



COMPETITIVE POSITIONING OF THE BULGARIAN MOBILE OPERATORS AND DIGITAL TRANSFORMATION

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ABSTRACT

The ongoing processes of globalization, digitalization and technological development presupposed the need for the transition of all economic and social sectors to the conditions of Industry 4.0 and the exploitation of the digital potential. This was especially evident during the developing pandemic of COVID-19, in view of the growing needs of the economy and society for high-speed connectivity, communication, data sharing, information provision, training and distance work, etc. On the other hand, the main priorities for sustainable growth and competitiveness of the EU Member States, along with the digital economy, are the transition to a green economy and addressing the environmental challenges, including rethinking energy efficiency measures, the need for infrastructure and network improvements, modernization and more. All of the above focus on the importance of the telecoms as a key sector for mediating the processes, related to the digital and green transformation of the economy, which reciprocally affects their domestic and, consequently, their innovation and investment activity as a means of achieving competitive positioning and development. The main goal of the publication is to highlight the opportunities for competitive positioning of Bulgarian mobile operators in the context of the digital and green transformation of the country's economy.

Key words: telecommunication sector, digitalization, globalization, competitiveness

INTRODUCTION

The fourth industrial (digital) revolution led to a reconsideration of the strategic concepts of the business organizations, connected with the need of adapting the digitalization processes as well as absorbing the existing digital potential (1-4). The crisis caused by the COVID-19 pandemic accelerated these processes, due to the need of a quick reaction on the side of institutions and businesses, in response to the increased needs of the economy and society for high-speed connectivity, communication, data sharing, information provision, training and

work remotely, etc. Furthermore, the parallel processes aimed at transition to a green economy should be taken into account, in the context of the concept of circular economy and environmental protection, reduction of the harmful emissions, green innovations, etc. The two directions demarcated are among the main priorities for growth and sustainable development laid down in the National Plan for Recovery and Sustainability of the Republic of Bulgaria (5), the Strategic Plan of the "Horizon Europe" Program 2021-2027 (6), the European Green Deal (7), etc., and the telecommunication sector is viewed as a key factor for the digital and green transformation of the economy.

The object of the present study are the Bulgarian mobile operators, and its subject – to identify the possibilities for their competitive positioning in the conditions of Industry 4.0 and the transition to a green (circular) economy.

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The main goal is: to analyze the competitive environment of the Bulgarian mobile operators as well as to highlight the advantages of their leading competitors and the potential of the sector, derived from the digital and green transformation of the economy.

METHODOLOGY AND CONCEPTUAL FRAMEWORK

For the purposes of this study, to present a theoretical overview and data for the development of the telecommunication sector, using secondary sources of information and author's analysis of the working statements. Along with that we use data from IMD, WEF, ETNO, etc.

The following research approaches are adopted: integrative, systemic, network, interdisciplinary, and the methods used are: analysis and synthesis, content analysis, comparative, situational and sectorial analyses. For data analysis, the Methodology framework presented in **Figure 1** is used, which involves the various stages of the research model (process), in the context of the two general aspects for competitive positioning:

- analysis of the competitive environment/structure of the sector;
- exposition of the competitive advantages, as key factors for the competitiveness of telecoms.

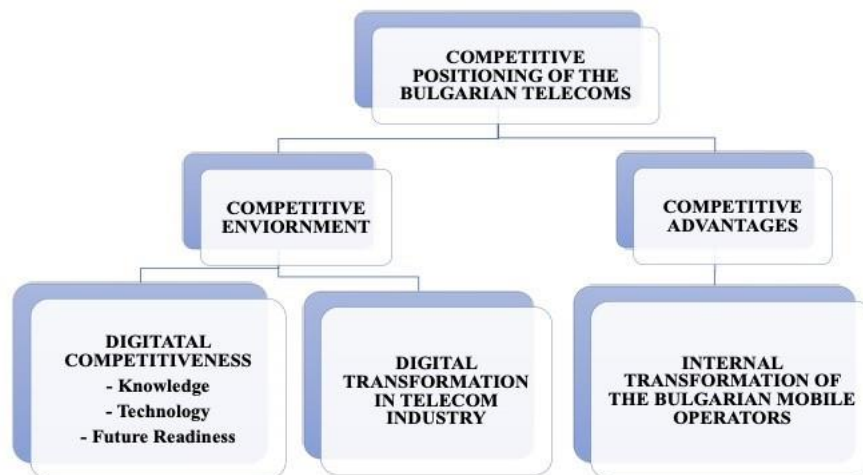


Figure 1. Methodology framework

In the analysis of the environment, the attention is focused on the processes of digitization and technological development, which are the basis for the country's digital competitiveness and presuppose the need of digital (and green) transformation of the economy, in order to emphasize the leading role of the telecommunications sector in these processes, mediated by its inner transformation.

Competitive advantages highlight the key factors for the competitiveness of the sector, and the directions in which they are established are precisely those, related to the internal transformation of the sector under consideration.

I. DIGITAL TRANSFORMATION OF ECONOMY VS INNER TRANSFORMATION OF TELECOMS

According to the proposed research model, the process of digital transformation will be analyzed by means of the two stages laid down in the research model, focusing on the competitive environment of the sector under consideration: *digital competitiveness ranking* and *digital (and green) transformation* of the telecommunication sector.

1. Digital Competitiveness of Bulgaria

According to IMD data (**Figure 2**), Bulgaria ranks 52nd among 64 countries in terms of digital competitiveness, derived on the basis of 52 evaluation criteria (32 – hard, 20 – from survey data), distributed in three directions – Knowledge, Technology and Future Readiness.

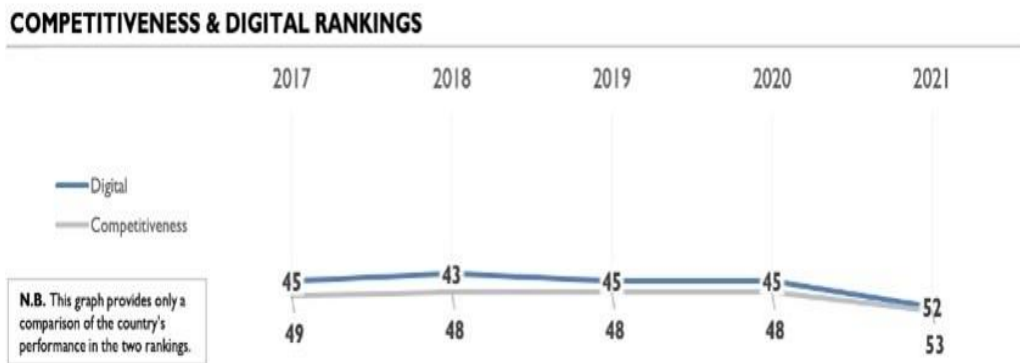


Figure 2. Dynamics of Bulgaria’s competitiveness and digital ranking

Despite the overall weakening position of the country for the considered 5-year period (from 45th place in 2017 to 52nd place in 2021 – (Figure 3) (8), its best positioning is in relation

to the Technology factor, determined by the sub-factors: Regulatory Framework, Capital and Technological Framework.

TECHNOLOGY					
Subfactors	2017	2018	2019	2020	2021
Regulatory framework	50	52	46	55	55
Capital	46	50	42	48	53
Technological framework	34	36	44	39	42

Regulatory framework		Capital		Technological framework	
	Rank		Rank		Rank
Starting a business	47	IT & media stock market capitalization	36	Communications technology	32
Enforcing contracts	32	Funding for technological development	50	Mobile Broadband subscribers	33
Immigration laws	60	Banking and financial services	49	Wireless broadband	21
Development & application of tech.	56	Country credit rating	43	Internet users	56
Scientific research legislation	57	Venture capital	48	Internet bandwidth speed	38
Intellectual property rights	55	Investment in Telecommunications	33	High-tech exports (%)	38

Figure 3. Dynamics of Bulgaria’s overall performance in the World Competitiveness Ranking

The data show that a large part of the technological indicators set for evaluation in that direction are related to the telecommunications sector, including those in which Bulgaria occupies the best position and are key to its digital competitiveness, including ∴ wireless broadband – 21st place, communications technology – 32nd place and mobile broadband subscribers – 33rd place.

Investment activity (as a factor for competitive positioning) is also the highest in the considered sector, with Bulgaria occupying 33rd place in investment in telecommunications.

2. Inner transformation of telecoms – digital and green transformation of the sector

In the conditions of the Fourth Industrial Revolution, aimed at high technologies and digitalization of the economy, and given the

preconditions available for a subsequent transition to the Fifth Industrial Revolution, related to artificial intelligence, robotization and "a new model of cooperation and interaction between man and machines" (9), the focus is on building a unified platform (Industry 4.0), as a set of interconnected components - people, machines, equipment, logistics systems and products that communicate directly, forming cyber-physical systems. The concept rests on the creation of networks functioning in an industrial environment, based on: improved interfaces, smart sensors, mobile applications, cloud technologies, virtual engineering, system integration, cyber-security, virtual reality, three-dimensional printing (3D printers), Big Data, etc. (10), in which the established connections certify a systematic approach to achieving growth and competitiveness.

In the given processes, the key role of telecoms is brought out in regard to building and maintaining a **unified digital infrastructure**, covering networks, devices, facilities, data, exchange, places, etc., and the sector is defined as the "backbone" of digital progress (11), and the predictions are that the next decade will mainly depend on the telecommunications industry (12).

The growth of the pandemic led to the acceleration of digitization processes, on the basis of the increased needs of the economy and society for *high-speed connectivity, communication, data sharing, information provision, training and remote work, etc.*

This, in turn, stipulated the need of the **internal transformation** of the Telecommunications sector before that, which in the context of building an infrastructure/ecosystem, relevant to all sectors, the individual and society as a whole - the so-called "connected society", is

seen as an **open transformation** aimed at making dynamic collaborations and building networks of a new generation - Networks of the Future (13), as an opportunity to develop the competitive potential of the sector.

Considering the implementation of digital connectivity and the digitalization of the economy, the directions in which a greater part of the processes of internal transformation and modernization of telecoms (and the investments in the sector, respectively) are also in this context accounted for and accepted as a field for the implementation of innovations and hence - for the generation of **competitive advantages**. Telecoms are generating innovations through and beyond networks, and the key areas in which operators invest and deliver/receive added value are precisely those where their leading competitive advantages are formed. Among them, the ones presented in **Figure 4** stand out:

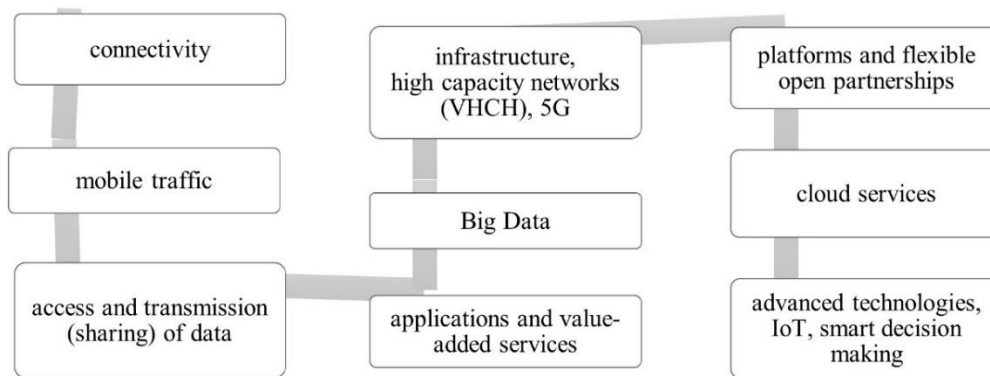


Figure 4. Competitive Advantages of the Telecoms

Connectivity is the staple of the telecommunications industry, enabling communication, flexible working, online shopping, remote health monitoring, remote learning, entertainment, and many more. **Access to data** (including also large amounts of data) involves the use of a number of applications and services (wholesale and retail), audio/video content, together with TV high-speed connectivity, Big Data, etc., and *data sharing* points directly to the Internet of Things, the Internet of Experiences, the Internet of Senses.

There has been observed a continuous **expansion of the range of services offered** - network resources and applications, recognizable for and by different spheres or sectors. The introduction of additional (including video services - streaming, video

calls, etc.) and accelerated data usage during the pandemic (as a consequence of the enlarged need of connectivity) has led to **an increase in data traffic** in Europe, such as (14):

- **Fixed traffic** increased by 53% in 2021 (293 GB/month), compared to 2019 (191GB/month)
- **Mobile traffic** increased by 90% in 2021 (8.5GB/month) compared to 2019 (4.5GB/month) and the forecast for 2023 is 16.2GB/month), and according to data from the International Telecommunication Union (ITU) - 63% of the world's population used the Internet in 2021, which is 17% more than in 2019 (15).

Infrastructural provision and the construction of high-capacity networks (VHCH, 5G) have led to the complication of the telecommunications (value) supply chain,

through the attraction of new suppliers, collaboration with vertical industries and platforms to create more complex technological developments – virtual networks, peripheral computing and building new business models and partner ecosystems. These changes have spurred *rapid innovations* and *smart solutions*, with, on the one hand, a focus on *advanced technologies* including: cloud technology, blockchain, robotics, security, IoT, virtual reality, BigData, etc., and, on the other – strengthening the role of telecoms for sectoral and inter-sectoral collaboration in connection with the use of the digital potential.

Building next-generation networks, as well as migrating MPLS networks towards cloud-based infrastructures, is application-oriented for end-user needs. This directs the process of generating competitive advantages to create value by *customizing the services and applications offered*.

This is as well the focus of the overall *digital strategy* (in the context of digital competitiveness and digital transformation), namely - to *the improved user experience*, as according to information exported - 46% of Europeans choose a mobile operator because of the additional services and applications (16), and the leadership in the sector is defined by the fact that the offered services are accessible from any place and on any device - fast, reliable and secure.

During the pandemic, 5G access in Europe reached 62% of the population, with infrastructure construction continuing, despite Europe lagging behind as a share of the total mobile connections - only 2.8%, at 13.4% (93.1% of population) in the USA and 29.3% (93.9% of the population) in South Korea (14).

Investments in fiber and 5G networks are on the rise, with the European telecoms sector achieving a record capital expenditure of €52.5 billion in 2020, up from €51.7 billion in 2019, the highest level in a four-year period. "The proportion of revenues devoted to CapEx reached 19 percent, the highest in recent history and greater than the US, South Korea or Japan". (17). **5G** is emerging as the "leading global standard" due to its greater capacity, lower data transfer costs, higher speed, and higher security and reliability. According to ETNO (18), 150 billion Euros will be needed to finalize the 5G construction process, and approximately the same amount is needed for the modernization of the existing fixed infrastructure and its adaptation to high speeds.

It is in digital transformation, infrastructural modernization and the construction of high-speed networks of a new generation that a significant part of the processes of *green transformation* and the achievement of energy efficiency through the use of energy-saving means, renewable sources, etc. are accounted for.

The results of a study conducted by BKG (19) show that the wider spread of digital solutions can contribute to reducing harmful carbon emissions by up to 15%, 30% of which can be achieved through the application of "smart cities" (19). There is an outstanding *IoT* growth, with active IoT connections expected to reach 352 million in 2023, up from 180 million in 2020.

Since more than 70% of the total energy consumption of telecommunications operators is absorbed by the networks, these measures are significant not only in relation to the fight against climate change and environmental protection, but also in terms of minimizing operator costs. The results in the direction are optimistic, as according to data from ETNO (13), for 2020, 75.3% of the total energy used by the European telecommunications operators (members of ETNO) is from renewable sources, and harmful CO₂ emissions have been reduced by 2.77 kT compared to 2017.

II. COMPETITIVE ADVANTAGES OF THE BULGARIAN MOBILE OPERATORS

The European and world trends do not exclude Bulgaria either. Telecommunication services are key for the country in the years of a pandemic, and for 2020, the Bulgarian mobile operators recorded a 5% growth compared to 2019 - applied to both the fixed and mobile segments, as well as in terms of sales of smart and communication devices (20).

As a result of 'closure' and working/learning in an online environment, the consumption of multimedia and other content, the need of connectivity and communication, as well as the increased use by all sectors of ICT, has led to expanded responsibilities in order to ensure smooth and faultless operation, which also boosted the revenue of the telecommunication service providers. According to KRS data, the telecommunication services market will grow by 6.7% in 2020, compared to 2019. The competitive

advantages and potential are revealed in the directions, indicated in **Figure 5**:

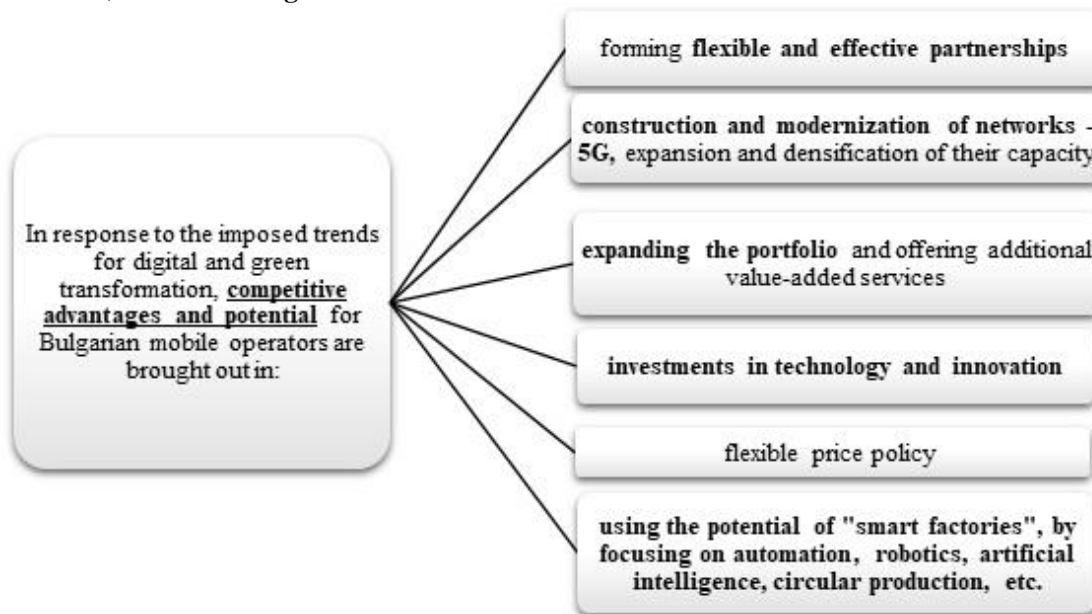


Figure 5. Competitive Advantages and Competitive Potential

Bulgaria occupies a leading position in average 5G speeds in Europe, third in the world (21) and appears on the 7th place in the world ranking for the fastest mobile internet. The Bulgarian mobile operators respond to the challenges of Industry 4.0 by directing their efforts to innovation (generating competitive advantages, respectively) through the implementation of

smart solutions and a focus on value-added applications (to mobile services), based on systematized exported information (22 -27), **Table 1** presents the strategic directions for growth, differentiation and competitive positioning of the three main telecommunication operators in the country.

Table 1. Strategies for Competitive positioning of the Bulgarian mobile operators

A1	BTK-VivaCom	Yettel
From 2011 to 2015, the company acquired Spekter Net AD and Megalan Network OOD (2011) and Blizoo (2015) and consolidated with Max Telecom (2015), expanding its portfolio with a full range of telecommunication services - high-speed Internet, digital TV, fixed and mobile services and became the leader in terms of number of customers.	United Group finalized 12 acquisition deals in 2021 and 2 more for the current year - 2022. Acquired are: Nova TV and the group around it, Telegraf newspaper group and three fixed operators – Sofia-based Net1 and ComNet Sofia , as well as N3 (Plovdiv) and it reports a surge in TV and fixed internet subscribers.	In 2020, Telenor (now Yettel) separated its services by allocating its network infrastructure into a new company - "Cetin Bulgaria" EAD, also owned by PPF Group. The focus is on the fixed services and on the improvement and implementation of telecommunications and IT infrastructure, their operation and maintenance.
The telecom is among the superiors in the field of providing solutions in the field of information and communication technologies and the Internet of Things, offering a full portfolio of services - software, hardware and system integration - after	In process of being acquired are: Ruse-based NetWorks Bulgaria , Telnet (V. Tarnovo) and the Ruse-based news and information channel - TVN .	At the end of 2021, Cetin Bulgaria acquires the technological company Sofia Communications EAD and its subsidiary - Rakkcom AD , thus expanding its team, its scope of services and its base of business clients. The main focus

the acquisition of STEMO (in 2022), making it the leader of the IT market. The goal is to offer corporate customers a wide portfolio of high-tech services.		is on offering wholesale services (wholesale connectivity) to telecommunications operators, including Yettel.
Through its business management tool - SAP Business One, A1 offers to its corporate clients an effective mobile application for business management anytime, anywhere.	In 2021 the EON multimedia content platform is being started.	Yettel offers the solution Digital Office – Business portal for managing business plans.
In response to global trends in the field of IoT, in 2018 A1 presents its project for "smart solutions" in urban environments - using Narrowband IoT (NB-IoT) technology - for air control, waste management, smart lighting and smart parking, etc. aimed at improving the urban environment, industrial environment and quality of life.	In recent years, Vivacom has been developing various "smart solutions" related to the Internet of Things (IoT), mainly aimed at building smart cities. At the moment, the separate solutions are united in a single platform - VIVASmart , which consists of four main elements - Viva Smart City, Viva Smart Data Hub, Viva Smart for smart education and Viva Tech Lab for support of start-up projects.	Through the Digital Office model, large and medium-sized companies are given the opportunity to automate a huge part of their administration related to HR management and internal communication. The platform includes partner solutions such as: Virtual telephone exchange, Telenor fleet or Interactive voice menu, which allow maintaining excellent relationships with customers, as well as the feedback on their satisfaction, monitored in real time with the Survey on Tablet solution.

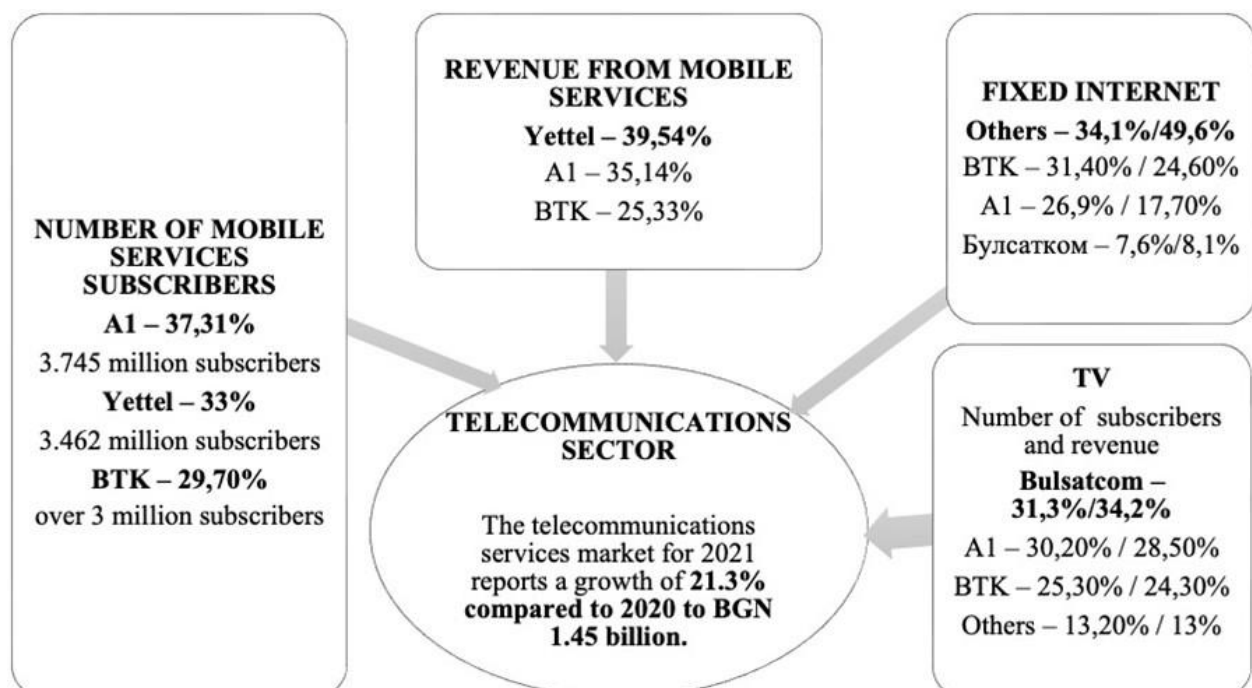


Figure 6. The competitive positioning of the Bulgarian mobile operators

Taken together from the summarized results of the study, the growth strategies of telecoms in Bulgaria can be highlighted, with the emphasis being on diversification and participating in integration processes in connection with the creation of infrastructure improvements in the construction of new generation and 5G networks, as well as on acquisitions, mergers and buyouts of local providers - to increase the range of additional services, providing added value (from and for consumers).

The competitive positioning of the Bulgarian mobile operators, set up on the offered mobile and fixed services (by number of subscribers and generated revenues), is shown in **Figure 6** (28). It takes into account the main directions for their strategic differentiation and occupied market share in the year under review.

III. PERSPECTIVES FACING THE MOBILE OPERATORS IN BULGARIA

Among the more significant prospects for the Bulgarian mobile operators, the following can be listed:

- Continuous investment activity, referring to the infrastructure construction and more thorough deployment of fifth generation networks.
- The accelerated development of digital services through NR (5G) will deepen the competition in the sector. The effect of the redistribution of the market among the main participants (through the completed deals for mergers and acquisition of regional enterprises from the electronic communication market in the past year 2021) will manifest itself particularly strongly during the current year 2022.
- The enrichment and customization of the offered services and applications will continue, e.g. a certain similar expansion of the operators' product mix is the addition of a service - providing of television content based on the availability of Internet access.
- Except for the service of the growing number of subscribers demanding fixed high-speed and ultra-high-speed Internet access, the mobile operators will attempt to penetrate the B2B market by consolidating new market segments, consisting of business customers. That is, they will take maximum advantage of the possibilities offered by 5G in terms of supporting the industrial processes and ways of working through connectivity and data access. For

sure "this will involve developing the capabilities to apply enabling technologies such as IoT support, Advanced 5G slicing, Network Function Virtualization, and Edge Computing" (29).

- The preferences of the consumers for service packages (mostly dual packages such as "mobile voice and mobile internet" and "fixed voice and mobile voice") will grow.
- The revenues of the mobile operators will increase due to increased consumption of internet access - both retail and wholesale. In addition, the introduced price indexation clause in the subscriber's contracts can be cited as a possible positive perspective for revenue growth.
- The telecommunication companies will continue their intensive activities to increase the digital literacy of the individual users and develop the digital society in Bulgaria. This process was intensified already with the onset of the pandemic and the accompanying restrictive measures, connected with the spread of Covid-19. After that the telecoms undertook a number of promotional campaigns to promote their own mobile platforms for various payment transactions (A1 Wallet, Pay by Vivacom), published useful articles relating to current topics, such as "How to disinfect your phone", "How to recognize fake news", "Is 5G harmful", distributed educational videos online for the purpose of training, etc. (30). However, as an area for improvement in the future there still stands the issue for the application of unfair commercial practices towards vulnerable population groups (elderly people and/or people with mental or other physical illnesses), e.g. by making misleading product offers, regarding the conclusion of contracts with advantageous conditions under tariff plans, the sale of telephone devices on payment, provision of additional (unsolicited) services, etc.

CONCLUSION

The COVID-19 pandemic has accelerated the digitization of the global economy and highlighted the key role of the telecommunication sector in meeting connectivity and communication needs. In response to the European (and global) priorities aimed at digital and green transformation, the sector is facing the challenges of its internal transformation, which is seen as an *open*

transformation, aimed at creating flexible partnerships in building the digital infrastructure and stimulating "rapid innovation" related to offering 'smart' and sustainable solutions.

It is in the indicated areas that the main competitive advantages of the Bulgarian mobile operators are taken into account. In response to the European priorities and trends, they are focused on the *applications* and *presenting of smart solutions*, such as in terms of *high-speed Internet* and *5G coverage*, whereas the country is among the leaders in Europe as well as globally.

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