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# RUSSIA ONLINE?

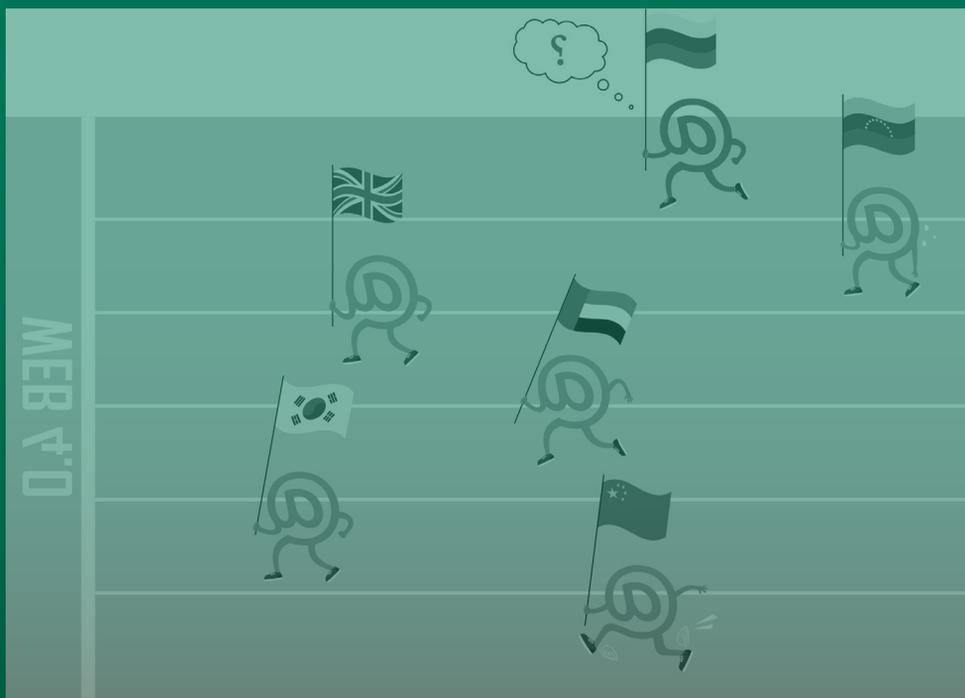
CATCH UP IMPOSSIBLE TO FALL BEHIND



WEB 4.0

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# CONTENTS

8	NEW WAVE OF THE DIGITAL REVOLUTION
14	DIGITAL ECONOMY IN RUSSIA: CURRENT STATUS
20	RUSSIA'S INTERNATIONAL STANDING
29	REGIONAL SPECIFICS OF THE DIGITIZATION IN RUSSIA
32	THE IMPORTANCE OF DIGITALIZATION FOR THE INDUSTRY
41	THE FUTURE OF DIGITIZATION IN RUSSIA

# FROM RUSSIA ONLINE TO RUSSIA ONLINE?

IT HAS BEEN 5 years since the publication of our previous report ‘Russia Online’ on the state of the Russian digital economy in 2011. In our new report a question mark in the title has been used for a reason.

A new wave of the digital revolution is about to sweep across the world, the greatest ever in speed and scope. It will substantially change the structure of the global economic system.

As always is the case with dramatic changes taking place, it is bringing huge opportunities to create value as well as challenges, responding to which may mean either coming out as a winner or losing in an intensely competitive environment. And this will concern not only individual companies or industries but also countries.

Another reason for using a question mark was that, as will be discussed in detail below, in the last 5 years Russia has reaped the full benefits of all the key digitization ‘quick wins’. Therefore sustaining the competitive advantage in the future is absolutely crucial.

In the absence of coordinated action by all the participants of Russia’s economic system Russia’s lag behind the leaders in the digital economy, that now stands at around 5-8 years, will rapidly increase. Within the next five years, due to the high speed of global changes and innovations, the lag may rise to 15-20 years – a gap that will be extremely difficult to close.

And this is a direct challenge – a question that calls for a strategically balanced and clear answer.

We strongly believe that by embracing intensive digitalization Russia will not only reduce the gap that separates it from the leading countries, but will be able to ensure that its development is really sustainable in the long term.



# EXECUTIVE SUMMARY

**D**igitalization that we see as the use of online capabilities and innovative digital technologies by all the participants in the economic system, from individuals to big businesses and governments, is a prerequisite to remaining competitive for any country. For Russia, considering its new economic reality, it is a unique opportunity to refocus its economy and make it sustainable in the long-term.

**The share of digital economy in Russia is 2.1% – this is 1.3 times more than 5 years ago but 3-4 times less than in the countries that are leaders in the digital economy.**

Russia is the sixth largest country in the world and the biggest in Europe by the number of Internet users.

Online consumption in Russia has been skyrocketing in the last 5 years growing by 27% per annum on average and in 2015 it reached the level of 2 trillion rubles.

An important achievement of the last 5 years was the rapid growth of new Internet-dependent segments: tourism, gaming, media, banking services etc. Overall these segments represent over half of the entire e-commerce volume.

However, due to the level of the export component that is still high and investment growth grinding to a halt, the share of the digital economy in the GDP has been stagnating since 2014.

**Since 2010 the cross-industry effect of digitalization<sup>1</sup> has increased by a factor of 5.5: from 5 to 27.7 trillion rubles.** This is the result of the introduction of electronic trading platforms, the growing number of bank card transactions, the expansion of the ROPO<sup>2</sup> and online advertising segments.

**As compared to other countries the development of the Russian digital economy was evolutionary: it occurred without breakthrough success (unlike in China, for example) but also without losing Russia's standing in the ranking (39 out of 85).**

Russia is currently about 5 – 8 years behind the countries that top the rankings in the overall level of digitalization.

Russia's level of infrastructure development is still higher than that of other BRIC countries, although China and Brazil are actively closing the gap (down from x 1.6 to x 1.2 in five years).

1. Not accounted for directly in the GDP calculation to avoid double counting (for details see Methodology).

2. Researched online purchased offline – searching for information about a product or a service online and purchasing offline.

In terms of the extent of using online capabilities Russia is improving its position, which is partly due to the development of electronic government services and growing user activity.

**Due to a more even infrastructure distribution, the digital gap between Moscow and the regions has been reduced from 2.6 to 1.35<sup>3</sup>. This is a major achievement of the digital economy.**

The degree of digitalization still varies from one region to another, which gives us reason to identify four main groups and discuss the specific features of their future development.

The regions become actively involved in the digital economy as soon as access to the infrastructure becomes available, although there is still inequality in a number of additional indicators – this concerns the penetration rate and the use of government services (the gap between Moscow and other regions is between 3 and 5 times) as well as business activity in terms of using digital opportunities (2-3 times).

**Overall, a huge underutilized potential for industry digitalization is apparent, irrespective of regional specifics.**

Even in Moscow the use of such basic digital products as ERP and CRM systems (basic by the standards of best practices) is not more than 24%.

Broadband access penetration<sup>4</sup> in the corporate segment was already 80% in 2014, however, the share of companies using the Internet with a speed of over 2 Mbit/s is 1.7 times less, while the share of those using the speed of over 10 Mbit/s is 3 times less.

The main reason for this is that the existing digital opportunities and their impact upon efficiency, productivity and business growth potential in most industries are underestimated both by small businesses and major players.

Nevertheless, we are confident that digitalization of industries has the greatest potential to create value.

**There are three possible scenarios of further digitalization in Russia that can be identified:**

- *Unless the digital component of the economy is supported by targeted incentives, its share of the GDP will continue to stagnate; this will result in a growing lag behind the leaders, which stands at 5-8 years today and will go up to 15-20 years in five years (Venezuelan model).*

Since the digital gap between the leaders and laggards is growing exponentially, it will be extremely difficult to make up for such a lag.

- *A moderate growth scenario (Middle-Eastern model) is possible with large-scale implementation of the initiatives that are already underway – in particular, those concerning the development and coverage of public services (government services, healthcare, education), optimizing the existing electronic processes, phasing out their offline replication etc.*

In the current environment where the leading digital economies and Asian countries are actively engaging in increasing digital intensity, this development scenario appears to be somewhat lacking but at least it will ensure that the digital divide between Russia and the digital leaders does not increase dramatically and will instead create the added value for the economy of 0.8-1.2 trillion rubles per annum, whereas the digital economy itself will reach 3% of the GDP.

- *An intensive digitalization scenario is the biggest in scope (Asian model)*

Going down this path will require a comprehensive approach to changes, both at the government level and for individual industries and companies. The focus is not only on the basic components of the digital economy (infrastructure, online spending and involvement) but also on the growth of private and public sector investment in such promising areas as the Internet of Things, Big Data, the development of IT products and services with a high export potential.

3. Evaluation based on the BCG e-Intensity index (infrastructure development level, online spending – e-commerce and advertising; involvement of the government, businesses and individuals in online use) – for more details see Methodology.

4. The Internet with the data transmission speed of 256 Kbit/s and over. Source: Rosstat.

This will make it possible to increase the share of the digital economy to 5.6% of the GDP and create large-scale additional cross-industry effects and real added value across various industries of up to 5-7 trillion rubles per annum.

**This scenario will require the greatest effort but we strongly believe that fully embracing a comprehensive digital transformation of the economy is key to ensuring that Russia remains competitive.**

This is the way that was chosen by the digitization leaders in the Asia-Pacific Region which has today enabled China, for example, to make a breakthrough and, according to our forecast, lay claim to joining the top 10 digitalization leaders by 2021. An impressive achievement considering that in 2011 China was 8 positions behind Russia<sup>3</sup>.

**Driving digital transformation requires a fundamental review of the approach by the private sector and the government to interaction, decision-making, incentivizing innovation and**

**creating a regulatory environment where each participant of the system plays a meaningful role.**

Consumers should be open to new opportunities and play an active part in creating digital services.

Private businesses should be focused on long-term growth and initiative, have the ability to question existing business models, show a readiness to learn quickly on their own and experiment, to review their attitude to risk, be open to creating a cross-industry system of interaction with other players and the state and prioritize innovation.

The state should respond to regulatory issues in a timely manner, invest and co-invest in the infrastructure, act as a moderator in the cross-industry dialogue, and also, considering Russia's specifics, act as a responsible owner of a number of major companies and lead change.

**Coordinated action by all the participants of the potential digital ecosystem will secure a sustainable and positive result.**

# NEW WAVE OF THE DIGITAL REVOLUTION

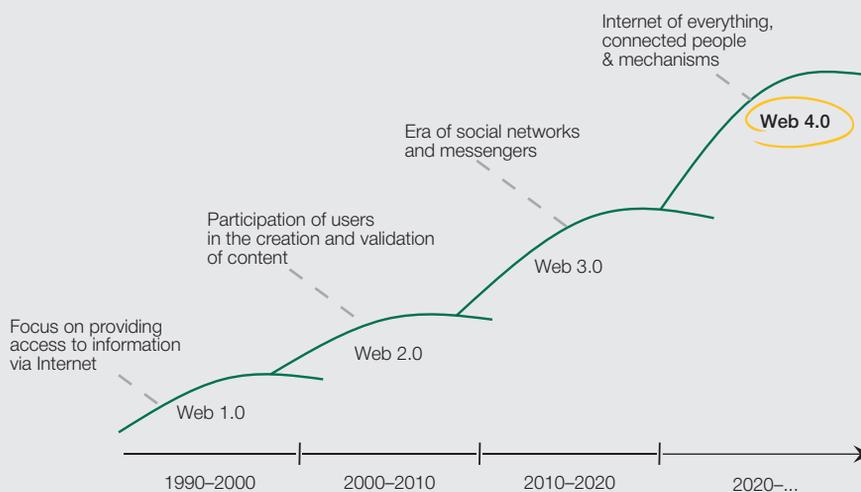
Infrastructure development, lower cost of processing, storing and transmitting data are taking the humankind to the threshold of a new and most powerful stage of the digital revolution. The previous stage was marked by a rapid penetration of the Internet into consumers' daily lives (Exhibit 1). The current stage is characterized by a fast and mutually amplifying penetration of a much larger range of digital services, products and systems.

**Today we are talking about an offline–online convergence and the emergence of a cyber-physical world.**

This has become possible due to several fundamental factors – universal connectivity, rapid proliferation of sensor devices and data.

In 1995 only about 45 million people had access to the Internet, whereas today this figure is almost 3.5 billion.

**EXHIBIT 1 | The world is approaching the 4th wave of digital revolution**



Source: BCG analysis.

Nowadays, in addition to people, the Internet is ‘used’ by around 10 billion machines and mechanisms – devices, meters and apparatuses and by 2020 this number is expected to double.

99% of the global data have already been digitalized and over 50% have an IP address. In future data volume will double every 2 years.

Connectivity and data exchange make it possible to use resources more efficiently, to share the use of the infrastructure and to optimize capacity utilization: it is the so-called ‘sharing economy’ the scope of which today is estimated at US \$150 billion.

All these phenomena fundamentally change the structure of the global economic system – consumer opportunity, industry structure, the role of the state (Exhibit 2).

### Impact on the consumer

Technology is increasingly becoming part of our daily lives, it is drastically changing the way we communicate, work, what we spend our money and time on.

**Every minute in the new Internet world means 150 million e-mails, 20 million WhatsApp messages, 3 million views on YouTube, 2.5 million Google search queries, 700,000 Facebook logins and over US \$200,000 spent on Amazon.com<sup>5</sup>.**

Today we are already living a 31-hour day<sup>6</sup> by doing more and more things at a time. Our attention is becoming increasingly fragmented and we give preference to companies and products that are better suited to our needs, which meet them within a minimal time-frame and provide the best value for money.

Various activities are being gamified. In the format of virtual games and augmented reality any educational subject can be studied; the development of artificial intelligence, robotic technology, this is all remarkably promising; Android and iOS assistants that are rapidly becoming ever smarter, Google autopilot systems, Barbie dolls that can maintain a conversation with a child.

However, new possibilities also pose new challenges for all of us; they are not limited to

#### EXHIBIT 2 | Digitization drives value at all levels – from consumers to countries

Values for nations		
A new driver for GDP growth		
Positive net impact on job creation		
More efficient use of existing resources		
Values for government	Values for companies	Values for citizens
Increasing productivity in government operations such as tax collection and data management	Access to bigger market – increasing sales	Increased competition – consumers can find the best products at the lowest price-point
Potential to identify and reduce fraud and misuse of public services	Increased productivity potential through digitization of business processes and business models	Access to new types of products and services (e.g. sharing economy)
Identifying and analyzing societal trends with big data tools	Better access to talent thanks to better reach of digital channels	Better employment possibilities through facilitated access to available job positions
More efficient communication with citizens and businesses	Increased transparency and ease of interacting with government	Facilitated access to government services through e-government services

Source: BCG analysis.

5. Excelacom, Inc. 2016.

6. Tech and Media Outlook 2016, Activate, October 2015.

technology but are also cultural, educational, moral and ethical challenges.

Mosaic thinking, the boundaries of privacy, the bifurcation of our virtual and real projections, competing with artificial intelligence – all these pose questions that the humankind is yet to answer.

### Impact on Business

The degree of the impact of digital technologies in various industries varies (Exhibit 3). However, there is no doubt that all industries and their players will sooner or later have to go through a digital transformation.

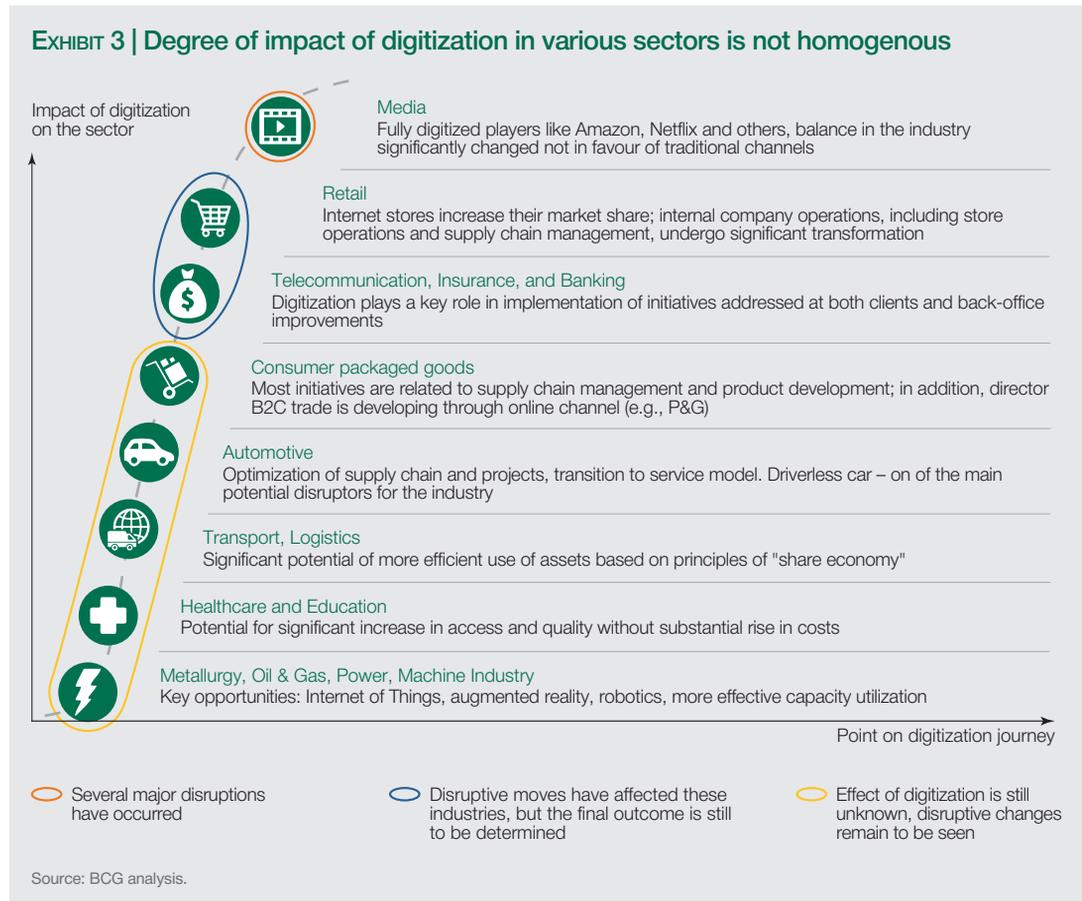
Just like with the invention of the car cleaning city streets with horse-drawn carriages became unnecessary, many, it would appear, major and complex current tasks may become irrelevant as a result of the emergence of fundamentally new approaches and business models.

Such changes are already affecting the B2C sector (the media, retail, banking and insurance services). Here they are triggered by an extremely tough competition over two highly limited resources – the consumer’s time and wallet.

**These days some companies that control no more than 30 seconds of user attention per day have a market capitalization<sup>7</sup> running into billions:** Shazam (music track information search) is valued at US \$1 billion; BuzzFeed (Internet media) is worth \$1.5 billion.

The success of aggregator platforms such as Uber and AirBnB is based on the principles of ‘sharing economy’ doing away with intermediaries and maximizing asset utilization, reducing the time between the moment a need arises and its fulfillment, and providing ample feedback opportunities.

In addition, both players emerged in the industries that seem to have very high barriers



7. Tech and Media Outlook 2016, Activate, October 2015.

to entry. That is why now the term ‘uberization’ is often used as a synonym for a digital threat to any conventional industry.

A fundamentally new feature for the business in the context of the current digital revolution is its impact upon the B2B sector. It is in B2B that digitalization capabilities are not limited to owning the consumer’s limited resources, but offer infinite opportunities to approach new heights of efficiency and productivity.

It is in B2B that digitalization capabilities offer infinite opportunities to approach new heights of efficiency and productivity.

We are talking about a phenomenon called ‘Industry 4.0’ that is characterized by a number of major trends (Exhibit 4) that are

already having a huge impact on the established business models today.

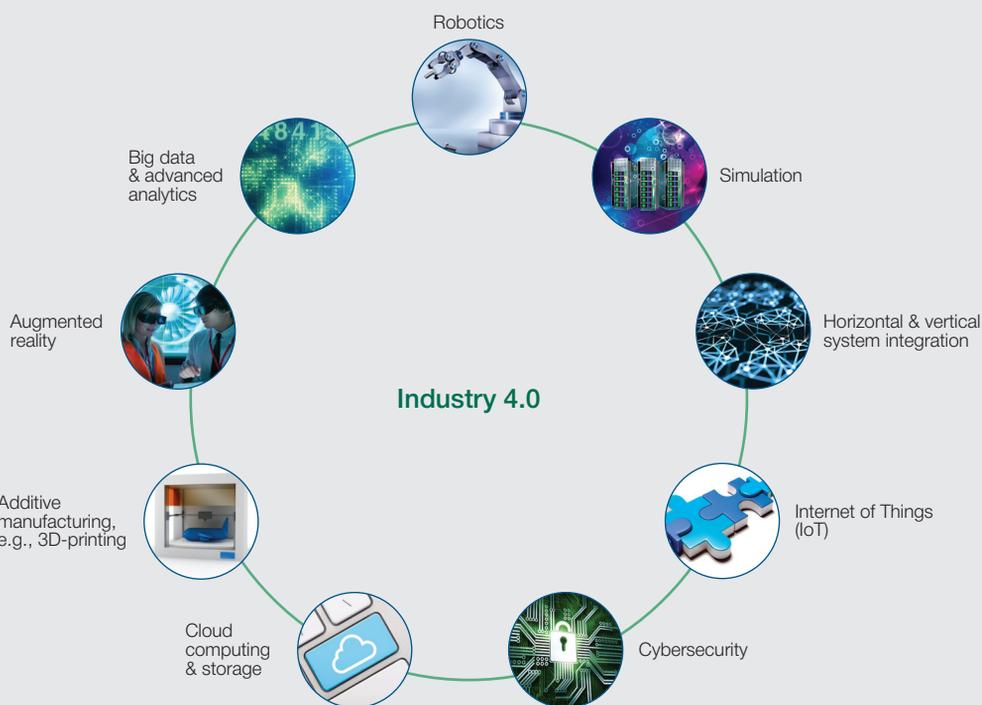
The development of 3D-printing will significantly change the production and logistics processes in most industries – from mass consumer products to organ transplantation.

As an example of robotics technology development, Airbus is carrying out a study on the creation of humanoids that will be able to perform complex production tasks. Russia, the USA and Japan are developing exoskeletons – hardware-software complexes that replicate the human locomotion system to enhance a person’s physical strength or restore mobility.

Big Data and advanced analysis enable better and faster decision-making from predictive maintenance to fighting fraud.

However, the most difficult change for conventional industries will be, in our view, not so much the creation and integration of technologies, but rather a fundamental restructuring of corporate culture and organization.

EXHIBIT 4 | Industry 4.0 is characterized by a number of trends



Source: BCG analysis.

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The most difficult change will be the restructuring of corporate culture and organization.

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An iterative adaptive approach and a higher risk tolerance that are inherent to entrepreneurial mentality are in many ways alien to the existing approaches to managing big business. It is difficult to accept that the structure of any industry and company today must be seen as the main variable rather than a constant.

Another risk factor is weak integration of 'new' solutions and products with the existing IT systems. On the one hand, to stay competitive, major companies should at least be quick to embrace innovation. On the other hand, they are facing one of the greatest challenges of harmonizing the already existing IT platforms with any new solutions. In other words, the most difficult component of the term 'digital transformation' for a conventional business is 'transformation' – a consistent and conscious restructuring. Those who fail to embrace it will be left far behind.

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The structure of any company or industry should be seen as the main variable and not as a constant.

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### The impact upon governments

**In terms of the necessity and complexity of the changes, the challenges facing governments are no less important than those of the major players in the private sector.**

### REGULATORY WORK AND INVOLVEMENT

A traditional approach to regulatory activity that implies a strict linear sequence of certain steps and approvals is failing to meet the challenges of the new age – the speed and the iterative nature of decision-making.

A direct involvement of citizens that has become possible thanks to technologies requires a rethink and development of fundamentally different processes designated to simplify any interactions – from receiving services to conducting elections.

### THE JOB MARKET

Another no less important mission of the government is concerned with the social sphere. According to the studies, in the next 10–20 years about 50% of professions will cease to exist<sup>8</sup>. Substantial changes will affect logistics, production, retail and agriculture. The number of people employed in administrative management will also dramatically fall.

Many experts point out that the new digital revolution may increase social inequality rather than reduce it. That is why it is necessary to pursue in advance a well thought-out and efficient policy in education, develop comprehensive re-training and continuous training programs.

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In the next 10–20 years about 50% of professions will cease to exist.

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Only then can it be expected that the number of new jobs created as a result of the emergence of technologies will exceed the number of jobs that are gone. For example, according to a BCG study, in a group of 9 **European countries that are leaders in digitalization, such as Denmark, Sweden, Finland etc., between 2015 and 2020 the number of new jobs will exceed the number of those phased out by 1.6–2.3 million.**

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8. C.B. Frey, M.A. Osborne, «The future of employment: How susceptible are jobs to computerization?», 2013.

## Relevance of Digitalization for Russia

The Russian economy is heavily dependent upon commodity markets, which have entered a structurally new reality. The new environment makes it more difficult for the country to remain competitive.

Digitalization has the potential for value creation in Russia's 'main business' – the commodity sector, but also for diversification and unlocking potential of other sectors, stimulating entrepreneurial activity, 'amplifying' the structure of the economy due to the diversity of opportunities.

According to various forecasts, in 2016 the Russian GDP in rubles will show zero or negative growth from -0.2 to -2.1%; in 2017, the growth, if any, will be no more than 0.4–0.8%<sup>9</sup>.

We are confident that embracing digitalization may change the forecasts for the next 3-5 years to being more optimistic.

We support the findings of the National Report On Innovations in Russia in 2015<sup>10</sup> that embracing the innovative component should be the key, if not the only possible, focus for Russia.

Innovations in the modern world are not only related to the possibilities offered by digital technology, most of them are based on such possibilities. It is for this reason that we maintain that **a comprehensive and consistent digitalization of the Russian economy will become a platform for a qualitative change of its structure and long-term opportunities.**

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9. Forecast of the Social and Economic Development of the Russian Federation for 2015-2019, Russian Ministry of Economic Development, April 2016.

10. Published by the Russian Venture Company, Open Government and the Ministry of Economic Development in 2015.

# DIGITAL ECONOMY IN RUSSIA: CURRENT STATUS

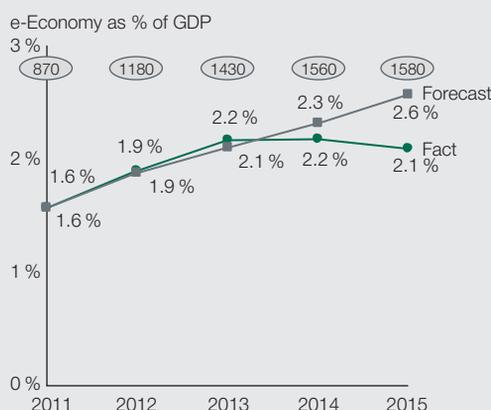
## Direct Contribution of Digital Economy to the GDP

In 2001 we estimated that the contribution of the digital economy into Russia's GDP was 1.6%. For comparison, its average value for G20 countries at that time was already over 4%.

Our forecast for 2015, which in the base case scenario was 2.6%, in some way exceeded, and in some way failed to live up to the expectations.

For example, online consumption was growing at a faster pace, by 27% a year on average, and reached the level of 2 trillion rubles, but in general the share of the digital economy in the GDP proved to be below the forecast (2.1%) – the share stopped growing as early as 2014 (Exhibit 5). This was due to the stagnation of investment volume and and high import component.

**EXHIBIT 5 | e-Economy share in GDP has been stagnating since 2014**



xxx e-Economy, B RUB

Source: BCG analysis; BCG e-economy model; Euromonitor; Data Insight; Mail Group; HSE; CBR; Pyramid research; RAEC; ACAR; MagnaGlobal; IAB Europe; Spark-Interfax; Consumer Barometer; Rosstat; zakupki.gov.ru, B2B-Centre.ru; Federal Customs Service of Russia; Gartner; Federal Program «Information Society»; OVUM; Ministry of Telecom and Mass Communications of the Russia

In 2015 the share of digital economy in Russia was 2.1% of the GDP – this is 1.3 times more than 5 years ago but 3-4 times less than the level achieved by the digitization leaders.

In 2015 the share of digital economy in Russia was 2.1% of the GDP – this is 1.3 times more than 5 years ago, but 3-4 times less than the level achieved by the digitization leaders. The average share of the digital economy in Europe today is more than 5% of the GDP, in the USA it is 6%. These values are 1.5 times higher among digitalization leaders: in the United Kingdom the share of e-Economy has increased to 8.4% of the GDP.

## Consumption

Increased accessibility of the Internet, growth of individual incomes, the emergence of a new generation of users – all this has resulted in a rapid growth of online consumption.

### E-COMMERCE

**Since 2011 the e-commerce market has been growing by 27% per annum on average and reached 3.3% of the total retail volume. So far this share is substantially lower compared to the developed economies (Exhibit 7) but it will continue to grow.**

The share of e-commerce has reached 3.3% of the total retail volume, however, it is still 2-4 times lower than that of the developed economies.

The e-commerce is most widely developed in such sectors as consumer electronics, apparel

and footwear, furniture and DIY goods. These categories account for 80% of the e-commerce market in Russia.

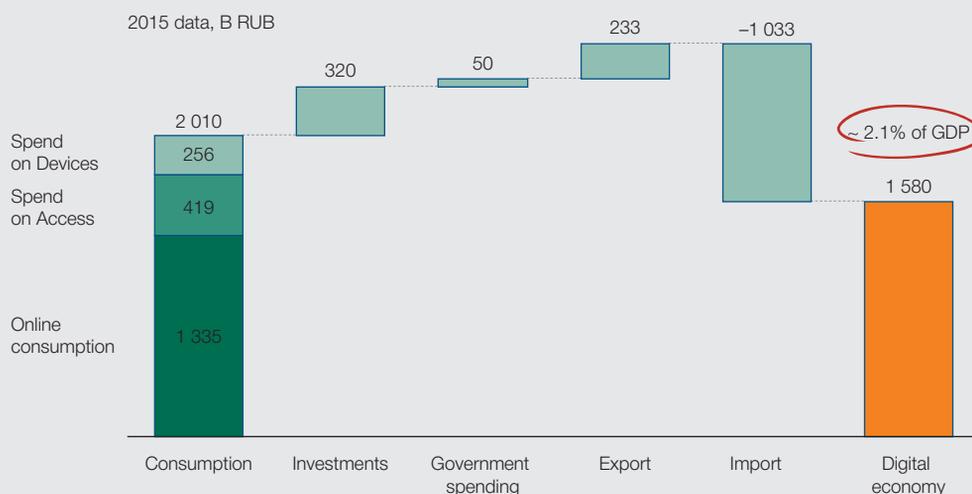
Feeling the pressure from online retailers, major offline retailers are also actively developing their online business. For example, the share of online channel in the sales volume of M-Video and Eldorado has doubled in the last 2 years. In 2015 the Internet accounted for 15.5% of Eldorado's sales and 11% of M-Video's (circa 25% in Moscow).

It is notable that online grocery retail is almost non-existent in Russia (only 0.2%), although the first online food stores appeared a while ago: Utkonos, one of the biggest players in this market, was set up in 2000. For comparison, in the UK the share of online food retail is 4.4%, in the Netherlands – 3.6%, in the USA – 3.0% (Exhibit 8).

Feeling the potential of the online segment, a number of major offline retailers already have or are launching food delivery services.

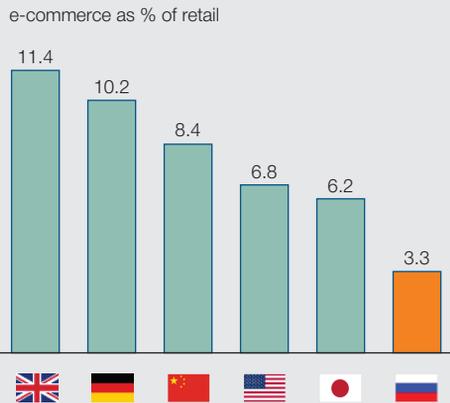
For example, in 2016 Azbuka Vkusa is planning to increase its current 3% share of online sales by a factor of 2.5. In addition to traditional food delivery, Azbuka Vkusa is

**EXHIBIT 6 | Russian e-Economy reached ~1.6 trln rub in 2015 (2.1% of GDP) mainly driven by consumption growth**



Source: BCG analysis; BCG e-economy model; Euromonitor; Data Insight; Mail Group; HSE; CBR; Pyramid research; RAEC; ACAR; MagnaGlobal; IAB Europe; Spark-Interfax; Consumer Barometer; Rosstat; zakupki.gov.ru, B2B-Centre.ru; Federal Customs Service of Russia; Gartner; Federal Program «Information Society»; OVUM; Ministry of Telecom and Mass Communications of the Russia.

**EXHIBIT 7 | e-Commerce share in Russia is 2-4 times lower than in developed markets**



**EXHIBIT 8 | Russian online grocery market is poorly developed**



Note: in 2014; the volume of retail excluding fuel.  
Source: Online retailing Europe, Euromonitor, AKIT, Syndy «State of online grocery retail in Europe», BCG analysis.

developing other online services, such as delivery of ready-to-eat meals and set menu ingredients for parties.

**THE DEVELOPMENT OF NEW ONLINE MARKETS AND THE CHANGING NATURE OF CONSUMPTION**

**An important achievement of the last 5 years is the rapid growth of Internet-dependent markets that are new compared to 2011: tourism, gaming, media, banking services and others. Currently these sectors taken together account for over half of the total e-commerce volume.**

For example, one of the leaders in online games – Wargaming (creator of the World of Tanks), whose sales in 2015 were RUB 36.2 billion<sup>11</sup>, became one of the three major Internet companies in the CIS coming very close to Mail.Ru Group (with its RUB 39.3 billion sales revenue).

Both Russian and international investors show interest in cybersports. The biggest transaction in this sector was a US \$970 million purchase of the Twitch Internet service by Amazon in 2014 that makes it possible to webcast cybersports

competitions. The main news in the Russian market was the announcement by Alisher Usmanov about investing US \$100 million in Virtus.pro that organizes cybersports tournaments. It is planned that one of the biggest cybersports stadiums in the world will be opened in Moscow already this year.

Apart from the gradual digitalization of the mass segment, the nature of online consumption is also changing. For example, the tourism and travel segments, as we forecast, are moving from simple online ticket bookings (mainly airline tickets) to a comprehensive selection, comparison and payment for travel packages. Travel companies are facing growing competition from search aggregators of airline tickets and hotels – Booking, AirBnB, Aviasales etc., which pushes conventional operators to actively develop online booking and dynamic packaging.

Today it can be confidently stated that the Internet in Russia is no longer only a tool for information search and communication, as it was 5 years ago. Today the Internet offers a full range of services: offline-to-online, online-to-offline and online-to-online.

11. US \$590 million. Source: Bloomberg.

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The internet in Russia is no longer only a tool for information search and communication but is also a comprehensive service platform.

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#### SPENDING ON ACCESS AND ACCESS DEVICES

**In the segment of access device spending the key driver of growth became a substantial increase in mobile devices spending.** It was due to the emergence of affordable smartphones and a significant development of the mobile Internet not only in Moscow and Saint Petersburg but all across Russia. Spending on mobile Internet alone grew by a factor of 1.5 and exceeded RUB 200 billion.

### Investment

Capital spending is one of the fundamental drivers of Internet development. Penetration growth, the development of fixed broadband and mobile access area a pre-requisite for the development of the digital economy.

The share of telecom operators in the total investment volume in the Internet infrastructure is around 80%. The investment programs of major players were mainly associated with the development of 3G/4G networks and fixed broadband access.

The last few years have seen no conditions in Russia that would prompt substantial investment growth by telecom operators. Due to the basic infrastructure reaching its saturation point and the absence of cheap ruble loans, capital expenditure has been stagnating since 2012. This was one of the key reasons for a halt in the growth of the digital economy in Russia and can become the major restricting factor in the digitalization process over the next 5-10 years.

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A halt in investment growth became one of the key reasons for the stagnation of the share of the digital economy in Russia.

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### Government Expenditure

Government expenditure was primarily used on special purpose government programs, especially the Information Society program, whose overall purpose was to ensure that Russia joins the top 10 countries in terms of information technology development. In this comprehensive program three areas can be identified that are crucial for the digital economy:

- development of the infrastructure and bridging of the digital divide among regions;
- development of e-government;
- development of ICT-based services in education and healthcare.

### Export

The contribution of net export to the digital economy is currently negative – minus RUB 800 billion. This is due to two key factors: the import of ICT goods and services and the growth of cross-border import.

#### ICT IMPORT

As of today **Russia imports about 90% of hardware and 60% of software.**

Russia has seen quite a number of examples of domestic IT projects becoming competitive on a global scale: Kaspersky Laboratory, Parallels, Acronis. Russia also has several large technology companies such as Yandex, Mail.ru, VKontakte. Although maintaining their positions in the future will be a challenge for these players, the CIS is still one of the few

markets where such giants as Google and Facebook do not enjoy a dominant position.

**CROSS-BORDER IMPORT**

Over the last 5 years the volume of purchases in foreign-based online shops has increased tenfold to about RUB 200 billion in 2015.

Over the last 5 years the volume of purchases in foreign-based online shops has increased tenfold to RUB 200 billion.

Goods from China account for 50% of the entire volume. Reciprocal export of similar goods is minimal. AliExpress is clearly demonstrating to the entire world that the export of SME products has a very high potential (see insert 'China: on page 25).

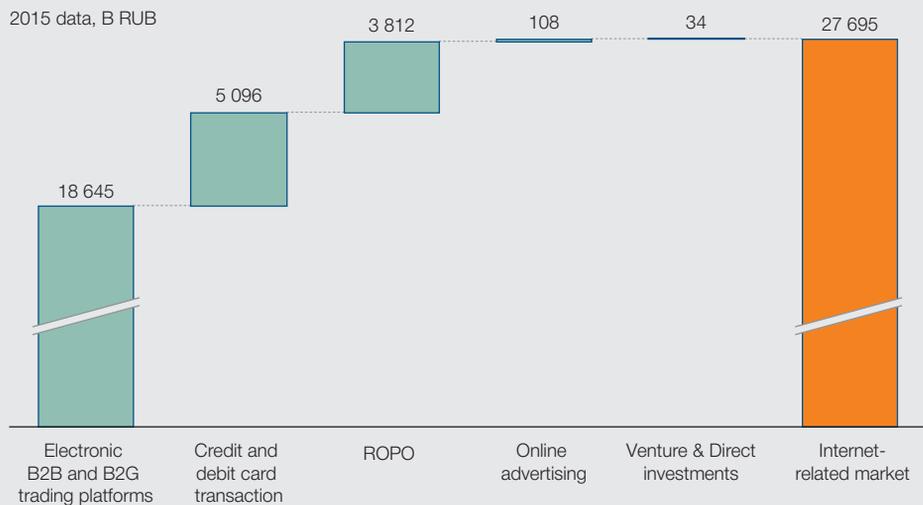
**Beyond the GDP: Cross-industry Contribution of the Digital Economy**

The importance of digitalization for the economy is much higher than it appears from the estimate of its direct effect on the GDP because to avoid double counting, a number of significant economic effects was not included in our calculation: the creation of electronic trading platforms, the growing number of bank card transactions, deeper ROPO<sup>12</sup> penetration, the growth of online advertising and venture investments (Exhibit 9).

The markets with a digital economy component have expanded by a factor of 5.5 since 2011 from 5 to 27.7 trillion rubles.

The markets with a digital economy component have expanded since 2011 by a factor of 5.5 from 5 to 27.7 trillion rubles.

**EXHIBIT 9 | Cross-industry effect of e-economy was 27.7 trln rub in 2015; 85% was contributed by electronic platforms**



Source: BCG analysis; BCG e-economy model; Euromonitor; Data Insight; Mail Group; HSE; CBR; Pyramid research; RAEC; ACAR; MagnaGlobal; IAB Europe; Spark-Interfax; Consumer Barometer; Rosstat; zakupki.gov.ru, B2B-Centre.ru; Federal Customs Service of Russia; Gartner; Federal Program «Information Society»; OVUM; Ministry of Telecom and Mass Communications of the Russia.

12. ROPO – researched online purchased offline: goods selected over the Internet but purchased in offline stores.

## BANK CARD TRANSACTIONS AND ROPO

Despite the fact that the bank card transactions segment has seen a dynamic growth (50% per annum on average), the main payment method in Russia is still cash. 60% of card transactions are still cash withdrawals from ATMs. The majority of users prefer cash payments even when ordering goods from Internet stores.

The ROPO sales segment has substantially expanded from 6% to 23%, and there is still a potential for growth. By analogy with the European experience it may be assumed that this segment may further grow at least by a factor of 1.5.

## ONLINE ADVERTISING

A global growth of the online advertising segment should be noted. While other global advertising channels show a 2% growth per annum, the growth of digital advertising is 13%. **In Russia Internet advertising has already taken over one third of the market and its mobile segment share is growing as well.**

Overall the Russian advertising market shrank by 10% in 2015 whereas the Internet advertising market grew by 15%. It is revealing that as early as two years ago Yandex outstripped the First Channel (Russia's leading federal TV channel) in terms of revenue, and the 2015 advertising revenue put Yandex ahead of the largest Russian advertising seller Gazprom-Media.

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**In 2015 the Russian advertising market shrank by 10% whereas the internet advertising market grew by 15%.**

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Within the global digital advertising segment the share of automatically targeted (programmatic) advertising is rapidly growing: the average annual growth rate is ~30% compared to 9% in traditional online advertising. In Russia this segment is not more than 5%. In comparison to the United Kingdom and the US, the share of programmatic there is already over 50% of online advertising.

The advertising budgets of the largest companies are switching to programmatic (for example, up to 75% of the P&G Internet advertising budget).

## VENTURE INVESTMENTS

The venture investment market is an important element of the digital economy. The growth noted in 2010-2014 put Russia's venture market next to the leaders in terms of volume: in 2014 Russia made it to the Top 10 countries with the largest venture investments. On the other hand, as regards its venture investment share in the GDP, Russia is still behind the majority of OECD countries.

**In 2015, as a result of the deteriorating macroeconomic situation, the Russian venture market shrank by half against the 2014 level and many experts expect a further diminishment in 2016.**

There are also some institutional issues, in particular, the lack of balance in the development of various stages of financing.

A relatively effective mechanism of supporting business projects in the early stages has been created, however, at a more advanced stage most of such projects fail to get the support of the Russian business community. The existing corporate demand for innovative startups is generally met with the import of technologies or attempts to develop the products required in-house.

Therefore even the companies that were grown by the local venture market are leaving for other countries to improve their competence and secure financing for future development, having no further investment prospects in Russia.

This is one of the most serious problems to be addressed while the digital component of the economy is being developed, it requires consistent incentives for innovative entrepreneurial activity.

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**The companies grown by the local venture market are leaving for other countries due to limited access to further financing in Russia.**

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# RUSSIA'S INTERNATIONAL STANDING

**S**ince the assessment of any achievement in terms of quality requires understanding not only its absolute but also its relative result, we compare the progress of digitalization in Russia and the dynamics demonstrated by other countries using the BCG e-Intensity index.

For the purposes of this index we have made a comprehensive assessment based on 28 criteria divided into three main categories (see the Methodology section on page 47).

- Infrastructure development: availability and speed of mobile and fixed-line Internet access.
- Development level of online spending: e-commerce and online advertising.
- Involvement of the government, individuals and businesses in using the opportunities offered by digital economy.

## Digital Economy Worldwide

Overall, the digital intensity of the global economy is constantly rising; however, the level of digitalization differs considerably from country to country. For convenience, five groups of countries can be identified across the globe (based on their digitalization level and GDP per capita).

The group of Leaders includes the most digitally developed countries: South Korea, Denmark, United Kingdom, Sweden, Norway, and the Netherlands. They implement the most advanced digital technology solutions.

Players include the majority of developed global economies: Germany, USA, Japan and the EU.

Laggards include prosperous countries with a high level of GDP per capita and the rate of digitalization that is lower than in the countries with a comparable level of economy. They are the countries of the Middle East: UAE and Saudi Arabia.

It should be noted that in recent years these countries have worked hard to close the digital divide that separates them from the leaders and given priority to the development of online government services online, that is why despite lagging behind, they have succeeded in considerably improving their position in the rating in the last 5 years.

The group 'Nascent natives' is of interest. It includes countries where the level of digitalization is higher than the relative development level of the economy. China is one of the best examples of countries in this group.

## Russia's standing

As compared to other countries the development of the Russian digital economy was evolutionary – there was no breakthrough success (unlike in China, for example, and some other countries), but there was no loss in relative position – 39 among 85 (Exhibit 10).

Over the last five years Russia has moved from the fringe of the Laggards group to the fringe of the Players group (Exhibit 11).

Having compared the current level of digitalization of the Russian economy and the development dynamics of the ranking leaders, it can be concluded that at present Russia is behind them by 5-8 years (Exhibit 12).

As of today Russia is behind the digitalization leaders by 5-8 years.

## Infrastructure Development

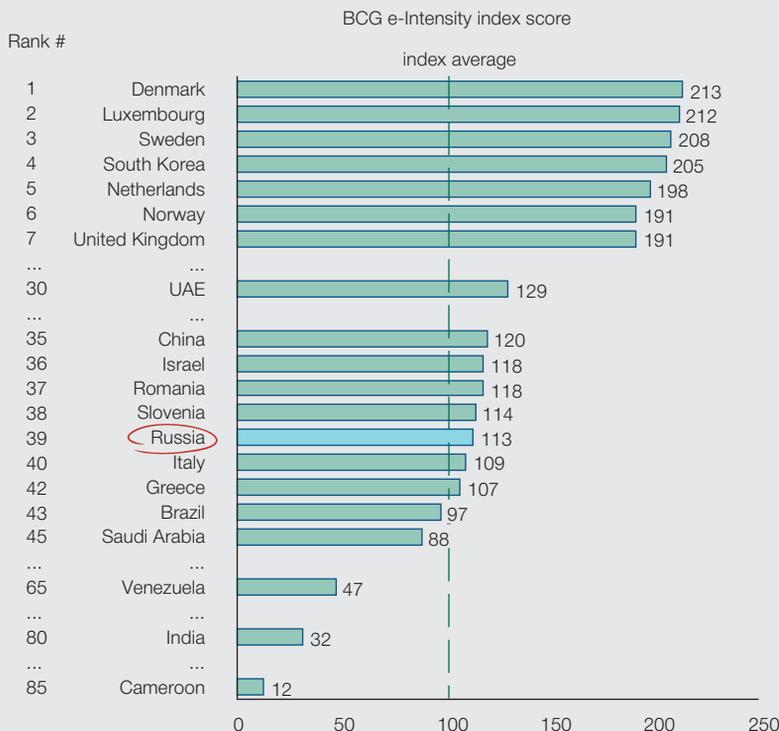
Over the last 5 years the wired Internet penetration has increased by a factor of 1.5 reaching 70.4% of the population<sup>13</sup>. The accessibility of wired broadband services in 2015 was 66.7%.

In the mobile internet segment Russia has considerably improved its positions compared to other countries in terms of broadband mobile Internet access (+29 positions) and sales of smartphones (+12 positions). Thus, the accessibility of 3G in Russia is 95%, LTE is accessible for 60% of the population.

Penetration of 3G in Russia is 95%, LTE – 60%.

According to the Cisco VNI report, the 3G connection speed in Russia is above the average level in Central and Eastern Europe.

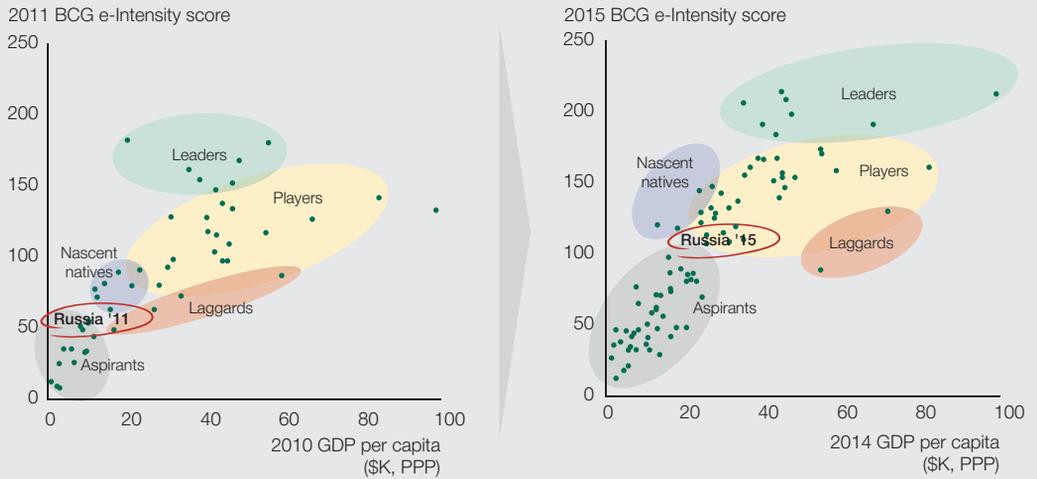
EXHIBIT 10 | Russia is at the 39th position in terms of economy digitization



Source: BCG analysis; BCG e-Intensity model

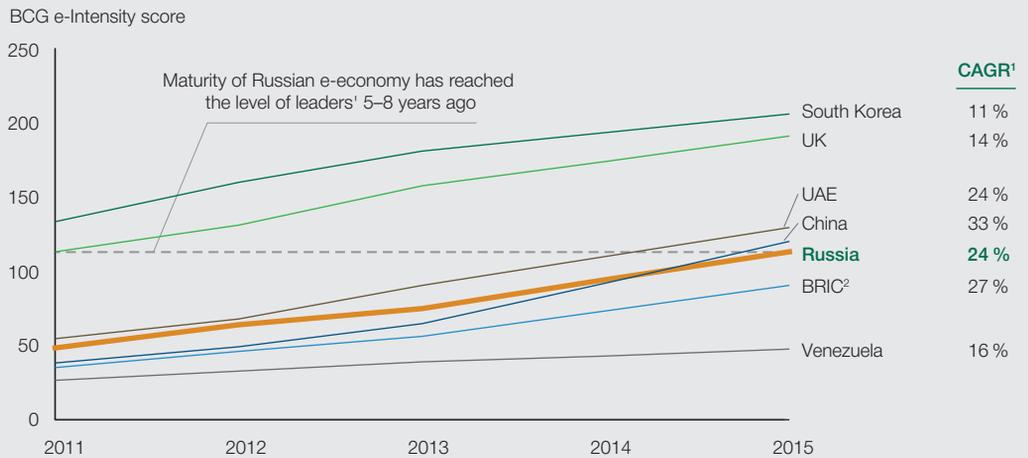
13. Data from Euromonitor.

**ЭКСПИТ 11 | Russia's relative position remains unchanged over the last 5 years**



Source: BCG analysis; BCG e-Intensity model.

**ЭКСПИТ 12 | Russia's absolute e-Intensity score has been improving at 24% CAGR, but its relative position is stagnating at ~#39-40 out of 85**



1. CAGR - compound annual growth rate.  
 2. BRIC - Brazil, Russia, India, China.  
 Source: BCG analysis; BCG e-Intensity model.

Overall, in terms of infrastructure development Russia is the leader among BRIC countries; however, it is behind the average for OECD countries by a factor of 1.5 (Exhibit 13).

It should also be noted that Russia is showing a slower growth rate as compared to China and Brazil. Over the last 5 years these countries have substantially reduced the gap with Russia, from 1.6 to 1.2 times.

### Online Spending Development

In the previous chapter we already described the specific features of online consumption patterns in Russia, so we are not going to dwell on this issue here. It should only be noted that the development level of e-commerce and online advertising in Russia is higher than among its BRIC 'neighbours', India and Brazil, but on average lower than in China and OECD countries (Exhibit 13) and is almost half the level of the countries that top the rankings.

China is a representative example of an explosive growth of e-commerce that put the country among the Top 5 in terms of online consumption (see insert "China" on page 25).

### Involvement in the Digital Economy

Analysis of the dynamics over the last 5 years indicates that it was thanks to its involvement indicator that Russia was able to improve its relative standing in the ranking.

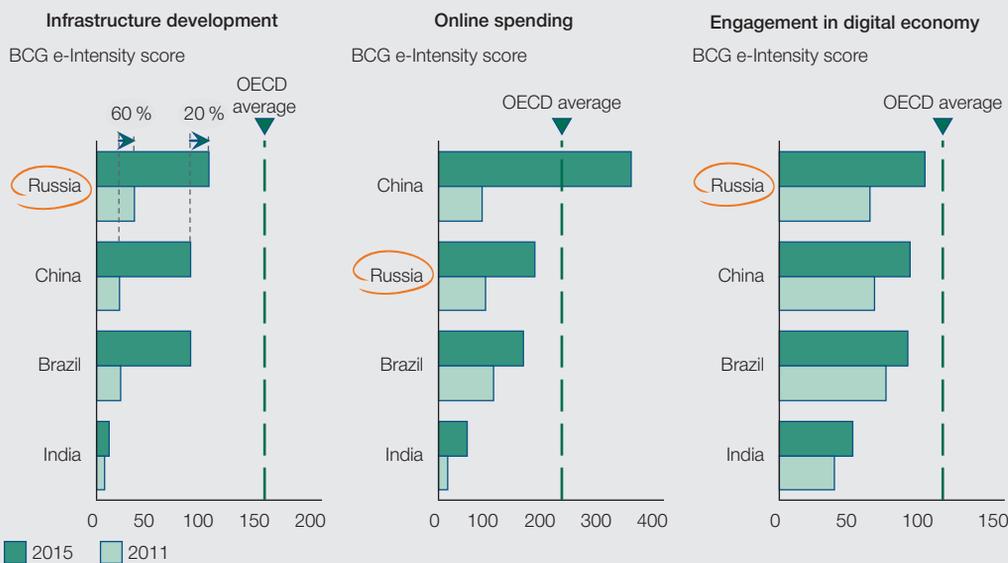
The main driver of growth here was a number of initiatives that were implemented by the government and involved the deployment of digital technologies. Two major projects can be identified among them.

The first one was the introduction of electronic procurement (Federal Law No. 44 (Federal Law No. 94) and Federal Law No. 223). The very emergence of an electronic platform is a proper fundamental step towards optimizing the existing processes and phasing out the replication of document management.

The other major achievement is the electronic government project. According to a study carried out by the Russian Statistic Service, in 2015 a total of 40% of citizens used the Internet to interact with the government, which is commensurate with the average figure in the European Union (46.3%).

However, the issue here is whether the services provided constitute real full-cycle services.

**EXHIBIT 13 | Russia is the leader among BRIC in infrastructure development and engagement in digital economy**



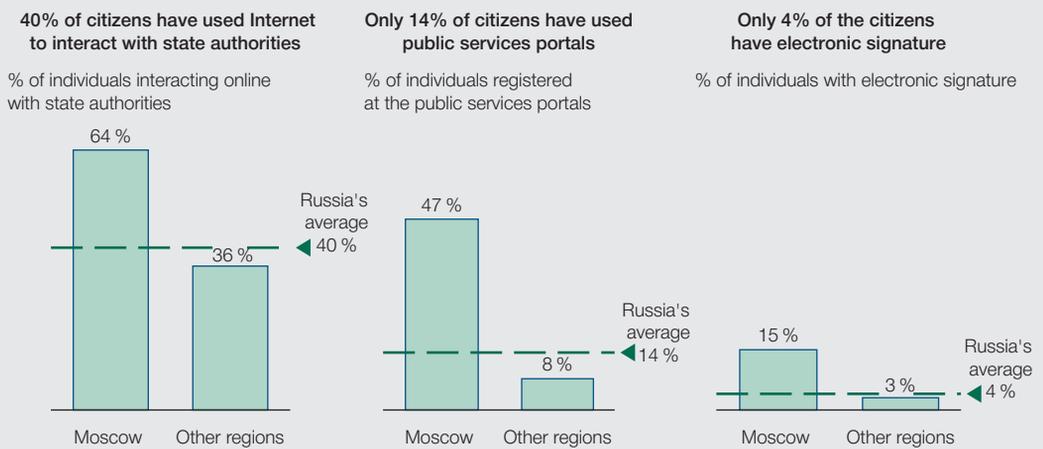
Source: BCG analysis; BCG e-Intensity model.

**So far most of the processes that require interaction with the government in Russia have to be completed offline, in contrast to the more digitally advanced countries.**

For example, only 14% of citizens are registered with the state services website and only 4% have a digital signature (e-signature). In comparison, in Denmark it is over 75%.

As regards the extent of involvement in electronic interaction with the government, the gap between Moscow and the regions continues to be substantial: the use of e-government services in Moscow exceeds the level of other regions approximately by a factor of 5 (Exhibit 14). This indicates that further effort is needed to provide a larger share of the population with online government services, and a potential for enhancing the efficiency of interaction processes.

### EXHIBIT 14 | E-government in Russia is at an early stage of development



Source: Rosstat 2015

## CHINA – THE LEADER IN DIGITALIZATION TEMPO

Over the last 5 years China has made a quality leap in digitalizing its economy which was partly achieved by the development of the fixed and mobile Internet infrastructure. This resulted in a substantial increase in the number of Internet users. The Internet penetration increased from 16% in 2007 to 48% in 2014. 86% of users access the Internet from mobile devices (Exhibit 15).

### Explosive Growth of Online Consumption

In 2010 online retail accounted for only 3% of total consumption. By 2015 the number of people making purchases over the Internet trebled reaching 410 million. At present approximately 8.4% of all purchases are made over the Internet. Forecasts claim that by 2020 the Internet sales volume will go up by 20%, whereas offline retail will grow by 6%. Thus, the Chinese e-commerce market will reach US \$1.6 trillion by 2020 or 24% of total retail sales. Meanwhile, the mobile segment share is growing. Namely, in 2011 the mobile segment accounted for 12% of the

total market volume, in 2014 its share increased to 25% and amounted to approximately US \$36 billion.

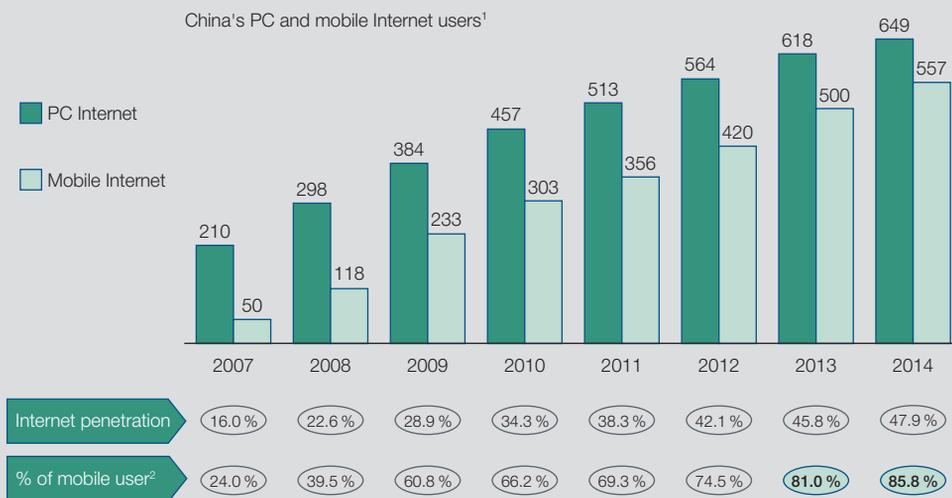
The main driver of online consumption development is the growth of online trading; however, other Internet segments are also showing high growth rates: online advertising, online games, online payments etc. (Exhibit 16).

The online markets in China are highly consolidated. Alibaba Group is the leader in the online trading market. Baidu and Taobao that are part of Alibaba Group, account for 70% of the Internet advertising market. Tencent is the absolute leader in the online gaming market in all the segments: mobile, browser and PC games.

### The Alibaba Phenomenon

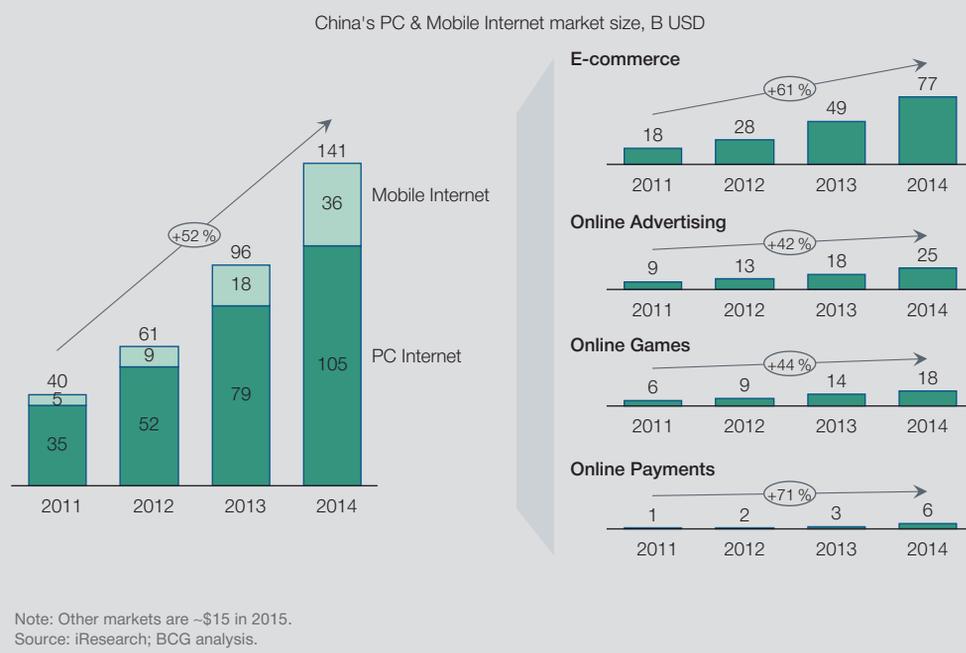
Alibaba Group is an indisputable leader in all segments of the online trading market. It accounts for 40% of the B2B market, 61% of the B2C and C2C markets and 86% of the mobile e-commerce market.

### EXHIBIT 15 | Internet penetration in China is growing fast, especially in the mobile segment



1. Internet users are defined as those aged 6 years old and above, who went online in the past 6 months.  
 2. % of internet users used mobile phone to access the internet in the past 6 months.  
 Source: CNNIC; BCG analysis

## ЭКСПИТ 16 | China's Internet economy has been growing at record rates during the last 5 years



In addition to the largest trading floors such as Alibaba.com, Taobao.com, Tmall.com, AliExpress.com, the company is developing an ecosystem of services that touch upon various aspects of users' lives. For example, in 2004 Alipay, an electronic payment system was launched enabling commission-free payments. Currently Alipay is the largest player in the online payments market with a 50% share. In the mobile payments segment the company's share is even higher, at 82%.

Alibaba Group is constantly seeking opportunities to increase its market presence. For example, to find a solution for withdrawing funds by the merchants from Alipay, Alibaba launched Yu'eBao, a money market fund that makes it possible to deposit funds at interest rates comparable with bank deposits. This made Alibaba the largest player in this market with a share of around 30%.

In addition to primary business promotion that involves further development in the local market and global expansion, as well as the development of financial services, by

2020 Alibaba is planning to make cloud technologies and Big Data the basis of the entire ecosystem of its business. Alibaba's founder, Jack Ma, strongly believes that this is the key to the future.

### Contribution by the State

The Chinese government plays an important role in digitalizing the national economy and consistently manages the digital transformation. In the five year plan (2016-2020) priority is given to the development of information and communication technologies and their impact upon the country's development. Several strategies at a time directly or indirectly relate to the promotion of digitalization: a wider use of ICT, fostering innovation.

One of the main ICT initiatives is the Internet+ strategy that involves the development of the Internet of Things, Big Data, cloud computing, the mobile Internet, etc., and their integration with all sectors of the economy: industry, agriculture, financial sector, commerce, state sector, etc. The Chinese government is planning to make the Internet+ concept a new economic

model for China and the principal driver of economic and social development of the country by 2025.

To deploy this strategy the government is implementing a number of measures to reduce the barriers that prevent the development of new companies and products and their access to the market:

- amendments to the legislation;
- preferential terms of financing and tax benefits;
- provision of legal services;
- involvement of all governmental authorities in strategy deployment;
- raising investment, including foreign funds etc.

**The Internet of Things.** The state's contribution into China's digitalization is exemplified by the initiative supporting the development of the Internet of Things. In particular, in 2012 a five-year development plan was launched to bring the Internet of Things market to the level of US \$163 billion by 2020. As a measure to attain this goal a special state fund was set up designed to engage in research and develop applications and services associated with the Internet of Things. In 2014 the state invested over US \$1.5 billion into such projects. In addition, in 2013 an ad hoc council was formed to develop laws and standards for the Internet of Things.

**A Smart City.** The Chinese government is also developing the concept of a smart city as a practical example of implementing the

Internet of Things: as of today 202 cities have been selected for pilot testing of the opportunities and over 90% of Chinese provinces and municipalities have indicated the Internet of Things as a development priority.

**Online healthcare.** The government is aware of the substantial benefits associated with the deployment of online healthcare and is striving to create all the conditions required for its development. For example, in 2012 the Health Ministry invested US\$9.5 billion in the development of electronic medical record books and data systems. The government is also working to remove the existing legal barriers. For example, it simplified the registration of online pharmacies and is expected to permit the online sale of certain prescription drugs in 2016. The government has also green-lit the use of telemedicine and remote issuance of prescriptions in rural areas with limited access to medical services.

The development of online healthcare in China is of interest not only to the state but to private companies as well. In 2014 various services associated with online healthcare received US\$700 million in investments. For example, Alibaba and Tencent developed services for online purchase of drugs including prescription drugs, making appointments with doctors online, and making online payments for their services. Baidu developed a 'cloud healthcare' service to prevent massive outbreaks of diseases and implement preventive diagnostics.

We expect an exponential growth of online healthcare in China, from US\$3 billion in 2014 to US\$110 billion in 2020.

## JACK MA – A TEACHER OF ENGLISH WHO CONQUERED CHINA

Jack Ma went all the way from a modest translator and a teacher of English to one of the richest people in the world. A company he founded, Alibaba, overturned the concept of e-commerce and made a major contribution to an explosive digitalization of China.

### 5 selected quotes by Jack Ma:

**About the role of the Internet:** ‘15 years ago nobody heard of Google, Facebook, iPhone, Alibaba. And now they are an integral part of people’s lives. The magic is down to the Internet that changes the world.’

**About globalization:** ‘WTO is good but it focuses on large corporations. We have

to set up something similar to WTO to help small companies in the course of globalization and ensure they can sell their goods all over the world.’

**About e-commerce:** ‘In 15 years e-commerce will be like electricity, nobody will be speaking about it.’

**About the future:** ‘Data will be the largest resource of the future. It will become a common resource like oil, water or electricity.’

**About economic difficulties:** ‘When I went into business 15 years ago, everyone was complaining about poor conditions and the investment climate just like today.’

## Alibaba creates an ecosystem to tap into various aspects of people’s daily life



Source: Alibaba Group.

# REGIONAL SPECIFICS OF THE DIGITIZATION IN RUSSIA

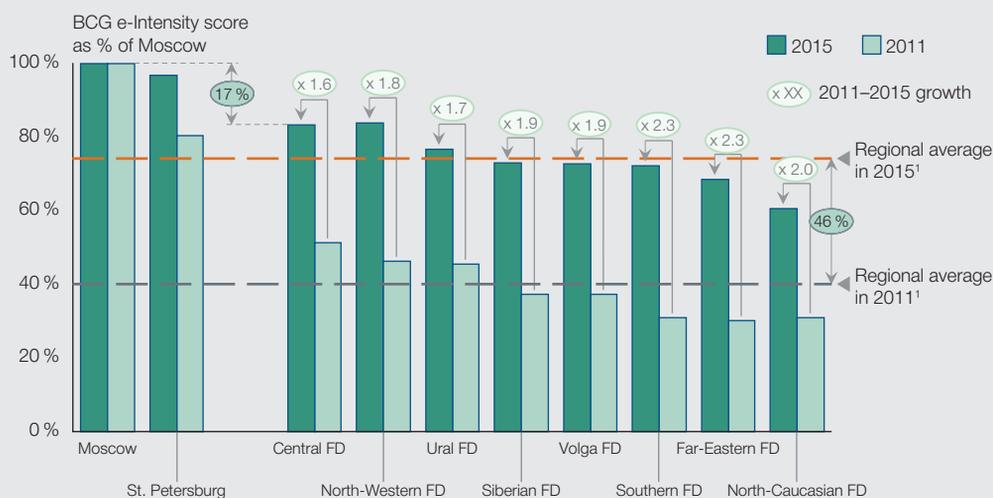
Russia's major achievement is an almost twofold reduction of the digital divide<sup>14</sup> between Moscow and other regions.

managed to bridge the existing gap and come very close to Moscow levels.

While in 2011 the digital gap between Moscow and the regional average was 2.6, today it is down to 1.35 (Exhibit 17). Digitalization growth should also be noted in Saint Petersburg which

**The development of access infrastructure was the key driver of reducing the digital gap. On average, since 2011 this indicator in the regions has grown by a factor of 2.6.**

**EXHIBIT 17 | Digital divide between Moscow and other regions has narrowed significantly over the last 5 years**



1. Average for Russian regions except Moscow and St. Petersburg.  
 Note: Data for Southern FD is used as data for North-Caucasian FD in 2011.  
 Source: BCG analysis; BCG regional e-Intensity model; HSE; Rosstat, Yandex.

14. Evaluation made on the basis of the BCG e-Intensity index (infrastructure development level, online spending – e-commerce and advertising; the involvement of the government, businesses and individuals in going online) – for more details see Methodology.

As a result of the infrastructure development and individual income growth there was a rise in online consumption in each region. On average the gap with Moscow was down by a factor of 1.6.

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In the last 5 years the digital gap between Moscow and the regions went down from 2.6 to 1.35.

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In addition, the frequency of purchases made in Internet stores is the same nationwide, which is yet another indication that **the level of online activity does not depend upon the person's place of residence. As soon as Internet access becomes available, people become active participants of the digital economy.** However, the average bill in the regions is 25% lower than in Moscow, which is due to the remaining differences in people's incomes.

### Specific features of regional development

The degree of digitalization in the regions varies from one region to another, making it possible to identify 4 main groups (Exhibit 18) and discuss the specifics of their future development.

#### DIGITALIZATION LEADERS

Despite the reduction of the digital gap, Moscow and Saint Petersburg remain absolute leaders in the ranking. They are role models for the other regions.

More growth can be achieved through further penetration of online services and greater involvement of individuals, businesses and the government in the digital economy.

Thus, despite its achievements, in terms of its digital maturity, Moscow is still in the second dozen of the largest megacities<sup>15</sup>.

#### DEVELOPING REGIONS – THE MAIN GROUP

This group includes most of the regions of Central and Southern Russia, the Urals, some regions of Siberia and the Far East. These regions have an average level of digitalization and in the last 5 years have substantially reduced the gap that separates them from the leaders. The Moscow and Leningrad regions where digital development is driven by Moscow and Saint Petersburg respectively are worthy of special notice.

The regions in this group have growth potential in all the key areas – infrastructure, online spending, and involvement.

In the current macroeconomic environment the development priority should become maximizing the use of the existing infrastructure and access as well as the enhancement of process efficiency by using digital services and platforms.

#### UNDERPOPULATED DEVELOPING REGIONS

This group includes the Northern regions of Russia and the underpopulated regions of the Far East. Their level of digitalization is comparable to that of the previous group, however, their future development in terms of digitalization has certain specific features.

First, these are mining regions. Best practices confirm that the implementation of digital technologies in the industrial sector makes it possible to significantly increase efficiency and therefore added value.

Second, low population density imposes certain restrictions on the development of e-commerce and accessibility of good quality education and healthcare. Implementation of online services in social sectors will allow to even out the geographical peculiarities of these regions and provide access to good quality services with no substantial increase in costs.

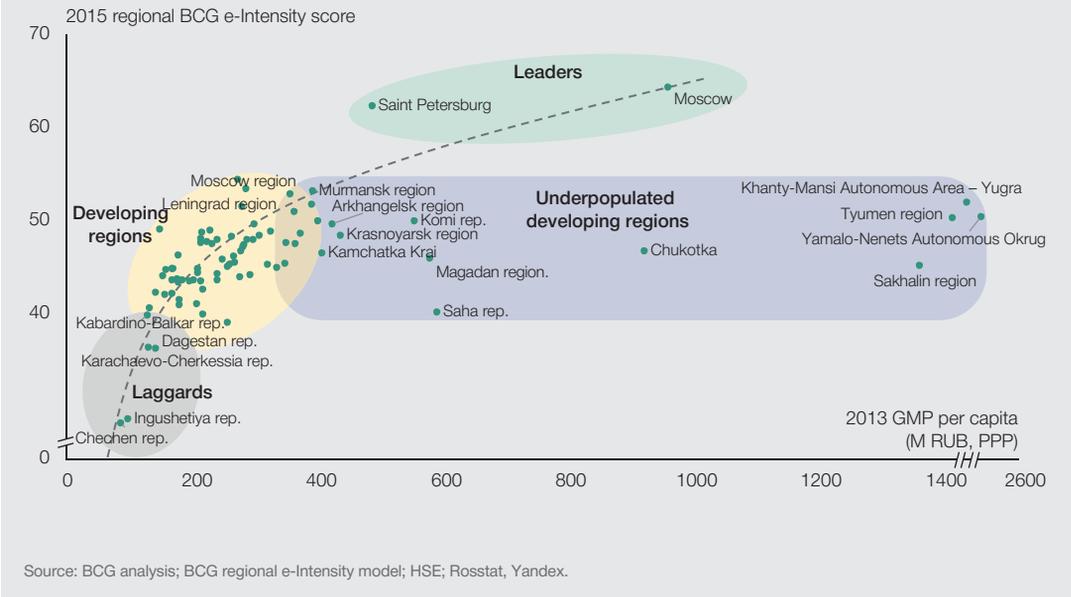
#### REGIONS LAGGING BEHIND

This group includes some regions of the North Caucasus. Despite lagging behind the main

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15. According to the Ranking of Smart Global Cities by the Institute of Information Sciences Shanghai Academy of Social Sciences and the Networked Society City Index by Ericsson for 2014.

**ЭКНИВІТ 18 | Regions differ greatly in digitization level; 4 main groups have been identified**



group to a fairly small extent in terms of infrastructure development, they are far behind the average indicators both in terms of the level of online spending dynamics and the level of their involvement in the digital economy.

The regional government should take the lead in digitalization. This will not only make it possible to improve the efficiency of government services, but will also increase the involvement of individuals in online use and its ample opportunities.

# THE IMPORTANCE OF DIGITALIZATION FOR THE INDUSTRY

**A** huge underutilized potential for digitalization of businesses is common for all the Russian regions.

Even in Moscow the use of such basic, by best practice standards, digital products as ERP and CRM systems by companies does not exceed 24% and the regional indicators are 2.5-3 times lower.

Broadband access<sup>16</sup> penetration in the corporate segment exceeded 80% already in 2014, however, the share of companies using the Internet with a speed over 2 Mbit/s is 1.7 times less and of those using a speed of over 10 Mbit/s it is 3 times less.

The main reason for this is that the existing digital opportunities and their impact upon efficiency, productivity and business growth potential in most industries are seriously underestimated – both by small businesses and major players.

We consider that it is important to stress once more that **digitalization opens up fundamentally new opportunities to create added value across all the industries and sectors of the economy.**

According to our estimates, the effect of consistent digitalization of the key industries by 2021 will make it possible to create added value

worth 5–7 trillion rubles per annum. For comparison, this is quite commensurate with the total fiscal revenues from the Russian oil and gas sector (RUB 7.4 trillion in 2014).

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Consistent digitalization of the key industries by 2021 will make it possible to create added value worth 5–7 trillion rubles per annum.

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To illustrate the readiness of the Russian industries for digital transformation we rely on the BCG Industry Digital Readiness Index that applies methods that are similar to the approach to the evaluation of the digital intensity of economies and are based on three factors.

- Development of basic requirements to launch the process of digital transformation – the existence of the infrastructure, the development level of institutions, services and regulation for the industry.
- Basic Internet use – online representation and the degree of online activity of the industry players.

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16. Internet with data transmission speed of 256 Kbit/s and over. Source: Rosstat.

- Advanced use of digital technologies – penetration level of global digital trends into the internal operations of the corporate industry players. makes the scaling and integration of any new solutions a challenge.

**BASIC INTERNET USE: AVERAGE**

The evaluation of digitalization is relative and is based on a comparison to the international leaders of a particular industry, for example, the retail sector is compared to that of the United Kingdom, the railway transport sector is compared to that of Germany.

For the most part Russian retail companies use the Internet for advertising and providing information about their services, whereas its ‘basic use’ by leaders today includes much more advanced solutions (for example, social media monitoring, CRM etc.).

We have provided illustrative examples to show the underlying status of the major industries and the potential areas for their digitalization.

**ADVANCED USE OF DIGITAL TECHNOLOGIES: AVERAGE**

We have intentionally selected the industries that are vastly different (retail, railway transport, healthcare, museums) to stress that digitalization is relevant for any of them.

On the face of it, it may appear that the need for using digital technologies in the Russian retail market may not be high – the share of the top 5 food retailers accounts for only 26%, and all of them still have room for growth through geographic expansion and consolidation (Exhibit 20). However, in some cities and regions competition between major chains is beginning to get tougher (for example, in Saint Petersburg) and is gradually approaching the levels of such countries as the United Kingdom.

**Retail**

A number of complexities are inherent to this sector in general. The major one is increasing customer fragmentation due to an accelerated pace of life. This affects the product range, in particular, it makes it necessary to maintain a large number of items. Maintaining a large range of products, in its turn, requires a fairly sophisticated system of logistics from the supplier to the point of sale.

In some non-food categories the level of retail consolidation is even higher (Exhibit 20). In this situation all players have to engage in a tough competition for the customer. It is here that digital technologies should become the key differentiation tool as well as a way of increasing revenue and minimizing the players’ costs (Exhibit 21).

In Russia these complexities are aggravated by the country’s extensive territory, the low quality of transport infrastructure and workforce shortages.

For example, Mercaux is an interesting B2B solution for apparel stores. It is a mobile application that allows the shop assistant to have all the necessary information at hand about the product range, availability of a particular item in the store or other stores of the chain, prompts what other goods may be offered to go with a particular item making it possible to offer all items as part of a digital set that is similar to the way clothes are now presented on a mannequin in a store. This service is already used by Incity and Benetton chains, Loriblu boutiques in Russia and the stores of a big cosmetics brand Kiko Milano in Italy. The first results showed a sales growth of 6–11%.

Our experience shows that digital technologies are a solution to many of these issues.

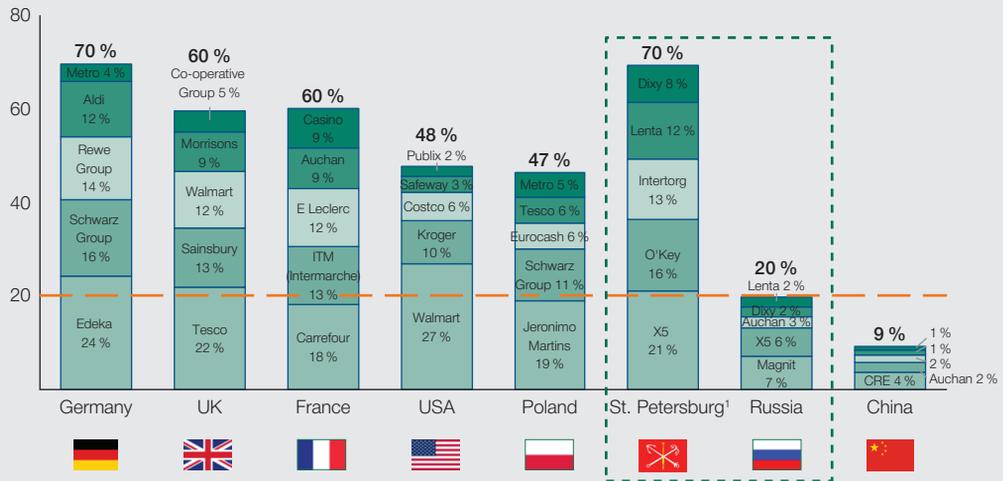
**DEVELOPMENT OF BASIC REQUIREMENTS: AVERAGE**

In terms of the development of such fundamental factors for retail digitalization as equipment- and telecom-related costs, Russia is almost on par with best practices. However, it lags behind in investment in data storage and management systems and especially in software and the lag is much more considerable. As a result, the IT systems of most players are characterized by multiple ‘makeshift’ IT solutions and ‘patches’ that are less effective than specialized solutions and need ongoing maintenance. This

‘We do not expect an Uber driver to know the city inside out – he must drive well and be polite, and a navigator will show the route. In

**EXHIBIT 19 | Overall, share of top-5 players in Russian grocery retail is ~26%; however, in St. Petersburg, it is ~70%**

Share of top-5 players, 2015



1. Data of Federal Anti-Monopoly Service in St. Petersburg, 2014. Sources: Euromonitor, Infoline, BCG analysis.

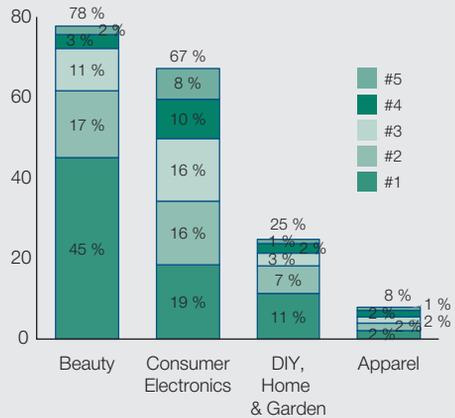
the same way one cannot expect sales assistants to remember the entire product range, the specific features and details of each product and whether it is available, considering how fast collections change and the high staff turnover in the retail business, this is simply physically impossible, and is not required anyway,' says the founder of Mercaux Olga Kotsur.

In Russia, with its vast territories and low population density, digital technologies may play an important role in the geographic expansion of the players into the regions through automation and standardization of supply chains. **The use of digital technologies in the distribution centers makes it possible to achieve a 5-10% reduction in costs and a 1-2% increase in revenues by ensuring that deliveries to the points of sale are made in a more timely manner and are more complete, by speeding up stock turnover and reducing the probability of running out of stock.** Thus, the existing distribution centers become more efficient and there is less need for investment in new ones, which makes entry into new regions cheaper.

Thus, those retailers that implement digital technologies will become more competitive in the Russian market. In addition, they will get closer to global leaders that will create the additional potential for entering new markets in other countries.

**EXHIBIT 20 | In Russian non-grocery retail, the highest concentration exists in the cosmetics & consumer electronic segments**

market share of Top-5 players, %, 2015



Sources: Eurononitor, Planet retail, Infoline, BCG analysis.

**Railway Transportation**

Railway transportation in Russia today has quite a number of issues.

Both B2B and B2C are affected by the following:

- absence or limited functionality of the digital channels for communication between carriers, shippers and passengers;

## ЭКСПИТ 21 | Digitization should become a key tool for differentiation, as well as a source of new revenues and cost optimization of players

BENEFITS	Innovations in interaction with customers	Innovations impacting store operations	Supply chain innovations
Differentiation	Personalized advertising & online merchandising Заказ онлайн – самовывоз из магазина	Virtual store research Большие данные: мониторинг в торговых точках, ценообразование	'Click-to-track' <sup>3</sup>
New revenue	Online & mobile shopping (incl. virtual tours, video chat)	Interactive fitting room mirrors and automation of fitting rooms	
Cost optimization	Self-service	Electronic price tags	Big data: Inventory management, demand forecast
	Digital stores <sup>1</sup>	'Smart' shopping bags <sup>2</sup> Training for personnel using 3D simulation	Automation of distribution centers 'Smart' logistics

1. Stores without physical presence of goods in outlets.

2. Allow the shopper to pay for the goods automatically upon leaving the store. 3. Tracking of products from the source.

Source: BCG analysis.

- limited demand forecasting capabilities for cargo and passenger transportation;
- low efficiency and high cost of repairs, absence of predictive maintenance.

In the B2B sector there is limited access to cargo transportation for small and medium businesses, which is mainly due to the absence of digital communication channels.

In the B2C sector customer experience is in need of improvement:

- making multimodal transportation more convenient, including not only the possibility of planning the itinerary but also purchasing 'door-to-door' travel tickets;
- ensuring access to means of communication en route;
- creating simpler ticket booking systems using websites and mobile applications.

Digitalization offers solutions to all these issues.

### DEVELOPMENT OF BASIC REQUIREMENTS: AVERAGE

Despite the progress made, a number of issues are apparent that are blocking the digitalization of railway transportation.

A problem that is common to B2B and B2C structures both in Russia and in the countries with more digitally advanced railway transportation, is the fragmented nature of the IT infrastructure that is often supported by various divisions within the company and is poorly coordinated. Deutsche Bahn AG (DB) for example has recently allocated € 120 million to harmonize its IT landscape.

The B2B structure is affected by regulatory restrictions: under the current regulation performing predictive maintenance is not permitted. Providing condition-based repairs in such countries as Germany, Denmark, Austria, Switzerland, has already resulted in cost reduction.

In the B2C sector passenger access to means of communication during travel is limited. The telecom infrastructure designed to support such access, especially during long-haul transportation, often operates with disruptions. Addressing the problem is further complicated by the long distances involved and the low density of cellular network coverage of remote segments of the route network.

### BASIC INTERNET USE: AVERAGE

Although Russian cargo and passenger carriers are already present on the Internet, the

## X-CHANGE PLATFORM

One of the outstanding examples of B2B digitalization in the transport industry is BCG's X-Change platform designed to streamline marine container transportation.

In this area the total costs of the major players related to an empty run are estimated at US \$15-20 billion per annum. Our analysis has shown that a platform that allows a shared use of assets by the players may reduce such costs by more than 30%, let alone the beneficial effect of such synergy on the environment.

Today the X-Change platform has been successfully implemented<sup>17</sup>.

17. For more information please see <https://xchange.bcg.com/#/public/welcome>.

possibilities of purchasing passenger services and especially cargo transportation services through a website or mobile applications are so far limited.

Meanwhile, a Deutsche Bahn's B2C application DB Navigator makes it possible not only to buy a ticket but also to plan a detailed itinerary from the starting point to the destination, including the way from home to the railway station, doing a search and paying for parking.

### ADVANCED USE OF DIGITAL TECHNOLOGIES: LOW

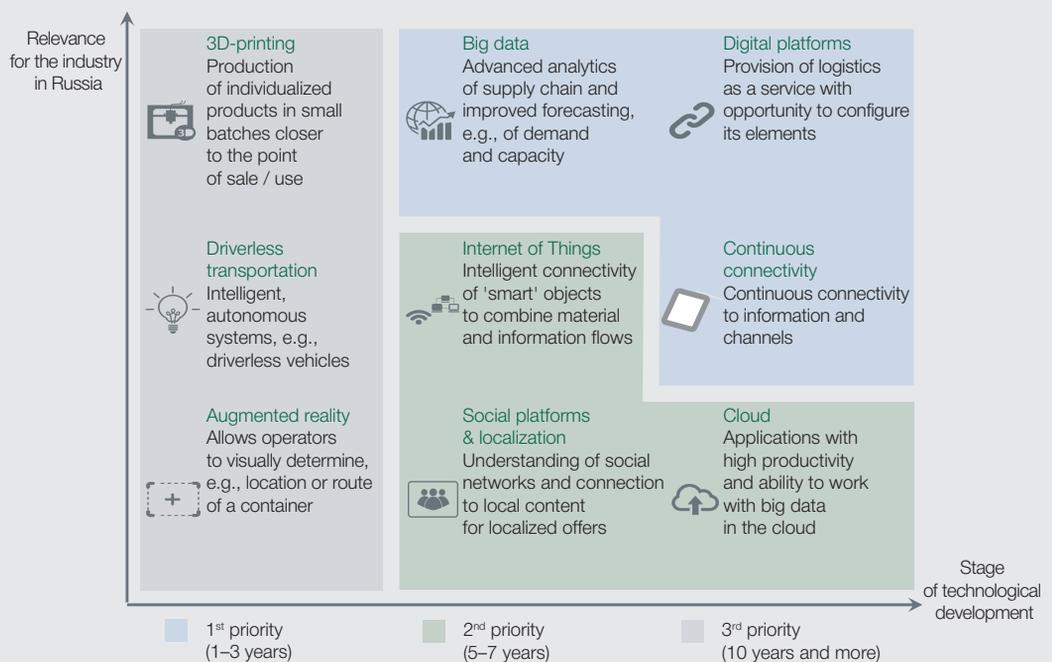
Today the use of digital trends in B2B and B2C railway transportation is very limited in Russia.

Depending upon the development stage and their relevance for Russia they have been divided in three groups (Exhibit 22).

We believe that the first priority is: continuous connectivity for B2C; Big Data for B2B and B2C; digital platforms for B2B.

In the short term **Big Data** is required to forecast the demand for passenger and cargo

## EXHIBIT 22 | Digital trends in rail transportation can be split into three groups by stage of development and relevance for Russia



Source: BCG analysis.

transportation more accurately and to better understand customer needs and other objectives. Poor forecasts today result in both lost revenue and increased transportation costs. Big Data is already widely used for these purposes by such foreign players as DB, SBB, SNCF etc.

**The digital platforms** make it possible to change the current operating and/or business model and methods of interaction between counterparties. In particular, they make it possible to provide access to cargo transportation for small and medium enterprises (SME) through electronic exchange. Today, despite a more economical cost of long-distance rail transportation (over 1,000 – 1,500 km) as compared to road transportation, SMEs select the latter due to a complicated process of booking and purchasing railway freight transportation. Globally, digital B2B platforms are divided into broker platforms (Cargoclix.com, DBSchenker, Cargomatic), forwarding companies' platforms (UPS, MyDHL) and information platforms (Xeneta, Intra). Most of them are multimodal and have a global reach, which makes the process of purchasing logistics services much simpler and improves fleet utilization.

We consider the following to be the second priority objectives: switching to cloud to streamline the B2B and B2C workload; the development of the Internet of Things to improve the efficiency of the B2B and B2C infrastructure; social platforms and localization of supply in B2C.

Processing large amounts of data in the medium term will require moving to **the cloud**, since this technology has the required level of performance without adding a substantial server equipment cost.

The **Internet of Things**, together with Big Data (and amendment to the current laws), will allow to perform predictive maintenance: sensors will transmit all the current information about a train and the infrastructure; analysis of Big Data will allow to compare such information with known accident patterns; the maintenance plan will be immediately updated, this will allow to prevent major breakdowns. This will result in a substantial cost reduction (estimated at 17-18%), improved availability of trains and customer satisfaction.

**Social platforms** will make it possible to personalize offers to customers based on their location, frequency of using services, preferences and interests.

We believe the following trends to be the third long-term priority: 3D-printing, autonomous transportation and augmented reality.

**3D-printing** will allow to produce spare parts where and when they are needed which will substantially reduce the duration and cost of repairs.

The future of **autonomous transportation** is still uncertain, but it creates potential for reducing labor input, power consumption and improving reliability.

We believe that the implementation of the above trends is not only important for the Russian railway industry but will have a multiplier effect on the development of other industries.

## Healthcare

It is obvious that the development level of healthcare directly affects the country's welfare, which is especially critical for Russia due to an increase in the demographic load factor.

As shown by the experience of many developed countries, each additional year of life expectancy is increasingly costly (Exhibit 24). However, digital technologies may make healthcare services more accessible and improve their quality even without an increase in costs. This is the key challenge.

### DEVELOPMENT OF BASIC REQUIREMENTS: AVERAGE

A digital revolution in healthcare requires widely spread digital telecommunications channels – both fixed-line and mobile. In Russia it is not formally the main obstacle – for example, in 2014, 97% of healthcare institutions in Russia had access to the Internet.

The main obstacle to the healthcare digitalization in Russia is the lack of regulatory basis, data processing protocols and standards. The Ministry of Healthcare is currently drafting a telemedicine bill. The success of digitalization of the industry will in many ways depend upon the results of this work.

Another obstacle is the current system of healthcare financing: the share of VMI<sup>18</sup> and personal spending is not high, while public funding is not focused on digital healthcare.

**BASIC INTERNET USE: AVERAGE**

Thanks to a number of government programs, the online presence of the healthcare system is now starting to expand. For example, the system of electronic appointments with doctors in public clinics in Moscow exceeds 50%.

However, due to regulatory restrictions, the sale of pharmaceutical drugs and medical devices over the Internet is almost non-existent.

**ADVANCED USE OF DIGITAL TECHNOLOGIES: LOW**

Certain digital trends are increasingly developing worldwide: some of them will become commonplace in the next 10 years, others will follow later (Exhibit 24). It should be noted that there are a number of other factors whose impact is difficult to predict at this time – for example, genome deciphering, the cost of which has gone down from US \$100 million 15 years ago to US \$1,000 today. Such innovations create unprecedented opportunities for the future development of genetics and precision medicine.

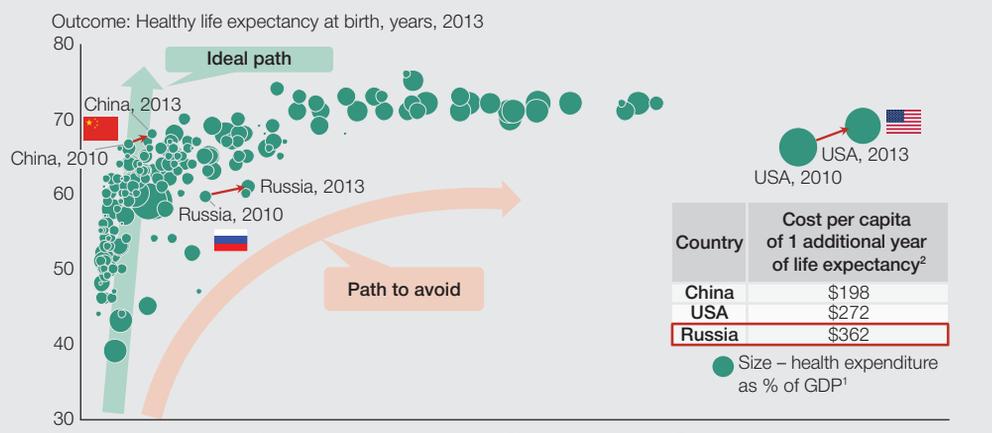
Advanced digital technologies have not yet become widespread in the Russian healthcare system be it in terms of patient interaction, or internal processes. Initiatives to develop digital systems to support medical solutions and advanced analytics of medical data are just beginning to be discussed.

In some regions and healthcare sectors the situation is somewhat better. For example, in Republic of Tatarstan the local government supports the development of certain telemedicine components and electronic medical records, there is also a designated Situation Center of the Healthcare Ministry.

In Moscow almost all subsidized prescriptions are issued electronically (however as per regulatory requirements, then they have to be printed out); medical startups are now appearing in big cities (for example, Doc+ in Moscow).

Generally, the legislation is the main obstacle to the development of digital healthcare in Russia. However, once this obstacle is removed, system-wide changes will be required which are only possible through coordinated effort by all participants of the sector – for example, the development of data standards, changes to the healthcare system financing etc.

**EXHIBIT 23 | China has achieved higher life expectancy without significant additional costs; Russia in 2010–2013 followed the ‘path to avoid’**



Note: Health-adjusted life expectancy: Estimates the number of years in full health an individual is expected to live at birth by subtracting the years of ill health (weighted according to severity) from overall life expectancy.  
 1. Bubble size corresponds to 1–0% of GDP.  
 2. 2013 compared to 2010, in Int\$, PPP.  
 Source: WHO; World Bank; BCG analysis

18. Voluntary medical insurance.

## EXHIBIT 24 | Some digital trends in healthcare will be wide-spread within the next 10 years; others – later

	SHORT- AND MID-TERM (0-10 years)	LONG-TERM (10+ years)
<b>ACCESS</b> 	<b>VIRTUAL CARE</b> <ul style="list-style-type: none"> <li>Connects clinicians, patients, family members and health professionals in real-time to provide health services, promote collaboration, support self-management, and coordinate care</li> </ul>	<b>MEDICAL 3D-PRINTING</b> <ul style="list-style-type: none"> <li>3D-printing to build biological structures from soft tissue or skin replacements</li> </ul>
<b>COSTS</b> 	<b>CONNECTED PATIENT</b> <ul style="list-style-type: none"> <li>Allows physicians and nurses to maximize their connectivity and productivity, incl. using intelligent devices</li> </ul> <b>CONNECTED HOME</b> <ul style="list-style-type: none"> <li>Integrated digital services that enable remote monitoring, video consultations, coordination of care and care delivery at home</li> </ul> <b>PATIENT ENGAGEMENT</b> <ul style="list-style-type: none"> <li>Insurance offering programs with rewards for health lifestyles</li> <li>Remotely monitoring a patient's health to identify signs of degradation</li> </ul>	
<b>QUALITY</b> 	<b>ELECTRONIC MEDICAL RECORDS</b> <ul style="list-style-type: none"> <li>Tracking data over time and across health institutions visited</li> <li>Identifying patients who are due for preventive visits and screenings</li> <li>Monitoring how patients measure up to certain parameters (e.g., vaccinations, blood pressure)</li> </ul>	<b>PRECISION MEDICINE</b> <ul style="list-style-type: none"> <li>Treatment and prevention taking into account individual variability in genes, environment, and lifestyle</li> </ul> <b>ROBOTICS</b> <ul style="list-style-type: none"> <li>Robotic surgical delivery, robotic services within a facility and emergency response services</li> </ul>
<b>FACILITATING FACTORS</b>	<ul style="list-style-type: none"> <li>Platforms &amp; connectivity</li> <li>Internet of Things</li> </ul>	
<b>POTENTIAL DISRUPTORS</b>	<ul style="list-style-type: none"> <li>Genome research</li> <li>Stem cells research</li> </ul>	<ul style="list-style-type: none"> <li>Sensing and Mining the Future</li> </ul>

## Digitalization of Museums and Galleries

Digitalization in the culture sector is a matter of national importance. Culture is an area where the educational and research effect of digitalization is boundless, so is the expansion of access to the cultural heritage, and this is exactly the key mission of the sector.

Contemporary users that are spoilt by attention and the 'sophistication' of commercial entities expect the same level of experience from museums and galleries.

The other major change affects the principles of financing: digitalization opens new sources of revenue for museums and galleries.

### DEVELOPMENT OF BASIC REQUIREMENTS: LOW

In terms of basic conditions required for digital transformation, museums and galleries in Russia encounter a number of issues.

First, in the majority of cases the existing IT infrastructure is obsolete and insufficient. The

majority of the systems used do not meet the international standards, in particular, in terms of integration capacity.

Second, most of museum employees in Russia are senior citizens who often do not have sufficient skills to deal with computer technology.

Third, under the existing regulations of the Ministry of Culture it is required that stock-taking records and reports to the Museum Fund must be kept and submitted on paper.

Attempts have been made to digitalize the records and catalogues, though they are limited: at present only several museums are allowed to keep the books of new arrivals in electronic form.

One of the recent initiatives is the digitalization of the State Catalogue of all museum exhibits. Although any information required for this catalogue may be digitally transmitted, in practice it is very limited (the name of the exhibit, author, year and place of creation, size, brief description, and location). The digital

images in this catalogue are of low quality and are only available for a few exhibits.

**BASIC INTERNET USE: AVERAGE**

Russian museums and galleries generally have their own websites, and many of them are also present in the social media.

However, the convenience of user interface and the scope of services offered through the website are limited. For example, there is no comprehensive information about the exhibits, and only the biggest museums offer tickets online.

**ADVANCED USE OF DIGITAL TECHNOLOGIES: LOW**

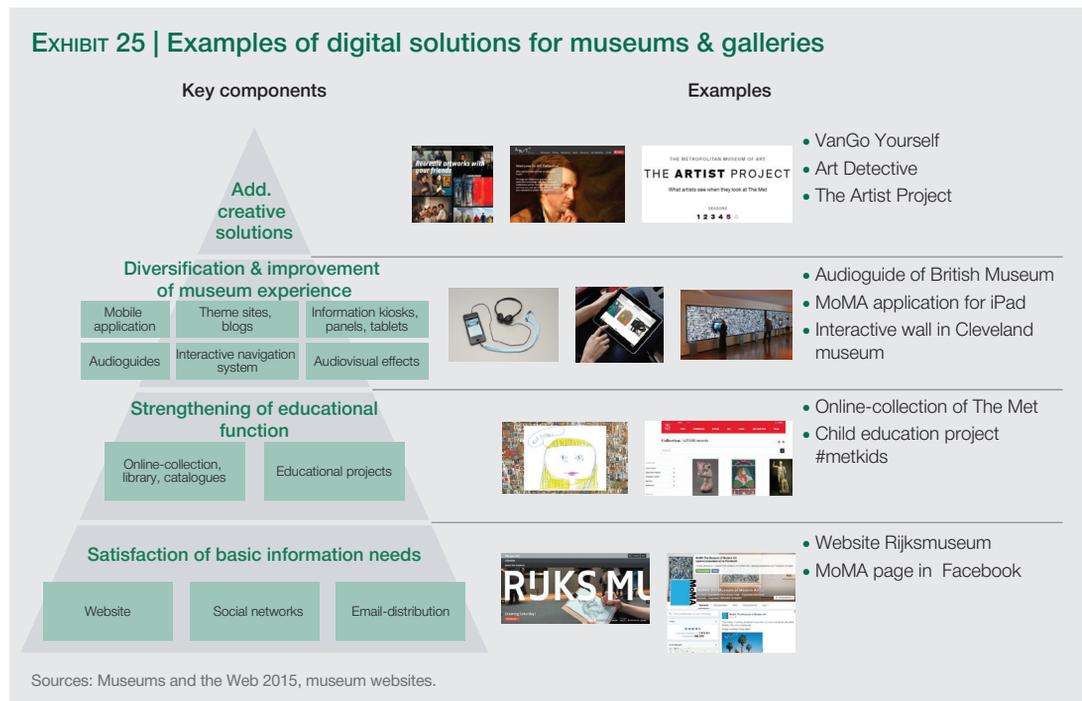
The deployment of digital technologies will make the following possible:

- preserve the existing cultural heritage and pass it on to the next generations;
- contribute to the Russian and international scientific research by providing access to information on valuable exhibits to researchers;
- provide access to valuable exhibits to a wider audience, including people who for various reasons are unable to visit a museum or gallery in person and improve the quality of user experience for such people.

Examples of digital solutions are shown in Exhibit 25. Some of them are already being introduced in Russia by technology companies that support museums and galleries (for example, there is a cooperation program between Samsung and the Moscow Museum of Modern Art). Still, introducing many of them first requires compiling an internal database with detailed information on all the exhibits (Collection Management System).

Unfortunately, Russian museums and galleries, unlike foreign ones (for example, The Met), simply do not have such databases. The experience of our Western colleagues shows that the best way to do it would be by adapting one of the existing special programs (for example, The Museum System), as opposed to developing an in-house proprietary system. The reason is not only the time required or the level of complexity of the development of proprietary solutions but their inevitably limited functionality and impossibility of subsequent integration with other systems.

It is relatively easy to ensure a successful digitalization in this sector as compared to the others. However, considering the limited resources of individual museums and galleries the success will specifically depend upon the centralized decision of the government to prioritize digital transformation.



# THE FUTURE OF DIGITIZATION IN RUSSIA

**D**uring the last 5 years the digital gap between the leading countries and those lagging behind has increased by a factor of 1.7. Considering that at present digitalization of the economies occurs almost exponentially<sup>19</sup>, the digital divide may also be expected to increase in the future (Exhibit 26).

During the last 5 years the digital divide between the leading countries and those lagging behind has increased by a factor of 1.7 and is growing.

## No acceleration means a growing divide (Venezuelan model)

The new economic reality and a fairly high level of infrastructure development that Russia has already achieved are likely to prevent digitalization from increasing at a sufficient rate if the development is evolutionary.

Further development of the infrastructure will require significant investments, which will prove difficult given the new economic reality.

The general decline of consumption will limit the online sector growth in absolute terms, despite the growth of its share.

At that, as seen from the international experience, the stagnation of the digitalization of economy, that Russia began to experience in the last two years, results in a rapid growth of the gap between Russia and the digital leaders.

**EXHIBIT 26 | Digital divide between leaders and laggards has increased 1.7 times over the last 5 years**



Source: BCG analysis; BCG e-Intensity model.

19. Based on the digitalization growth dynamics for the economies of 85 countries from 2011 through 2015. Source: BCG analysis.

A striking example of such scenario is Venezuela – during the last 5 years its economy digitalization level has fallen behind that of the digital leaders, with the gap increasing by a factor of more than 1.5 and counting.

We believe this scenario to be likely and the worst possible for Russia. In the absence of targeted action, digitalization of the economy will virtually stop growing; its share will remain at its current level of 2.1–2.2% of the GDP: the investment volume will stagnate, while the share of import will remain high.

In this event, by 2021 the digital divide between Russia and the digital leaders, which currently stands at 5-8 years, will rise to 15-20 years.

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The current evolutionary scenario will result in an increase in the digital divide between Russia and the digital leaders to 15-20 years.

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### Public sector digitalization – preparing for a leap (Middle-Eastern model)

If the state creates a favorable environment to support the growth of online markets and services, the share of online consumption is likely to increase. However, unless priority is given to digitalization, growth in other areas (investments, public spending and export) will be limited.

Our estimates show that with this scenario by 2021 the direct contribution of the digital economy will be over RUB 3.2 trillion, i.e. 3% of the GDP. However, the digital divide between Russia and the digital leaders will still increase to 8–10 years.

Even with this scenario, considerable effort will be required to upgrade the key public

online services, e-purchases, online education and e-healthcare to full-cycle services and platforms, to exclude duplicating offline services, streamline the current processes, standards and regulations, etc.

Based on the international experience, the potential effect of these initiatives can be estimated at RUB 0.8 – 1.2 trillion annually.

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Public sector digitalization is expected to yield RUB 0.8–1.2 trillion annually.

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UAE and Saudi Arabia are an example of implementing this strategy. The digital transformation of the governments of these countries based on a number of such major projects as creating an electronic government, an electronic job market, a national payment system etc. has enabled them to significantly cut the transaction costs both for the government and the businesses.

### Acceleration means decreasing the gap (Asian model)

The intensive digitalization scenario implies a comprehensive approach to changes, both for the government and the individual industries and companies. The focus is not only on the basic components of the digital economy (infrastructure, online spending and involvement), but also on the growth of private and public investment in such promising areas as the Internet of Things, Big Data, the development of IT products and services with a high export potential.

This will allow to increase the share of digital economy by up to 5.6% of the GDP, which is comparable to the digitalization level expected in Europe by 2020, i.e. 7.5%.

The most important outcome of this strategy will be improved efficiency and productivity, continued growth in the digitalization-dependent markets and sectors. The expected annual added value will be RUB 5–7 trillion.

## EXHIBIT 27 | We see three digitization scenarios for Russia

	DESCRIPTION OF SCENARIOS	RESULTS IN 2021
<b>ASIAN SCENARIO</b>	<ul style="list-style-type: none"> <li>• Digitization – top priority for the government</li> <li>• Adoption of advanced digital technologies such as IoT, Big Data &amp; Analytics, e-Healthcare</li> </ul> <p><b>Examples:</b> <i>Asia Pacific countries – China, Taiwan</i></p>	Share of e-economy <b>5.6% of GDP</b> Added value <b>RUB 5–7 trln./year</b> Gap vs. leaders <b>RUB 5–7 trln./year</b>
<b>MIDDLE-EASTERN SCENARIO</b>	<ul style="list-style-type: none"> <li>• Focus on e-government and digitization of public and social sectors of economy</li> <li>• Evolutionary growth of online consumption</li> </ul> <p><b>Examples:</b> <i>Middle East countries – UAE, Saudi Arabia</i></p>	Share of e-economy <b>3.0% of GDP</b> Added value <b>RUB 0.8 – 1.2 trln./year</b> Gap vs. leaders <b>8 – 10 years</b>
<b>VENEZUELAN SCENARIO</b>	<ul style="list-style-type: none"> <li>• Stagnation of e-economy</li> <li>• Growth of digital divide vs. leaders</li> </ul> <p><b>Examples:</b> <i>Venezuela</i></p>	Share of e-economy <b>2.2% of GDP</b> Added value <b>RUB 0.1 – 0.2 trln./year</b> Gap vs. leaders <b>15 – 20 years</b>

Source: BCG analysis.

Intensive digitalization of the economy will make it possible to reduce the digital gap between Russia and the digital leaders and will create an annual economic value of RUB 5-7 trillion.

This is the approach that was chosen by the leaders in digitalization in the Asia-Pacific region which today has enabled China<sup>20</sup>, for example, to make a radical breakthrough and, according to our forecast, lay claim to joining the top 10 digitalization leaders by 2021. An impressive achievement considering that in 2011 China was 8 positions behind Russia.

# CONCLUSION

**I**n the last few years Russia's development was rather similar to the Middle-Eastern model of implementing public sector digitalization programs. However, today it is likely to drift towards the Venezuelan scenario robbing the country from its competitive edge.

We strongly believe that only an intense digitalization scenario and a strong focus on comprehensive digital transformation of the economy will allow Russia to remain competitive.

Digital transformation, in its turn, requires a fundamental review of the approach of private businesses and the government to interaction, decision-making, promotion of innovation and creating a regulatory environment where each participant of the system plays a meaningful role.

Consumers who enjoy most of the benefits of the digital economy should be open to new possibilities and play an active role in development of digital services.

Businesses should focus on improving efficiency and productivity for which ample opportunities are emerging today.

Digitalization also brings quick wins that are so necessary to demonstrate success in the short term. Even more importantly the topic should

remain high on the agenda of strategic investors and managers who care about sustainable development of their businesses.

Multiple opportunities for companies in all industries are apparent to actively develop their dialogue with the state, cross-industry cooperation and a joint development of major projects.

The mission of the state is no less important. Its three key functions can be identified as follows:

- orchestrator and coordinator of the cross-industry dialogue with focus on public interest and economy as a whole, including the social sector, employment, etc.;
- investor and co-investor in the infrastructure required for digitalization;
- regulator and law maker, especially in areas concerned with the development of small and medium-sized businesses.

In Russia, in addition to these three functions, there are two significant factors determined by its economic and cultural specifics.

The state is a shareholder in a number of major industrial companies where even a small-scale digitalization effect will deliver tangible results. The state is best positioned to accelerate the

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20. See "China" insert.

innovative ecosystem, as the Russian cultural model tends to resemble the Asian model where changes are announced and initiated from top to bottom (which, however, does not preclude other participants from taking an active approach as mentioned above).

A strategic approach to transformation is based on the four major elements:

- defining clear objectives;
- focusing on immediate results and consolidating them in the early stages;
- promptly selecting and developing successful initiatives on an iterative basis;
- implementing and supporting the transformation process – encouraging changes in culture and approach.

These general stages help to determine where exactly changes should start, how to manage the process and achieve not only impressive results but a large-scale long-term positive effect.

Coordinated action by all the participants of the potential digital ecosystem will secure a sustainable and positive result.

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Coordinated action  
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# ANNEX: METHODOLOGY

This report was prepared based on the following assumptions, calculations and information sources.

## e-Intensity

The economy digitalization index is calculated as a weighted average of three sub-indices: infrastructure development, online spending and user activity. The Infrastructure Development sub-index shows the level of infrastructure development and the availability and quality of Internet access (fixed-line and mobile). The Online Spending sub-index includes online retail spending and online advertising costs. The User Activity sub-index is calculated as the weighted average of the lower level sub-indices: corporate activity, consumer activity and public agency activity. All the sub-indices are calculated as the weighted average of the values of several underlying parameters.

In 2016 the methods of calculating the BCG e-Intensity index changed, including the issue of setting the rates: the focus was shifted to mobile technologies. The method of ranking the countries was also changed: the absolute index values were replaced by relative values. In compiling this report it was important for us to observe the dynamics of the index changes in the last five years that is why we used the previous calculation method.

We used a number of international annually updated reports as data sources, including reports by Gartner, Ovum, Pyramid Research, Euromonitor, the UN report on the state of the electronic government development (E-Government survey), The Global Information Technology Report, etc.

When no data in respect of any parameter was available, one of the following calculation methods were used:

- approximation of values based on the data for the previous periods;
- calculation based on the values of similar parameters from alternative sources;
- regressions based on the parameters with which the required metrics correlate to a high degree.

The index was tested for sensitivity to changes in the weight values and the choice of metrics by the Monte-Carlo modeling method using random weight values and variables. Where a parameter was randomly omitted, the interquartile range was insignificant. When the weight values changed, the variance in interquartile values for each country was insignificant, but for several groups of countries the same average rating values were obtained, and their interquartile ranges overlapped.

## Calculating the Regional Digitalization Index

When calculating the regional digitalization index the same methods were used as for calculating the country digitalization index (e-Intensity).

When calculating the user activity index for the state a portion of the parameters based on the UN and WEF data was substituted for similar parameters based on the Russian Statistics Service data and The Information Community Bulletin issued by the Higher School of Economics to replace the data relating to Russia as a whole with regional data. The other parameters remained the same.

Due to the lack of data for 2014 – 2015 regarding the city of Sebastopol and the Republic of Crimea in the sources used, these regions were not included in the calculations.

## GDP Calculation

When calculating the input of the digital economy in the GDP, the cost-based method of calculating the GDP was used. The cost-based GDP is a total of the final consumption, capital costs, public costs and net export.

All the calculations were in rubles to keep the effects of a drastic change in the currency rate out of the equation.

The **end consumption** includes three components:

- volume of online spending, including e-commerce, online tourism, games and media sectors (books, music, films) etc.;
- Internet access costs: consumer expenses relating to fixed-line and mobile access;
- costs relating to access equipment. The share of costs relating to access equipment (computers, mobile phones, routers, etc.) included in the GDP is calculated as the share of the average time spent by the consumers online to the entire time of using the device.

The sources used to calculate the final consumption include reports and analyses by

Euromonitor, Data Insight, Pyramid research, the Central Bank of Russia, a bulletin issued by the Higher School of Economics entitled The Information Community Indicators, a bulletin issued by the Higher School of Economics and the Russian Association for Electronic Communications entitled Runet Economics, an industry-specific report by the Federal Press and Mass Media Agency entitled Internet in Russia, reports by Mail Group, M.Video, Travelata etc.

Capital costs include telecom operator investments and investments by other private businesses. When calculating the input of investments by telecoms operators in the GDP, the share of investments to develop mobile and fixed-line Internet was taken into account. To calculate the input of investments by other businesses in the GDP, the equipment costs were taken into account pro rata to the proportion between the average time during which the Internet access equipment was used to the overall running time of the equipment.

The following sources were used for the purposes of the calculations: Gartner, Ovum, telecom operators' annual reports, data from the Russian Ministry of Communications and Media.

The **state expenditure** on the information and communication technologies (ICT) include the costs relating to hardware and software, telecommunications and infrastructure services.

The share of costs included in the calculation was determined pro rata to the proportion between the average time during which the Internet access equipment was used to the overall running time of the equipment.

The analytic reports by Gardner, data from the Information Community state program and the bulletin by the Higher School of Economics entitled The Information Community Indicators were used as data sources.

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proportion between the average time during which the Internet access equipment was used to the overall running time of the equipment.

The analytical reports by Gartner, data from the Information Community state program and the bulletin issued by the Higher School of Economics entitled The Information Community Indicators were used as data sources.

The net export is calculated as the aggregate of the net export of the ICT-related equipment and services and the net export related to electronic cross-border trading. The share of the equipment included in the calculation was determined pro rata to the proportion between the average time during which the Internet access equipment was used to the overall running time of the equipment.

The following sources were used for the purposes of the calculations: data from the Federal Customs Service, data from the Central Bank of Russia, report by the Association of Internet Trade Companies, Data Insight, and the bulletin issued by the Higher School of Economics entitled The Information Community Indicators.

The calculation of **cross-industry effect** of the digital economy on the GDP is based on the reports and analyses by MagnaGlobal, IAB Europe, Consumer Barometer, Russian Statistics Service, DataInsight, Russian Association of Communication Agencies, Central Bank of Russia, SparkInterfax, Investment Initiatives Development Fund, data from the public procurement portal and the bulletin issued by the Higher School of Economics and the Russian Association for Electronic Communications entitled Runet Economics.

## Digitalization Scenarios

The **evolutionary scenario** (the Venezuelan model) means there will be no changes in the structure and share of the digital economy.

A **moderate growth scenario** (Middle-Eastern model) is based on the following assumptions: public consumption will grow at 12% per annum on average, while the other indicators, such as investment, public expenditure, net export (as a share of the other three indicators) will remain at a level comparable to that of 2015.

An **intensive digitalization scenario (Asian model)** is based on the following assumptions: public consumption will grow at 23% per annum on average, while the investments will continue growing at the 2009-2012 level based on investment by businesses (not telecoms operators) in the development of digital technologies, the state expenditure will remain at a level comparable to 2015, and the share of import will decrease by 30%.

## Effects of Implementing Digital Technologies

In evaluating the effects of implementing e-government and e-purchasing, the research by the European Commission, OECD and such EU countries as the UK and Denmark was used. The estimates by the Audit Chamber, zakupki.gov.ru and B2B-centre portals were used as well as estimates by experts regarding the results of implementing the e-purchasing system in Russia .

The valuation of effects from implementing digital technologies in the economy is based on BCG's international practice and global research (Gartner, IDC etc.).

# ANNEX:

## ADDITIONAL RECOMMENDED MATERIALS

1. Digitizing Europe, May 2016.



2. The Digital Revolution Is Disrupting the TV Industry, March 2016.



3. The Winner-Take-All Digital World for CPG, March 2016.



4. Travel Innovated: Who will own the customer?, January 2016.



5. Digital Government: Turning the Rhetoric into Reality, June 2014<sup>21</sup>



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21. An update is expected to be published in July 2016.

# NOTE TO THE READER

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