IBM Institute for Business Value

# Russia's productivity imperative

*Leveraging technology and innovation to drive growth*

## IBM Institute for Business Value

IBM Global Business Services, through the IBM Institute for Business Value, develops fact-based strategic insights for senior executives around critical public and private sector issues. This executive brief is based on an in-depth study by the Institute's research team. It is part of an ongoing commitment by IBM Global Business Services to provide analysis and viewpoints that help companies realize business value. You may contact the authors or send an e-mail to iibv@us.ibm.com for more information.

*By Susanne Dirks and Mary Keeling*

**Russia** has set ambitious productivity and innovation goals as part of its strategic Concept 2020 plan. To achieve them, however, the country needs to address two key areas: technology and innovation. A number of factors, including inadequate technological infrastructure and a weak regulatory environment, are restricting the potential for technology and innovation to drive Russia's productivity growth. There are specific actions companies and the government can take now to improve the likelihood that Russia will meet – and perhaps even exceed – its productivity and innovation targets.

## Introduction

As part of its strategic Concept 2020 plan, the Russian government has set a goal to more than double its annual productivity growth, as well as to drive technological innovation.[1] To achieve these interrelated strategic goals, Russia needs to pay special attention to the crucial areas of technology and innovation, especially in its largest companies within key sectors, which have the greatest impact on productivity.

Technology is a major driver of productivity, as it enables transformation of business processes and applications and improves organizational effectiveness. Innovation, which often leads to the creation of new products and services, the improvement of existing offerings or the creation of new business models, is also a key contributor to productivity growth. Technology and innovation also reinforce each other, thus enabling further positive impact on productivity. Currently, the productivity improvements that can be derived from technology and innovation are not fully leveraged by either Russian companies or the Russian government.

To drive productivity growth, Russian companies need to improve their technology adoption and use, as well as their innovation performance. Use of the Internet and online public services by Russian businesses lags that of global leaders, and Russian companies have not yet tapped the potential of technology to improve business processes. One of the reasons for the low levels of technology use is the inability of Russian companies to absorb new technology, as well as relatively weak technical skills. Russian companies also lag global leaders in innovation inputs and outputs – the determinants of overall innovation performance. Russia's poor innovation input is reflected in relatively low expenditure on research and development (R&D). In addition, Russia performs well below Organisation for Economic Co-operation and Development (OECD) averages on innovation output measures such as patents and number of scientific articles published.[2]

Several factors under the government's control, including inadequate technological infrastructure and a weak regulatory environment, are restricting the potential for technology and innovation to drive Russia's productivity growth. Russia's technology and connectivity infrastructure – a key enabler for adoption and use of technology – lags considerably that of Eastern Europe and developed economies.[3] The Russian government also has not yet fully leveraged online public services – including procurement – to drive technology adoption and use by Russian companies. Other major barriers to improving innovation performance include lack of appropriate skills in the workforce, weak intellectual property rights laws and enforcement, and low levels of collaboration between public and private sectors.

To boost productivity, those in management positions in Russian companies need to take a leadership role now and remove barriers to technology adoption and innovation. This includes improving in-house training, anticipating future skills needs, and collaborating with government to develop closer linkages that will address skill shortages and requirements. They must also build capabilities to handle the risks generated by the changes involved in adopting technology and boosting innovation and embed innovation and technology into the corporate culture of their organizations.

The Russian government also needs to tackle the obstacles that impede the improvement of technology adoption and innovation performance. Improving the technology infrastructure, leveraging e-government, enhancing competition and regulation, and confronting issues relating to the availability of skills are key areas on which the government should focus. Reforming innovation funding to encourage collaboration and facilitating access to information on the benefits of technology are also important.

The path forward for Russia to secure productivity improvements must involve a holistic approach, as collaborative action by both companies and government is critical to improving technology and innovation. Effectively managing these issues now improves the likelihood that Russia can meet – and perhaps succeed – its strategic productivity and innovation targets.

*Currently, the productivity improvements that can be derived from technology and innovation are not fully leveraged by Russian companies or the government.*

## Technology and innovation: Keys to economic goals

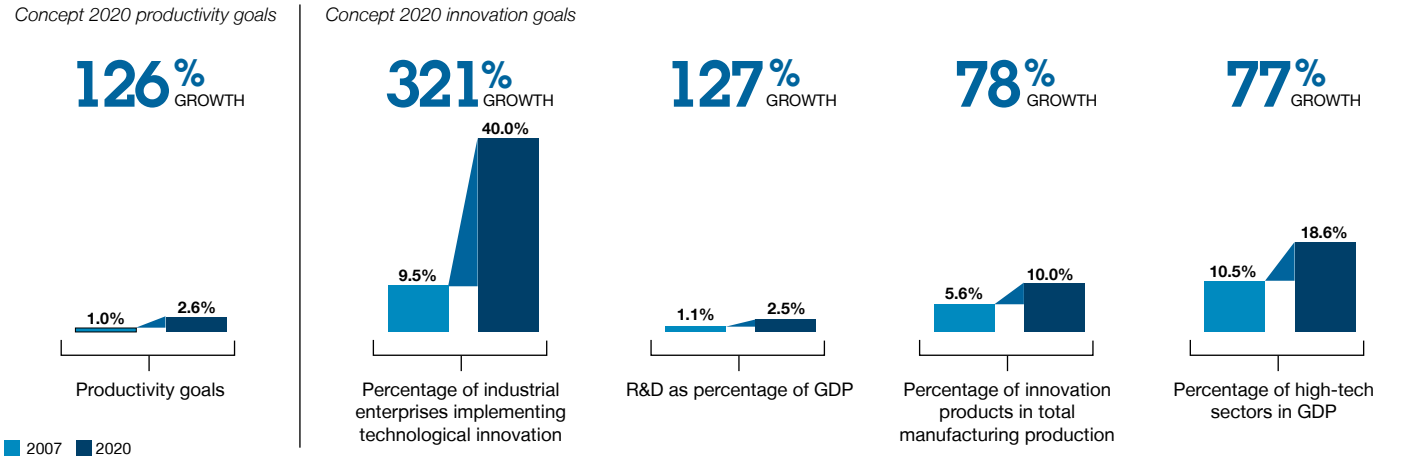
**Russia has set ambitious productivity and innovation goals as part of its strategic Concept 2020 plan (see Figure 1).**

The 2008 gross national income per capita in Russia is US$15,630, which is low compared to developed economies such as the United Kingdom, Germany and the United States.[4] As part of its strategic Concept 2020 plan, the government has set a goal to more than double annual productivity growth from the 1 percent achieved in 2007 to 2.6 percent per year in 2020.[5]

Russia also has set several ambitious strategic innovation targets as part of the Concept 2020 plan, with the aim of establishing itself as a leader in technological innovation. These include:

- Significantly increasing the proportion of industrial enterprises implementing technological innovation from 9.5 percent to 40 to 50 percent.[6]
- More than doubling R&D spending as a proportion of GDP, from 1.1 percent to 2.5 to 3 percent.
- Boosting the proportion of innovation products in total manufacturing production from 5.6 percent to 10 to 12 percent.
- Increasing the proportion of high-tech sectors in GDP from 10.5 percent to 18.6 percent.

If Russia wants to achieve its ambitious strategic goals, it needs to improve overall productivity. Since both technology and innovation have a direct impact on productivity, these are important areas to address.

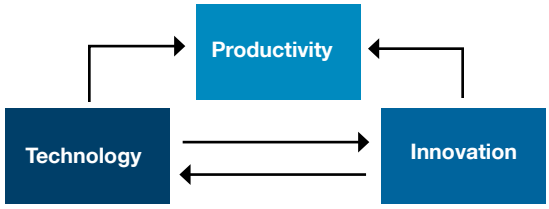



Source: "The Concept of Long-Term Socioeconomic Development of the Russian Federation to 2020." Russian Ministry of Economic Development and Trade. September 2007; Sokolov, Alexander. "Russia 2018." Presentation to European Futurists Conference. Lucerne, Switzerland. October 27, 2008.

*Figure 1:* Russia's Concept 2020 productivity and innovation goals.

Technology is a key driver of productivity growth, as it enables transformation of business processes and applications and improves organizational effectiveness. Technology also enables improved management of internal or outsourced expertise by facilitating improved communications. Innovation, on the other hand, can lead to the creation of new products and services, which facilitates increased market share and generates growth. Innovations aimed at improving existing and creating new business models also help generate productivity growth.

In addition to the direct impact that technology and innovation have on productivity, they also reinforce each other, creating further potential for positive impact on productivity. Technology, for example, impacts innovation by facilitating new and more flexible business models and increasing the flexibility and speed with which new business models can be implemented. And, innovation also impacts technology, as innovation can lead to the creation of new technology, as well as new ways of using existing technology (see Figure 2).




Source: IBM Institute for Business Value analysis of "The IBM CEO Study: Enterprise of the Future." 2008.

*Figure 2:* Impact of technology and innovation on productivity.

**Improving technology and innovation, especially in Russia's largest companies, is critical to achieve productivity improvements.**

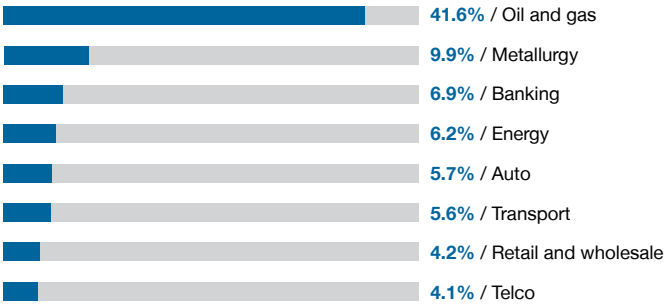
Large companies play a particularly important role in the Russian economy and, given their significant size, productivity in these companies has a massive impact on overall productivity in Russia. In 2008, the top 30 companies in Russia accounted for 42 percent of GDP and generated sales of US$555 billion.[7] The value of exports by Russia's top 20 companies increased by 420 percent to US$260 billion between 2001 and 2007 – this represented 66 percent of total exports.[8]

It's important to understand Russia's specialized industrial structure – eight sectors account for 84 percent of the total sales generated by Russia's 100 largest companies (see Figure 3).[9] By comparison, the same eight sectors account for only 66 percent of total sales for the 100 largest U.S. companies.[10] Oil and gas is by far the most important sector in Russia, accounting for over 41 percent of total sales compared to 21 percent and 16 percent respectively in the United Kingdom and the United States.[11] This means that concentrated efforts to improve technology and innovation in a small number of sectors could potentially have a large impact on productivity growth. In fact, internationally recognized companies that operate in industries that are part of key sectors in Russia are already leveraging technology and innovation to improve their productivity growth (see StatoiHydro case study).

### StatoilHydro utilizes technology to increase productivity

**StatoilHydro, the Norwegian oil giant, engaged IBM as a member of a research consortium to create a new process framework that links advanced realtime sensing capabilities in the field to powerful collaborative and analytical resources accessible across the enterprise. The new solution enables StatoilHydro to monitor offshore oil and gas fields in order to improve the regularity of each platform to optimize long-term production as part of its integrated operation programs. This will help support StatoilHydro's goal to increase recovery from Norway's offshore oilfield and reduce operating costs.**

*Source: "Statoil pumps up production levels through information sharing and 'smart' practices." Software success stories. IBM web site. http://www-01.ibm.com/software/success/cssdb.nsf/CS/JSTS-78HQ6F?OpenDocument&Site=soa&cty=en_us*




Source: "Russia's top-400." Expert Rating Agency. 2008.

*Figure 3:* **Sales of top 100 Russian companies by sector, 2008, percent of total sales of top 100.**

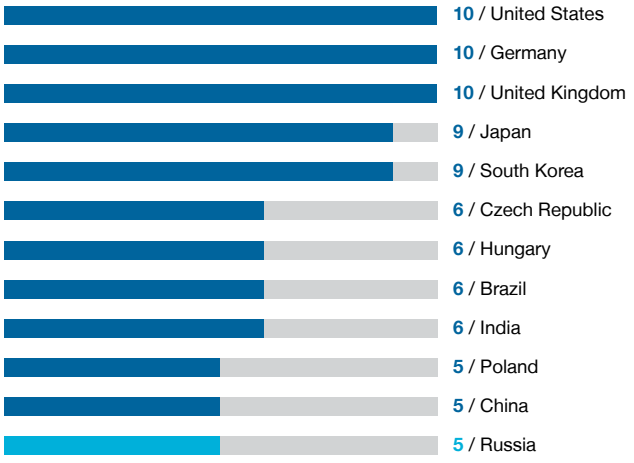
## The role of Russian firms in improving productivity

### Technology use and absorption by Russian companies compares poorly with those in other countries.

Use of the Internet and online public services by Russian businesses lags global leaders. Russia ranked 51st out of 134 countries for use of the Internet by business in 2008.[12] According to the Economist Intelligence Unit's 2009 e-readiness rankings, which measure the quality of a country's information and communications technology (ICT) infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit, Russia also ranked relatively low on the use of online public services by business, scoring just 3 out of 10 in 2009.[13] As a comparison, the United Kingdom received a score of 8, while South Korea and the Czech Republic both received a score of 7; Brazil scored 5 out of 10 while India and China both achieved the same score as Russia.[14] Russia's low e-readiness score reflects the fact that while use of online public services is beginning to expand beyond a small core of businesses, it has yet to reach the larger business community, and use is mostly informational or limited to high-volume services such as e-procurement.

Russian companies have not yet tapped the potential of technology to improve business processes. Russia scored 5 out of 10 and ranked 42nd out of 70 countries in 2009 in e-business development (defined as the use of the Internet to automate/overhaul traditional business processes and shift business transactions online), and its score did not improve between 2008 and 2009.[15] Russia's low score indicates that use of technology for business processes is currently confined to multinational companies (see Figure 4).

Use of the latest technology has an important impact on productivity, as it can lead to efficiency gains and improvements in firm operations and business processes. What constitutes the latest technology will vary for different industries and sectors, but just a few recent technological advances include nanotechnology and power and cloud computing. Additionally, the "latest technology" for some businesses could mean the use of improved equipment.

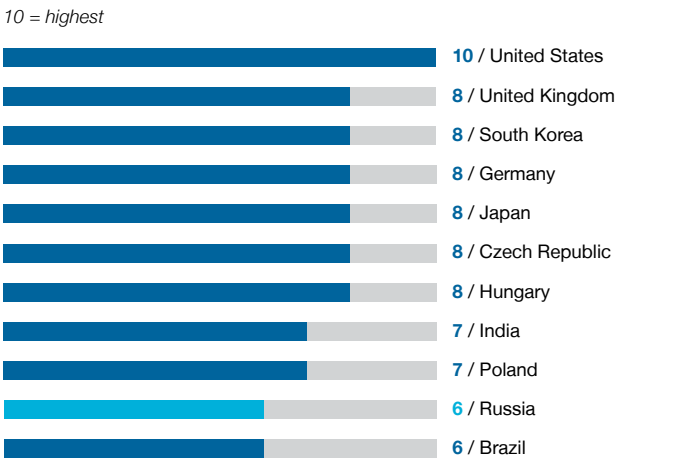



Source: "E-readiness rankings 2009: The usage imperative." Economist Intelligence Unit, written in cooperation with the IBM Institute for Business Value. 2009.

*Figure 4:* **E-business development: Use of technology for business processes, 2009.**

Russia also compares poorly with other countries in its use of the latest technology, being ranked 98th out of 134 countries in 2008 and scoring just 3.9 out of 7. This compares to a rank of 43rd for India and 58th and 83rd respectively for Brazil and China.[16] Russia's score reflects the fact that the latest technology is not yet widely available and used by companies. Foreign technology licensing is one way that companies can acquire the latest technology and, again, Russia's score reflects that, currently, this is relatively uncommon, with the country scoring 3.9 out of 7 and ranking 93rd out of 134 countries in 2008.[17] Again, its fellow BRIC members, Brazil, India and China, were ranked higher at 48th, 30th and 79th.[18]

A workforce with relatively weak technical skills and the inability of Russian companies to absorb new technology are significant obstacles to more widespread technology use in Russia. Appropriate human capital and skills are crucial for technology absorption, as technology alone is not sufficient to achieve productivity growth. Russia ranked 105th out of 134 countries in 2008 for firm-level technology absorption (i.e., the ability to absorb new technology), down from 90th position in 2007.[19] Again, Russia lags behind the other BRICs, with India ranked 26th, Brazil 42nd and China 46th.[20] While Russia scores well on general education levels, workers lack the technical skills necessary for absorbing and using technology. Russia ranked 45th out of 70 countries in 2009 and scored 6 out of 10 compared to scores of 8 for the Czech Republic and Hungary (see Figure 5).[21] Russia's score on technical skills of the workforce reflects patchy computer literacy in schools, with many older workers fearful of technology. Technically skilled professionals are available but at a high price, and training is available only for a fraction of the workforce.




Source: "E-readiness rankings 2009: The usage imperative." Economist Intelligence Unit, written in cooperation with the IBM Institute for Business Value. 2009.

*Figure 5:* **Technical skills of workforce, 2009.**

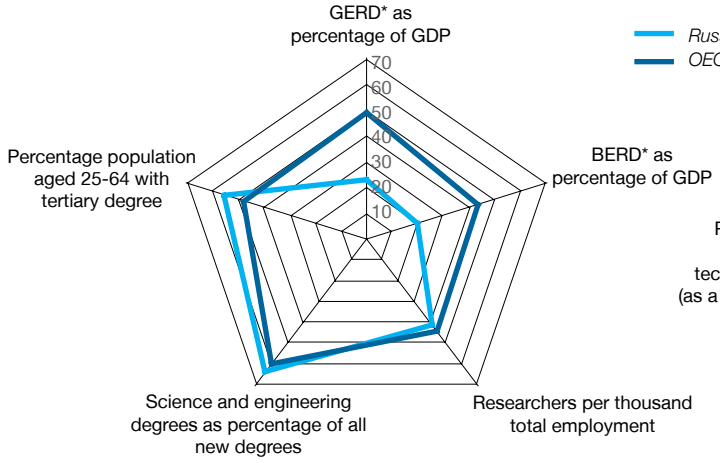
### Russian companies lag global leaders in overall innovation performance.

Russia ranked 76th for innovation input and 60th for innovation output out of 130 countries in 2008.[22] This performance is reflected in various measurements of innovation input and output. In particular, Russia's poor innovation input could be explained by relatively low business expenditure on R&D (BERD) and gross expenditure on R&D (GERD), both of which are considerably below the OECD average.[23] Survey evidence shows that only 6 percent of companies that obtained credit in 2008 used it to invest in R&D, knowhow and purchasing licenses.[24] On metrics such as number of science and engineering degrees, researchers per thousand of persons employed and the population of working age with tertiary education, Russia compares favorably to the OECD averages.[25] However, on various measures of innovation output, such as patents and scientific articles published, Russia performs well below the OECD average (see Figure 6).[26] One possible explanation for the poor conversion of innovation inputs into outputs may be the orientation of innovative activities in Russia toward imitation, rather than innovation to produce new knowledge that requires patents or reflects new-to-market product innovations.

*Russia's poor innovation performance is reflected in a private sector focus on imitation-based innovation.*

As such, the weak innovation performance of Russian companies is reflected in a private sector focus on imitation-based innovation. When ranked on the capacity for innovation by conducting formal research and pioneering new products and processes, Russia ranked 45th out of 134 countries in 2008, illustrating that Russian companies are not global leaders in this area.[27] Considering the orientation of Russian companies toward imitation and the low levels of R&D expenditure and innovation output performance, it is not surprising that Russia's overall innovation performance, which captures both input and output innovation, lags global leaders. Russia's relative innovation performance has also deteriorated, falling from 54th position in 2007 to 68th position in 2008, and lags behind the other BRICs, with China ranked 37th, India 41st and Brazil 50th. [28] This further underscores the importance of addressing innovation to secure productivity improvements in the Russian economy.

***Innovation input:***
*Russia compared to OECD average, 2006*




***Innovation output:***
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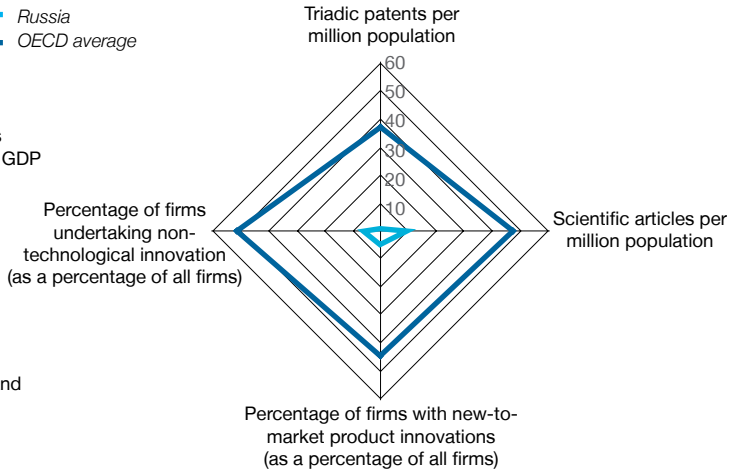
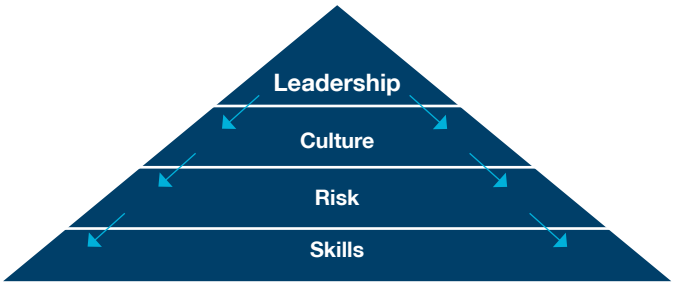



Source: "OECD Science, Technology and Industry Outlook 2008, Science and Innovation." Organisation for Economic Co-operation and Development.

*Figure 6:* **Innovation input and output – Russia compared to the OECD average, 2006.**

### Management needs to remove barriers to technology adoption and innovation to boost productivity.

Russian companies face a number of barriers to adopting and using technology and improving innovation performance. Based on our analysis of a variety of sources, including findings in academic literature, we have formulated a number of key recommendations for Russian companies (see Figure 7).




Source: IBM Institute for Business Value Analysis: Rogers, Everett M. Diffusion of Innovations, 5th Edition. New York: New York Free Press. 2003; Maurer, Rick. "Creating a shift. 12 steps that can build success for change." Journal for Quality and Participation. Vol. 29, No.1. 2006; Carr, David K., Kelvin J. Hard and William J. Trahant. "Managing the change process: A field book for change agents, consultants, team leaders, and reengineering managers." New York, NY: McGraw-Hill. 1995; Katungi, E. "Social capital and technology adoption on small farms." Unpublished PhD thesis. University of Pretoria. 2007.

*Figure 7:* **Management needs to take a leadership role and remove barriers to technology adoption and innovation to boost productivity.**

To successfully remove the barriers to technology adoption and innovation to boost productivity, those in management in Russian companies need to:

- **Address skill barriers**. Management needs to lead by improving in-house training (see Maybank case study), developing workforce analytics to anticipate future skills needs and leveraging industry associations to collaborate and develop closer linkages with government. The relative importance of these initiatives for management and nonmanagement employees will depend on each organization's individual skill needs.
- **Build capability to handle risk**. Management needs to build the capability to handle risk generated by the changes involved in adopting technology and boosting innovation. This requires developing a thorough and thoughtful approach to managing and mitigating risk, including the ability to help spot and avoid potential problems, recover quickly should disruptions occur and better manage change in general. Results from a 2008 IBM study, "IBM Global CEO Study: The Enterprise of the Future," reveal that financially outperforming companies are more successful at managing change than financially underperforming companies.[29]
- **Embed innovation and technology into the corporate culture of the organizatio**n. Management needs to embed innovation and technology into the corporate culture of the organization, while also incorporating innovation into the company's strategy and mission (see Chevron case study).

This top-down approach is critical to overcoming barriers to innovation and technology adoption. Our in-depth conversations with leaders at Russian companies revealed that the key barriers to investment in technology and innovation related to concerns over incorporating the benefits of technology and

### Maybank optimizes talent through leadership excellence

**In 2005, Maybank launched a Corporate Management Development Program to train 750 managers to build core management skills. The managers then shared their lessons with their direct reports, impacting over 3,000 employees. Benefits included the increased ability of managers to communicate a strategic vision and optimize talent and performance; a common management and leadership model across the bank; a richer, deeper learning experience at a lower cost per student; and a business impact of US$20 million.**

*Source: "Unlocking the DNA of the Adaptable Workforce: The Global Human Capital Study 2008." IBM Institute for Business Value. http://www-935.ibm.com/services/us/gbs/bus/html/2008ghcs.html*

### Chevron develops a Global Innovation Services function

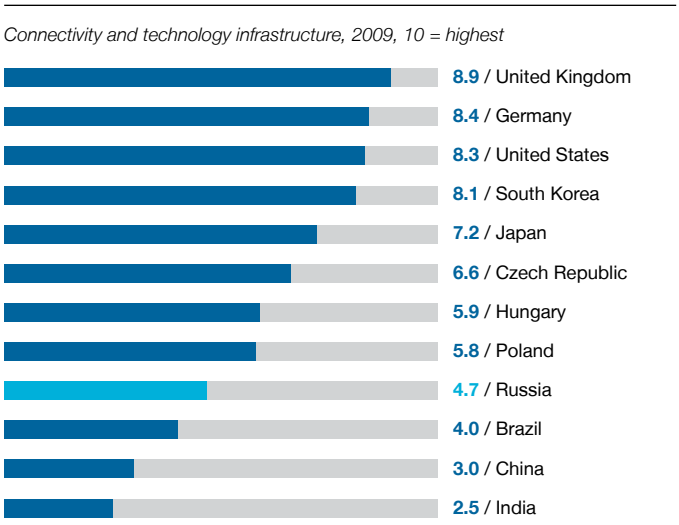
**Innovation is part of the Chevron corporate culture, but innovation was focused on products and core exploration competencies. Chevron analyzed 35 "best practice" innovative companies to drive the development of an IT-enabled operating model and establish a new Global Innovation Services function. The "innovation ecosystem" involves internal and external partners to develop innovative IT-enabled solutions to business problems or opportunities to drive strategic aspects of the business. The new operating model also requires involvement by colleagues at all levels of the business and ongoing explicit leadership support.**

innovation into strategy, ensuring new technology is smoothly integrated with other systems and securing agreement within the firm on adoption of technology or new innovative efforts – all areas where management can play a key leadership role.

## Government's role in improving productivity

**Inadequate infrastructure, a restrictive regulatory environment and underutilized e-government are impeding Russia's technology use and development.**

Russia's technology and connectivity infrastructure – a key enabler for adoption and use of technology – lags Eastern Europe and developed economies considerably (see Figure 8).




Source:"E-readiness rankings 2009: The usage imperative." Economist Intelligence Unit, written in cooperation with the IBM Institute for Business Value. 2009.

*Figure 8:* **Connectivity and technology infrastructure, 2009.**

Russia's technology and connectivity infrastructure improved slightly between 2007 and 2009, resulting in an advance from 46th to 44th place out of 70 countries. While it is ahead of the other BRIC countries, its score of 4.7 out of 10 in 2009 indicates there is still potential for improvements.[30] Use of broadband is far below levels in developed and other emerging economies, with Russia scoring just 2 out of 10 in 2009 compared to 4 in the Czech Republic and 7 in South Korea.[31]

Government laws and regulations relating to use of technology and foreign investment impede technology transfer and use in Russia. Russia ranked 79th out of 134 countries in 2008 for development of laws relating to the use of information technology, indicating that laws relating to electronic commerce, digital signatures and consumer protection are far from being well developed and enforced in Russia.[32] This position reflects a large gap with the other BRIC countries, with India ranked 38th and China and Brazil ranked 47th and 49th respectively.[33]

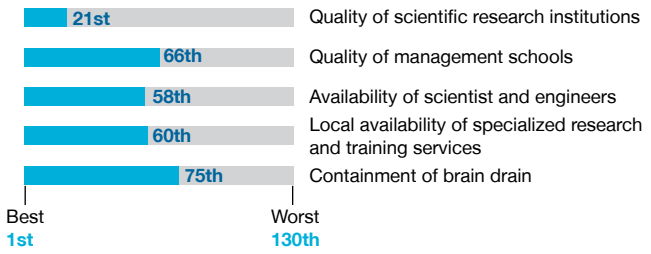
Foreign investment can contribute to technical progress and innovation through the direct importation of modern capital, managerial skills, and corporate practices, as well as indirectly through linkages with domestic companies, worker training and more intense competition on domestic markets. Russia does not effectively leverage this source of technology transfer and ranked 99th out of 134 countries in 2008 for foreign direct investment (FDI) as an important source of new technology.[34] In terms of whether rules that govern FDI encourage or discourage foreign investment, Russia ranked near the bottom, at 129th out of 134 countries, indicating that its rules have a damaging and discouraging effect. These rules impact the prevalence of FDI in Russia: Russia ranked 127th out of 134 countries in 2008 in terms of the prevalence of foreign ownership of companies, indicating FDI is rare and limited rather than prevalent and encouraged.[35]

The Russian government's underutilization of online public services, including procurement, does not help drive technology adoption and use by Russian companies. Based on 2009 e-readiness rankings, Russia scored just 3 out of 10 for online procurement.[36] There is also potential to improve the availability of online public services for businesses, which is reflected in Russia's score of 4 out of 10 compared to a score of 6 for India and Brazil and 9.5 for South Korea, (although China also achieved the same score of 4 out of 10).[37]

### The innovation environment in Russia is constraining innovation performance.

The quality of education and availability of skills in Russia are hampering innovation. While Russia performs very well in terms of the quality of scientific research institutions (ranking 21st globally in 2008), the quality of management schools ranks relatively low.[38] Russia also ranks lower in terms of the availability of specialized research and training services, availability of scientists and engineers and containment of brain drain (see Figure 9).[39] In addition, skills are an obstacle for many Russian companies, with 59 percent reporting labor resources as a significant obstacle to firm development in 2008.[40]

*Russia's rank relative to the best and worst performers*



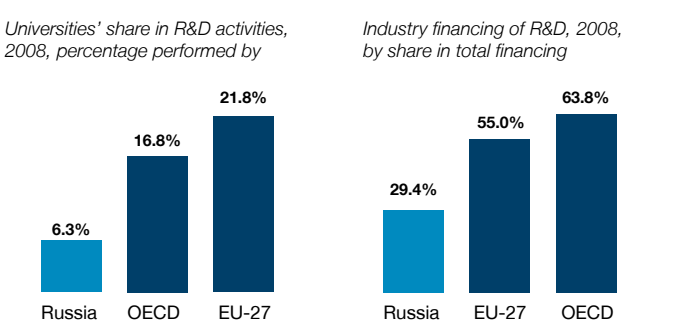

Source: "Global Innovation Index 2008-2009." INSEAD. 2009.

*Figure 9:* **Education and skills 2009: Russia's rank relative to the best and worst performers.**

Weak intellectual property rights laws and enforcement in Russia also hinder innovation. In 2009, Russia ranked 71st out of 115 countries in intellectual property rights, compared to 49th for India, 60th for Brazil and only slightly behind China at 70th. Russia's overall performance was a function of ranking 101st in intellectual property rights protection, 61st in copyright piracy and 46th in strength of patent rights.[41] Piracy and counterfeiting remain major concerns in Russia despite new laws introduced in 2008 to strengthen intellectual property rights. The United States copyright industries estimate a loss to U.S. companies in excess of US$2.7 billion in 2008 due to copyright infringement that occurred in Russia.[42]

Another concern is the fact that universities and the private sector make a less significant contribution to funding and performing R&D in Russia than in other developed regions (see Figure 10). The share of universities in R&D activities in 2008 was just 6.3 percent in Russia compared to an average of 16.8 percent in the OECD and 21.8 percent in the European Union-27 (EU-27). Similarly, industry financing of R&D is much lower in Russia at just 29.4 percent of all R&D compared to averages of 55 percent and 63.8 percent in the EU-27 and OECD respectively.[43]

*Quality of education, availability of skills, intellectual property rights laws and enforcement, and private and public sector collaboration all impact innovation performance.*




Source: "Main Science and Technology Indicators 2009-1." Organisation for Economic Co-operation and Development. 2009.

*Figure 10:* **Universities' share in R&D activities and industry financing of R&D.**

Collaboration is also low between private and public sectors in Russia, despite the fact that collaboration and cooperation are key channels through which businesses add value for customers. Effective collaboration can lead to reduced costs, better quality, and greater access to skills and products. Collaboration between the university and industry communities in Russia is relatively low, with Russia ranked just 55th out of 130 countries, lagging the other BRIC countries with China ranked 23rd and India and Brazil ranked 43rd and 48th respectively.[44] Based on the results of the 2006 IBM Global CEO study, external sources of new ideas were more important for financial outperforming companies than for underperforming ones.[45] Thus, improving the level of external collaboration on innovation has the potential to reap benefits for Russian companies.

### The Russian government needs to tackle barriers to improving technology adoption and use and innovation performance.

Given the need to improve technology infrastructure and regulatory environment for intellectual property and FDI, as well as the level of skills and collaboration, there are a number of key actions that the Russian government should take:

- **Improve technology infrastructure and leverage e-government.** The government needs to improve technology infrastructure and leverage e-government to enable improved development, adoption and use of technology. By improving its connectivity and technological infrastructure, Russia can stimulate technology development and use (see Korea case study). This can also increase Russia's attractiveness to FDI and boost productivity. In addition, improving the availability of online services for business and developing online procurement procedures can enhance the use of technology by business (see Slovenia case study).
- **Improve competition and regulation.** The Russian government should improve competition and regulation to encourage startup companies. Regulation can also be improved to encourage innovation commercialization and investment in R&D (see Malaysia case study).

*"It is high time [to invest in ICT], but until there is a stimulus that would regulate competition, economic activity, production and sales of products, no critical need will emerge."*

Russia's Institute for the Economy in Transition

- **Improve the availability of skills.** The Russian government can learn from leading practices and facilitate access to the skills needed by Russian companies. This would include both realigning current skills to companies' needs and improving the quality of education to improve future availability of skills (see Singapore case study).

### South Korea: Encouraging technology infrastructure

As a result of the South Korean government's push to advance telecommunications with the active cooperation of the operators, South Korea has become a hotbed for infrastructure developments. This investment helped lead the way for a highly developed electronics industry, including world-leading companies such as Samsung and LG. South Korea is now developing world-class network and application software for mobile technologies

*Source: "Information and Communications Technologies (ICT): The Diamond of Competitive." Industry Canada, 2009. www.ic.gc.ca*

### Slovenia: Developing online services for business

The Slovenian government set up the e-VEM project, designed to be a one-stop shop for establishing individual private entrepreneurs and limited companies. This single access point simplified business registration and made other company information, such as trade license, tax number acquisition, etc., available online. These changes reduced the number of procedures by four, the time by 41 days and the cost by 8.4 percent of income per capita and resulted in savings for entrepreneurs of approximately €1.5 million per year.

*Sources: "Doing Business 2009: Comparing Regulation in 181 Economies." World Bank Doing Business, 2009. www.doingbusiness.org; Ferlinc, M. "Shortening of business start-up times and the reduction of administrative burden." Presentation to Solvenian Business and Research Association, April 2009.*

### Tax regulations in Malaysia's innovation system

Tax regulations in Malaysia are designed to encourage R&D and the commercialization of research. Researchers are given a 50 percent tax exemption for five years on the income that they receive from the commercialization of their findings. A company that undertakes in-house R&D can apply for a tax allowance of 50 percent of the expenditure incurred over ten years. A company that invests in its subsidiary engaged in the commercialization of the R&D findings is eligible for tax deduction of the amount of investment.

*Source: "Invest in Malaysia: Incentives for Investment." Malaysian Industrial Development Authority. www.mida.gov.my*

### Singapore's skill system

Singapore's strategy for technology development places heavy emphasis on the skill needs of industry and on addressing skill shortages through a number of measures. School leavers are given high-quality preemployment industrial training designed to provide graduates with the education and skills needed to compete in the global marketplace. Singapore's tertiary education system is given ample financing and closely linked to industry. The Singapore government also established the Skills Development Fund (SDF) and the Skills Programme for Upgrading and Resilience (SPUR) to encourage employers to invest in skills upgrading of the workforce by sharing the costs of training that is relevant to the economic development of Singapore. The government also welcomes skilled foreign talent to Singapore.

*Sources: "Education in Singapore." Singapore Ministry of Education. December 2008; "SPUR." Singapore Workforce Development Agency. http://app2.wda.gov.sg/web/Contents/Contents.aspx?Id=174*

- **Reform funding and encourage collaboration.** The government can leverage the funding of public and private sector R&D to encourage collaboration and strengthen the ties between the industry and research sectors (see United Kingdom case study).
- **Facilitate access to information on the benefits of technology.** The Russian government should provide the public information on the benefits of technology to help reduce the uncertainty associated with adopting new technology and should foster technology development and utilization (see India case study). Reducing uncertainty also may have the added benefit of addressing concerns companies have about the costs associated with technology and innovation.

Our in-depth discussions with individuals at Russian government agencies indicate they recognize that the main factors deterring investment in technology and innovation by companies are competition, legislation, skills and qualifications.

*"Digitization is hindered by interrelated factors: insufficient interest, insufficient qualifications of managers and specialists, limited funds for initial investments, reluctance to invest in ICT and insufficient communication…"*

Russian Academy of Education

### The United Kingdom: Encouraging private sector participation in R&D

**The UK government introduced tax credits on research and development for small- and medium-sized enterprises in 2000 and extended it to include large companies in 2002. According to a 2008 survey, of those companies claiming the credit, 80 percent indicted it had appreciable effect on their R&D efforts. In addition, 37 percent said they have increased their R&D as a result, and 50 percent claim the program has directly helped them maintain R&D spend in the United Kingdom.**

*Source: Cassley, Chris. "Impact of the R&D tax credit: Adding value, reducing costs, investing for the future." Confederation of British Industry (CBI). February 2009. http://www.cbi.org.uk/pdf/20090204-CBI-R&D-Tax-Credit-survey-report.pdf*

### India: Outreach project promotes technology

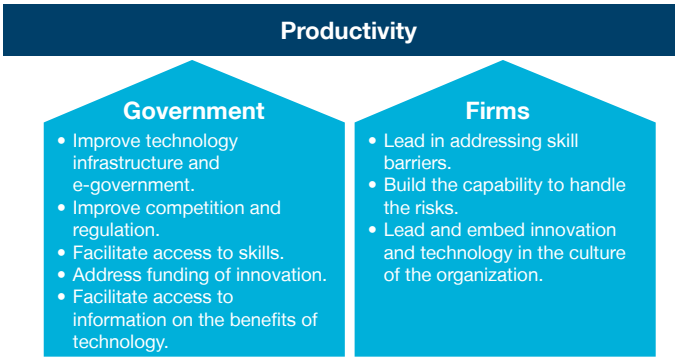
**India's Technology Information Facilitation Programme was formed to create internal capabilities for the development and utilization of digital information resources and to contribute to research and industrial development. Part of the Technology Promotion, Development and Utilization Programme of the Department of Scientific and Industrial Research, the program's mission has extended to include strengthening the resource base of available information and providing a mechanism for optimal utilization of the resources in the country. In addition, it promotes information and knowledge networking at local, regional and national levels and aims to facilitate collaborative research among industries and institutions.**

*Source: "Technology Information Facilitation Programme." India's Department of Scientific and Industrial Research Web site. http://www.dsir.gov.in/tpdup/tifp/tifp.htm*

## Conclusion

Successfully addressing Russia's technology and innovation issues requires a comprehensive approach (see Figure 11). The path forward for Russia to secure productivity improvements needs to involve all of the key actors in the technology and innovation systems. A piecemeal approach is unlikely to succeed, as all elements are critical to improving technology and innovation.

The various issues that Russia faces in the development, adoption and use of technology and improving its innovation performance create a huge opportunity for a win-win situation for all participants. Even small incremental changes that address the major issues are likely to create worthwhile benefits. Getting the basics right creates an opportunity for Russia to generate much greater impact on productivity by expanding its existing strengths. Tackling these issues now improves the likelihood that Russia will not just achieve its strategic productivity and innovation targets, but exceed them.




Source: IBM Institute for Business Value.

*Figure 11:* **Addressing Russia's technology and innovation systems requires a holistic approach.**

This study was written by the Center for Economic Development in Dublin, Ireland, which is part of the IBM Institute for Business Value. To learn more about this study or the center in Dublin, please e-mail Susanne Dirks at *susanne_dirks@ie.ibm.com*. You can also browse a full catalog of our research at: **ibm.com/**iibv

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