

## WORLD MOBILE SERVICES MARKET: ECONOMIC ASPECT

Galyna Zhavoronkova, Vladimir Zhavoronkov, Victoria Klymenko,  
National Aviation University,  
Kyiv, Ukraine  
zhavor@ukr.net

**Annotation.** *The structural trends of the last ten years in terms of individual connections in the mobile market have been identified. The characteristics of the largest companies in the world that provide mobile services have been given. The sources of creating new value in the mobile business have been named. A comparative analysis of the provision of services by the leaders of the global mobile services market (like China Mobile, AT&T and Vodafone) has been conducted. The advantages and disadvantages of these mobile operators have been highlighted. A comparative portfolio of services of leaders-mobile operators has been compiled. It has been concluded that there are differences between the UK market, Chinese and US operators.*

**KEYWORDS:** MOBILE COMMUNICATION, TELECOMMUNICATION SERVICES, WORLD MARKET, INCOMES, PRICING, INTERNET SERVICE

### 1. Introduction

The mobile market is developing at an unprecedented pace. It seems that almost every day the new devices appear. They are faster, more convenient and more powerful than the old ones. And almost every moment new types of mobile devices are created, and the number of applications running on them is estimated at millions. There is a huge need for new devices and applications that should generate huge amounts of mobile data [1].

The structural trends of the last ten years regarding individual connections in the mobile market reflected the general logic of global economic processes, according to which ten years ago the developed countries of Europe and the United States were the undisputed leaders of economic development. The last five years were characterized by a tendency to a certain stabilization and parity of the shares of these players [2].

According to the classification of the International Telecommunication Union, 52 countries are classified as developed, which is a fairly broad interpretation of modern ideas about development. The developed world includes Ukraine and five other countries from the post-Soviet space: Belarus, Estonia, Latvia, Moldova, and the Russian Federation. Most countries in Africa, Asia, and South America have traditionally been included in developing countries [3].

Mobile, telecommunications, Internet technologies are developing at a tremendous rate, and to constantly meet consumer demand, establish stable long-term relationships with customers, companies need to keep up with the times, monitor scientific and technological progress, adapt inventions and innovations to the needs of society, not forgetting the overall mission and goals of their business.

### 2. The state of the world market for mobile services

The current state of the world mobile market is best reflected in the selection of a group of leaders in this field. Among the many attributes of identifying leaders, the market value of the company is a determining factor for this list (Table 1). Thus, 10 global operators account for 35% of the total subscriber market. Let's analyze the ten largest telecommunications companies in the world.

1. AT&T Inc. is the largest telecommunications company in the United States, which occupied 32.5% of the mobile market in the country. It provides voice services in more than 200 countries and serves more than 34,000 Wi-Fi hotspots. Expanding its GigaPower - an ultra-fast Internet service, to 56 cities in the United States, it plans to continue diversification in the future. In May 2014, AT&T acquired DirecTV for \$ 48.5 billion, allowing the company to offer customers the ability to combine multiple services into one package.

2. China Mobile Ltd is the absolute leader in the number of subscribers to telecommunications services in China. It is the world's leading telecommunications company. Since April 2017, the market value of the company amounts to 215.3 billion dollars, from

January to December 2016 its customer base increased by 2.5%. China Mobile provides its subscribers with a full range of state-of-the-art telecommunications services, including high-speed mobile Internet access.

**Table 1.** *The World's Largest Companies Providing Mobile Services, 2018*

№	The company name (country)	Number of customers, mln	Market value, billion US dollars	Coverage countries
1	AT&T Inc. (USA)	355	245,58	200
2	China Mobile Ltd (China)	849	215,3	1
3	Verizon Communications Inc. (USA)	-	191,72	150
4	Nippon Telegraph & Telephone Corp. (Japan)	-	86,138	1
5	Softbank Group Corp. (Japan)	-	81,459	1
6	Deutsche Telekom AG (Germany)	100	76,11	50
7	Vodafone Group PLC (UK)	444	68,41	26
8	Telefonica S.A. (Spain)	180,8	52,84	21
9	America Movil (Mexico)	280,6	49,385	-
10	China Telecom (China)	62,36	37,309	1

*Source: compiled on the basis of [4]*

3. Verizon Communications Incorporation is the second largest telecommunications company in the United States. Its sales are 131.8 billion dollars (according to Forbes). Verizon, headquartered in New York, was established in 2000 by merging Bell Atlantic Corporation and GTE Corporation. In 2014-2015, Verizon acquired shares in AOL and Vodafone.

4. Nippon Telegraph & Telephone Corporation is a company known for its high-speed Internet. Japanese companies spend a lot of money to achieve the latest Internet technologies. Unlike other telecommunications companies, Nippon derives most of its revenue from fiber-optic Internet connections rather than product packages. To expand its customer base, the company is increasingly seeking to sell its virtual storage services.

5. Softbank Group Corporation is a company that began operations in 1981 as a software distributor. Since then, it has created an internal telecommunications segment that caters to Japan's mobile and broadband Internet needs. In addition to managing Yahoo! Japan, Softbank owns 80% of the shares of the American telephone service provider - Sprint. In 2015, Softbank acquired an IBM license for its human-readable Watson robot to create a Japanese Android called Pepper with plans to sell the robot to retail customers. The first 1,000 Pepper robots were sold in November 2015.

6. Deutsche Telekom AG is a German company with more than 218,000 employees. More than half of its income is earned outside Germany. In 2013, Telekom became the first telecommunications company to introduce a smartphone with Firefox. In 2015, the company launched a standardized European network that provides cross-border infrastructure in three out of ten countries.

7. Vodafone Group PLC (MTS) is one of the largest telecommunications companies headquartered in the UK. From 2012 to 2014, Vodafone acquired three companies: Cable & Wireless Worldwide, Kabel Deutschland and Ono. The mobile sales package accounts for 42% of the Vodafone service group's revenue, while 27% of revenue comes from sales of mobile devices outside the package. By acquiring Kabel Deutschland in 2013, Vodafone gained access to 8.5 million households of the cable company in Germany and was able to offer new services for telephone, television, broadband and wireless. Today MTS provides subscribers not only with cellular communication services, but also with access to the Internet from home and office via fixed lines, mobile and retail banking services (with the help of MTS Bank), access to mobile TV and much more. Vodafone is the most valuable brand in the United Kingdom, ranking in the top 100 most expensive brands in the world according to the BRANDZ™ rating.

8. Telefonica S.A. is a Spanish company that serves a customer base, mainly concentrated in Latin America. Its products and services include virtual cloud, mobility services, data centers, corporate, voice and security services. Telefonica sells its three main brands with different target audiences: Movistar serves Spain and Latin America; O2 serves the United Kingdom, Ireland, Germany, the Czech Republic and Slovakia; and VIVO serves Brazil.

9. America Movil is a Mexican company that serves 363.5 million access lines worldwide. It has a general coverage of mobile, fixed lines, broadband and television services.

10. China Telecom is a state-owned company headquartered in Beijing that provides fixed telephone services to 194 million customers. By the end of 2016, its broadband services had reached 113 million people. China Telecom's commercial brands include E-surfing, E-surfing Navigator, E-surfing E Home and E-surfing Flying Young.

The International Telecommunication Union (ITU) constantly monitors the development rate of fixed, mobile communications and Internet access in the world, individual regions and countries. According to union experts, in 2019, the number of mobile users was expected to increase to 7377 million people, and Internet users – to 3488 million people [5].

The dynamics of absolute indicators are largely determined by demographics and cannot reflect the basic trends in the global mobile market. The analysis of the annual growth rates of the mobile connection segments made it possible to determine the current state and forecast the development trends in the mobile communication market (Table 2).

Table 2. Annual Growth Rates of Mobile Connection Segments

Indicator	Annual growth rates, %				
	2015	2016	2017	2018	2019
Mobile telecommunications (developed countries)	103	102	104	103	101
Mobile telecommunications (developing countries)	107	108	105	103	102
Mobile telecommunications (World)	106	107	105	103	102

Source: compiled on the basis of [3]

The current period of the mobile market development is characterized by a saturation, in which overall growth in the last two years has slowed to 2-3%. There is a synchronization of growth rates of this segment relative to countries with different levels of development. Moreover, the declining share of India and China in mobile connections indicates a narrowing of the digital divide in the relevant segment among developing countries.

### 3. Trends in the development of mobile communications in the world

Analysis of the dynamics of mobile communications in the global market over the past ten years reveals the first trend - the annual increase in the number of mobile users. One of the reasons for the growth of mobile subscribers was the weakening of barriers to entry into telecommunications markets for foreign companies, which led to increased competition and lower prices for mobile services.

The second trend is the growth of the global market for mobile Internet access. Thus, the number of mobile Internet users increased from 9 per 100 inhabitants in 2009 to 69.3 in 2019. Such a significant growth in the segment of mobile Internet access was due to the development of high-speed data networks (3G / 4G), the active penetration of smartphones and tablets, due to the development of Android, sales of 3G-USB modems, the spread of Wi-Fi connection to a fixed network. As well as reducing the cost of unlimited mobile Internet, tariff packages [6].

Cisco, a world leader in network technologies, believes that operators have four areas in which they can create new value in their business (Figure 1) [7].

1. *Cost optimization.* Production costs in IT and network architectures typically account for one-third of an operator's typical operating costs. Experience working with large customers – service providers shows that you can increase the efficiency of operating costs of the service provider by at least 10%. The key factors are the virtualization of the production architecture, mobile access of the new generation, increasing the maneuverability of the business and new operational and business models.

2. *Pricing.* Pricing is the most powerful tool for making a profit, often managers do not give it due importance. Key factors for increasing profitability through pricing include: differentiated pricing and usage restrictions; pricing based on consumer perception of service value; general tariff plans prepared for the introduction of a comprehensive Internet; rationalization and simplification of tariff plans, package sales.

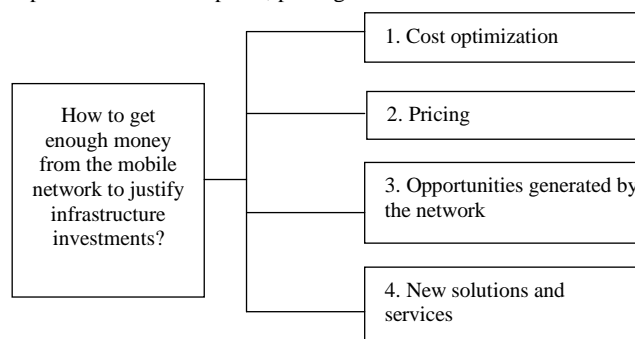


Figure 1. Sources of new value in the mobile business

3. *Opportunities generated by the network.* The key monetization opportunities generated by the network are the quality of business components such as: service (QoS), policies, application programming interfaces (API), data and analytics, information security.

4. *New solutions and services.* New solutions and services that could be provided by mobile operators include: virtual cloud; comprehensive Internet; inter-machine communications; connected rolling stock; solutions for corporate, medium and small businesses; joint services with independent providers; location-based services and analytical solutions.

A key factor in reaping the benefits of creating new, long-term business values will be the organization and successful operation of several levels of monetization above the network. At the level of solutions, services and functions, the internal technical value will be obtained from the mobile network and its transformation into final market products and services, which will be sold to interested final users through various channels.

Over the past few years, in order to double the core network and hoping to gain more market share, many of the largest transactions have been made by companies that buy competitors in the telecommunications industry.

**4. Comparison of service provision by the leaders in the world mobile communication services market**

To compare the provision of mobile services in the international market, we will choose three companies: China Mobile, AT&T and Vodafone. The market of mobile operators is characterized by a concentration of subscribers in the largest companies. Let's consider the dynamics of selected companies' incomes for 2015-2019 (Table 3).

**Table 3. Incomes of Mobile Operators, 2015-2019**

Company	Incomes, billion dollars				
	2015	2016	2017	2018	2019
China Mobile	70213	121231	127067	134563	152212
AT&T	63 055	118 928	124 028	123 018	124245
Vodafone	58 906	71 218	70 475	71 000	71 125

Source: compiled on the basis of [3]

According to the International Telecommunication Union ITU [5], the number of signed cellular contracts is increasing annually regardless of the crisis in the economy, but the number of fixed line contracts, by contrast, has been steadily declining over the past five years. Table 4 examines the dynamics of leading international companies' subscribers in 2015-2019. After all, the number of China Mobile subscribers in 2019 exceeded 800 million people, AT&T subscribers – more than 300 million people and Vodafone subscribers – more than 400 million people.

China Mobile uses its own and completely incompatible 3G version called TD-SCDMA. It also has the most advanced 4G / LTE network, but again uses Chinese TDD-LTE, which is just beginning to be used in some other countries. 4G uses 1900 MHz (band 39), 2300 MHz (band 40) and 2500 MHz (band 41 compatible with band 38) on TDD-LTE.

**Table 4. Dynamics of Subscriber Connections for 2015-2019**

Company	Number of subscribers, million people				
	2015	2016	2017	2018	2019
China Mobile	816	821	836	849	853
Vodafone	429	432	435	444	448
AT&T	345	348	350	355	357

Source: compiled on the basis of [3]

Let's analyze the international mobile operators according to the tariff packages they offer to their subscribers.

In most cities, China Mobile sold their prepaid cards not under its own brand, but under other names, such as Easy Own or MZone. Since 2015, China Mobile 4G SIM cards have been available in areas where LTE has been launched. Prices and plans vary slightly by region [9].

In most areas, such as Shanghai or Beijing, currently new subscribers are required to first choose a master plan, which is either MZone, EasyOwn, or a new global 4G plan. MZone's plans include data limits for mobile Internet and in some areas for Wi-Fi hotspots with SSID "CMCC-WEB" in China, as well as, as a rule, nationwide free incoming calls and vary between regions.

AT&T is built on GSM. Note that GSM in the US does not work in the usual 900/1800, but in the 850/1900 standard. A significant advantage in the US is the fact that you can save your number when switching to another operator. America is familiar with 4G/LTE, and the country is already moving towards 5G. Differentiation of tariff plans is mainly based on Internet traffic. Calls and SMS are almost unlimited everywhere. Most operators provide unlimited calls around the world for a specific monthly

price. For example, unlimited calls from the US to Ukraine at AT&T can be purchased at \$ 5 and called at \$ 0.32 [10].

Most begins when you need to choose a plan that suits your Internet traffic. The lower limit of the allocated traffic starts with 100 MB and ends, of course, unlimited. The main marketing feature is the connection in 4G / LTE networks. AT&T has the following tariff grid: 2 GB will cost \$ 30 and 5 GB will cost \$ 50. Calls and SMS across the country are unlimited. The cheapest AT&T tariff is \$ 30 (more details in Table 5).

**Table 5. AT&T Tariff Plans**

Price	Calls, SMS	Internet
\$ 30	unlimited in the USA	not included, \$ 2 for MB or \$ 250 for \$ 5
\$ 35	unlimited in the USA	1 GB is included, then the speed is reduced to 128 Kbps
\$ 45	unlimited (to Mexico and Canada inclusive)	included 6 GB, in Mexico and Canada, data with the possibility of transferring to the next month
\$ 65	unlimited (to Mexico and Canada inclusive)	"Unlimited" in Mexico and Canada; Policy of fair use: 22 GB, then the speed is reduced to 128 Kbps

Source: compiled on the basis of [10]

If you include automatic payment, all plans come at a discount of \$ 5 per month. Plans include unlimited domestic SMS and MMS and international SMS in more than 100 countries. You can increase the limits up to three times a month and the rest of the unused limits can be transferred to the next month. When the data limit is used, the data transfer rate will drop to 128 Kbps. The default data transfer rate outside of these packages is 1 cent per 5 KB, which is \$ 2 per MB. The \$ 30 plan contains no data at all. Therefore, it is necessary to purchase an additional data card at \$ 5, so you can use 250 MB of data [10].

Vodafone in the UK has good coverage at 2G (900 and 1800 MHz) and 3G (900 and 2100 MHz) and deploys 4G / LTE at 800, 2100 and 2600 MHz. Vodafone has the longest validity period among all network operators. They provide 180 days for any activity plus an additional grace period of 90 days before disconnecting the card [11].

Vodafone has adopted a "roaming at home" scheme and all limits can be used without additional roaming charges in the EU / EEA. Vodafone currently offers international roaming partners 4G / LTE in the UK. Some additional countries were included in the zone without additional fees: Albania, Bosnia and Herzegovina, the Faroe Islands, the Channel Islands, the Isle of Man, Switzerland and Turkey. Big Value Bundles from Vodafone are combined Internet, telephone calls and SMS plans. They are offered for 30 days, and all of them contain an unlimited number of SMS (Table 6).

**Table 6. Big Value Bundles Tariffs from Vodafone**

Price	Calls	Internet Traffic
10 pounds	150 minutes	500 MB
15 pounds	250 minutes	1 GB
20 pounds	500 minutes	4 GB
30 pounds	unlimited	12 GB

Source: compiled on the basis of [11]

The limits are valid in the UK and in all European countries in roaming. Internet usage in the UK is paid at £ 1 per day for 25 MB, up to a maximum of 125 MB per day, after which you are charged £ 4 per MB. Unused data is transferred to the next month. Freebee Data. Vodafone adds data limits for account replenishment. This means that a limit is issued as a bonus and is not deducted from the top-up amount.

In the fall of 2017, Vodafone launched a new £ 1 plan for casual users. Under this plan, you pay 20 pennies for 5 MB (both for text and minimum) to a daily cap of £ 1. When you reach £ 1 a day, you get unlimited calls and SMS, and up to 500 MB of data. The day is valid from midnight to midnight British time. The same assistance is provided for EU / EEA roaming, based on the time

zone associated with the roaming capital. For additional data, you can add 500 MB once a day for £ 1 to 2345. Thus, the maximum data consumption is 1 GB per day under this plan.

Table 7 highlights the advantages and disadvantages of each mobile operator.

**Table 7. Advantages and Disadvantages of Mobile Leaders**

Company	Advantages	Disadvantages
China Mobile	the largest player in the Chinese cellular market, providing the most complete portfolio of communication services for subscribers	prices for communication services are on average higher than those of competitors
Vodafone	the largest player in the Chinese cellular market, providing the most complete portfolio of communication services for subscribers	not the highest quality of one of the most relevant services today - mobile data transmission, prices are slightly higher than prices of competitors.
AT&T	high speed internet, unspent traffic moves to next month	if the subscriber did not have time to replenish the account in time, the operator threatens not only to disable services, but also nobody will call and no SMS will come.

The image of a modern telecommunications player consists of the following key components: the quality of products and services, their diversity in the operator's portfolio and compliance with the needs of the subscriber, and, finally, the cost of these services. A comparison of the services' portfolio of the international mobile market leaders is given in table. 8.

Communication services provided by telecom operators in China and the United States follow the global industry trends in communication services: the subscriber is offered with mobile Internet access services, broadband access from home, pay TV services, and of course a full package of traditional wired and wireless voice services.

**Table 8. Comparative Portfolio of Leaders-Mobile Operators' Services**

Service	China Mobile	Vodafone	AT&T
Voice mobile communication	+	+	+
Voice mobile communication	-	+	-
Messaging	+	+	+
Mobile Internet	+	+	+
Home Internet	-	+	-
Mobile TV	+	+	+
Home TV	-	+	-
Banking services	-	+	-
Navigation services	+	+	+

The difference from the UK market is that Chinese and US operators have not yet come to the need to change their strategy and look for business growth points outside the telecommunications sector, such as banking. The reason for this state of affairs is the maturity of the Chinese and American telecommunications markets and the available space for further penetration growth.

Thus, the Chinese and American markets, as well as the UK market, have access to the full range of wireless telecommunications services, including Internet access, but, unlike the UK market, modern fixed infrastructure and non-telecom businesses (such as banking services) provided by telecom operators are less developed.

### 5. Conclusions

The International Telecommunication Union (ITU) constantly monitors the rates of fixed and mobile communications' development, as well as development of Internet access in the world, individual regions and countries. According to the experts of the union in 2019, the number of mobile users should increase to

7377 million people, and Internet users – to 3488 million people. It should be mentioned that China Mobile – China (over 860 million people), AT&T – USA (over 245 million people) and Vodafone (over 720 million people) are the largest companies in the world and their regions, respectively.

Comparing the leaders of the international mobile market (China Mobile, AT&T, Vodafone), it was found that communication services provided by telecom operators in China and the United States, repeat the global industry trends in communication services: the subscriber is offered with mobile Internet access services, broadband network access from home, pay TV services, and of course a full package of traditional wired and wireless voice services. The difference from the UK market is that Chinese and US operators have not yet come to the need to change their strategy and look for business growth points outside the telecommunications sector, such as banking. The reason for this state of affairs is the maturity of the Chinese and American telecommunications markets and the available space for further penetration growth.

After analyzing the leaders of the international market for mobile services on such indicators as: availability of radio network and services, completeness of service, continuity, quality of customer service, we concluded that the international leader in mobile quality is China Mobile, but all mobile operators, which were analyzed, showed compliance with the established levels of mobile services' quality. Modern mobile operators provide their subscribers, in general, a similar set of services. This set includes products and services without which the full use of a mobile phone is impossible, such as voice communication, messaging services, Internet access. In addition to this basic set of services, each operator seeks to provide its subscribers with something special, such as access to the Internet at home on a fixed line, and on the street, via cellular communications, digital television, bank payments, etc. It is due to such "special" services that the operator is differentiated in the subscriber's imagining.

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