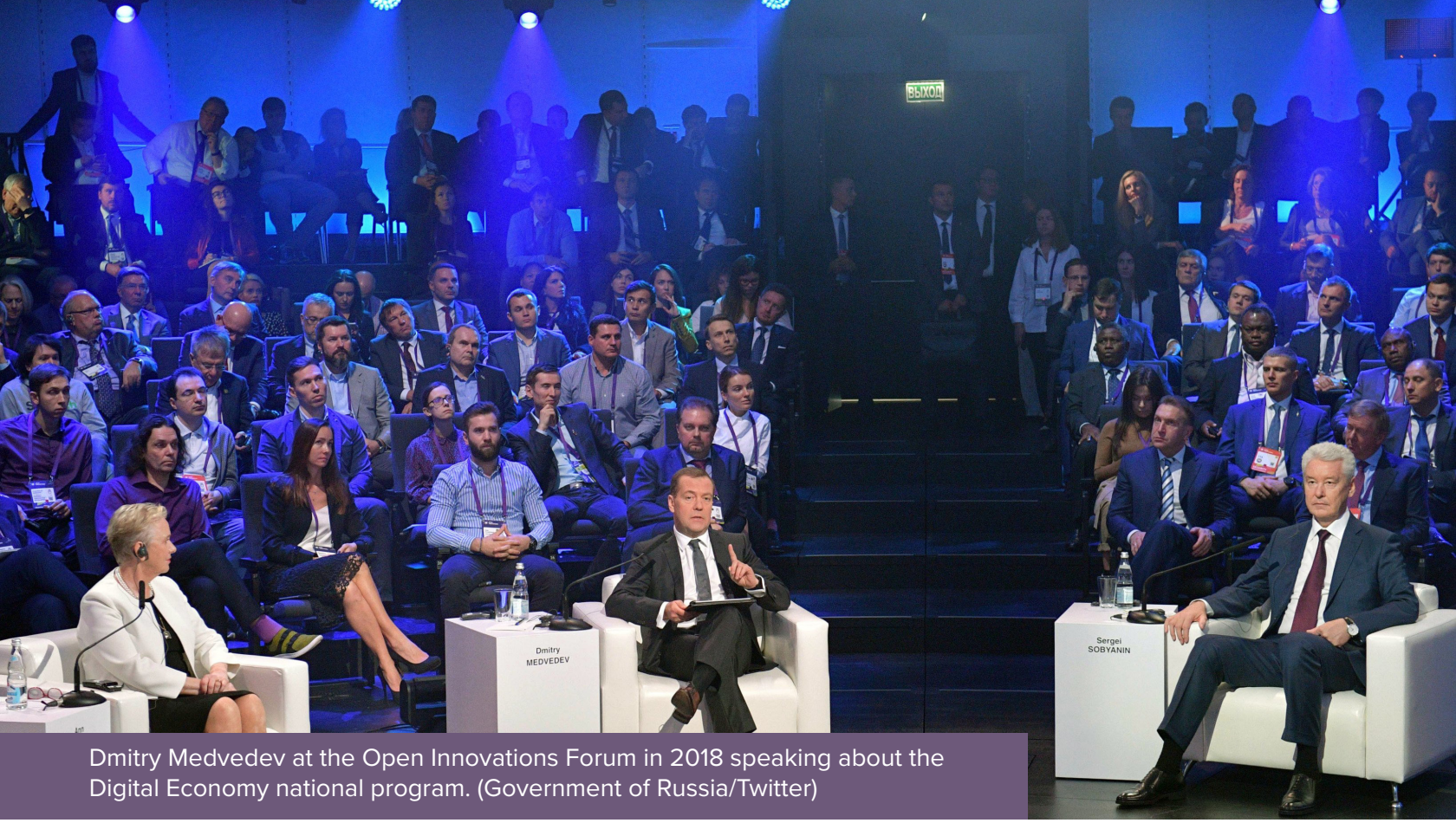
16 Government of Russia, "Ob utverzhdenii programmy «Tsifrovaya ekonomika Rossiyskoy Federatsii» [On the confirmation of the program "Digital Economy of the Russian Federation]," July 31, 2017 (accessed July 31, 2020), http://government.ru/docs/28653/.

17 Presidential Council for Strategic Development and National Projects, "Pasport natsional'noy programmy "Tsifrovaya ekonomika Rossiyskoy Federatsii" [Passport of the National Program "Digital Economy of the Russian Federation"]," December 24, 2018 (accessed July 31, 2020), https://phototass2.cdnvideo.ru/futurerussia/uploads/20191127/20191127134147_5dde52ebba396.pdf.

18 The program's governance structure is laid out in: Government of Russia, "O sisteme upravleniya realizatsiyey programmy «Tsifrovaya ekonomika Rossiyskoy Federatsii» [On the system of governance of the National Program "Digital Economy of the Russian Federation"]," August 28, 2017 (accessed July 31, 2020), http://government.ru/docs/29003/.

19 A list of the group's members can be found at: Avtonomnaya nekommercheskaya organizatsiya «Tsifrovaya ekonomika», "Informatsionnaya infrastruktura [Information infrastructure]," https://data-economy.ru/infrastructure (accessed July 31, 2020).

20 A list of the group's members can be found at: Avtonomnaya nekommercheskaya organizatsiya «Tsifrovaya ekonomika», "Tsifrovyye tekhnologii [Digital technologies]," https://data-economy.ru/science (accessed July 31, 2020).



Dmitry Medvedev at the Open Innovations Forum in 2018 speaking about the Digital Economy national program. (Government of Russia/Twitter)

Clash of Concepts

According to the outline of the "Digital Economy" program, the first step on Russia's path to 5G is the approval of a commonly prepared strategy (the "5G concept"). As of August 2020, the goal has not been reached. The network operators presented a first draft in November 2018, and voted to approve it in the ANO working group "Information Infrastructure."[21] In December 2018, a second, independent draft was presented by the Communications Ministry, which contradicted the operators' proposal on several points, and was rejected by the working group.[22]

Throughout 2019, the Communications Ministry, the network operators, and other government agencies negotiated over their drafts. Two sticking points arose during their discussions. First, the network operators insisted that the 3.4-3.8 GHz band should be prioritized for the deployment of 5G, which was rejected by the security apparatus. Second, the operators and the Federal Antimonopoly Service strongly opposed the Ministry's idea that a single shared 5G network should be built. Although the Communications Ministry and the operators finally reached a compromise in September 2019, the Ministry unexpectedly and unilaterally approved an earlier draft of the concept in December 2019.[23] While the operators were still puzzling

21 The draft concept was authored by the private consultancy "Spektrum Management." Konik, "5G-seti v RF poluchili plan razvitiya [5G networks in the Russian Federation got a development plan]"

22 Anna Ustinova, "Dvuglavaya kontseptsiya 5G [Double-headed 5G concept]," *ComNews*, December 3, 2018, https://www.comnews.ru/content/116135/2018-12-03/dvuglavaya-koncepciya-5g (accessed July 31, 2020).

23 Ministry of Digital Development, Communications and Mass Media of the Russian Federation, "Prikaz Minkomsvyazi Rossii N° 923 «Ob utverzhdenii Kontseptsii sozdaniya i razvitiya setey 5G/IMT-2020 v Rossiyskoy Federatsii» [Order of the Minkomsvyazi of Russia No. 923 "On the confirmation of concept for the creation and development of 5G/IMT-2020 networks in the Russian Federation]," (accessed July 31, 2020), https://digital.gov.ru/ru/documents/6990/.

over this step, the Russian government was dismissed by Vladimir Putin in January 2020, and negotiations over the 5G concept resumed with the ministry's new leadership.[24]

Rostec's Rent-Seeking

Parallel to the ongoing discussions on a 5G concept, Russia's state-owned arms and technology giant Rostec produced its own road map on "Technologies for Wireless Communication" for the "Digital Technologies" working group in the ANO. The document also contains a plan for the introduction of 5G, including possible frequency bands, but it focuses on the development of a competitive wireless harware- and software industry in Russia. The Rostec road map proposes an expansive list of state subsidies for the development of technical specifications, prototypes, and calls for several new plans on different aspects of wireless high-tech to be developed.[25]

Finally, yet another parallel strategy process was launched in July 2019. In the presence of Vladimir Putin, state companies Rostelekom and Rostec signed an agreement with the government to produce a road map on "Fifth Generation Mobile Networks."[26] The result was presented in December 2019. It envisions the production of 20,000 5G base stations "Made in Russia" by 2024, and 200,000 base stations by 2030,[27] which subsequently should be exported to other post-Soviet and African markets.[28] The road map identifies the need for billions of rubles in subsidies by the state. Requirements for import substitution in the 5G rollout have since become the third sticking point in the bargaining process.

THE GOLDEN SPECTRUM

The main issue in the negotiations among Russia's 5G stakeholders is the question which part of the radio spectrum should be made available for 5G. In principle, 5G can be used on many different frequency bands, but only one particular spectrum, 3.4-3.8 GHz, currently promises quick commercial success in Russia. Lower frequencies (below 1 GHz) enable reliable connections over long distances, but are more suitable for smaller amounts of data. They are ideal for devices that transmit very little data and for sparsely populated (and poorer) regions because fewer base stations can cover a larger territory. High frequencies (over 20 GHz, often called the "millimeter band") enable large bandwidths and many simultaneously connected devices, but the signal has a short range and cannot pass through walls or even rainfall, making

24 Anna Ustinova, ""Chernyy yashchik" 5G ["Black box" 5G]," *ComNews*, January 27, 2020, https://www.comnews.ru/content/204215/2020-01-27/2020-w05/chernyy-yaschik-5g (accessed July 31, 2020).

25 Ministry of Digital Development, Communications and Mass Media of the Russian Federation, "Dorozhnaya karta razvitiya «skvoznoy» tsifrovoy tekhnologii «Tekhnologii besprovodnoy svyazi» [Road map for the development of "cross-cutting" digital technolgies "Wireless connection technologies"]," October 10, 2019 (accessed July 31, 2020), https://digital.gov.ru/ru/documents/6674/.

26 The original title of the road map was "New Generation Wireless Communication." "Putin potreboval ot kabmina i goskompaniy aktivno nachinat' rabotu v sfere novykh tekhnologiy [Putin demandend from the cabinet and state companies to actively start work in the sphere of new technologies]," *TASS*, July 10, 2019, https://tass.ru/ekonomika/6649943 (accessed July 31, 2020).

27 Igor Korolev, "«Rostekh» i «Rostelekom» khotyat potratit' 92 milliarda na sozdaniye rossiyskogo 5G-«zheleza» ["Rostec" and "Rostelekom" want to spend 92 billion on the development of Russian 5G hardware]," February 12, 2020, https://www.cnews.ru/news/top/2020-02-12_rosteh_i_rostelekom (accessed July 31, 2020).

28 Yuliya Tishina, "Iz Rossii — s 5G [From Russia - with 5G]," December 24, 2019, https://www.kommersant.ru/doc/4205894 (accessed July 31, 2020).

it suitable for local applications, such as campus networks, city squares, or soccer stadiums. The "in-between" frequencies (1 to 6 GHz) combine most advantages of both the high and the low bands. The radio spectrum most frequently allocated for 5G networks internationally is the 3.4-3.8 GHz band, which in Russia is referred to as the "golden band" (zolotoy diapazon).

What makes the 3.4-3.8 GHz frequency band "golden" in the eyes of Russia's network operators is not just its radio electronic characteristics, but also economies of scale on the international market for telecommunications equipment. A large and highly competitive ecosystem of end user devices (such as smartphones) and network infrastructure is quickly developing around the 3.4-3.8 GHz radio spectrum. This is not the case for other frequencies, such as the 4.4-4.9 GHz band, which is also discussed in Russia. While alternative frequencies are supported by many smartphone chips in theory, and network infrastructure can be produced for non-standard spectrum as well, prices are higher and market development will be slower. According to a Huawei representative in Russia, equipment for 4.4-4.9 GHz would be at least 50% more expensive than the "golden spectrum." [29] Alternative frequencies currently have a low priority among 5G equipment producers and operators.[30]

WHILE ALTERNATIVE FREQUENCIES ARE SUPPORTED BY MANY SMARTPHONE CHIPS IN THEORY, AND NETWORK INFRASTRUCTURE CAN BE PRODUCED FOR NON-STANDARD SPECTRUM AS WELL, PRICES ARE HIGHER AND MARKET DEVELOPMENT WILL BE SLOWER.

Siloviki in the Way

Russia's "golden band" is currently occupied by a large number of civilian and military applications. The introduction of 3G and 4G suffered from a similar problem. It can be (and in the past has been) solved by transferring existing applications to a different part of the radio spectrum. However, this process is expensive, involves technical and security risks, and, in the case of the 3.4-3.8 GHz band

29 Yuliya Tishina, "5G of Eastern frequencies (5G vostochnoy chastoty)," August 12, 2019, https://www.kommersant.ru/doc/4059293 (accessed July 31, 2020). There are also other problems connected to the 4.4-4.9 GHz spectrum, such as interference with NATO friend-foe airplane recognition that would force operators to keep a 200km distance from NATO borders. Valeriy Kodachigov and Ekaterina Kinyakina, "Operatory lishilis' eshche odnoy vozmozhnosti bystro zapustit' v Rossii 5G [The operators lost another possibility to quickly unroll 5G in Russia]," *Vedomosti*, March 6, 2020, https://www.vedomosti.ru/technology/articles/2020/03/05/824604-operatori-lishilis (accessed July 31, 2020).

30 Leonid Kovachich, "Chastoty dlya setey 5G. Pochemu Rossiya i SShA vybirayut osobyy put', a Kitay – net [Frequencies for 5G networks. Why Russia and the US are chosing a special path, and China does not]," *Carnegie Moscow Center*, August 27, 2019, https://carnegie.ru/commentary/79723 (accessed July 31, 2020).

in Russia, it is particularly complicated.

The current users of the 3.4-3.8 GHz band include fixed wireless internet providers, radio relay systems, medium-range flight radars (such as used by the Russian S-400 air-defense system), and satellite communication services. Discontinuing fixed wireless internet is the least problematic issue. Radio relay systems and air-defense systems can coexist with 5G if they remain at a certain distance from 5G base stations. The main problem standing in the way of 5G in Russia is satellite communications. The frequencies needed for 5G happen to be ideal for covering Russia's vast territories with satellite television, and the federal channels are transmitted on this spectrum. The state-owned space corporation Roskosmos is using the frequency band to control satellites and other space equipment from several different space centers across Russia. Most importantly, however, the Defense Ministry is operating its own satellites and communicates with them through 1,400 base stations, both stationary and mobile, on the needed radio spectrum. The military and the Federal Protective Service (FSO, a special agency for protecting the president and other high-ranking officials) also use the spectrum for their emergency communication system.[31]

Waiting for Putin

While the technical complexity of clearing up the "golden band" for 5G is already staggering, the more daunting task is to convince the risk-averse and conservative security elites in Moscow to give up their frequencies for a technology that they may not see as essential for Russia and that involves foreign vendors roaming Russia's territory to set up network infrastructure. Neither the network operators nor the civilian authorities in Russia's government have enough lobbying power to overcome the siloviki's resistance. It will take a decision from Putin to move the process ahead. To get Putin's attention, former Vice Prime Minister Maksim Akimov has repeatedly tried to ring the alarm bell, stating in interviews that it is a "it is a question of survival" that the frequencies be made available for 5G. [32] In April 2019, Akimov asked Putin directly for support.[33]

However, in August 2019, the president instead supported the Russian Security Council's position not to clear the needed frequencies, leaving only the 4.4-4.9 GHz band for 5G as the closest hypothetical alternative. The Council had concluded that it was impossible to combine the current use of the spectrum with 5G networks.[34] In May 2020, the Council again declined a request by the network operators to allow the transformation of the spectrum for 5G use.[35] The carriers' request to adapt their existing 3G and 4G licenses to the use of 5G was

31 Igor Korolev, "Rossiyskiye 5G v opasnosti: Vlasti vydelili im samyye marginal'nyye chastoty [Russian 5G in danger: The authorities allocated the most marginal frequencies]," CNews, April 15, 2019, https://www.cnews.ru/news/top/2019-04-15_rossijskie_5g_v_opasnosti_vlasti_vydelili_im (accessed July 31, 2020).

32 "Maksim Akimov: «Chinovniki ne doveryayut chastnomu biznesu, a on – gosudarstvu» [Maksim Akimov: "Officials don't trust private business, and it doesn't trust the government"]," *Vedomosti*, June 4, 2019, https://www.vedomosti.ru/politics/characters/2019/06/04/803269-maksim-akimov (accessed July 31, 2020).

33 Kremlin.ru, "Vstrecha s vitse-prem'yerom Maksimom Akimovym [Meeting with Vice Prime Minister Maksim Akimov]," Kremlin http://kremlin.ru/catalog/persons/552/events/60331 (accessed July 31, 2020).

34 Svetlana Yastrebova, "Putin ne otdayet operatoram populyarnyye chastoty dlya 5G [Putin does not give the popular frequencies for 5G to the operators]," *Vedomosti*, August 15, 2019, https://www.vedomosti.ru/technology/articles/2019/08/14/808820-putin-ne-otdaet (accessed July 31, 2020).

35 Valeriy Kodachigov and Ekaterina Kinyakina, "Sovet bezopasnosti snova otkazalsya otdavat' operatoram chastoty dlya 5G [The Security Council again declined frequencies for 5G to the operators]," *Vedomosti*, May 14, 2020, https://www.vedomosti.ru/technology/articles/2020/05/14/830255-sovet-bezopasnosti-snova-otkazalsya-otdavat-operatoram-5g (accessed July 31, 2020).

(Istockphoto.com)

denied by the Security Council as well due to resistance from Roskosmos and security services.[36] The operators have not given up hope yet, and the frequency question was raised again in a conversation between the network operators and Putin in June 2020.[37] Several schemes for reaching an agreement are under discussion, including the buy-out of the needed frequencies by the network carriers.[38]

While the radio spectrum issue remains unresolved, Russia is slipping further behind on its original milestones outlined in the National Program "Digital Economy." The timeline is likely to be updated later in 2020[39] as a major overhaul of the program is underway.[40] Meanwhile, Russia's operators are limited to 5G testing in small, specially designated areas. Megafon and Rostelekom were the first to operate test zones during the soccer World Championship in 2018 in the 3.4-3.8 GHz band.[41] Since 2019, all of the Big Four carried out experiments on different frequencies, partnering with equipment

36 Kodachigov and Kinyakina, "Operatory lishilis' eshche odnoy vozmozhnosti bystro zapustit' v Rossii 5G [The operators lost another possibility to quickly unroll 5G in Russia]"

37 Yuliya Tishina and Angelina Galanina, "Operatory vyshli na svyaz' s prezidentom [The operators connected with Putin]," *Kommersant*, June 10, 2020, https://www.kommersant.ru/doc/4376912 (accessed July 31, 2020).

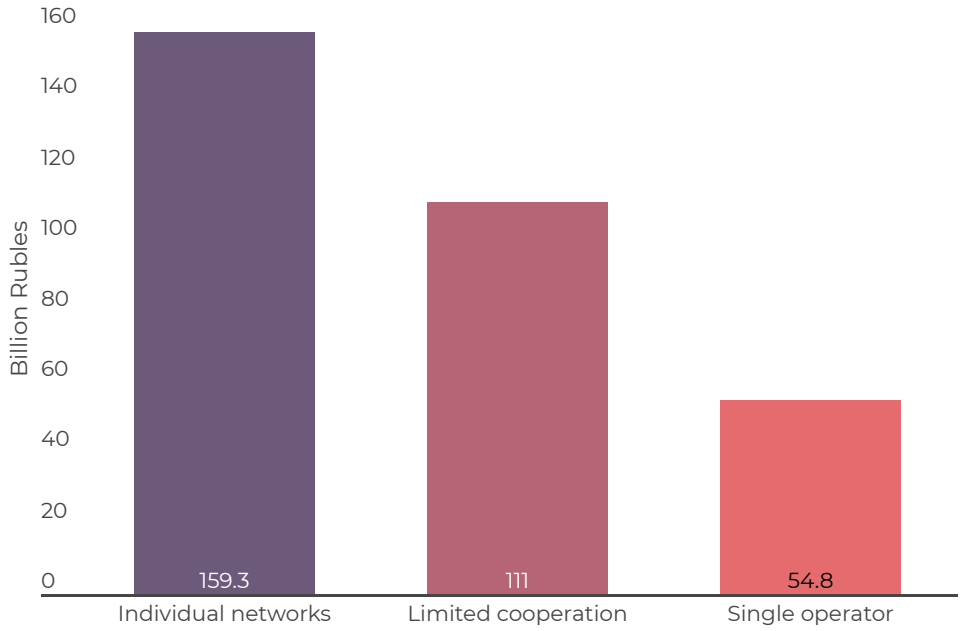
38 Valeriy Kodachigov and Ekaterina Kinyakina, "Minkomsvyazi nashlo sposob osvobodit' chastoty dlya 5G [Minkomsvyazi found a way to free frequencies for 5G]," *Vedomosti*, April 3, 2020, https://www.vedomosti.ru/technology/articles/2020/04/03/827063-minkomsvyazi (accessed July 31, 2020).

39 "Chernyshenko: sroki vnedreniya 5G v natsproyekte "Tsifrovaya ekonomika" poka ne perenesli [Chernyshenko: the timeline for the 5G rollout in the National Project "Digital Economy" has so far not been changed]," *TASS*, July 22, 2020, https://tass.ru/nacionalnye-proekty/9027045 (accessed July 31, 2020).

40 El'yas Kasmi, "Minkomsvyazi kardinal'no menyaet natsprogrammu «Tsifrovaya ekonomika». Izmeneniya ischislyayutsya desyatkami [Minkomsvyazi fundamentally changes National Program "Digital Economy". There are dozens of changes]," *CNews*, June 17, 2020, https://www.cnews.ru/news/top/2020-06-17_minkomsvyazi_kardinalno (accessed July 31, 2020).

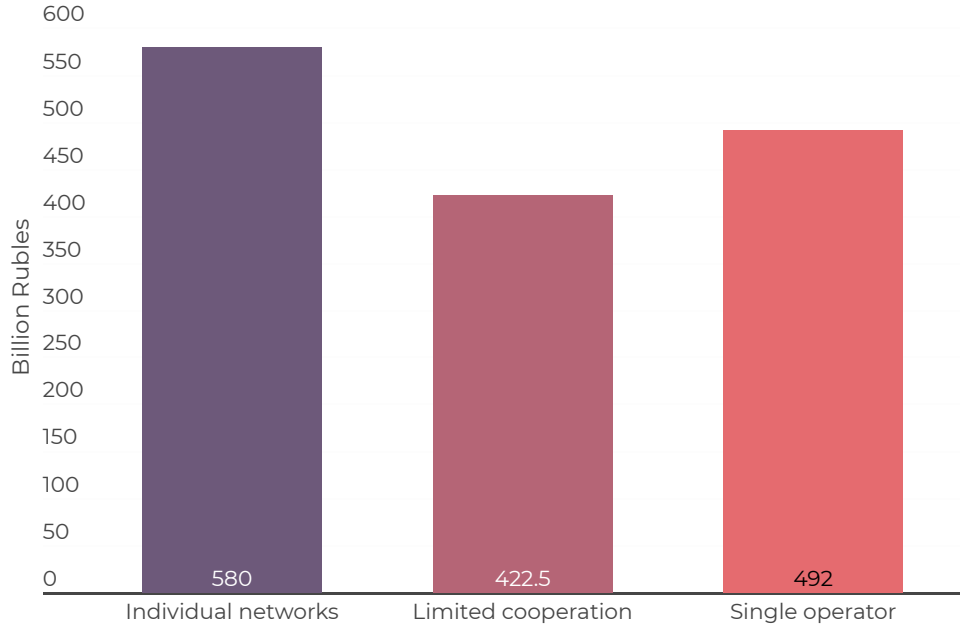
41 Igor Korolev, "Gde v Rossii v pervuyu ochered' zarabotayet 5G. Spisok [Where 5G will start to work first in Russia. List]," *CNews*, December 24, 2018, https://www.cnews.ru/news/top/2018-12-24_gde_v_rossii_v_pervuyu_ochered_zarabotaet_5gspisok (accessed July 31, 2020).

Chart 3: Total infrastructure investments for 5G rollout until 2024 (billion rubles)



Own chart, based on average values from *id.*, p. 79.

Chart 4: Total infrastructure investments, operators' view



Own chart, based no average values from Konik, "5G-seti v RF poluchili plan razvitiya [5G networks in the Russian Federation got a development plan]"

producers Huawei, Nokia, and Ericsson.[42] In July 2020, MTS received Russia's first license to offer 5G in the "millimeter band" (24.25-24.65 GHz). However, because it can only be used for small local networks and there is not yet enough equipment for these frequencies available, the license has little economic significance for MTS for now.[43]

AN ALL-RUSSIAN 5G NETWORK

The spectrum stalemate between the siloviki and the network operators puts the Communications Ministry, which is responsible for ensuring Russia's progress on 5G, in a difficult position. To deliver on the official 5G deadlines, the Communications Ministry wants the operators to join forces and build one single network that is shared by all market participants. The hope is that, for a single network, less of the radio spectrum would have to be wrested from the siloviki. The Communications Ministry has traditionally liked the idea of a single all-Russian operator, especially if it includes state participation. In 2011, during the run-up to the 4G frequency auctions in Russia, telecoms firm Skartel (then-partially owned by state corporation Rostec) was supposed to build and operate one unified 4G network in Russia. During a Memorandum of Understanding signing ceremony Putin expressed his hope: "Where there would have been three or four towers, now will be only one." [44] However, the operators' cooperation remained limited to joint lobbying for freeing up radio spectrum, which was then allocated to the operators individually.[45]

WHILE EACH OF THE BIG FOUR STILL RUNS AN EXCLUSIVE NETWORK IN THE BIG LUCRATIVE MARKETS SUCH AS MOSCOW, SHARING NETWORKS IN OTHER REGIONS HAS BECOME COMMON.

Sharing networks is not an issue for Russia's carriers *per se*. The network operators intensely cooperate in their network rollout, but on the basis of mostly bilateral, commercially negotiated agreements. Shared infrastructure first became a trend after the 2008 Global Financial Crisis forced

42 Anastasiya Skrynnikova, "MTS ne poluchit chastoty iz «zolotogo diapazona» dlya testirovaniya 5G [MTS will not get frequencies from the "golden band" for testing 5G]," *RBK*, March 17, 2020, https://www.rbc.ru/technology_and_media/17/03/2020/5e7102ca9a79473863e3e2b4 (accessed July 31, 2020).

43 El'yas Kasmi and Igor Korolev, "V Rossii vydana pervaya litsenziya na 5G. Eye poluchila MTS [In Russia the first 5G license was given out. MTS got it]," *CNews*, July 28, 2020, https://www.cnews.ru/news/top/2020-07-28_v_rossii_vydana_pervaya_v (accessed July 31, 2020).

44 Polina Zimina, "«Skartel» k 2014 g. postroit set' LTE v RF ["Skartel" will build an LTE network in Russia until 2014"]," *Cableman*, March 4, 2011, https://www.cableman.ru/content/skartel-k-2014-g-postroit-set-lte-v-rf (accessed July 31, 2020).

45 In Russia, radio communications licenses are not sold in auctions, but assigned in "beauty contests," in which the applicants are ranked according to pre-defined criteria.

Russia's providers to cut costs.[46] The sharing of active infrastructure (including antennas and networks) was only legalized in Russia in 2014. Soon after, MTS and Vimpelcom agreed to build shared 4G networks in 36 Russian regions. Similarly, Megafon and Vimpelcom cooperated in 10 regions.[47] While each of the Big Four still runs an exclusive network in the big lucrative markets such as Moscow, sharing networks in other regions has become common.

Cost Considerations

On the surface, the discussion about a possible single operator, shared 5G network is based on technical and economic considerations. In its 5G concept draft, the Ministry emphasized the advantages of the idea:[48]

- The main argument is that capital expenditure would be lower if only one network is built. The Communications Ministry also expects the rollout of a single network to be quicker and providing more coverage for remote regions.
- The struggle to free up the radio spectrum may be alleviated if a common operator is formed. A commercially viable 5G network requires a spectrum block of a certain minimum size (e.g., 50-100 MHz in the 3.4-3.8 GHz band). A single network could be built if the siloviki compromise and make 100 MHz available.
- With "network slicing," the 5G standard could make it easier to share a common network among several operators.

The network carriers give a contradicting conclusion in their draft 5G concept. They deem the "single operator" scenario to be the worst approach, recommending "limited cooperation" instead (where up to 70% of base stations are shared by two operators). While they rank the single network second in terms of capital expenditure, they point to risks for competition in the market, innovation, and service quality if only one network is built by a single operator. The market participants also see higher technical and political risks connected to a single network, as there would be no redundancy in case of a network failure.[49] Russia's Federal Antimonopoly Service similarly voiced its concerns regarding the "single operator" idea, calling it risky for the state, business, and consumers.[50]

Will Competition Survive?

The discussion about a possible single network seems technocratic, but there is more at stake for the private network carriers.

46 Oleg Sal'manov, "Chtoby rasti, nuzhno menyat'sya [For growing, one has to change]," *Vedomosti*, July 6, 2016, https://www.vedomosti.ru/technology/articles/2016/07/06/648214-rasti-menyatsya (accessed July 31, 2020).

47 Elizaveta Titarenko, "Minkomsvyazi podelit kommutator [Minkomsvyazi shares the switch]," *ComNews*, January 23, 2017, https://www.comnews.ru/content/105606/2017-01-23/minkomsvyazi-podelit-kommutator (accessed July 31, 2020).

48 Ministry of Digital Development, Communications and Mass Media of the Russian Federation, "Prikaz Minkomsvyazi Rossii N° 923 «Ob utverzhdenii Kontseptsii sozdaniya i razvitiya setey 5G/IMT-2020 v Rossiyskoy Federatsii» [Order of the Minkomsvyazi of Russia No. 923 "On the confirmation of concept for the creation and development of 5G/IMT-2020 networks in the Russian Federation]," p. 85.

49 Ibid.

50 Vladislav Novyy, Dmitriy Shestoperov, and Pavel Belavin "5G predlagayut razdelit' na vsekh [5G is proposed to be split up for everyone]," *Kommersant*, May 23, 2019, https://www.kommersant.ru/doc/3976873 (accessed July 31, 2020).

If a single shared network is built, then the 5G service quality of all operators would be equally good. This would deprive leading operators such as MTS from their competitive advantage: MTS already has a dense 4G network in place that it could upgrade with relatively little investment to offer 5G to its customers. Other operators, especially the state-owned discounter Tele2, could be the winner of a common 5G network. However, all four operators are already investing in upgrading their respective networks to 5G-ready in cooperation with Huawei, Ericsson, and Nokia,[51] and much of that investment may be sunk if a single network is built.

In the long term, a single shared 5G network could also increase the role of the state in Russia's communications market. The physical networks that Yevtushenkov's MTS and Fridman's Vimpelcom have built, and the spectrum licenses they own, give them a certain degree of independence from the state. A single 5G network operator with state participation is almost certain to erode this independence over time. The private operators could ultimately see their role diminished to mere brands or virtual carriers. In contrast, for state-owned Rostelekom and its subsidiary Tele2 Russia, it would be an opportunity to expand its influence. Rostelekom has lobbied for the idea of a single operator for several years,[52] and convinced Megafon to set up a joint venture in February 2019 ("Digital for Business") that could play this role. While the position of Megafon on the issue is ambiguous, MTS and Vimpelcom want to strictly limit sector-wide cooperation to lobbying for and cleaning up the radio spectrum.[53]

HUAWEI, ERICSSON, OR ROSTEC?

Like the 5G debate in the West, the question of who should supply the infrastructure is a key sticking point in Russia's 5G bargaining. However, in contrast to the Western debate, it is rarely about Chinese vs. Western manufactures or the risk of spying, but instead about Russian-made vs. foreign-made equipment and narrow interests of Russian suppliers. Rostec, the powerful arms and technology state conglomerate, and other Russian electronics producers would like to get involved in the lucrative telecommunications market. They are supported by the Russian Ministry for Industry and Trade Communications Ministry, which have promoted the use of Russian equipment since the late 2000s—so far to no avail. However, since sanctions were imposed on Russia in 2014, proponents of import substitution have had strong tailwinds and were able to erect market barriers in other sectors of the economy and raise billions of rubles in state subsidies.[54]

The import substitution requirements in the 5G concept favored by the Communications Ministry are relatively soft: It stipulates that Russian equipment should be preferred

51 One example for the diversity of vendors is the upgrade of the operators' Metro networks. Yuliya Tishina, "«Vympelkom» dogonyaet poyezd ["Vympelkom" catches the train]," *Kommersant*, July 29, 2020, https://www.kommersant.ru/doc/4434031 (accessed July 31, 2020).

52 Anna Balashova, "«Rostelekom» predlozhil sozdat' konsortsium dlya razvitiya 5G v Rossii ["Rostelekom" proposed building a consortium for the development of 5G in Russia]," *RBK*, September 1, 2017, https://www.rbc.ru/technology_and_media/01/09/2017/59a95e6b9a7947205b540b3c (accessed July 31, 2020).

53 Aleksandra Posypkina and Anna Balashova, "Odna strana — odna set' [One country — one network]," *RBK*, March 14, 2019, https://www.rbc.ru/technology_and_media/14/03/2019/5c8a21fe9a7947efcda8ff1e (accessed July 31, 2020).

54 Richard Connolly, Russia's Response to Sanctions (Cambridge University Press, 2018).

on the condition that it is competitive.[55] In the independently developed 5G road map of state corporation Rostec and state-owned Rostelekom, a much stricter rule for import substitution is suggested: According to their plan, the 3.4-3.8 GHz spectrum should be made available for 5G; however, network operators should be forced to use *exclusively Russian-made equipment* on these frequencies. The authors claim that this would help Russia to become an international 5G supplier, as the equipment for the 3.4-3.8 GHz band will have the best export prospects. To facilitate the development of a Russian 5G solution, Rostec and Rostelekom suggest new trade barriers and subsidies.[56]

Wishful Thinking

According to the Russian Association of Electronics Developers and Producers (ARPE), the size of Russia's market for telecoms equipment was 250-300 billion rubles in 2017, driven mainly by the network operators' demand. ARPE estimates that domestic producers have a market share of 6%-8%, consisting mostly network switches and routers, and sees Chinese imports as the main competition for Russia's industry.[57] No Russian company has experience in producing 5G equipment for commercial use. Russian firms are absent from international rankings on 5G patents, and also from discussions within the international standard setting body 3GPP.[58] In the words of Mikhail Alekseev, a leading expert in the Russian market: "Any attempt to force [the operators] to build modern networks on Russian equipment is silly, because there is no Russian equipment, and, most importantly, it is apparent to all market participants that there won't be."[59]

The network operators are opposed to any constraints in their choice of a hardware and software supplier, which would limit their bargaining power and lead to rising equipment prices. They have no illusions regarding a Russian 5G option. Through their voice in the ANO working group "Information Infrastructure" of the National Project "Digital Economy, " they managed to thwart the threat of forced "Russification" of their networks for now: When the Communications Ministry proposed to include stricter import substitution criteria in the concept for Russia's 5G development, the group blocked it in a close vote in June 2020.[60]

The Huawei Factor

Among the foreign equipment vendors, Huawei is the leading supplier in Russia, and it has increased its market share at the

55 Ministry of Digital Development, Communications and Mass Media of the Russian Federation, "Prikaz Minkomsvyazi Rossii N° 923 «Ob utverzhdenii Kontseptsii sozdaniya i razvitiya setey 5G/IMT-2020 v Rossiyskoy Federatsii» [Order of the Minkomsvyazi of Russia No. 923 "On the confirmation of concept for the creation and development of 5G/IMT-2020 networks in the Russian Federation]," p. 59.

56 Igor Korolev, "Operatoram mogut otdat' samyye tsennyye 5G-chastoty, esli oni kupyat rossiyskoye «zhelezo» [Operators could get most valuable 5G frequencies, if the buy Russian hardware]," *CNews*, December 10, 2019, https://www.cnews.ru/news/top/2019-12-10_operatoram_mogut_otdat (accessed July 31, 2020).

57 Yuliya Tishina, Denis Skorobogat'ko, and Vladislav Novyy, "Routeram vypryamlyayut marshrut [Routers get their line straightened]," *Kommersant*, August 20, 2018, https://www.kommersant.ru/doc/3718739 (accessed July 31, 2020).

58 IPlytics Platform, *Who is leading the 5G patent race?* (2019), https://www.iplytics.com/wp-content/uploads/2019/01/Who-Leads-the-5G-Patent-Race_2019.pdf (accessed July 31, 2020).

59 Content-Review.com, *Telekom na udalenke N°8 [Telecom remotely No.8]* (2020), Youtube.com, https://youtu.be/wuG21xmEA30?list=PLe3Nq0ymzoBGhTKNEChD0RrJcCIHY-rSF&t=755 (accessed July 31, 2020)

60 El'yas Kasmi, "Sotovyye operatory poshli protiv vlasti. Oni otkazalis' stroit' seti 5G na rossiyskom oborudovanii [Network operators went against the authorities. They declined to build their 5G networks with Russian equipment]," *CNews*, June 18, 2020, https://www.cnews.ru/news/top/2020-06-18_rossijskie_operatory_otkazalis (accessed July 31, 2020).

Mobile World Congress, 2019 (Huawei)

expense of Ericsson, which ranks second, and Nokia.[61] The Chinese vendor has often been able to beat out Nokia and Ericsson in terms of pricing and technology in the operators' equipment tenders. Still, the European vendors remain present in Russia. They can offer better financing conditions and already inked several contracts for 5G-ready equipment with Russian operators. Instead of tying themselves to a single supplier, the network carriers are diversifying and cooperate with all three major 5G vendors. Tele2 Russia, the subsidiary of state-owned Rostelekom, ordered 50,000 5G-ready base stations from Ericsson in 2019.[62] Similarly, all three of the leading international equipment producers are involved in 5G testing with Russia's mobile operators.

So far, geopolitics does not play a significant role in Russia's mobile telecommunications market. Without a disruptive policy intervention, the continued co-existence of all three leading foreign vendors in Russia is the most likely scenario. Even after six years of sanctions on Russia, the network operators are dependent on Western technology and capital markets. This is exemplified by the fact that none of Russia's leading carriers, including state-owned Rostelekom, offers any service on annexed Crimea due to Western sanctions.

61 No official data is available. Most, but not all experts interviewed for this article see Huawei as the market leader. Still, for the leading operator MTS, Huawei plays an insignificant role. One analysis from 2017 can be found here: Zhanna Zhuravleva, "Kitayskiy Huawei vytesnyaet Ericsson i Nokia s rossiyskogo rynka oborudovaniya dlya sotovykh operatorov [Chinese Huawei squeezes out Ericsson and Nokia from the Russian market for equipment for network operators]," *Delovoy Peterburg*, May 2, 2017, https://www.dp.ru/a/2017/05/01/Vostochnij_veter_peremen (accessed July 31, 2020).

62 Yuliya Tishina, "«MegaFon» obnovit arkhitekturu [Megafon renews its architecture]," *Kommersant*, March 2, 2020, https://www.kommersant.ru/doc/4274580 (accessed July 31, 2020).

Huawei could have an edge over its competitors if Russia radically intensifies its import substitution ambitions. Given that a firm like Rostec will not be able to produce 5G equipment on its own, it would have to partner with a foreign vendor to deliver. As Carnegie Moscow's Aleksandr Gabuev points out, Huawei is very well-positioned to become the partner in this case. Although Rostec's leadership is relatively skeptical of China, it is also skeptical of the West, and Huawei has invested much more than the other 5G vendors into its presence in Russia, setting up research centers with thousands of Russian engineers and cooperating with other state companies.[63] Among the three world-leading 5G vendors, Huawei can rightfully claim to have the largest "Russian" presence. The Chinese vendor would also have a good chance to extend its presence in Russia if the regulator overcomes the carriers' resistance against forming a single shared 5G network, especially if this network would have to rely on the higher, less congested 4.6-5 GHz band, which is only allocated for 5G in China and Japan. However, in all these those scenarios, Huawei would benefit not because of a strategic, geopolitical pro-Chinese choice by the Kremlin, but because it would have the right offering to help lobbyists and officials within Russia advance their narrow interests.

RUSSIA'S INERTIA: A VICE AND A VIRTUE

The introduction of 5G in Russia will be delayed by several years due to three key disagreements among the industry and government stakeholders: The lack of suitable radio spectrum is the thorniest issue. Disagreement about who will build the 5G network and whose equipment should be used add two more layers of complexity to Russia's 5G bargaining process. All three sticking points are not new to the sector and were overcome during the introduction of 3G and 4G, but, in the case of 5G, the situation is particularly complicated.

A MORE LIMITED 5G ROLLOUT ON UNCONVENTIONAL FREQUENCIES IS A REAL POSSIBILITY, WHICH WOULD FURTHER DELAY THE LARGE-SCALE TRANSITION TO THE NEW COMMUNICATIONS STANDARD AND, IN THE LONG RUN, CLOUD RUSSIA'S DIGITALIZATION OUTLOOK.

63 Aleksandr Gabuev, "Huawei is on its way to cement dominance in the Russian&Eurasian 5G market." https://twitter.com/AlexGabuev/status/1168535769532764160 (accessed July 31, 2020).

If the radio spectrum issue can be resolved and Russia's network carriers will be granted access to the 3.4-3.8 GHz spectrum after all, large-scale 5G deployment across Russia can be expected by 2023-2024. However, given the uncompromising stance of the security services, a more limited 5G rollout on unconventional frequencies is a real possibility, which would further delay the large-scale transition to the new communications standard and, in the long run, cloud Russia's digitalization outlook.

The idea of building a single all-Russian 5G network, supported by the Communications Ministry and state-owned Rostelekom, could significantly change the structure of Russia's mobile communications market in the long run. Reduced competition among the network carriers and an increasing state presence would slow down innovation. However, because this scenario would require the support of the private operators who are already preparing individual networks and so far firmly resist the idea, it is currently unlikely to materialize.

Strict import substitution rules, which are favored by several ministries, state-owned suppliers, and the Russian electronics industry, would similarly bring fundamental change to the telecommunications sector in Russia. Huawei could be the beneficiary of a new impulse for import substitution in Russia, not because it is Chinese, but because it can rightfully claim to be the most "Russian" of the three leading international 5G vendors in terms of its local presence. However, like it is the case with plans for a single network, Russia's operators have had enough lobbying power in the past to block the introduction stringent import substitution requirements.

The slow-moving, meandering regulatory process of Russia's telecommunications governance and 5G introduction is both a strength and a weakness. On the one hand, it is the absence of disruptive interventions by the state that has allowed a competitive and innovative telecommunications market, driven by profit-maximizing entrepreneurship, to appear in the first place. Russia's slow, decentralized bargaining also protects the market against radical ideas such as the construction of a single all-Russian 5G network and overly ambitious import substitution requirements. It limits the scope for rent-seeking or ideologically motivated policies from actors outside of the market. At the same time, it also impedes the quick allocation of urgently needed frequencies, which will result in a much slower development of 5G in Russia.

The high number of veto players in Russia's regulatory process similarly protects the future role of Western 5G suppliers Ericsson and Nokia in Russia, who are needed by Russia's network operators to diversify their equipment procurement. It is impossible to rule out a surprise policy turn in Moscow, potentially triggered, for example, by a new round of U.S. sanctions that affect the Russian telecommunications sector, or internally, if import substitution lobbyists gain the upper hand. In both cases, Huawei may turn out to be the winner, not as much because of a political shift toward China by the Kremlin, but because the vendor is best positioned to help certain narrow interests within Russia succeed.

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