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Developing Skills for Innovative Growth in the Russian Federation

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ABBREVIATIONS

AHELO	Assessment of Higher Education Learning Outcomes
BEEPS	Business Environment Survey
BRIICS	Brazil, Russia, India, Indonesia, China, South Africa
EU	European Union
GDP	Gross Domestic Product
HSE	Higher School of Economics
IDI	International Telecommunication Union (ITC) Development Index
KEI	Knowledge Economy Index
NWDP	National Water Development Project
OECD	Organization for Economic Co-operation and Development
PIRLS	Progress in International Reading Literacy Study
PISA	Program for International Student Assessment
R&D	Research and development
SDF	Social Development Fund
SME	Small and Medium Enterprise(s)
SOEP	German Socio-Economic Panel Study
SPUR	Skills Program for Upgrading and Resilience
TIMSS	Trends in International Mathematics and Science Study
VET	Vocational Education Training
WB	World Bank

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Executive Summary

1. From 1998 to 2008, the **Russian economy enjoyed a decade of relatively robust and stable growth of GDP**. Russia's GDP grew by an average of 6.9 percent annually and GDP per capita increased almost nine times in nominal US dollars terms (World Bank, 2011). During this decade increasing aggregate labor outputs by tapping in to excess labor and increasing the number of hours worked was the main driver of Russia's solid GDP growth. This resulted in productivity levels growing by an average of 6 percent per year, accounting for two-thirds of the expansion in per capita GDP¹ over the decade. However, during the same period limited increases were attained in boosting the output per worker per hour reflecting the overall low level of productivity in Russia today.
2. **Indeed, the Russian labor productivity is low by international comparisons** and is less than half the average level of OECD countries.² Concurrently, Russia has almost exhausted its existing excess labor capacity as reflected in the current low unemployment rate (of less than 7 percent) and high number of hours worked, i.e. almost 2000 hours per year. This implies that in the future Russia will have to rely more on increasing productivity levels (output per hour worked) as a source of economic growth.
3. **At the same time the Russian economy is mainly represented by traditional (and often natural resources extraction oriented) firms**, while the number of innovative firms – potential drivers of a modern knowledge-based economy – remains very low. The share of firms making technological innovations was 9.4 percent of the total number of businesses in 2009, well below the OECD average of 50 percent of firms and 70 percent of German companies.³ So, why are so few Russian firms engaged in innovation? Clearly, there is a structural challenge within the economy and the business environment, but a contributing factor behind this also lies in the notable skills gap between the skills that firms need and demand to allow them to innovate and those that the workforce (stock) currently has and the education system delivers (flow).
4. **As is known more productive and innovative economies make new demands for workers' skills**. This is evidenced by a number of studies showing on one hand that there is an increasing attention of these companies towards the skills and competencies of their employees, but on the other hand that to meet the skills demanded by the labor market requires qualitative changes in the type of skills taught as well as the ability to

¹ Bakatina et al. (2009) Lean Russia: Sustaining economic growth through improved productivity, McKinsey Global Institute.

² Hanouz, M.D., Prazdnichnykh, A. (2011) The Russia Competitiveness Report 2011. Laying the Foundation for Sustainable Prosperity // http://www3.weforum.org/docs/WEF_GCR_Russia_Report_2011.pdf

³ Abdrakhmanov et al. (2011) Russian Innovation Index. M.: HSE.

renew skills on a continuing basis (see Heckman, Levy, etc.). A 2009-2013 BEEPS study found that Russia's private sector considers the lack of skills and education in workers to be one of the most severe constraint to its expansion and growth (together with taxation and corruption issues).

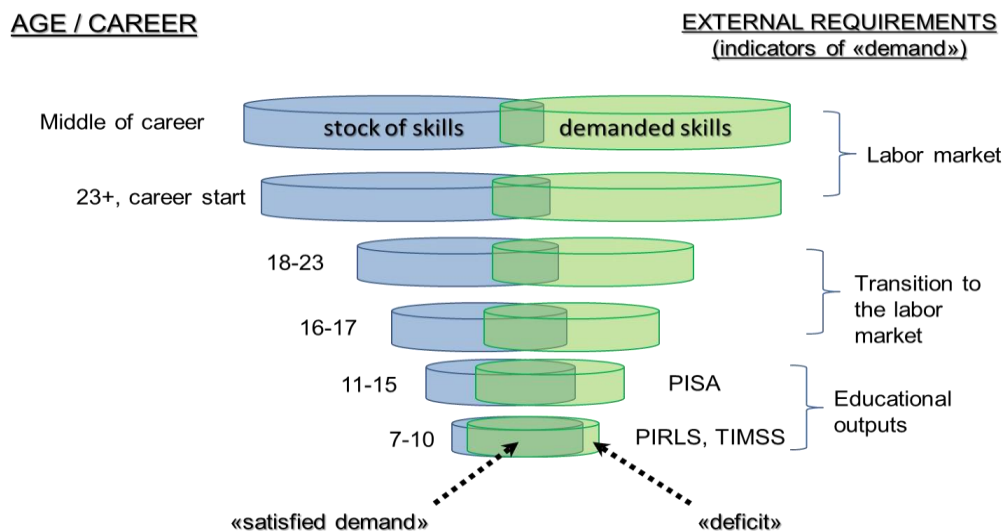
5. **Despite the very high level of formal education attained by Russian workers the problem behind this may be explained by the current quality and content of education, which does not develop the necessary skills and competences demanded by the labor market.** As a matter of fact over the period from 1995 to 2010, the share of workers with education below secondary declined from 47 to 24 percent, and share of employees with higher education increased from 20 to 29 percent ⁴, but despite these achievement the skills gap exists.
6. This report examines the reasons and the consequences of this skills deficit, which constrain productivity and limits innovation ultimately stifling accelerated economic growth in Russia. **The objectives of the report are** i) to deepen the understanding of the structure and composition of this skills deficit by analyzing in detail the demand for and supply of particular cognitive and non-cognitive skills; ii) to review the capacity and problems of the current systems for skills provision in Russia both through the public and private provision thereby identifying some of the underlying reasons for this skills gap; and iii) to support the development of evidence-based policy making in professional education and training, which will lead to a system better responding to the challenges of the economy and labor market.
7. **The report utilized data** from three surveys (household survey, student survey, and employer survey), which were conducted from late 2011 to early 2012. It also draws upon the international education quality assessment studies (i.e., PIRLS, TIMSS, and PISA) and analyses these to compare differences and trends in the demand and supply of skills.
8. **The report reveals that social and behavioral skills** (e.g. ability to work with people), **as well as high-order cognitive skills** (such as the ability to solve problems) **are in a high demand in the Russian economy.** Employers reported especially severe shortages of these skills – more severe than shortages of technical skills. At the same time the analysis revealed that efficient, persevering workers in Russia have better employment opportunities and higher income, while also emotionally stable workers receive a large premium.
9. **Problem-solving abilities are a key skill** in high demand for all categories of workers. Many employees are called upon daily to solve problems at work, and employers look for

⁴ Federal Service for State Statistics of the Russian Federation.

problem-solving abilities in prospective new hires. The greatest unmet need for this skill is among specialist employees in innovative companies.

10. Reviewing the skills shortages **in the context of qualification groups**, in addition to problem solving, *managers* frequently lack decision-making abilities, leadership qualities, knowledge of foreign languages, and the ability to work with people; *specialists* lack decision-making ability, and to work independently or cooperatively with others; *blue-collar* workers lack conscientiousness.
11. **The skills shortages also varies depending on the type of business. Innovative and traditional companies differ most in their need for skills.** Innovative companies report an overall *larger gap* in all types of skill sets than traditional companies with problem-solving skills being the predominant shortfall. At the same time despite the fact that innovative firms in general are in a better financial situation than traditional firms they still cannot bridge this skills gap simply by raising salaries and contract these skills directly from the labor market, because the skills they need differ in nature from those currently available in the labor force pointing the serious constraint faced by many businesses in Russia. Often innovative firms seek a mix of skills in their new hires or employees, including: open-minded and creative leaders, specialists-communicators, and creative blue-collar workers who show initiative.
12. **On the supply side of skills provision the report reveals that the skills gap grows as student's progress through the education system and widens further as they enter the labor market** as shown in the figure below.
13. In general, **the education system does not focus on the high-order cognitive and social skills demanded by firms and businesses.** As shown in the Figure 1, the development of basic cognitive skills (literacy and numeracy) in students is adequate in primary education. Russian primary school students demonstrate high achievement in reading: according to the PIRLS study Russia was the top global performer in 2006, and 2nd in 2011. As students progress in their studies, the secondary education gives them an adequate supply of knowledge but is less capable of developing the high-order cognitive skills demanded by the labor market. As measured by PISA, international standardized tests in reading, math and science for 15-year-olds, the quality of secondary education in Russia is higher than in other countries of similar per capita GDP. However, it remains significantly below the OECD average. In addition, Russia has not improved in reading and math since 2000.

Figure 1: The Gap between the Skills Demanded and the Actual Skills Available among Age-cohorts.



Source: findings of Chapters 2 and 3.

Note: the benchmarks for the demanded skills are set by the expected learning outcomes reflected in the international education quality assessments and reported by employers under the firm survey conducted for this study.

14. **As students enters into university education, the skills gap widens and the acquisition of work skills is insufficient.** Initially, students expect universities to develop their technical skills and equip them for a smooth transition to obtain a job. Later in their university lives, however, 27 percent of students deem their education will be insufficient for them to obtain a good job. While indeed some students' cognitive skills improve substantially during their studies, universities focus on developing basic cognitive skills rather than the high-order cognitive, social and behavioral skills that are critical for employers. Thus, the gains or opportunities for university students to acquire the skills demanded by the labor market remains limited, including the ability to work in teams, leadership and openness to new ideas, which is linked to innovation. While, practical job experience appears to be an important source of skills development for students, especially social and behavioral, in reality the opportunities for internship remain limited.
15. **Russia is experiencing a large influx of migrant workers, but unfortunately, the current skills gap is not bridged by migration.** Despite the fact that the contribution of foreign countries to the stock of skills in the working age population could range from 4 to 6 percent of the working age population, it appears that almost 90 percent of the

migrants coming to Russia have lower cognitive skills than the average Russian national worker as estimated by average PISA scores. Most of the migrants arriving in Russia are from Central Asia, the Caucasus or Central Europe. Thus as the Russian workforce continues to shrink this skills shortage could be further worsened as many of local workers are replaced by migrant workers.

16. **Furthermore, the overall problem of skills shortages is exacerbated by large and significant variance in the skills supplied from one Russian region to another. Geographic** disparities in cognitive skills are very large. With all the restrictions imposed by the PISA sample size in the Russian regions, the analysis of averaged data gives some idea of the inter-regional differences. While results in some low performing regions are comparable to countries like Argentina, pupils in the city of Moscow perform as high as an average Canadian pupil. Performance in the Northern regions remains comparable to Eastern Europe, but the Central and Southern federal districts lag about one year of study below OECD countries. In the Far East and North Caucasus, average reading scores are below the typical level for the OECD countries by about 100 points, pointing to a threat of a majority of 15 year-olds to be functionally illiterate. In the Far East and North Caucasus, average reading scores are below the typical level for the OECD countries by about 100 points, pointing to significant challenges to developing functionally illiteracy among 15 year-olds.
17. **The report concludes** that the Russian education system, despite high educational achievements, is facing challenges in developing both students' high-order cognitive skills and non-cognitive social skills that are needed by Russian firms, particularly innovative firms. This situation is in part explained by the legacy of centrally managed and highly state regulated education system. While the skills development system has ceased to be guided exclusively by the state as the customer and provider of educational services, the full mechanisms of interaction between employers and educational institutions have not yet formed. The number of private training providers remains limited. Often public educational institutions implement their activities on the basis of traditional and outdated concepts, content and practices and not on the real needs of the beneficiary whether it be an employer, student or worker.
18. This largely supply driven situation and "orientation towards the wrong customer and beneficiary" leads to the fact that **neither the educational institutions nor the employers have any obvious incentives for aligning themselves to ensure quality and relevance in the provision of skills.** Today in Russia most education and training providers focus on certification of graduates, principally through diplomas. Furthermore, the financing of educational institutions and staff salaries primarily depend on inputs such as the number of students, graduates, staff workload, etc. and to a lesser extent on the quality and educational outcomes.

19. On the other hand, enterprises too have very little incentives to invest more in training, to participate in educational institution management processes, to influence the content of training and to participate in the quality assessment of the system and institutions. While most OECD countries provides significant amount of resources through tax incentives or subsidies these mechanisms remains underutilized in Russia and Russian firms sees limited benefit in spending scarce resources on acquiring training with limited relevance.
20. This situation is further exacerbated by a high level of *information asymmetry* in the demand and supply for skills and jobs. Russia has no system for gathering, analyzing, and reporting labor market information that can be used in policy making. Thus, there is a general lack of information for students, workers and employers about educational and career pathways and employment opportunities. At the same time tertiary education institutions that develop educational and training programs have no reliable information on the labor market requirements of the skills and competencies demanded by employees, students and employers. An important source of such information could become occupational standards, development of which has recently started in Russia.
21. **The report finally provides a set of measures** to guide the education system to meet the demands of the labor market and as a result of this generate a set of workers' skills demanded by employers (especially to develop the most demanded skills such as higher-order cognitive skills and social skills).
22. First of all, **effective incentives** (financial, institutional, organizational) should be introduced to change the content, forms and methods of training. Such incentives should work both at the public and private sectors. *Educational institutions* should be encouraged to develop programs and teaching methods that will build the demanded skills and competencies in students to meet the challenges for an ever changing economy. This will require introduction of mechanisms for quality assessment and evaluation of educational services, and the introduction of incentives for educational service providers to reward good performers and drive a better aligning of quality and relevance thus narrowing the skills gap. On the other hand, *employers* should be given clear and strong incentives to invest in training of their staff and employees, to cooperate with the educational sector in designing education and training programs, to participate directly in training activities, in quality assessment of programs and learning outcomes. Such incentives will appear only if employers get the real rights and authority to manage the education system, will be involved in the decision-making processes and receive additional resources to participate in training.
23. Second, there is a need to strengthen the **capacity** (institutional, administrative, personnel, methodological) of the skills development system. This means a) expansion of the range of education and training programs (especially at the vocational cycle), b) increase of the number of organizations, providers of vocational training specifically for adult population, c) involvement of specialists-practitioners from businesses into the

education and training process, d) approximation of practices used for management of educational institutions to the practices used in business. There is also a need to support large-scale teacher and faculty training program on the modern methods of development and assessment of skills, competencies and training needs, develop and implement modern and specialized programs and courses for development of demanded skills and competencies.

24. Thirdly, it is necessary to create a modern **information system** on the state of the labor market, prospects of its development and on the state and quality of vocational education institutions and training providers. Such system should facilitate the exchange of information between key stakeholders. As a result, workers, pupils, and students will be given a rationale for designing their adequate educational paths, adjustment of career paths; educational institutions will be able to fine-tune their program design in accordance to the needs of employers, to develop relevant courses and programs focusing on the current and future demands; employers will get access to information on the quality of educational programs of specific institutions and qualifications, skills and competencies of its graduates. Professional intermediaries between the labor market and education system may significantly contribute to increase of information transparency and knowledge for both employers and education providers.
25. A table linking the report findings with some specific recommendations can be found at Chapter 4, Section 3.
26. **The report is divided into four chapters.** *Chapter 1 “The Strategic Context for Workforce Development for Improved Competitiveness, Productivity and Economic Growth”* highlights the importance of investing in skills and building the right skills-development policies for improving Russia’s competitiveness. *Chapter 2 “Skills Demand at Innovative and Traditional Companies”* describes the skills that are (a) used on the job, (b) valued by the employers at hiring, (c) especially demanded by innovative firms. Chapter 2 also describes strategies for workforce development used at firms. *Chapter 3 “Skills Supply”* summarizes evidence on the supply of cognitive, non-cognitive, and technical skills produced by the Russian educational system. *Chapter 4 “Summary Findings, Constrains of the Skills Development System and Policy Options”* summarizes key findings, identifies major constraints in the education system, international experiences in reforming skills provision and recommends possible solutions.

Introduction

1. Over the past decade Russia has experienced stable economic growth with GDP growing by 7 percent per year from 1998 to 2007. With significant decrease in 2009 due to the financial crisis, the Russian economy held steady in 2010 and 2011, but in 2012 it started to decline and dropped down to 3.5 percent, the lowest growth rate for the past decade. While the global economic crisis certainly played a part in this slowdown, it is clear that the underlying conditions for growth have also changed within Russia, especially since oil prices are near record levels and higher than in 2011.
2. While the nation still enjoys a relatively healthy growth rate, analysis shows that earlier rapid growth was primarily due to, and is limited by, increasing capacity utilization. The World Bank's flagship report on productivity in Europe and Central Asia (2011) underscores the fact that a large part of the productivity gains in Russia derived from increased capacity utilization, particularly in manufacturing. As firms began using excess labor and capital that had been idle during the deep transitional recession in the 1990s, their output increased. In fact, two-thirds of the expansion in per capita GDP can be attributed to an increase in hours worked.
3. However, there is a long term downward trend in the Russian labor supply. Increases in the working-age population in Russia, and a significant influx of immigrant labor, are no longer present or are insufficient to increase the supply of labor (Bakatina, et al, 2009, Lean Russia: Sustaining economic growth through improved productivity, McKinsey Global Institute). Moreover, changes in Russia's demographic profile, including low fertility rates and declining life expectancy, further constrain the size of the labor pool; by 2050 Russia's workforce is due to decline by 25 million.
4. One of the main sources for Russia's future economic growth is therefore increasing labor productivity. By international comparison Russian workers are among the least productive among modern nations. A single Russian worker spends approximately 2,000 hours a year to produce on average US\$20 per hour worked. In the top-performing countries, the employees work just 1,400 hours a year to produce three times as much (estimation based on the data of Eurostat). Russian workers labor productivity is, for example, only 30 percent of the USA level (Bakatina et al, 2009 op. cit.).
5. Improving productivity will impose new demands on Russia's workforce requiring better skills to satisfy the needs of economy growth. The international Business Environment Survey reports that Russia's private sector considers the lack of skills and education of workers to be the most severe constraint on its expansion and growth (the issue of skills and education is placed ahead of taxation and corruption barriers). Paradoxically, Russia has one of the highest education attainment level in the world. There has been a dramatic increase in educational attainment in just under two decades, reflected in the growing

share of the workforce with higher education. Between 1995 and 2010, the share of the workforce with no more than a secondary education fell from 47 percent to 24 percent. Over the same period, the share of those with higher education rose from 20 percent to 29 percent.⁵ The key problem appears to be increasing the relevance of the education and job skills in the workforce.

6. This report on Russia is a follow-up, country-level study that builds on key lessons from the World Bank regional report, *Skills, Not Just Diplomas*, (World Bank, 2011), which focused on skills development in Europe and Central Asia (ECA). The key framework that shapes the skills agenda in the World Bank is *Skills Toward Employment and Productivity* (STEP), and this study uses the STEP conceptual framework for defining skills in three subgroups: cognitive, non-cognitive, and technical skills. As recommended by *Skills, Not Just Diplomas*, the report addresses the issue of lack of information on skills and educational outcomes and ultimately shines a light on the skills gap in Russia.
7. Within the STEP program and in this report, the classes of workplace skills being discussed are defined in Table 1.
8. The STEP framework is a guide to help policymakers think through the design of systems to impart skills that enhance productivity and growth. It guides preparation of diagnostic work on skills and provides a roadmap for designing cross-sectoral policies that facilitate productive employment and economic growth. The scope and objectives of this study didn't allow full implementation of the STEP study instruments, which were adapted for Russian conditions. It included only skills self-assessment modules and simplified questionnaires on respondent backgrounds. The study does not aim, however, to benchmark the national education system against other countries in a systematic way.
9. Within the broader context of the Russian government's strategy to address macro-economic and labor market challenges, there is no strategic plan for aligning the professional education and skills development system with the needs of the economy. To facilitate that, the objectives of this report are to:
 - a. Deepen understanding of the structure and composition of the skills deficit in the Russian economy, including the demand for and supply of particular skills;
 - b. Review shortfalls and constraints in the skills development system, and
 - c. Support development of evidence-based policy in professional education and training, leading to policies more responsive to the challenges of the economy and labor market.

⁵ Federal Service for State Statistics of the Russian Federation.

Table 1: Definitions of Workplace Skills

Cognitive
<u>Basic cognitive</u>
reading and writing literacy
numeracy
foreign language skills
<u>High-order cognitive</u>
ability to make non-standard decisions, take non-standard actions
work related problem solving
ability to plan work (for yourself or others)
Non-cognitive
<u>Social and Behavioral</u>
ability to work with people
leadership skills
ability to work independently
collaboration skills (team work)
<u>Big Five / Personality traits</u>
conscientiousness (takes work seriously, hardworking, works efficiently)
emotional stability (relaxed, stress tolerant, does not worry, does not get nervous on trifles)
agreeableness (forgives easily, attentive, kind, polite)
extraversion (is talkative, assertive, friendly, communicable)
openness to new ideas (original, full of ideas, has active imagination)
Technical (Professional, job-related)
technical job-related skills (speed typing for a typist, accounting for accountant)

Approach and Methodology

10. The report is prepared in cooperation with National Research University—Higher School of Economics (HSE). HSE as a leading Russian think-tank that assists the Government of Russia in developing economic and social policies. It has contributed significantly to designing and implementing educational system reforms since 2000. HSE has demonstrated an advanced capacity in the area of labor-market research and policy design.
11. In order to achieve its objectives, the report uses a methodology that compares skills demand as measured through employer surveys with skills supply as measured through household and university student surveys, as well through international education quality assessment studies. In cooperation with HSE, the World Bank conducted three surveys in late 2011–early 2012 in various regions of the Russian Federation: (i) employer survey, (ii) household survey, and (iii) student survey. (A detailed description of all three surveys may be found in Appendix A.)

12. All three surveys relied on formalized individual interviews using special questionnaires. The *employer* survey was conducted in 26 regions of the Russian Federation on a total sample of 1500 firms. Interviews were conducted with heads of human resources departments at enterprises with more than 50 employees.⁶ The interviews included businesses from the main sectors of the Russian economy, ensuring a representative sample at the national level but not at the industry level. Data collected during the employer survey provided evidence on the demand for skills in Russia, as well employers' opinion regarding lack of these skills in the labor force.
13. The *household* survey studied 1500 individuals aged 18 or older living in 95 localities (35 rural and 60 urban) in 40 regions. The household survey collected data on actual usage of skills in the workplace and everyday life, as well as evidence on skills supply levels in the employed, unemployed and non-employed populations. Inter alia, the data made it possible to calculate the return on skills and distribution of earnings among populations with different levels of skills.
14. The *student* survey was conducted in the ten regions of Russia with the highest number of higher education institutions. The target population was 2000 students of higher education institutions of Russia, including 1000 students in the first year of study and 1000 students in their final year of study (which would be the fourth year for those in bachelor's degree programs and the fifth year for those in specialist degree programs). Student survey data enabled us to measure the skills provided by secondary and higher education systems, as well as the evolution of skills from school through higher education to the labor market.
15. The analysis in the report keeps the focus on the innovative firms for two reasons. First, the GOR Strategy aims to boosting "innovative growth". Second, analysis of the demand for skills by sectors did not reveal statistically significant differences in demand with one exception, less unsatisfied demand for selected skills from the finance sector. This is likely explained by the ability of financial institutions to offer salaries attracting workers with high credentials.
16. The study concentrates on the micro level of the firms (but not the sectors). At the firm level it was possible to clearly identify significant differences in demand between innovative and traditional firms. All other firms' sub-samples (e.g. more and less financially stable firms, operating under weak and strong competition, paying larger or

⁶ The statistics uses "below 100 employees" threshold. There were about 1.6 million registered firms of the size below 100 employees in 2010 and only 1.2 million of them operated generating about 19 trillion RUR in sales revenue (Source: Federal Service for State Statistics of the Russian Federation).

smaller salaries) did not show such clear and strong differences between innovative and non-innovative firms.

Structure of the Report

17. The report consists of four chapters. *Chapter 1* highlights the importance of investing in skills and building right skills development policies for improving Russia's competitiveness. It positions the country on global competitiveness, and outlines the development that must take place to improve that position (i.e., greater economic diversification and productivity). Finally, it briefly looks into the key constraint on this development—relevant education and skills in the workforce.
18. *Chapter 2* discusses the skills gap in the Russian economy. It is based on the findings of the survey of Russian employers, augmented with findings from the household survey. The chapter describes the skills used on the job by various types of workers, and the skills that Russian employers consider most important when hiring employees. The chapter also defines the skills that are lacking at Russian companies, with a focus on the skills gap at innovative companies. The extent and structure of the skills gap in innovative companies is assessed against traditional companies—those that do not rely on new technologies—revealing differences between the needs of enterprises of the “new” and “old” type.
19. *Chapter 3* summarizes evidence on the supply of cognitive, non-cognitive, and technical (both professional and job related) skills in the Russian labor force. It focuses particularly on the demand for non-cognitive social and behavioral skills, and on high-level cognitive skills (related primarily to problem-solving abilities). It is based on the surveys of adults and students. Additional evidence on cognitive skills is drawn from the latest PIRLS, TIMSS and OECD PISA surveys, which are international standardized assessments of reading skills at the primary and secondary school levels.
20. *Chapter 4* summarizes the key findings and issues for skills development that are revealed in the report, describes the constraints to the education system which cause these issues and concludes with policy recommendations to eliminate the constraints to improve the responsiveness of the education and training system to the needs of the labor market and ultimately close the skills gap.

Chapter 1: The Strategic Context for Workforce Development for Improved Competitiveness, Productivity and Economic Growth

Introduction

This chapter sets out to examine the issue of skills and workforce development in the context of economic growth models, innovation, competitiveness and productivity. It first analyzes the contributory factors to GDP growth in Russia over the past two decades, including total factor productivity growth and level of technological innovations, and compares these to international trends. Section 2 then examines the future constraints to economic growth and productivity giving Russia dependency on natural resources, changing demographics, labor force structure and high labor capacity utilization. Section 3 summarizes current international trends in skill demand in countries and firms in an era of technological development and innovations. Section 4 reviews current government plans and strategies to diversify the economy and meet the skills gap in the market place.

The chapter concludes that the potential for economic growth in Russia is limited by two major contributors: low productivity and low level of innovation. Indeed, the value of the output per hour worked in Russia is about half of the OECD average. The Russian economy is concentrated in traditional and natural resource sectors, with a very low percentage of innovative firms. Changes in productivity and industry composition will impose new demands on Russia's workforce, requiring better education and skills. While Russian workers attained very high level of education, they lack some key workplace skills. Investing in skills and developing better policies for enhancing skills in the workforce are important conditions for innovation and for Russia ability to sustain economic growth, competitiveness and productivity in the future. Finally, over the past two decades Russia has boosted GDP outputs by expanding the number of hours worked and tapping into excess labor. This will no longer be possible in the future.

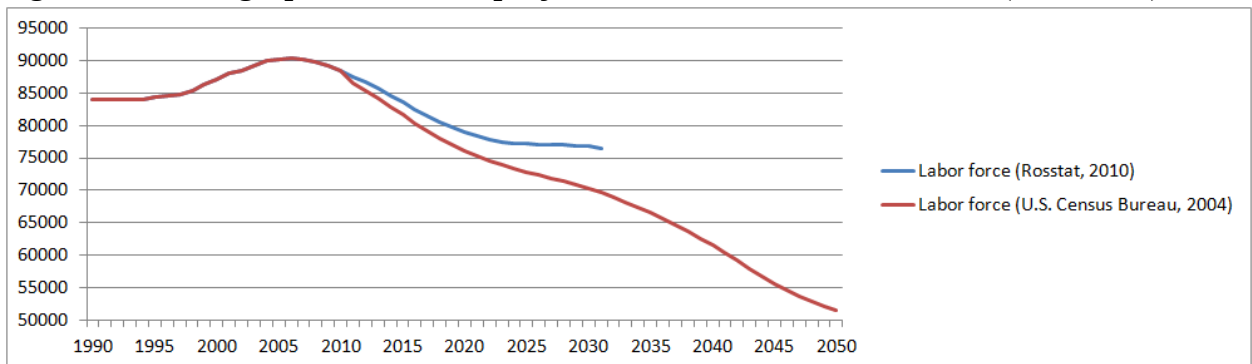
Section 1. Economic Growth, Global Competitiveness and Russia Today

1. The robust growth of the Russian economy over the last decade has begun to slow. Russia experienced a 7 percent annual growth rate from 1998-2008, which has slowed to an estimated 3.5 percent by 2012. While the global economic crisis certainly played a part in this slowdown, it is also clear that the underlying conditions for growth have changed within Russia.
2. While Russia still enjoys a relatively healthy GDP growth rate estimated to 3.5 percent in 2012, analysis shows that earlier rapid growth was due primarily to, and is limited by, increasing capacity utilization. The World Bank's flagship report on productivity in Europe and Central Asia (ECA 2011) underscores the fact that a large part of the GDP

growth in Russia derived from *increased capacity utilization*, particularly in manufacturing. As firms began using excess labor and capital that had been idle during the deep transitional recession in the 1990's, output increased. In fact, two thirds of the expansion in per capita GDP can be attributed to an increase in hours worked.

3. However, there is a long term downward trend in the Russian labor supply. Increases in the working-age population in Russia, and a significant influx of immigrant labor, are no longer present or are insufficient (Bakatina et al., 2009) to increase the supply of labor. Moreover, changes in Russia's demographic profile, including low fertility rates and declining life expectancy, further constrain the size of the labor pool⁷ as shown in Figure 1.1; by 2050 Russia workforce is due to decline by 25 million workers.

Figure 1.1: Demographic trend and projection in the Russian Federation (thousands)

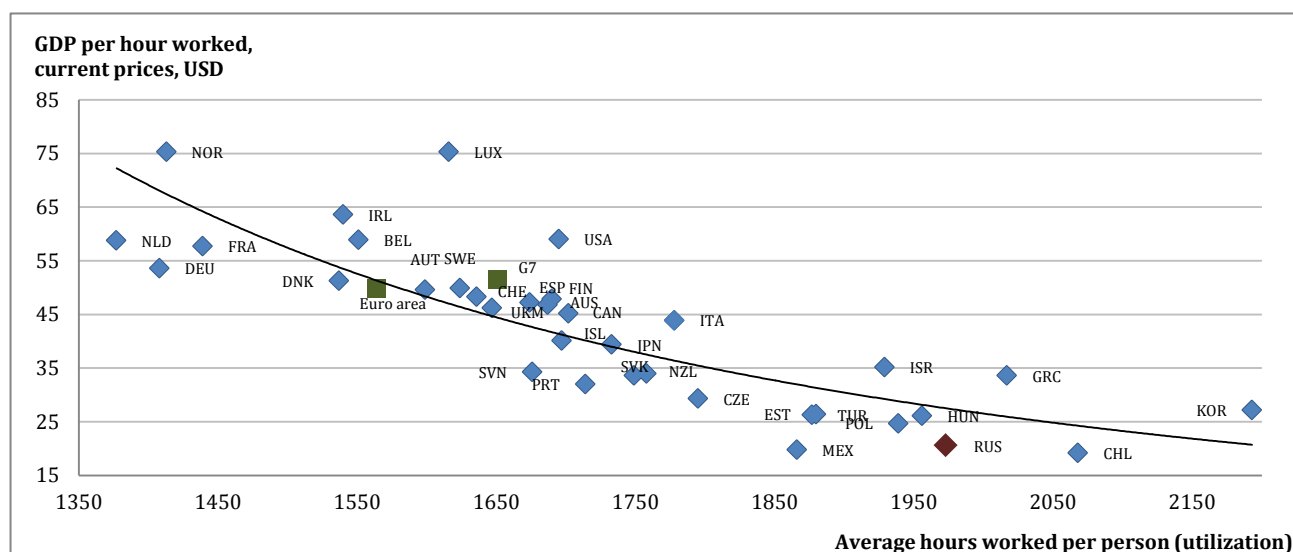


Source: Federal Service for State Statistics of the Russian Federation, U.S. Census Bureau

4. The decreasing labor force has led to more intensive use of labor, but economic output unfortunately has failed to keep pace. As shown in Figure 1.2, Russian workers are among the least productive among modern developed countries. A Russian worker puts in approximately 2,000 hours a year to produce an average of \$20 per hour worked. In the top-performing countries, employees work just 1,400 hours a year to produce three times as much. Russia is close to exhausting its labor capacity, and was using 80 percent of capacity before the economic crisis in 2007.

⁷ World Bank (2005). Dying too young: addressing premature mortality and ill health due to noncommunicable diseases and injuries in the Russian Federation (2005). Washington, DC, World Bank.

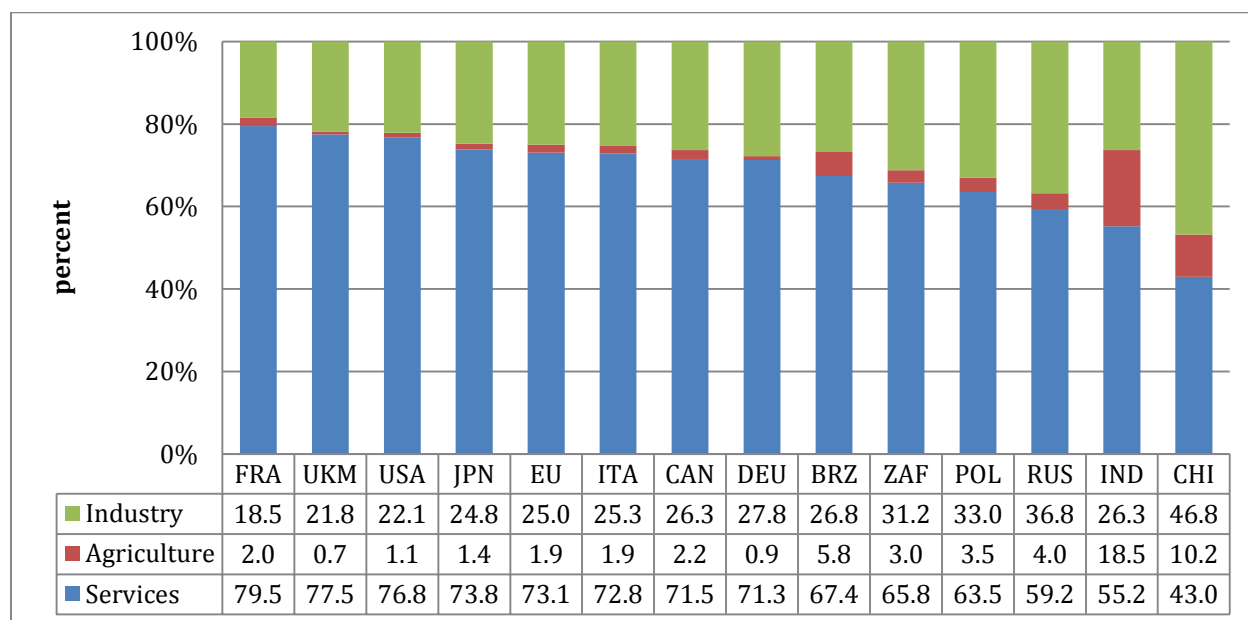
Figure 1.2: Labor productivity as measured as GDP per hour worked and labor capacity utilization measured as total hours worked (2010)



Source: OECD

5. Typically, countries with low GDP output per hour worked will be characterized by the use of outdated technology, ineffective business organization and production processes, low level of knowledge adaptation and technological innovations and possible poor external environment with regards to the overall business environment and competitiveness. A further feature is the low investment in capital and instead a focus on labor intensive production. The physical capital infrastructure is often outdated, and reinvestment in research and development is limited. The situation in Russia is similar.
6. As shown in Figure 1.3, the contribution of the services sector to the GDP in Russia is lower than in any OECD country. The Russian economy is mainly dominated by traditional industry-oriented firms with low levels of technological and knowledge adaptation, a poor business organization and production process (in part due to lack of competition). In addition Russia is characterized by an aging capital infrastructure and poor investment climate and business environment. These firms have typically boosted outputs by increasing the number of hours worked per worker instead of investing in skills, technology and new capital infrastructure and equipment.

Figure 1.3: Composition of GDP in BRICS, G8 and countries with similar to Russian economic development, 2010

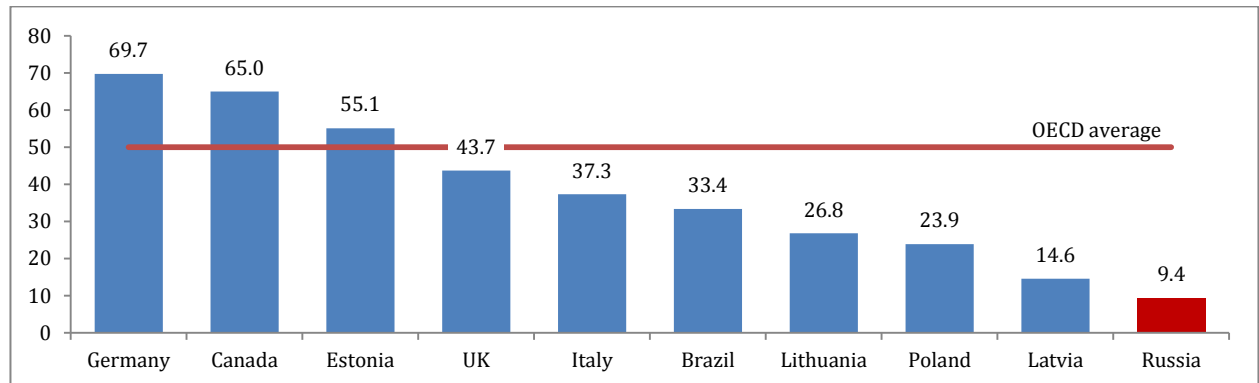


Source: Field Listing – GDP composition by sector. CIA World Factbook // <https://www.cia.gov/library/publications/the-world-factbook/fields/2012.html>

7. Oil, gas, timber and mineral resources account for over 80 percent of Russian exports, with the commodity base being further narrowed over the past 5 years, despite the government goals to diversify the economy. The major non-commodity-based exports are chemicals and military equipment. This structure of the Russian economy contributes to a lack of technological innovation. A recent survey, Figure 1.4, found that less than 10 percent of Russian firms are engaged in technological innovations. This is among the lowest percentages in modern economies, with and OECD average of about 50 percent and with 70 percent of German companies engaged in technological innovation.
8. Moreover, the economic transition from the Soviet Union has significantly reduced investment in R&D and the number of scientists in Russia. In 1990, before the break-up of the Soviet Union, Russia spent 2 percent of GDP on R&D and had about 1.9 million scientists and engineers. With the break-up of the Soviet Union and the economic crisis of the 1990s spending dropped by over 80 percent in 2000s (or about 1 percent of GDP), little of which is targeted towards the productive sector. Except for oil and gas, the Russian industrial sector is becoming outmoded, with few products other than military items globally competitive. As can be seen from Table 1.1 below, while Russia still does quite well in many areas in comparison to other BRICS countries, and has the highest level of university education, this is not translated into innovation in the productive sector. In particular, the number of firms with new-to-market innovations significantly lags behind other countries, pointing to structural and institutional problems in linking

R&D with the private sector. This is reflected in the low Knowledge Economy ranking discussed below. It may also indicate a lack of workers and firms with the ability to apply new technology and knowledge.

Figure 1.4: Percent of firms conducting technological innovation (2009)



Source: Abdrakhmanov et al. (2011) Russian Innovation Index, M.: HSE

Table 1.1: R&D Inputs and Outputs for the BRICS Country Group (2008)

	Brazil	Russia	India	China	South Africa
Gross expenditure on R&D (GERD) as percent of GDP	1.09	1.03	0.71	1.54	0.92
Business expenditure on R&D as percent of GDP	0.50	0.65	0.14	1.12	0.53
Industry-financed GERD as percent of GDP	-	0.3	-	1.1	0.39
Triadic patents per million population	0.34	0.45	0.14	0.39	0.56
Scientific articles per million population	141.3	176.0	35.0	156.2	109.8
percent of firms with new-to-market product innovations (as a percent of all firms)	3.5	1.7	23.5	14.6	21.1
percent of firms undertaking non-technological innovation (as a percent of all firms)	36.1	3.26	-	-	60.7
percent of patents with foreign co-investors	17.7	22.9	24.5	12.6	11.2
percent of GERD financed by abroad	-	5.94	-	1.24	10.67
Researchers per 1000 employment	1.48	6.36	0.35	2.06	1.46
Science and engineering degrees as a percent of all new degrees	10.95	24.77	-	39.18	16.41
percent of population aged 25-64 with tertiary degree	10.8	54.37	11.43	9.48	-

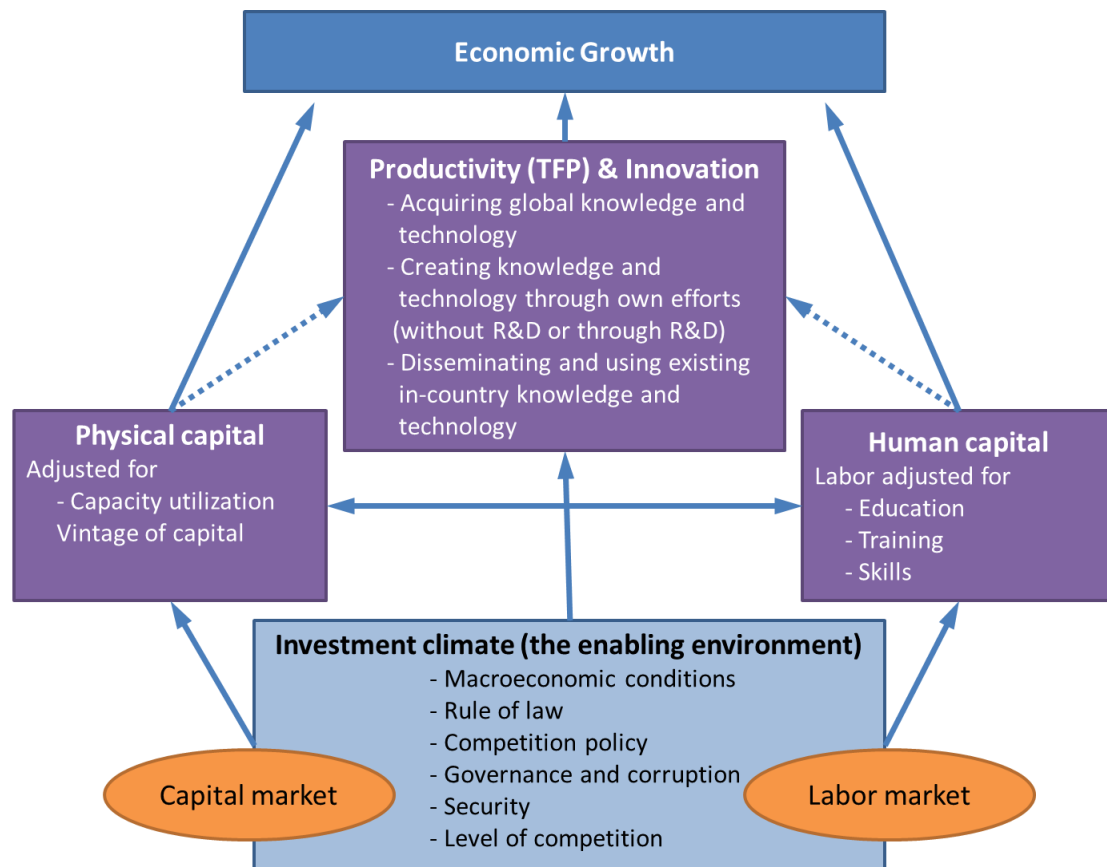
Source: "OECD Science, Technology and Industry Outlook 2010, Science and Innovation." Organization for Economic Cooperation and Development.

Section 2. Renewing Growth in the Russian Economy

9. With a diminished labor force and outmoded capital, to reignite and accelerate growth in the Russian economy, will require changes in its underlying structure. Growth will have to be generated from increases in the productivity of workers (GDP value of output per hour worked), and this is often associated with structural changes in an economy and skills of the workforce. Economic growth in modern, developed economies is closely linked to the development of the Knowledge Economy and effective policies in other areas (overall investment climate (Doing Business), access to financing and a functioning financial sector, etc.). While capital and cheap labor previously constituted critical inputs to drive economic growth (and continue to do so for many low income countries), the importance of knowledge, innovation and technological adaptation is increasingly associated with higher economic growth and competitiveness. This new paradigm for middle-income countries – knowledge or the *Knowledge Economy* – not natural resources (on which Russia is heavily reliant) nor cheap labor or labor utilization – increasingly constitutes the core of a country’s comparative advantage.
10. Today, the Government of Russia is focused on improving the overall investment climate (Doing Business), but so far less attention has been paid to the issue of skills. While the **conceptual model** employed here (see Figure 1.5) is highly relevant, macroeconomic and investment policies are complex issues beyond the scope of this report. The focus here will be on the issues of labor force contributions to innovation and productivity gains. The report concentrates on the importance of evolving skills of the workforce and how Russia can move towards a more knowledge-based economy.
11. In the conventional neoclassical model, growth generally is understood to be a function of capital and labor, with technology treated largely as a given. When physical and human capital interact more efficiently, growth also occurs more rapidly. Economists describe this incremental efficiency-based growth as changes to Total Factor Productivity (TFP). TFP can be understood as the factors beyond capital and labor that enable an economy to increase production output. Identifying the factors that compose TFP is difficult. Many elements – ranging from better intermediate inputs to improved organization and management, as well as large-scale, new, or improved technology – can increase TFP. This report focuses primarily on the innovation component of TFP, including the creation and use of knowledge.
12. Recent conceptualizations of growth models incorporate adjustments for quality of input factors. For example, capital is typically refined and measured in terms of capacity utilization, or sometimes in terms of equipment obsolescence; and labor – through education, skills, and professional experience. The more that capital and labor are adjusted to account for knowledge components, the lower the residual of TFP. Some recent models have also begun explicit consideration of innovation-related variables such as R&D, patents, foreign investment, and technology licensing.

13. Some growth models have also begun to incorporate the investment climate as a measure of favorable economic conditions. This may include appropriate policies, stable macro-economic environment and adequate capital investments. Growth, therefore, is the interactive result of physical capital, TFP (innovation), and human capital, with interaction strongly defined by an overarching enabling environment that can either enhance or obstruct it.

Figure 1.5: Conceptual Model for the Contributory Variables to Economic Growth



Source: Rodriguez, A. (2008) "Knowledge and Innovation for Competitiveness in Brazil," Washington, DC: World Bank.

14. Growth in TFP presents challenges for the Russian economy, which is heavily dependent on natural resources. During the first half of the past decade, TFP's contribution to growth in the non oil-and-gas sectors of the economy was slightly lower than for the total economy. This changed from 2006-2008, the years immediately before the current economic crisis, when TFP's contribution to the non oil-and-gas sectors rose to become greater than for the economy as a whole. The recent Global Competitiveness Report for

Russia (WEF 2011) also shows that productivity in the support sectors (e.g., market services including construction, retail trade, and hospitality) grew faster over this period than in many basic sectors (such as mining and manufacturing, which are mainly owned and promoted by the government).

15. Sustained per capita growth, driven by increases in TFP, will require the economy to diversify to reduce its dependency on natural resources. The move towards higher value-added economic sectors and efficient adaptation of innovations and technologies can be facilitated by improving skills within the labor force⁸. The evolution of workforce skills towards those needed for innovative and higher value-added production will be critical as will be discussed in Chapter 3. At present, there is considerable evidence that such skills are in short supply.
16. According to the World Bank's Knowledge Economy Index (KEI), Russia was 55th out of 145 countries in 2012 (compared to 64th in 2000). Again, this is better than other BRIICS countries (Brazil was No. 60, South Africa 67, China 84, India 110) but lower than countries with similar economic development (Estonia was No. 19, followed by Lithuania (32), Latvia (37), and Poland (38)). The ICT Development Index⁹ (IDI), places Russia on 47th position out of 152 countries in 2010 (up from 50th in 2007 and 52nd in 2002), comparing poorly to other countries with similar economic development: Estonia was No. 33 in the index, Lithuania 35, Poland 38, and Latvia 40.

Section 3. Human Capital Needs in an Era of Technological Innovation

17. The Russian employment structure has undergone substantial changes in the last two decades. In particular, the service sector has expanded significantly while employment in less productive manufacturing and agriculture sectors has declined, as shown in Figure 1.6 below. The recent Global Competitiveness Report for Russia (WEF 2011) shows that productivity in the support sectors (e.g., market services including construction, retail trade, and hospitality) grew faster over this period than in many basic sectors (such as mining and manufacturing, which are mainly owned and promoted by the government).

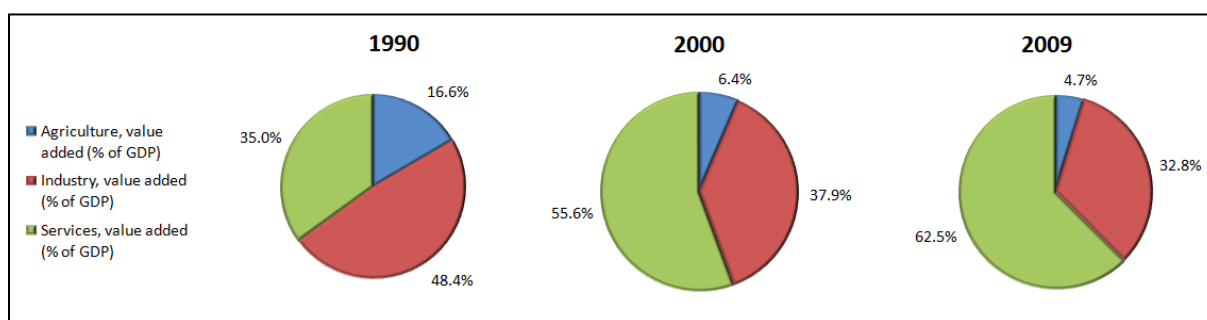
⁸ See for example Bakatina, D., Duvleusart, J., Klintsov, V., Krogmann, K., Remes, J., Shvakman, I., Solzhenitsyn, Y. (2009) "Lean Russia: Sustaining economic growth through improved productivity," McKinsey Global Institute.

⁹ "Development Index" (database). International Telecommunication Union.

<http://www.itu.int/net/pressoffice/backgrounders/general/pdf/5.pdf>.

Accessed June 6, 2012/

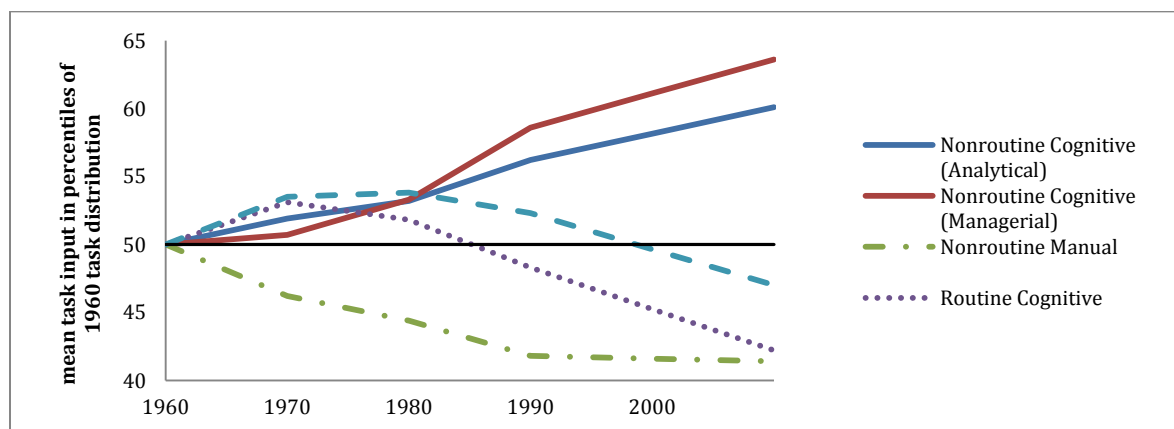
Figure 1.6: GDP by sector in Russia



Source: World Bank (World Development Indicators)

18. International experience demonstrates that modernization of the economy has been accompanied by changing demand for skills. Figure 1.7 shows, for example, the changing mix of skills required of the U.S. labor force. There is less need for routine skills, while the demand for non-routine cognitive skills has increased significantly.

Figure 1.7: Trends in Routine and Non-routine Tasks of U.S. Labor Force, 1960–2002



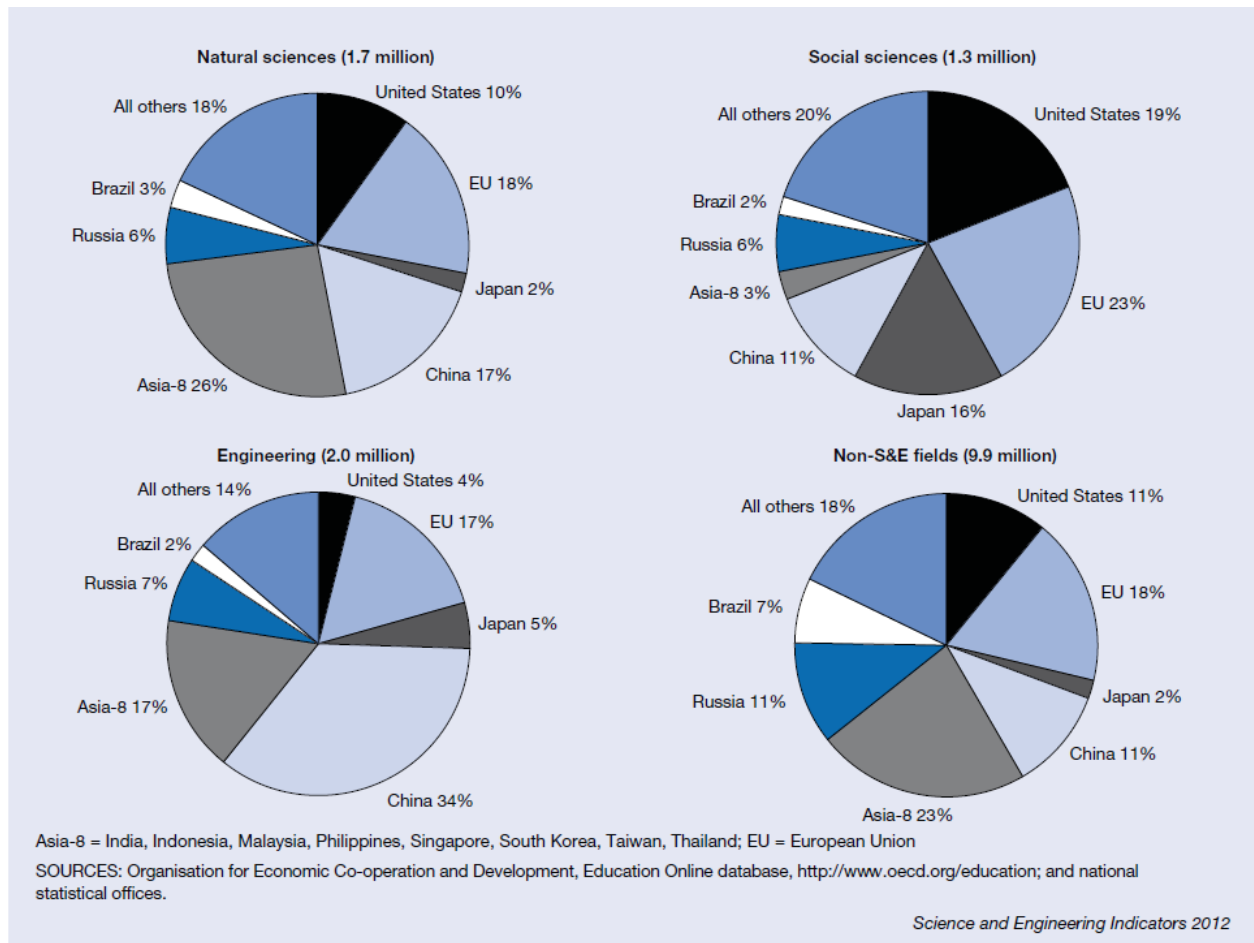
Source: Autor, Levy, and Murnane 2003. With data updated to 2002 by David Autor.

19. Governments in many Western countries believe that natural sciences and engineering (NS&E) fields convey technical skills and knowledge that are essential for innovative and knowledge-intensive economies. Thus they are concerned about lagging student interest in studying the NS&E programs. While overall number of university graduates is growing in Russia, the share of graduates in NS&E has been declining for the past several decades: from 36.4 percent in 1990 to 21.6 percent in 2008.¹⁰ Moreover, the low Russia's share of global engineering degrees in recent years is striking and well above half of all such degrees are awarded in Asia. Overall, in the developing world, the

¹⁰ Federal Service for State Statistics of the Russian Federation.

number of students earning first university degrees in NS&E is rising. China, especially, has driven the rise of first university NS&E degrees – from about 280,000 in 2000 to one million in 2009.¹¹(Figure 1.8)

Figure 1.8: First university degrees, by selected region/country: 2008 or latest data



Source: *Science and Engineering Indicators 2012*, National Science Foundation. USA.

20. The evolving structural change in the Russian economy has introduced the need for new skills in the labor force. A major constraint to increasing innovation appears to be skills required of the labor force. The international BEEPS study reports that Russia's private sector considers the lack of skills and education of workers to be the most severe constraint on its expansion and growth. (Table 1.2). The issue of skills and education is placed ahead of taxation and corruption barriers.

¹¹ Science and Engineering Indicators 2012.

Table 1.2: Ranking of Constraints to Firm Growth

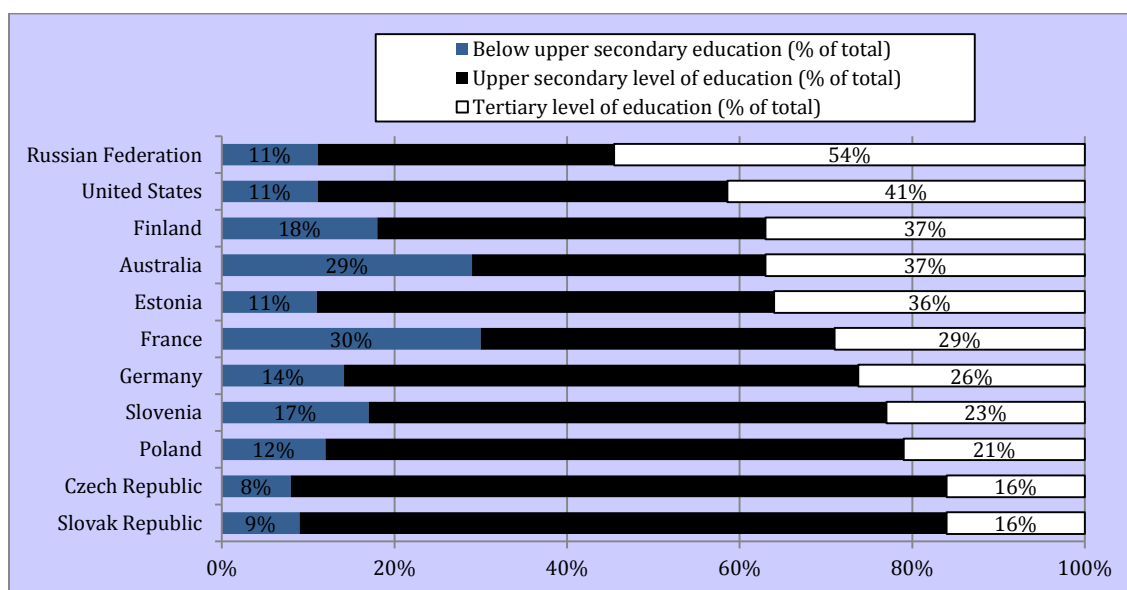
	2005	2008	2012
Tax rates	2	2	1
Corruption	3	3	2
Skills and education of workers	4	1	3
Access to finance	6	8	4
Macroeconomic instability	-	-	5
Electricity	13	4	6
Transport	12	9	7
Tax administration	1	10	8
Organized crime/mafia	-	-	9
Access to land	10	5	10
Crime, theft and disorder	8	6	11
Business licensing and permits	5	11	12
Customs and trade regulations	9	13	13
Labor regulations	11	14	14
Courts	7	12	15
Telecommunications	14	7	-

Source: BEEPS At-A-Glance 2008, Russia, The World Bank Group, 2010; BEEPS At-A-Glance 2012, Russia, The World Bank Group, forthcoming 2013

Note: Relative rank by mean score with 1 being most severe.

21. Paradoxically, the overall level of educational attainment of the Russian workforce is actually high relative to international benchmarks (see Figure 1.9). The changing mix of necessary workforce skills over time documented by the BEEPS survey offers a partial explanation for the apparent skills deficit in what is actually a highly educated labor force.

Figure 1.9: Adult population by level of education (2009)



Source: OECD Education at a Glance 2011, OECD.

22. This issue was studied and documented in the recent regional World Bank study, “Skills not Diplomas”¹² for a number of Eastern Europe and Central Asian (ECA) countries. This study finds that the global economic expansion at the beginning of the century exposed significant barriers to growth in ECA countries, particularly with respect to the skills of the labor force. Despite relatively high educational attainment, the workforce in these countries suffers from a shortage of skills, and this shortage is one of the most important constraints on business expansion – a finding consistent with the issues facing Russia.
23. The emergence of skills shortages in the face of high and rising attainment suggests that the problems lies not so much with access as with quality of education. Education systems in Russia - like in the ECA region - do not produce enough graduates with the right skills. The education systems are still making the transition from teaching the basics (factual content often via rote-learning) to inculcating higher order skills such as critical-thinking and problem solving. Not surprisingly, the education premium for higher and vocational education in Russia after significant increases in 1995-2003 period has started to decrease (Table 1.3).

¹² Sondergaard, Lars et al. (2012) Skills, not just diplomas; managing education for results in Eastern Europe and Central Asia, The World Bank.

Table 1.3: Education premium by education level*(% salary surplus comparing to workers with upper-secondary education)*

	1995	2000	2003	2005	2007	2009
Higher	42.0	67.7	70.7	66.3	52.7	58.0
Secondary vocational	4.9	18.6	21.1	10.5	7.0	6.1
Upper-secondary and initial vocational	-2.7	4.2	2.4	2.4	-4.5	-1.3
Lower-secondary and below	-22.4	-19.1	-21.3	-20.0	-23.6	-13.5

Source: Kapelushnikov, 2010

Section 4. Government Policy and Plans to Promote Innovation

24. The Russian government has acknowledged these difficult development issues (inter alia highlighted by the international development indices), and has produced a plan to accelerate innovation and growth. The Russian government has published a Strategy for 2020¹³, a plan for long-term development (see Box 1.1 below). The plan identifies some of the major economic challenges for Russia as lack of diversification of the economy, low productivity, and a shrinking labor force. The economy needs be diversified to reduce its dependency on natural resources and move towards higher value added economic sectors and innovation. Moreover, the current extremely low level of productivity needs to be improved. Finally, as will be shown, these challenges will have to be overcome in an economy where the labor force is shrinking.

Box 1.1: The Strategy for Innovative Growth of the Russian Federation to 2020

The new strategy for an innovative development of the Russian economy up to year 2020 published by the Ministry of Economic Development is aimed at helping Russia catch up with the ever increasing pace of technological development and globalization. Highly qualified workers and professionals and financial flows are becoming extremely mobile and attracting them is a real challenge for a country to boost its innovation and knowledge economy.

Russia is still among the world's leaders with regard to human capital potential. However it lags Western economies in relative R&D expenditures (1.3 percent of GDP) and, especially, in business openness towards innovations (as well as corruption levels and rule of law). Available data suggest that existing post-soviet R&D infrastructure is not suited to serve and compete in the global market economy and needs to be revamped. During the last 10 years the Russian government has been

¹³ Government of Russia. "The Concept of Long-Term Socioeconomic Development of the Russian Federation to 2020." GoR Resolution № 1662-p, November 17, 2008.

investing intensively into both hard and soft innovation infrastructure, establishing so-called institutes of development of Russian innovative economy, hundreds of techno-parks and business incubators, 4 special economic zones and the famous Skolkovo (Russian Silicon valley) project all of which is articulated and laid out in the Strategy 2020.

The proposed new programs advocate for a so-called mixed innovation strategy. In several areas like aerospace, nanotechnology and composite materials, nuclear power and ICT Russia may pretend to take the role of one of the global leaders, providing world-class innovative solutions and technologies as articulated in the leadership strategy. In other areas the country will follow the path of developed Asian countries (Japan, S. Korea, Singapore, etc) importing and adopting the most advanced technologies available on the market (catch up strategy). A list of new long-term goals has been stipulated in the strategy along with numerical indicators (summarized in Table 1.4 below).

In addition to Strategy 2020, there is support directly from the President's office. The President's executive order from May 7, 2012 on long-term state economic policy includes the following points:

The Government has been instructed to take measures to achieve the following targets:

- create and modernize 25 million highly-productive jobs by 2020,
- increase share of government investments to 25 percent of GDP by 2015 and to 27 percent of GDP by 2018,
- achieve a 1.3-fold increase in the share of the high-technology and science-intensive sectors in the GDP relative to the 2011 level by 2018,
- increase labor productivity 1.5-fold relative to the 2011 level by 2018,
- increase Russia's ranking in the World Bank's "Doing Business" index from 120th place in 2011 to 50th place in 2015 and 20th place in 2018.

25. The government plans to diversify the economy to reduce its dependence on oil and gas revenues as shown in Table 1.4 below. Strategy 2020 calls for the oil-and-gas sector's share of the economy to decline from 16.6 percent of GDP in 2010 to 13.7 percent in 2015 and to 12.7 percent in 2020. Meanwhile, the "high-tech" industry is slated to increase from 11.1 percent of GDP in 2010 to 13.0 percent in 2015 and 17.0 percent in 2020 mainly through investment in human capital and adaptation of new technologies. This will be realized by an increase in the internal spending on R&D and more attention to the transfer of applied and fundamental research results. Overall it is anticipated that spending (both public and private) on education will increase by 2 percent of GDP (4.1 percent currently).

Table 1.4: Share of GDP Value Added, by Economic Sector

	2007 (actual)	2010 (actual)	2015 (forecast)	2020 (forecast)
Innovation (“high-tech”)	10.9	11.1	13.0	17.0
Oil and gas	18.7	16.6	13.7	12.7
Natural resources	7.7	7.3	7.0	6.9
Transport	5.2	4.9	4.4	4.1
Trade	16.2	17.1	17.2	17
Other	41.3	43	44.6	42.3
Total Value Added	100	100	100	100

Source: Ministry of Economic Development of Russia

26. The plan sets an ambitious goal of doubling country’s per capita GDP by 2020, which would require Russia to increase its labor productivity by an average 6 percent a year (Bakatina et al., 2009). Plans call for several strategic priorities, including increasing R&D spending, innovative products in manufacturing, and increasing the proportion of industrial enterprises implementing technological innovation.

Conclusion

27. Several indices and studies reveal that Russia is not very competitive in the global marketplace and is ranked low on the Knowledge Economy Index in large part explained by Russia’s weak institutions, poor investment climate and low levels of private sector R&D. Furthermore, Russia’s productivity is quite low, with the value of output per hour worked about half of the OECD average. In addition, the composition of the Russian economy is weighted toward traditional and natural resource sectors, with a low percentage of innovative firms engaged in technological development. At the same time the current labor capacity utilization is almost exhausted, leaving little space for further increases in GDP outputs by working more hours. The Russian government has an economic development strategy with ambitious targets for Russia to become a more knowledge based and diversified economy. However, the role of skills and the renewal of skills seem to be peripheral in the strategy. At the same time, the Ministry of Education and Science of the Russian Federation is currently preparing the overall strategy for vocational education sector development. This work has been prioritized by the Ministry to highlight the strategic importance of enhancing skills to build effective human resource capacity in support of long-term/sustainable economic growth and social development in Russia.
28. To conclude, continued economic growth in Russia, including competitive exports, depends on greater innovation, knowledge and technological adaptation in the Russian economy. Concurrently, while Russian workers are highly educated, they lack some key

workplace skills. Improving productivity further will require and impose new demands on Russia's workforce, requiring better education and skills. Furthermore, innovation, however, requires a set of cognitive workplace skills that are currently in short supply among the labor force. Investing in skills and developing better policies for enhancing skills in the workforce are important conditions for addressing these issues and for Russia's ability to sustain economic growth, competitiveness and productivity in the future. A further understanding of the characteristics of these skills will clarify and help shape policy ideas. The current supply and demand of skills will be analyzed in the following chapters.

Chapter 2: Skills Demand at Innovative and Traditional Companies

Introduction

This chapter assesses the skills gap in the Russian economy, based on the findings of a joint World Bank–Higher School of Economics (HSE) survey of Russian employers conducted in 2012. To analyze demand for skills an employer survey was conducted and augmented with data from a survey of households carried out by the World Bank in 2012. Section 1 reviews activities most frequently accomplished by typical Russia workers in the workplace and skills that employers consider important in hiring. Section 2 addresses the key question of this chapter by defining the skills that are lacking at Russian companies, particularly innovative companies. Section 3 reviews actions Russia’s private sector has taken to bridge the skills gap, in particular those related to hiring new workers and training or retraining staff.

The chapter concludes that along with the relevant professional (technical skills) skills Russian companies experience severe shortage in high order cognitive (e.g. problem solving, non-standard decision making, etc.) and social and behavioral skills (e.g. ability to work with people, ability to cooperate with others, etc.). Unsatisfied demand for these skills is particularly strong in innovative companies that are on average in a better financial position than traditional companies, and able to pay prevailing market prices, but face a relatively inelastic supply of particular market skills. Moreover, skills demanded by innovative firms differ from those needed to traditional companies. Innovative firms are interested in particular skills mixes (creative leader, specialist-communicator, creative worker with initiative) that are currently underrepresented on the market.

Section 1. Skills Demanded in Russia’s Economy

29. Not only does a lack of some workplace skills limit the international competitiveness of the Russian economy, it also impacts the operations of specific Russian firms. Insights into the skills demanded by Russian firms, and their difficulties in acquiring them, comes from a 2012 employer survey jointly conducted by the World Bank and the Higher School of Economics (HSE). The survey included formal individual interviews of 1,500 firms in 26 regions of the Russian Federation. Interviews were conducted with heads of human resources departments at establishments with more than 50 employees. The interviews included businesses from the main sectors of the Russian economy, ensuring a representative sample at the national level but not at the industry level. Data collected during the employer survey (i) shared the employers’ expectations of the tasks and activities accomplished by employees; (ii) provided evidence on the demand for skills in Russia, as well (iii) employers’ opinion regarding lack of the skills. A detailed description of the methodology of the surveys is presented in Appendix A.

30. Three types of workers were covered in the survey: (1) *managers*, (2) *specialists (professionals)*, and (3) *skilled blue-collar workers*. Worker categories were defined by the International Standard Classification of Occupations (ISCO-88) by ILO:

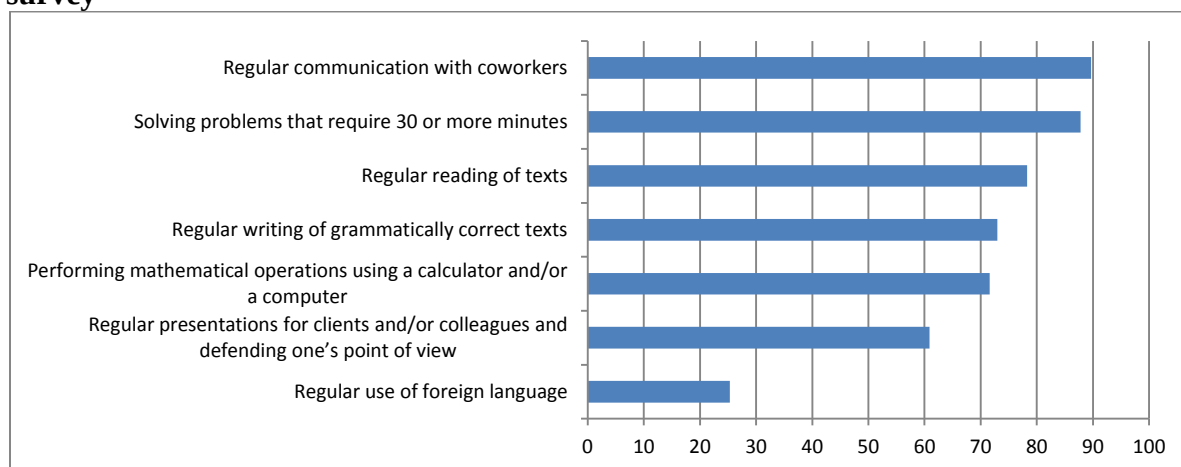
- Managers: ISCO major group 1 Senior officials and managers.
- Professionals: ISCO major group 2 Professionals and group 3 Associate professionals (technicians).
- Skilled blue-collar workers and clerks: ISCO major groups 7 and 8 (craft workers, plant and machine operators, assemblers, and clerks).

31. Skills were grouped into three categories: (1) *cognitive (basic and high-level)*, (2) *non-cognitive (behavioral and social)*, and (3) *technical skills*. Definitions of these skill categories were shown in Table 1 in the Introduction.

1.1. Activities accomplished in the workplace

32. The employer survey indicates that regular communication with colleagues and solving nontrivial problems are the core of professional activities for the overwhelming majority (90 percent) of Russian *managers*. A smaller share of managers (slightly over 70 percent) regularly read and write texts and perform mathematical operations. Only 25 percent of Russian managers need to speak a foreign language on the job. The percentage is somewhat higher for innovative enterprises (see Box 2.1. for definition of the innovative firms), but still does not exceed one third.

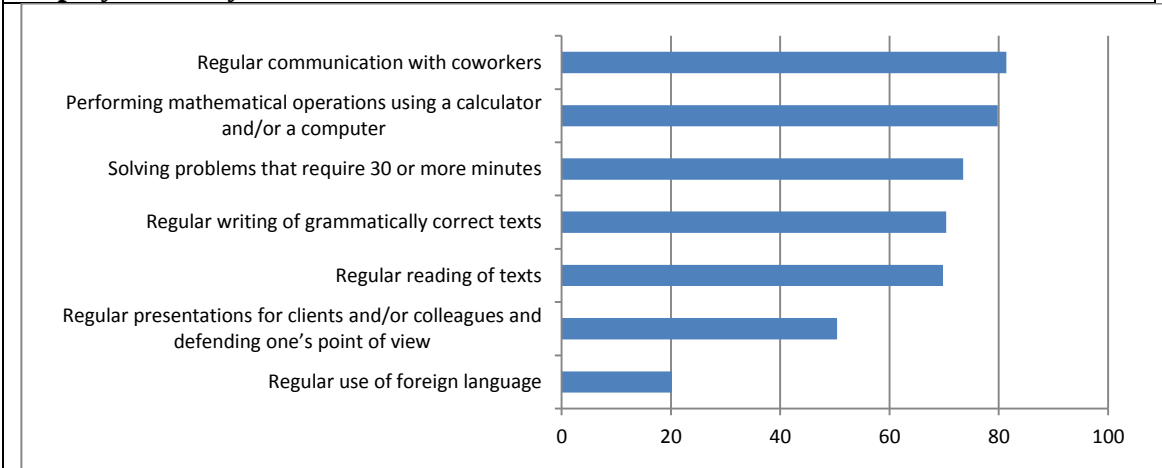
Figure 2.1: Tasks/activities most frequently accomplished by managers: from employer survey



33. *Specialists* have a similar profile to managers. They communicate with their colleagues and solve nontrivial problems somewhat less frequently than managers, but these skills are still key for them. Predictably, specialists perform mathematical operations with a calculator

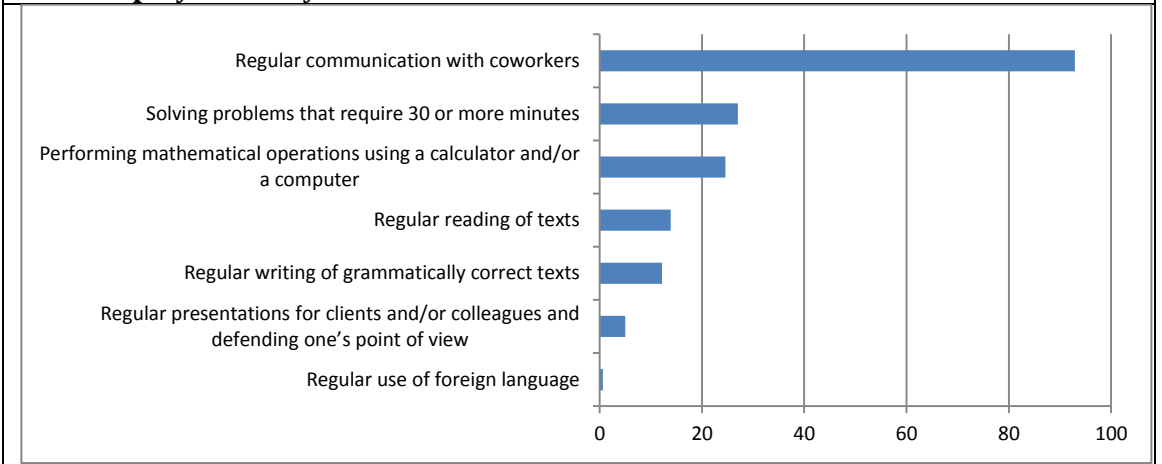
and/or a computer more often than managers do. About 70 percent of specialists regularly read and write texts. Even fewer specialists than managers use a foreign language at work—only every fifth specialist needs such skills.

Figure 2.2: Tasks/activities most frequently accomplished by specialists: from employer survey



34. The primary task accomplished by *blue-collar workers* (as expected by employers) is regular communication with coworkers, which is typical for 90 percent of respondents. About 25 percent of respondents also cited the use of skills related to problem solving and mathematical operations. Blue-collar workers make very few presentations and do not use foreign languages.

Figure 2.3: Tasks/activities most frequently accomplished by blue-collar workers: from employer survey



Box 2.1: Criteria for defining a company as innovative

A company was defined as innovative if its representative selected more than one answer for the following question within the employer survey:

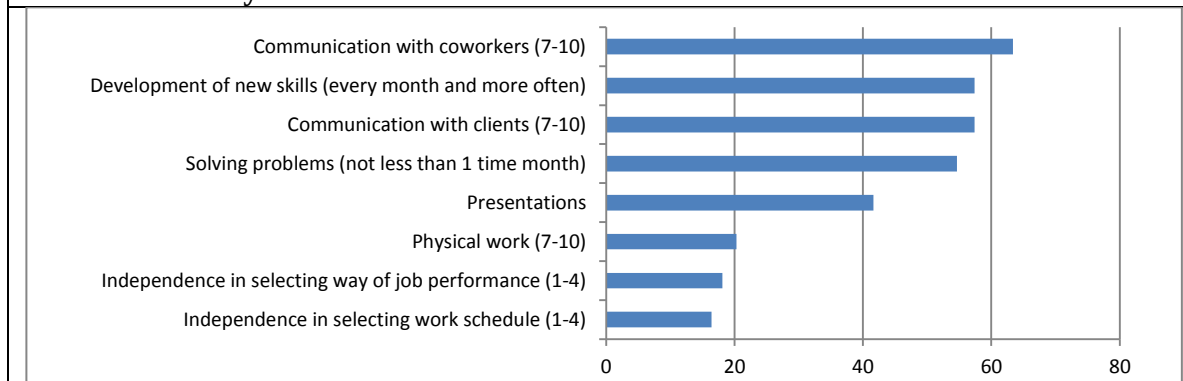
“Which of the listed innovative activities did your enterprise finance in 2011?”

1. Launch of new or considerably improved product on the market;
2. Introduction of new or considerably improved production technology;
3. Implementation of R&D;
4. Acquisition of new technologies (patents and licenses) related to introduction of new products and production process.

Description of surveys can be found in the Appendix A.

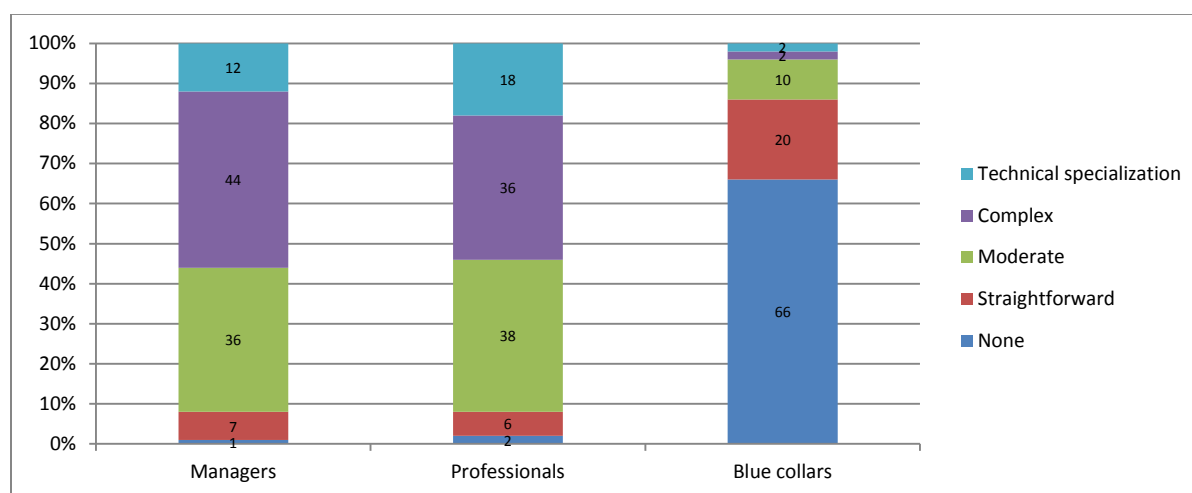
35. The findings from the employer survey are confirmed by data from a separate survey of individual workers. Figure 2.4. shows how specialists in that survey described the functions they performed at work. Although this survey uses a different scale than the employer survey, the general conclusions are the same: employees agree with their employers that they most frequently use communication and problem-solving abilities at their jobs.
36. One important workplace activity not covered by the employer survey was the development of new skills. Specialists in the worker survey indicated that regular acquisition of new skills is an important component of their work.

Figure 2.4: Tasks/activities most frequently accomplished by specialists: from household survey



37. Russian workers use computers extensively at work. Computer skills are mandatory for *managers* and *specialists* in most companies. Moreover, a basic knowledge of computers is not sufficient. The overwhelming majority of these employees are expected to possess at least mid-level skills, and in many cases have an advanced or even a professional knowledge of computers. Contrary to managers and specialists, blue-collar workers seldom use computers in routine work, either at traditional or innovative companies (Figure 2.5).

Figure 2.5: Use of computers at work



1.2. Skills important in hiring

38. The analysis shows that employers attach key importance to behavioral and social skills in hiring any worker, along with the relevant technical skills. In the case of managers and specialists, employers also take high-level cognitive skills into account. When hiring *managers*, employers say the most important skills a candidate can possess are the ability to plan, to make nonstandard decisions, and to resolve emerging problems, as well as leadership qualities. Interestingly, a large proportion of employers cited personal relations (i.e. range of contacts outside the company) of the candidate as an important factor in hiring managers.
39. In hiring *specialists*, employers place the greatest emphasis on technical skills (cited by the overwhelming majority of respondents), social and behavioral skills (including the ability to work independently, the ability to cooperate with *other people*, and conscientiousness), and the ability to solve problems. In *blue-collar workers*, employers look for technical skills, as noted by the majority of respondents, and social and behavioral skills such as conscientiousness, the ability to work independently, and the ability to cooperate with others (Table 2.1).

Table 2.1: Skills that receive the most weight in hiring decisions: the employer's perspective

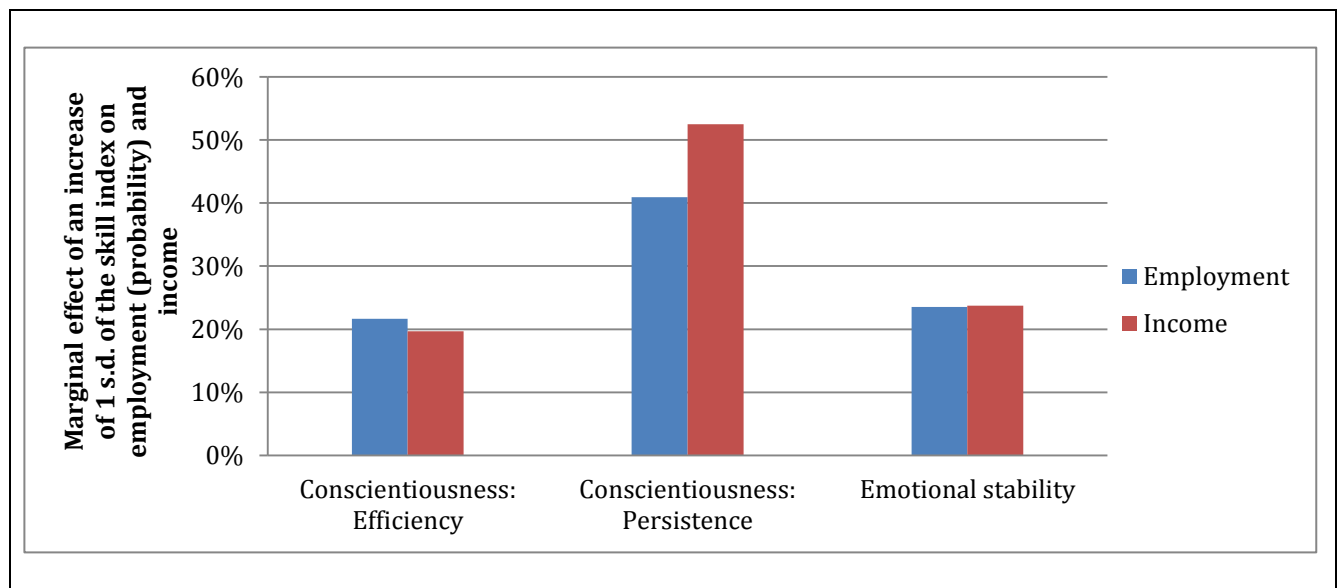
	Managers	Specialists	Blue-collar workers
Technical skills		Professional technical skills	Manual Technical skills
Cognitive skills	Ability to make nonstandard decisions Problem-solving Ability to plan work	Problem-solving	
Non-cognitive skills (behavioral and social skills; personality traits)	Leadership qualities Personal connections	Ability to work independently Ability to cooperate with others Conscientiousness	Ability to work independently Ability to cooperate with others Conscientiousness

40. For specialists, professional skills, the ability to solve problems, and the ability to cooperate with others are important irrespective of whether the firm is innovative or traditional. Neither employers nor individuals cited personal characteristics of workers (gender, age, and physical appearance) as important factors in employment, which is evidence of a certain degree of maturity in the Russian labor market as well as the appreciable competitive pressures on it.

1.3 Skills rewarded by employers

41. The current value of skills in the labor market can be gauged by looking at correlations of skills and income, and the likelihood of being employed. The analysis is restricted to the working-age population (15–64 years of age), as most of the senior population is no longer active. Details on the methodology used can be found in Appendix E. The marginal effects of skills on employment are displayed in Figure 2.6.

Figure 2.6: Marginal effects of some non-cognitive skills on earnings and employment



Note: The figure displays by how much either the probability of being employed or the income increase, when a given skill index increases by one standard deviation. Marginal effects for the listed skills are significant at the 5 percent level. For instance, people whose emotional stability is about one standard deviation higher than average tend to have 24 percent more probability to be employed and tend to earn about 24 percent more than average.

42. *Computer competencies* are self-assessed by respondents. They appear to have a strong positive correlation with both employment and income. People who report a “professional” level of computer skills are far more often employed¹⁴ than those with no computer skills at all, and earn almost 60 percent more than the average employee. It is to be noted, however, that clerks frequently use computers¹⁵ while blue-collar workers do not. Those strong correlations are consistent with the workers’ view that such skills are important assets in getting a job and being successful in one’s career. Although 53 percent of those polled don’t use computers, the gap narrows for younger workers. Only 13 percent of workers under 25 don’t use computers.
43. Knowledge of foreign languages does not appear to help in either finding a job or increasing income. In fact, people who know foreign languages are less likely to be employed, all other things being equal. This finding is consistent with the surveys of employers and workers.¹⁶

¹⁴ The probability of employment is 30 percent higher, other factors being equal.

¹⁵ Clerks use computers about as frequently as the general population.

¹⁶ One explanation of this counterintuitive effect could be that the group of people who declare speaking a foreign language is very heterogeneous. It gathers on one hand well educated people who master English, Chinese or other languages used globally and who are likely to be valued on the labor market but also on the other hand migrants

44. *Conscientiousness (efficiency, persistence, and self-discipline)* and *emotional stability* are shown by the poll to be very important non-cognitive skills on the Russian labor market. Efficient, persevering workers are more likely to work and earn higher incomes, while emotionally stable workers also receive a large premium. A similar finding has been noted in Germany: Male workers who reported themselves as conscientious also tend to earn more.¹⁷ However, the opposite effect was observed for women.
45. Other non-cognitive skills, such as *sociability* or *extroversion*, do not have a significant impact on employment or income. Moreover, all other things being equal, personalities that are more open to new ideas seem to earn less. This may be explained by the very low share of the innovative firms (that do need the corresponding skills) in the Russian economy. This effect has been also witnessed on the German labor market, but only for men. In fact, open-minded German women earn more than might be expected given their other attributes.

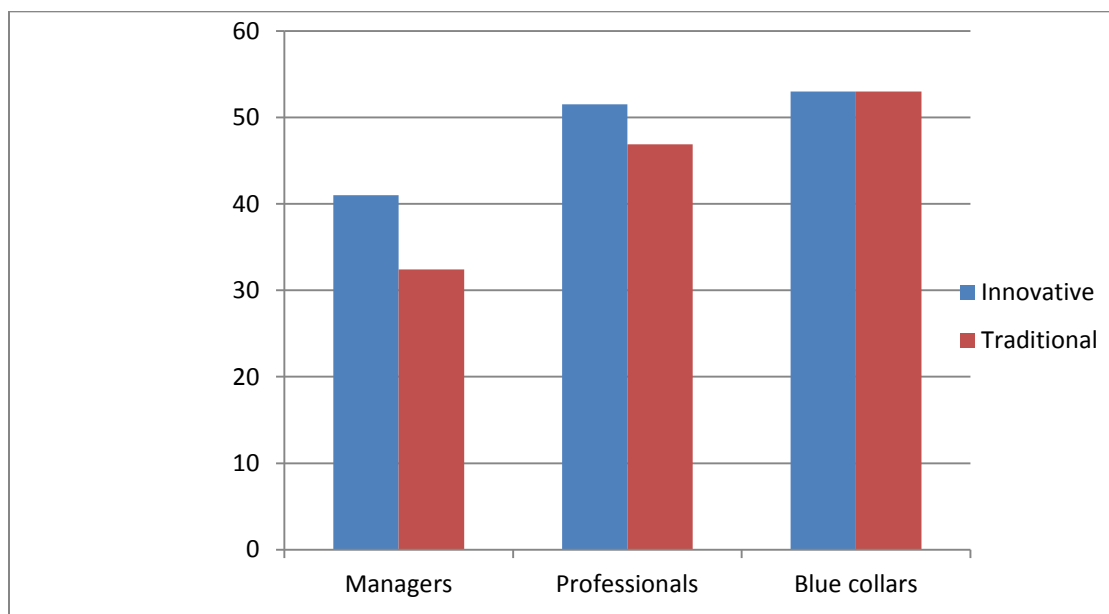
Section 2. The Skills Gap

46. Over all, every third Russian firm reports a shortage of at least one skill in its employees. While the average share may seem quite moderate, it is meaningful that the lack is much greater at innovative companies compared with traditional companies (Figure 2.7), and at companies experiencing strong competitive pressure. It is notable that those skills that are reported as most unavailable are those that employers say they look for most in their hiring. One of the most important skills that is lacking in employees at innovative companies is problem-solving ability. It is in the demand for this skill that the largest differences are observed between innovative and traditional companies. Analysis presented here focuses on the differences between innovative and traditional companies. Findings for firms facing different degrees of competition were not robust.

from CIS countries whose mother tongue is not Russian. This latter group might encounter more difficulties on the labor market, because of some lack of cognitive skills and/or discrimination.

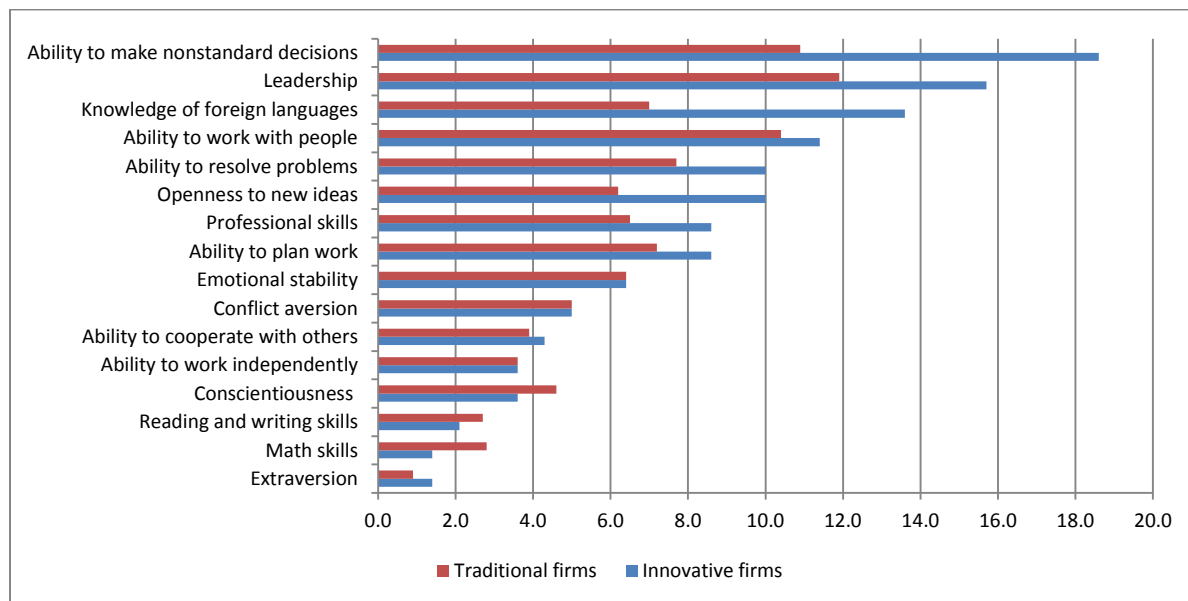
¹⁷ Heineck, G., S. Anger. (2008) "The return on cognitive abilities and personality traits in Germany." *German Socio-Economic Panel Study*, German Institute for Economic Research, Berlin.

Figure 2.7: Skills shortages by type of enterprise, percent of firms reported about skills shortage in at least one skill



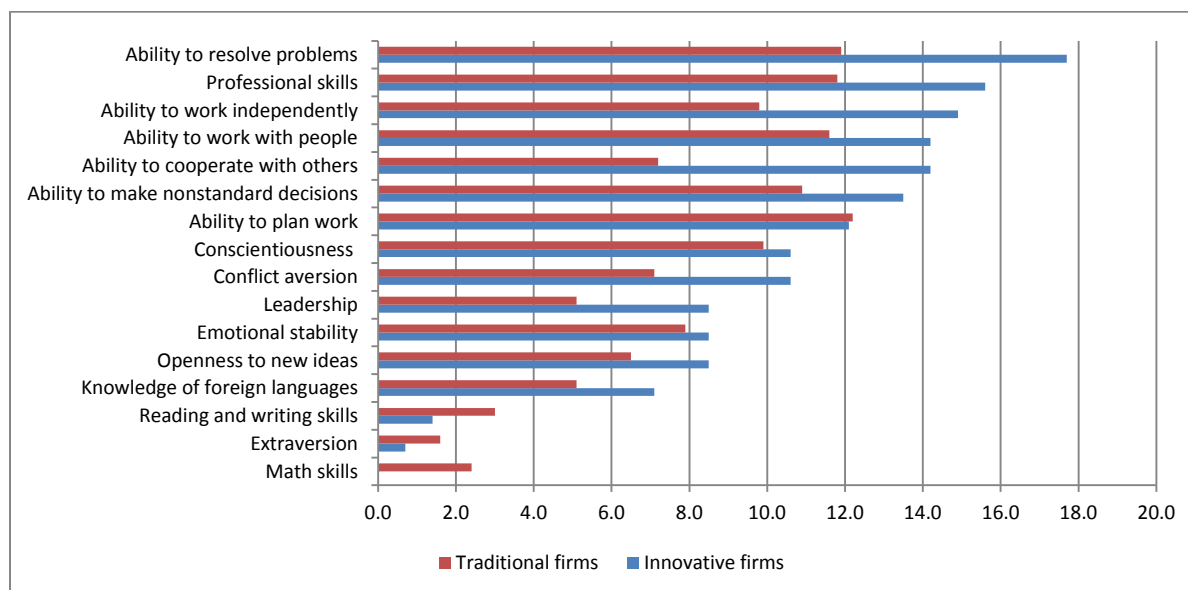
47. Innovative companies on average, are in a better financial position (in terms of profitability) than traditional companies, but still suffer from skill shortages. This suggests that innovative firms, though able to pay prevailing market prices, face a relatively inelastic supply of particular market skills. The shortage of skills faced by innovative companies is especially severe for managers and specialists.
48. The specific skills that innovative firms report as rationed are key cognitive and social skills related to their work and—to a lesser degree—professional skills. *Managers* of innovative enterprises frequently lack decision-making ability, leadership qualities, knowledge of foreign languages, and the ability to work with people. The biggest difference in the type of skills demanded by innovative and traditional companies. Is represented by high order cognitive skills (ability to make nonstandard decisions, openness to new ideas), leadership, and knowledge of foreign language (Figure 2.8).

Figure 2.8: Share of firms reported lack of skills among managers



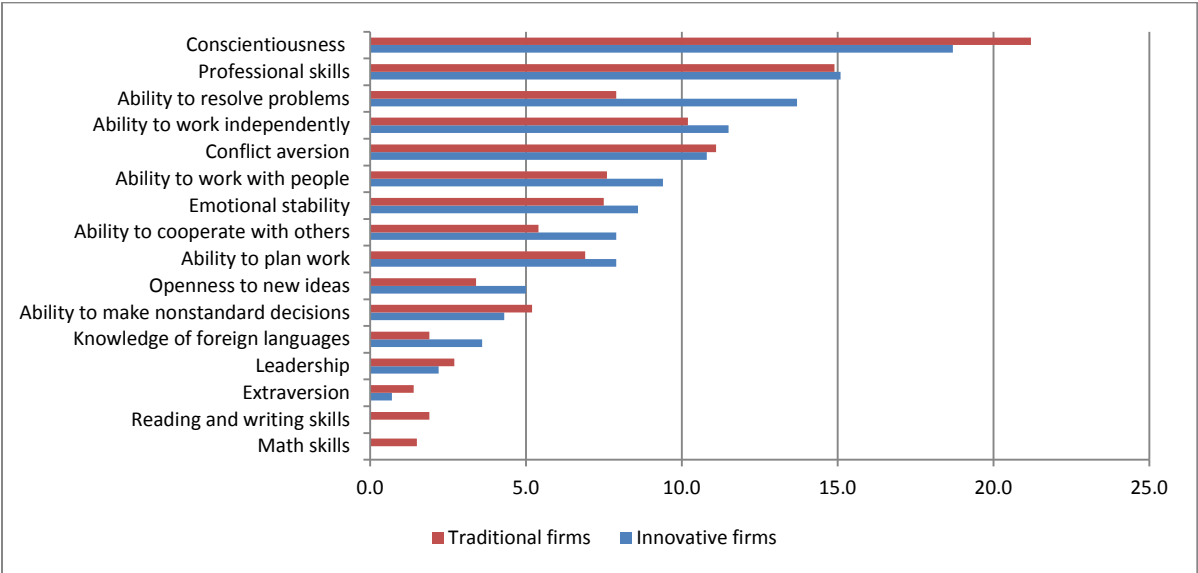
49. *Specialists* often lack decision-making ability, professional skills, the ability to work independently, and to work cooperatively with others. Similar to managers, the biggest difference between innovation and traditional firms is in the demand for high order cognitive (ability to resolve problems, ability to work independently), and social (behavioral) skills (ability to cooperate with others) (Figure 2.9).

Figure 2.9: Share of firms reported lack of skills among specialists



50. *Blue-collar workers* may lack conscientiousness and technical skills (Figure 2.10). The only significant difference in the structure of demand of innovative and traditional firms relates to the ability to resolve problems.

Figure 2.10: Share of firms reported lack of skills among blue-collar workers



51. Table 2.2 summarizes data on the skills that innovative companies lack most.

Table 2.2: Skills innovative companies report most often as missing (by frequency of mention)

Managers	Specialists	Blue-collar workers
Ability to make nonstandard decisions Leadership qualities Knowledge of foreign languages Ability to work with people Openness to new ideas Ability to solve problems	Ability to solve problems Professional skills Ability to work independently Ability to cooperate with others/Ability to work with people Ability to make nonstandard decisions Ability to plan work	Conscientiousness Professional skills Ability to solve problems Ability to work independently Conflict aversion

Note: The table shows only skill shortages mentioned by at least 10 percent of respondents

52. Table 2.3 lists workforce skills for which innovative companies report deficits, but not listed by traditional companies. By inference, these skills are more sought after within innovative firms. Higher-level cognitive skills represent the biggest difference in the type of skills demanded by innovative and traditional companies. Innovative companies report a lack of high-order cognitive skills much more frequently in all categories of workers. For

managers at innovative companies, being able to make nonstandard decisions and speak a foreign language are much more important than for managers at traditional companies. For *specialists*, the ability to solve problems, cooperate with others, and work independently, as well as professional skills were identified. Demand for problem-solving ability in the skill sets for blue-collar workers is required by innovative companies, but not by traditional ones.

Table 2.3: Skill shortages significantly more important to innovative than to traditional companies

Managers	Specialists	Blue-collar workers
Ability to make nonstandard decisions	Ability to solve problems	Ability to solve problems
Knowledge of foreign language	Ability to cooperate with others	
Leadership qualities	Ability to work independently	
Openness to new ideas	Professional skills	
Ability to solve problems		

53. Factor analysis of the data can provide a rich profile of the skill sets of workers sought after by innovative firms. Box 2.2 paints a portrait of these workers as open-minded, creative leaders; specialist-communicators, and creative blue-collar workers who show initiative.

Box 2.2: Profile of managers, specialists, and blue-collar workers demanded in innovative companies

Using the method of principal components, a factor analysis identified correlations between the answers of firms' managers about skills deficits. This exercise created a set of profiles of the missing workers at Russian firms. Different sets of complementary skills were identified in each worker category.

Scarce innovative managers

Type 1: Problem-solving leader. This is a leader with a strong set of social and behavioral skills (ability to work with people, leadership qualities) and high-level cognitive skills (ability to solve problems, ability to make nonstandard decisions).

Type 2: Committed professional. This is a manager with strong professional (technical) skills who has a conscientious attitude toward work and is able to plan it.

Type 3: Creative leader. This is a leader possessing certain personality traits (extroversion, openness, conscientiousness) along with a strong set of high-level cognitive skills (ability to make nonstandard decisions and ability to plan work).

The first two types are in demand at both innovative and traditional companies, while the third is sought only by innovative companies. The substitute for this type at traditional companies is what might be called a "traditional manager," defined as a manager who is capable of working with people and possesses adequate basic skills (math and writing).

Specialists

Type 1: Creative professional: A professional with leadership qualities and a strong set of high-level cognitive skills (ability to make nonstandard decisions, ability to solve problems), who is open to new ideas.

Type 2: Cooperative specialist: A conscientious professional capable of cooperating with others.

Type 3: Specialist-communicator: a professional possessing certain personality traits (emotional stability, conflict aversion, and extroversion).

The first two types are common to innovative and traditional companies, while the third type is typical only at innovative companies. A distinctive feature of traditional companies is their demand for "traditional specialists," i.e., professionals with basic skills (reading and writing).

Blue-collar workers

Type 1: A thinker: A worker possessing a strong set of high-level cognitive skills (ability to solve emerging problems, ability to work independently, and ability to cooperate with others)

Type 2: Conflict-averse conscientious worker: A worker with specific personality traits, such as emotional stability, conflict aversion, and extroversion (innovative companies); conscientiousness, conflict aversion and an ability to plan one's own work (traditional companies)

Type 3: Creative worker with initiative. This is a leader capable of making nonstandard decisions, a characteristic type for innovative companies.

For traditional companies, a distinctive type is what might be called a "traditional laborer," who is capable of working with people and has basic cognitive skills (math and writing).

Section 3. Coping with Skills Shortages: Employers Strategies

54. Both traditional and innovative businesses are taking proactive measures to address the challenge by conducting training programs for their employees. These programs are largely aimed at improving the professional skills of workers. Some companies also offer training in behavioral and social skills, but such programs are rare. Of those enterprises that reported a skills shortage, more than 80 percent of innovative companies and about 70 percent of traditional companies provide training. Moreover, training is provided even by companies that reported no skills shortage. (Table 2.4).
55. Companies looking for managers and specialists first try to find a solution in-house by retraining existing personnel. About 60 percent of employers reported that in filling vacancies for managers and specialists, they rely only or mainly on internal candidates. In other words, these companies are developing internal labor markets. Partially, this is dictated by the strong Employment Protection Law which makes it difficult to fire workers and discourage external hiring. For blue-collar workers, the figures are reversed: about 60 percent of respondents rely on external candidates. In using strategies that target the internal market for managers and specialists and the external market for blue-collar workers, innovative and traditional companies do not differ substantially from each other.
56. The dominance of internal hiring for managers and specialists makes the labor market less fluid and thus makes it more difficult for young workers to get a job. However, innovative companies hire graduates of higher education and secondary vocational education institutions somewhat more frequently than traditional companies, including specialists (41 percent v. 29 percent) and managers (21 percent v. 15 percent). The difference might be explained by the fact that innovative companies constantly seek new talent to preserve their competitiveness.

Table 2.4: Percentage of innovative and traditional enterprises with training programs.

	Innovative companies			Traditional companies		
	Managers	Professionals	Blue-collar workers	Managers	Professionals	Blue-collar workers
Firms which report lack of skills	82.8	86.3	78.7	69.2	72.3	64.0
Firms which report no lack of skills	42.1	55.7	39.1	34.3	48.3	38.9

57. Training strategies differ by employee category. Managers often receive training/retraining through external programs (60 percent both at innovative and traditional companies). In-house training of managers is provided by about half of innovative companies and just over 40 percent of traditional companies. Specialists receive roughly the same amount of external and in-house training at innovative companies (about 60 percent). Traditional companies, however, tend to rely more on in-house training than on external programs (60 percent

versus 53 percent). Blue-collar workers at enterprises of all mainly receive in-house training (60 percent against 30 percent for external programs).

Box 2.3: Strategies of Russian innovative companies in coping with skills shortages

Many innovative and high-tech companies operating in Russia today like United Aircraft Corporation, RUSNANO or Capital Group and others face common problems while attracting new employees from the market and skills mismatch is the key. Major constraints of public tertiary education system often mentioned by the companies are (i) outdated curriculum, (ii) “last century” teaching methods, (iii) lack of practical experience among graduates, and (iv) inadequate expectations from the graduates toward the workplace.

Formal education system in Russia cannot quickly and efficiently respond to the changing and often urgent employers’ demands in skills. In order to cope with the issues many large companies have been developing own programs to address the issue. Three of them summarized below: i) United Aircraft Corporation experience of training employees and improving information exchange with education sector, ii) Capital Group program to develop high-order cognitive and non-cognitive skills, and iii) Rusnano approach to mediating and matching the needs of nano-industry and education system.

United Aircraft Corporation (UAC), an open joint stock high-tech company with a majority stake belonging to the Russian Government. The Corporation invests significantly into improving the skills stock and inflow. UAC provides broad continuous learning opportunities through corporate training programs, for instance it trains managers in the area of development of leadership skills, enhances professional and technical skills of specialists, ensures communication and development of corporate culture, etc. UAC cooperates with vocational schools and universities in Russian regions to share information about skills and qualifications required at the Corporations. Such information is regularly collected analyzed and communicated to particular education institutions but also to the federal Ministry of Education and Science.

Capital Group, one of the leading Russian real estate development companies, which entered Moscow property market in 1993, carries out high-end residential projects, as well as office projects. Real estate development is relatively new sector which currently experiences active growth. For the Group, the main source for improving effectiveness and competitiveness is seen in enhancement of labor productivity. Capital Group pays much attention to attracting best cadres as well as to regular retraining and qualification enhancement of employees. In 2009 the company established corporate educational program (Real Estate Management University - REMI) in partnership with HR executives of the top industry representatives. Two years later, REMI in partnership with Russian Presidential Academy of National Economy and Public Administration established a retraining program “Project Manager in Real Estate and Development” and introduced first professional standard for the real estate and development sector.

RUSNANO is the state company dedicated and empowered to foster the growth of the nanotechnology industry in Russia. Rusnano co-invests in nanotechnology projects with substantial economic potential. Nano-industry is a young branch of economy, and traditionally there was no specialized education and training programs available to prepare workforce for this industry. Nano-manufacturing companies require large number of workers with very specific technical skills which are not sufficiently produced by the higher education system. So, the demand for retraining of existing specialists is high. Rusnano has established a special training Fund and develop specific procedures to link nano-companies with universities in order to develop joint training programs. The Fund co-finances the program development, ensuring that the training needs of a firm is clearly articulated and communicated to partner university and transformed to a relevant training program. It assesses and ensures quality if the program, disseminates the information on the market. Nano-firms co-finances actual

training of its employees and helps the Fund to ensure the quality of the training. Ultimately, this program led to elaborating first occupational standard for nano-industry and establishing the qualifications certification center.

(For detail description of programs see Annex D)

58. Staff training is primarily for technical, job-specific skills. Over 60 percent of the programs for specialists and blue-collar workers aim to improve technical skills. Behavioral and social skills are a much lower priority for training. Thus, the development of communication skills (the ability to work with people) is addressed by fewer than 20 percent of programs for managers and fewer than 30 percent of programs for specialists. An even lower priority is the development of high-level cognitive skills in managers and specialists. Development of problem-solving ability, the skill in which specialists are most deficient, is addressed by fewer than 25 percent of training programs (Table 2.5).

Table 2.5: Skills targeted by training programs (ranked by importance)

Managers	Specialists	Blue-collar workers
Professional skills	Professional skills	Professional skills
Leadership qualities	Ability to cooperate with others	Conscientiousness
Ability to cooperate with others	Ability to solve problems	Ability to work independently
Ability to plan work	Ability to plan work	
Ability to make decisions	Ability to work independently	
Ability to solve problems	Ability to make decisions	

59. Overall, modern human resource management practices are currently underdeveloped in Russia. In spite of the fact that foreign companies have been actively developing the Russian market over the last twenty years, they are still faced with the Soviet-era heritage in human resource management. Historically, Soviet companies treated employees “as a cost rather than as a resource” (Fey et al. 1999:70). The functions of a modern Human Resource Department in the Communist era have been performed by a list of departments (Kamenitser et al, 1961; Sigov 1972; Gurianov and Kostin 1973):

- *Scientific Management of Labor Department* promoted the effective usage of material and human resources as well as the increase of labor productivity by organizing socialist emulations and individual and team work activities.
- *Cadre Department* was responsible for all administrative work concerning hiring, transferring, firing, remuneration, retirement, and communication with external partners such as the local military authorities.
- *Labor and Salary Department* was responsible for, among other things, salaries, social benefits, job descriptions, personnel arrangements, tariffication and labor-output ratio.

- *Training and Development Department* was responsible for pre- and re-training as well as further qualifications; however, most training was just a formality to meet bureaucratic demands for the accreditation of employees (Clarke and Metalina 2000).
 - *Legal Department* was required to verify all actions in order to ascertain whether or not they complied with the Soviet Labor Law.
60. Empirical studies (Fey et al. 1999) show that it is a difficult task to develop a good Human Resource (HR) system even in a foreign company that starts operating in Russia. It usually takes at least two years to implement even a basic HR management system.

Conclusion

61. The development of social (communication), behavioral and high-level cognitive skills (such as the ability to solve problems or make non-standard decisions) is a major challenge for the Russian economy. One third of Russian firms report unsatisfied demand for at least one workplace skill. This problem is particularly severe for innovative companies, which report a larger gap in all types of skill sets than traditional companies. This gap cannot be bridged simply by raising salaries, because the skills they need differ in nature from those available in the labor force. Combinations of skills sought by innovative companies: open-minded, creative leaders; specialist-communicators, and creative blue-collar workers who show initiative are difficult to find on the market. To address skills shortages, Russian companies (and in particular, innovative firms,) heavily use both in-house and external training programs but most of them are traditionally focused on developing technical (job-specific) rather than high order cognitive or behavioral skills. Employers recognize the importance of building social skills and high-level cognitive skills but have yet to learn how to teach them. As a result, the development of these latter skills remains a crucial outstanding issue, requiring more attention from policy makers for education and employment.
62. The next chapter will examine the ability of Russia education system to produce skills demanded by Russian companies. It will analyze the stock and distribution of these skills among Russia population, and examine outcomes and limitations of the skills development system at various educational levels.

Chapter 3: Skills Supply

Introduction

This chapter summarizes evidence on the supply of cognitive, non-cognitive, technical and professional skills, as well as social and behavioral skills in the Russian labor force, based on the findings of two joint World Bank–HSE surveys on adults and students conducted in 2012. Additional evidence on cognitive skills is drawn from the latest PIRLS, TIMSS and OECD PISA surveys,¹⁸ which are international standardized assessments of reading skills at the primary and secondary school levels. The chapter examines the distribution of skills among Russia’s school-age and adult population, and how those skills are formed. Considerable variation in skills is found both geographically and between working adults and the non-working population.

The development of cognitive skills is adequate at school’s primary levels, but secondary education in Russia is less capable of developing high-order cognitive skills. Adult women suffer from gaps in math and computer skills that are barriers to accessing scientific and research-oriented careers. The Russian population also suffer from critical gaps in non-cognitive skills such as openness to new ideas and emotional stability, skills which appear to be strong prerequisites for Russia’s labor market. Large geographic disparities in the distribution of both cognitive and non-cognitive skills exist across the territory and 80 percent of migrants entering Russia are from countries with a lower level of cognitive skills. Workers value high-order cognitive skills and non-cognitive skills and regret their lack of technical skills but their assessment of skills in high demand is not completely consistent with the current economy. The unemployed and the inactive have a high attainment of formal education, an asset when it comes to improving their skills through adult education programs.

Introductory comments: methodology used to study skills supply among university students and adults

63. Despite a high level of formal education in Russia by international standards, Russian firms report difficulty in hiring workers with adequate skill sets, particularly high-order cognitive skills such as problem solving and time planning, and social and behavioral skills. This apparent paradox suggests that skills provided by the educational systems may be insufficient or inconsistent with labor market demands.

¹⁸ Progress in International Reading Literacy Study and Trends in International Mathematics and Science Study, 2011, Lynch School of Education at Boston College, <http://timss.bc.edu/>; OECD Programme for International Student Assessment 2011, Organization for Economic Co-operation and Development, http://www.pisa.oecd.org/pages/0,2987,en_32252351_32235731_1_1_1_1_1,00.html.

64. A 2012 household survey provides some light on this issue. The survey studied 1,500 individuals aged 18 or older living in 95 localities (35 rural and 60 urban) in 40 regions. The household survey collected data on actual usage of skills in the workplace and everyday life, as well as evidence on skills supply levels in the employed, unemployed and non-employed populations. Inter alia, the data made it possible to calculate the return on skills and distribution of earnings among populations with different levels of skills.
65. A student survey was conducted in the ten regions of Russia with the greatest number of higher education institutions. The target population was 2,000 students of higher education institutions of Russia, including 1,000 students in the first year of study and 1,000 students in their final year of study (which would be the fourth year for those in bachelor's degree programs and the fifth year for those in specialist degree programs). Student survey data measured the skills provided by secondary and higher education systems, as well as the evolution of skills from school through higher education to the labor market. As most of the information on skill supplies is based on self-reported data, the results presented in this chapter come with caveats. A detailed description of the methodology of the surveys is presented in Appendixes A and E.

Section 1. Overview of Education Sector in Russia

66. *Organization of education system.* Education in Russia is provided predominantly by the state and is regulated by the Ministry of Education and Science. Subnational (regional and municipal) authorities manage and finance general and vocational education while federal ministry is in charge for public universities.
67. At the pre-primary level, children are admitted into the school system from the ages of 1 to 6. Compulsory education starts at the age of 6 (6 years and 6 month according to Russian legislation) and generally corresponds to entry into primary school. Beginning from September 1, 2007 compulsory full-time education lasts for eleven years and continues up to the age of 17. The general education school system of Russia consists of nine years of basic general education (primary and lower secondary education) and two years of upper secondary education, which leads to the certification of complete secondary education. Basic general education is almost always provided in single-structure schools without a transition between primary and lower secondary levels, up to the age of 15. The end of basic general education coincides with the transition between lower and upper secondary education.
68. There are two main options in upper-secondary education: the general education option, which mainly prepares the pupils for higher education, and the vocational option, which prepares pupils both for working life and for higher education. These different options are organized into separate programs and institutions, and the students have to opt for one or the

other. There are no dead-end tracks in the system and a vocational school graduate can enroll to a higher education institution.

69. *Financing.* Russian public spending to education system is approximately 4.1 percent of GDP or 11.2 percent of its total public spending. OECD countries, on average, spend around 5.1 percent of their GDP on educational institutions. However, total public expenditure on education ranges from above 6 percent of GDP in the Ireland, New Zealand and Nordic countries to less around 4 percent in Chile, Japan and the Slovak Republic. The largest share of spending goes to primary and secondary levels.
70. Total expenditures on education from public and private sources in Russia was equal to 5.5 percent in 2009 (in OECD – 6.2 percent). By international comparison Russia spends on education the same share of GDP as countries with similar economic development (expenditures include private investments in education).
71. *Preschool education.* Attendance at a preschool establishment is optional in Russia; parents are free to enroll their child if they wish. However, in contrary the state is obliged to provide parents with the services if they are requested. High demand in preschool services generates inequalities in this area – coverage by preschool services varies from 9 percent to 86 percent among Russian regions. Average coverage of preschool educational institutions of children at the age of 1-7 in the Russian Federation was 52 percent in 2000. The situation has insignificantly improved in recent years: in 2010 59.4 percent of preschool age children were covered by services in pre-school educational institutions.
72. *Primary and secondary education.* Since 1997 Russia has faced a steep demographic fall in the compulsory-school-age population. The gross coverage ratio for the secondary level of education in the Russian Federation is largely in line with the figures for developed countries and shows a high level of participation of relevant age-cohorts.
73. The student to teaching staff ratio in the Russian Federation is 17.0 for primary education and 8.8 for secondary level. For OECD countries average student/teacher ratios are 15.8 for primary and 13.8 for secondary education (Education at a Glance 2012, OECD). Compared to the OECD averages, there is an excess of teachers at the secondary level, which translates into inefficient use of resources.
74. In Russian Federation, more than 75 percent of funds allocated to education are raised and spent at regional level. Primary and secondary education is totally financed from regional budgets (99 percent in 2010). Russian regions spend annually on average 62 thousand RUR (USD 2,033) on general school student, though the number across regions varies about 12-fold in actual spending (2010).
75. By international comparison Russia spends less than most of European countries. In primary education OECD average is USD 7,719 per student and in secondary USD 9,312 per student (EU21 average is USD 7,762 and USD 9,512, respectively). However, according to its

economic development Russian expenditures on secondary education lay in line with other countries.

76. *Professional and vocational education and training.* In 2000–2009 coverage ratio in vocational education decreased by 38.3 percent for initial vocational schools and by 9.3 percent for secondary vocational schools (down to 20 percent and 32 percent respectively)¹⁹ mostly due to decrease of the number of entrants. Facing the problem of the decline in the corresponding age population, state authorities intended to restructure the present network of state VET institutions. The number of IVET institutions has changed dramatically decreasing by almost $\frac{1}{3}$ in 2000–2009.
77. Student-teacher ratio in both sectors has not changed significantly. Internationally, Russia is close to the European estimates of student-teaching staff ratio in vocational education: in initial vocational education OECD average is 15.8, EU21 average – 14.4²⁰ (in Russia—12.7); in secondary vocational education OECD average—16.4, EU21 average—12.9²¹ (in Russia – 15.8).
78. The proportion of GDP per capita earmarked for vocational education (both initial and secondary VET) increased from 14.4 percent in 2003 to almost 20 percent in 2009. However, the share of public expenditure on vocational education in total public expenditure on education has dropped during that period. At relatively stable public spending on education represented by share in total public spending, per student investments on state higher education institutions (as a share of GDP per capita) has increased by almost 13.2 percent point. Higher education became a higher priority in the area of education financing – share of spending on higher education in total public spending on education increased by 6.6 percent in 5 years.
79. *Higher education.* In 2003 Russia signed the Bologna Declaration, which launched the process of migrating from Russian traditional tertiary education model to a modern degree structure in line with Bologna Process model. In October 2007 in Russia a law was enacted that replaced the traditional five-year model of education with a two-tiered approach: a four-year bachelor degree followed by a two-year master's degree. In 2010 the admission to the traditional five-year programs was stopped. So in 2014 in Russia there should be no five-year programs students excluding just a few specializations.
80. The number of students pursuing higher education in the Russian Federation has significantly increased over the past 18 years, growing 2.5 times from 2.8 million in 1990 to 7.1 million in 2010. Gross coverage by higher education doubled over this period significantly due to the growth of the number of students studying on commercial places. Beginning from 2000 number of students applying to fee-based services at educational

¹⁹ Rosstat.

²⁰ Postsecondary non-tertiary education.

²¹ OECD. Education at a glance 2012: OECD Indicators. Paris: OECD.

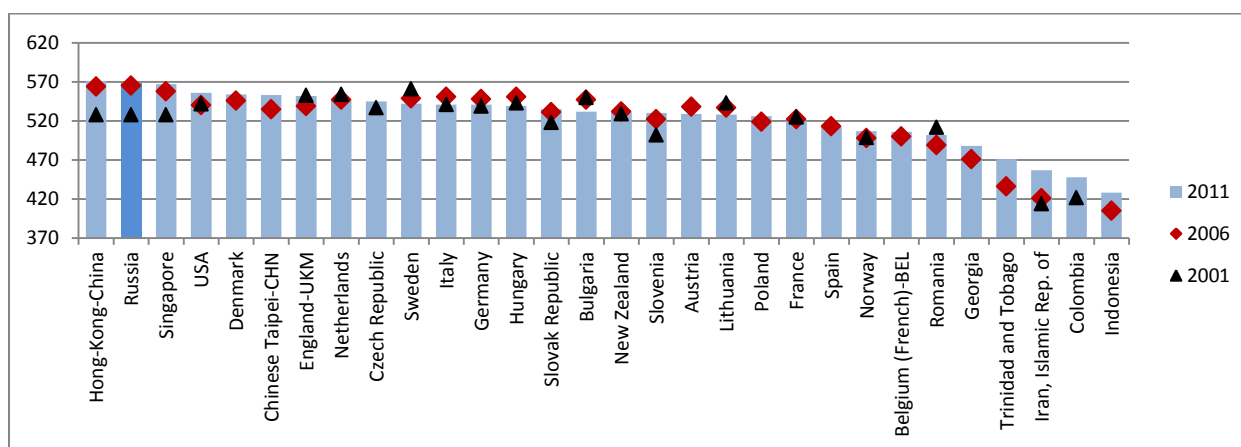
institutions has been exceeding number of students applying to state funded places. This is quite alarming as training in universities on fee-based basis has been providing mostly in areas that are popular among students (economics, management, law), but already in low demand by employers due overproduction of such specialists in previous years.

81. The network of higher education institutions has experienced significant growth. The number of HEIs has increased by more than 15 percent in 2000-2010 significantly because of increase in the number of non-state higher education institutions – by 29 percent (against 8 percent growth in the number of state HEIs).
82. Higher education has hierarchical management system that includes 3 levels: federal, regional, and municipal. In addition to existent network of higher education institutions there is widely spread network of institution branches in the regions of Russia: in 2008/2009 academic year there were 1,663 branches of higher education institutions including 1,102 branches of public HEIs, and 561 of private. That means that one higher education institution on average have 1.5 branches (1.7 in public sector of higher education system, and 1.2 in private).
83. State HEIs are mostly financed from the federal budget with only 3.5 percent of total funding in 2010 coming from regional budgets. Looking outside the Russian border OECD countries as a whole spend USD 13,728 annually per tertiary student (Education at a Glance 2012, OECD). On average, OECD countries spend nearly twice as much per student at the tertiary level as at the primary level. Russia also spends, on average, two times more on educational institutions per student at the tertiary level than at the primary level.
84. In December 2012, a new Law “On Education” was signed. The law that enters into force on September 1, 2013 brings a range of positive changes into Russian education system organization and functioning. First of all, the new Law removes level of initial VET (IVET) from Russian education system; however, IVET programs will still be implemented in secondary VET schools (e.g., colleges). Second, it furthers the opportunities for the private entities including enterprises to participate in the system governance and provide training services. The law expands opportunities for adult learning, and supports introduction of private-public partnership models in the area of training programs development, quality assurance and management.
85. Ministry of Education and Science of the Russian Federation is currently preparing a *Strategy for Workforce Development* based on best international experience and analysis of experience of Russian regions in development of TVET systems. It is expected that the Strategy will allow the Ministry to orchestrate interactions across institutions and stakeholders and establish a platform for collaboration between private and public sectors. The Strategy shall be a basis establishing effective mechanisms to incentivize interactions across stakeholders.

Section 2. Skills Development at School

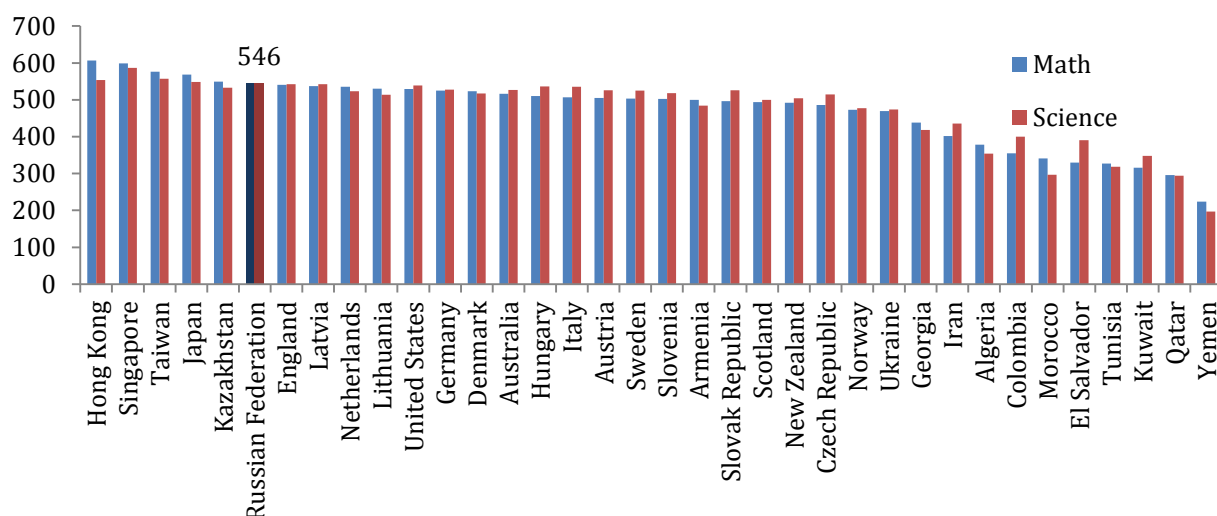
86. Primary schools are effective at developing basic cognitive skills, as shown by results in international assessments in reading, math and science at the primary level. In 2006 the Russian Federation was ranked as the top global performer in reading achievement according to the PIRLS survey, and second in PIRLS 2011, which measures educational quality in primary schools. Moreover, the quality of primary education has improved sharply in recent years, as shown by the progress achieved in PIRLS results since 2001 (see Figure 3.1 below)

Figure 3.1: PIRLS average score, 2006



87. TIMSS surveys are curriculum-based and measure achievement in math and science in fourth and eighth grades. Russia has also done very well in math and science at the primary level, as witnessed by very high TIMSS results for fourth-grade students. Russia's average scores were about 545 in math and science, well above the TIMSS average of 500 (see Figure 3.2).

Figure 3.2: Average score in TIMSS math and science in 4th grade, 2006



88. In contrast, at the level of secondary education, the development of cognitive and high-order cognitive skills in Russian schools is somewhat limited. The PISA surveys, international standardized tests in reading, math and science for 15-year-olds, measure the quality of secondary education. As shown by follow-up studies in Canada, they are also good predictors of the future educational levels of adults and of their level of high-order cognitive skills. Educational quality is higher in Russia than in other countries of similar per capita GDP, as measured by PISA (see Figure 3.3). However, quality remains significantly below the OECD average. In addition, Russia has not improved in reading and math since 2000.

Box 3.1: Description of international assessments

Program for International Student Assessment (PISA) is an international assessment that measures 15-year-old students' reading, mathematics, and science literacy. PISA also includes measures of general or cross-curricular competencies, such as problem solving. PISA emphasizes functional skills that students have acquired as they near the end of compulsory schooling.

PISA is coordinated by the Organization for Economic Cooperation and Development (OECD), an intergovernmental organization of industrialized countries. PISA was first administered in 2000 and is conducted every three years. The most recent assessment was in 2012.

PISA 2012 focuses on mathematics literacy and also assesses reading and science literacy. PISA 2012 also includes computer-based assessments in mathematics literacy, reading literacy, and general problem solving, and an assessment of students' financial literacy. PISA 2012 results will be released on December 3, 2013.

Source: www.oecd.org/pisa/

Trends in International Mathematics and Science Study (TIMSS) is an international assessment of student achievement dedicated to improving teaching and learning in mathematics and science. TIMSS is coordinated by the International Association for the Evaluation of Educational Achievement (IEA), an independent, international

cooperative of national research institutions and governmental research agencies. First conducted in 1995, TIMSS reports every four years on the achievement of fourth and eighth grade students. The most recent assessment was in 2011. A number of countries participating in TIMSS 2011 will have trend data across assessments from 1995 to 2011.

A globally cooperative enterprise, TIMSS conducts comprehensive state-of-the-art assessments of student achievement supported with extensive data about country, school, and classroom learning environments. Fifty countries participated in TIMSS 2007, and more than 60 are expected to take part in TIMSS 2011. There is enormous diversity among the TIMSS countries—in terms of economic development, geographical location, and population size. Fundamental to IEA’s vision is the notion that the diversity of educational philosophies, models, and approaches that characterize the world’s education systems constitute a natural laboratory in which each country can learn from the experiences of others. TIMSS participants share the conviction that comparing education systems in terms of their organization, curricula, and instructional practices in relation to their corresponding student achievement provides information crucial for effective education policy-making.

Source: timss.bc.edu/

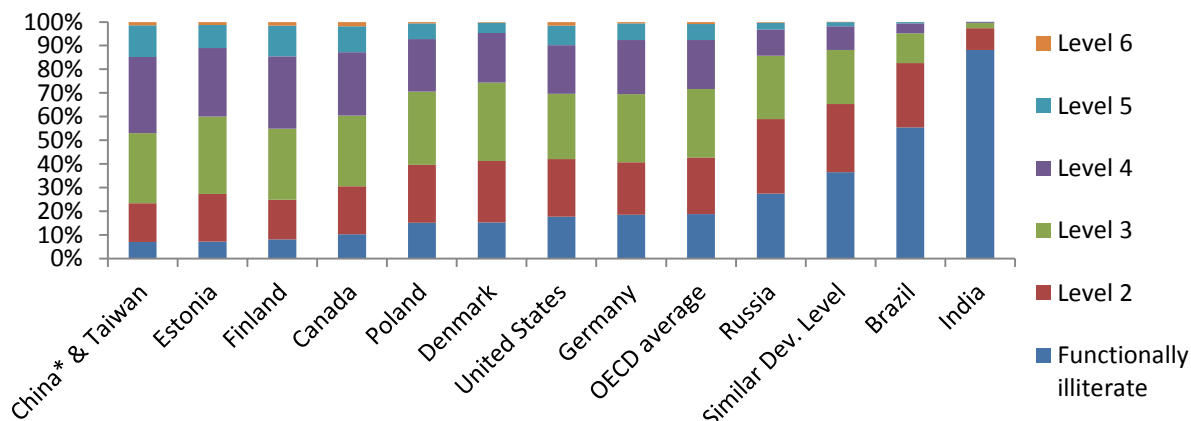
The Progress in International Reading Literacy Study (PIRLS) is an international comparative study of the reading literacy of young students. PIRLS studies the reading achievement and reading behaviors and attitudes of 4th-grade students in the United States and students in the equivalent of 4th grade in other participating countries.

The first administration of PIRLS was in 2001, and included 36 education systems (including countries and subnational entities, such as Canadian provinces and Hong Kong, a Special Administrative Region of the People’s Republic of China). It was followed five years later by the second administration in 2006 to students in 45 education systems. The third and latest administration of PIRLS was in 2011, with 53 education systems participating at grade 4. PIRLS is coordinated by the International Association for the Evaluation of Educational Achievement (IEA).

Source: <http://nces.ed.gov/surveys/pirls/>

89. Russia’s proficiency levels (and associated cognitive skills) are far below levels in the most innovative economies, according to the PISA survey. For instance, 27 percent of 15 year olds are functionally illiterate in Russia, versus 19 percent in the average OECD country and fewer than 10 percent in the so-called “Asian tiger” nations (see Figure 3.3). Moreover, Russia’s share of top-performing students is small. Only 3.1 percent of 15 years-olds reached proficiency levels five and six in reading, well below the OECD average of 7.6 percent. The situation is similar in math and science, where Russia’s top students represent only 3.0 percent and 3.6 percent, respectively, of high scores, compared to 7.2 percent and 9 percent in the average OECD country. Problem-solving ability was measured directly in PISA 2003, and Russia’s results were closer to those of advanced countries. Although it was slightly below the OECD average, Russia’s score was similar to Spain’s and that of the United States.

Figure 3.3: Distribution of 15 year-olds by reading proficiency level in PISA 2009

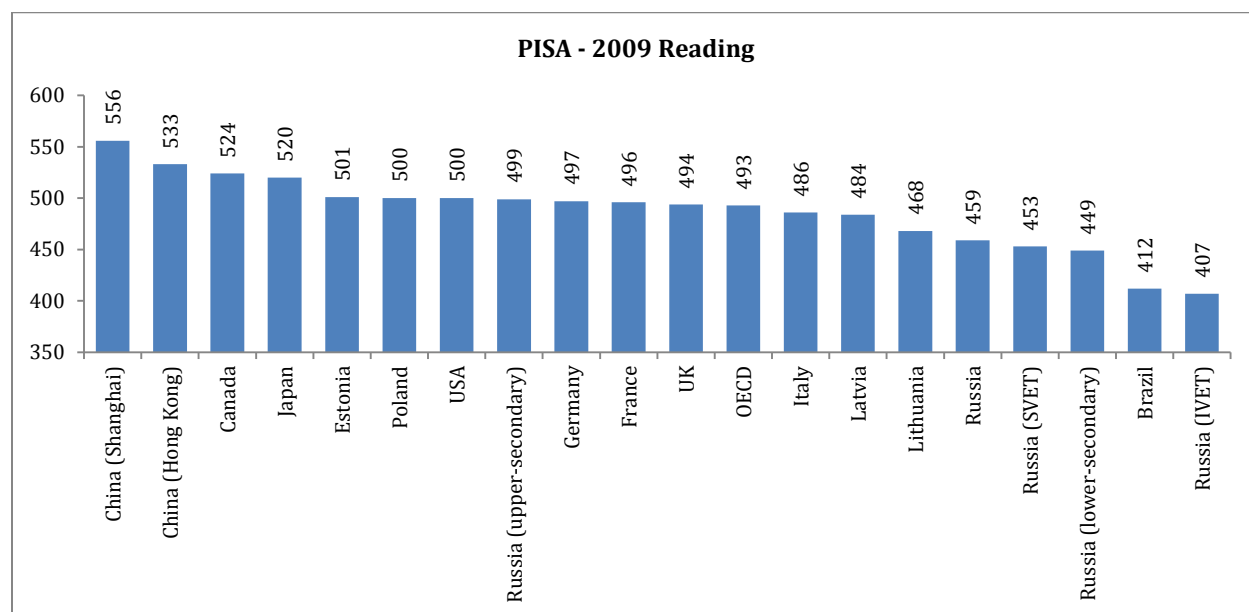


* Simple average of results in Shanghai, Macao, Hong Kong and Taiwan.

Note: The group of countries with a similar level of economic development is based on PPP per capita GDP in 2009 and includes Latvia, Lithuania, Mexico, Panama, Chile and Uruguay.

90. In addition, Russian students of vocational schools (especially enrolled to initial vocational education programs) performed much lower in PISA 2009 reading test than peers from upper-secondary schools in Russia and in selected OECD and BRICS countries (Figure 3.4). To a large extent, this disparity can be attributed to negative selection of the TVET sector which often attracts low performing students after completion of basic secondary education. As a result, the stock of basic and higher order cognitive skills is low at the vocational education cycle, which ultimately affects the ability of education system to further develop both technical job specific and broader professional skills of the students.

Figure 3.4: Distribution of average PISA 2009 Reading scores in Russia by type of educational institution, in BRICS countries and G8 members



Source: Ministry of Education and Science of the Russian Federation // http://sch1361.3dn.ru/Novosti/PISA_2012/pisa-2009_kratkierzultaty.pdf

Note: Data for Russia is not representative by levels of education

91. By the evidence from TIMSS, Russia's academic standards are being maintained in areas of traditional strength such as math and science. Indeed, Russia remains among the best performers in TIMSS, lying on the right of the horizontal axis of the Figures 3.5A and 3.5B. But Russian students are less able (relative to their OECD counterparts) to use their knowledge and skills in order to meet real-life challenges, as measured by PISA scores on the vertical axis of Figures 3.5A and 3.5B. Indeed, Russia appears below the regression line between PISA (which is competency based) and TIMSS (which is curriculum based) scores in both Math and Science. This means that acquisition of competencies measured by PISA is more limited than it should be, given the TIMSS results. This suggests that the Russian educational system may be overly focused on acquiring knowledge while not doing enough to develop high-order cognitive skills such as problem-solving, which is one of the most highly demanded skills in the labor market. Such problem is acute as Russia is in fact the lowest PISA performers, both in math and science, among the group of countries which performed above average in TIMSS²². On a positive side, Russia is doing strong in TIMSS improving the results during last three rounds of the assessment (see Figure 3.6).

²² Average performance in TIMSS is set to be 500 points.

Figure 3.5A: Average TIMSS (2007, 8th grade) scores vs. PISA (2009) scores in math

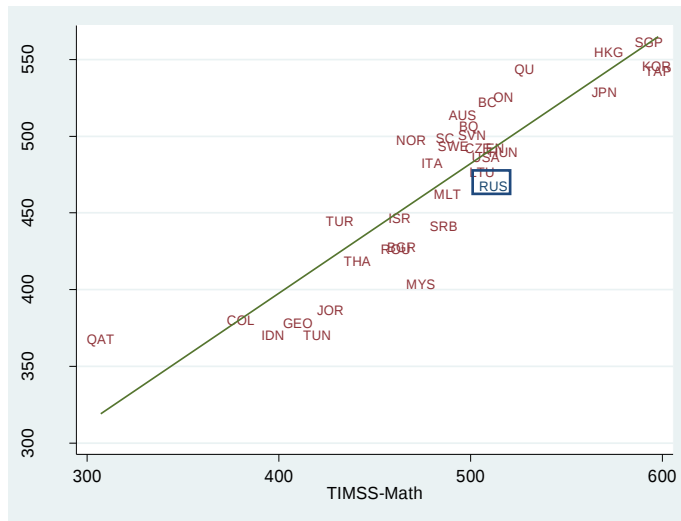
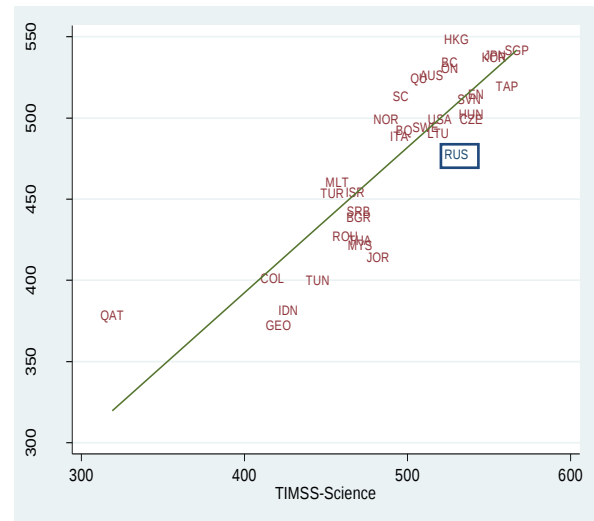


Figure 3.5B: Average TIMSS (2007, 8th grade) scores vs. PISA (2009) scores in science



92. Recent improvements in education quality measured by either PIRLS or TIMSS, especially at the primary level can be partially attributed to economic growth which tends to improve the socioeconomic determinants of education performance.²³ Specific reasons have also played a role in the case of Russia such as the addition of a fourth year of schooling in primary school leaving more time to students to master reading and the provision of new textbooks.²⁴
93. Russian students also put more emphasis on memorization and less on cooperative learning than do OECD students on average. This differences put forward a challenge to support a shift in learning strategies and outcomes from those which generate old skills (rote learning, use of invariant sources, working alone, routine and unchanging modes of operation) to those which generate new skills (problem-solving, critical use of diverse sources, collaboration and teamwork, flexible and self-correcting modes of operation).
94. Such a shift in teaching and learning strategies can be expected to have a positive impact on labor-market performance. International evidence²⁵ suggests that people with these skills (broadly corresponding to the 'literacy' skills tested by PISA) are more likely to get highly skilled jobs regardless of the level of their education.
95. Improving the relevance of secondary education is therefore a strong prerequisite for building a flourishing innovation-based economy in Russia. Such an objective project will

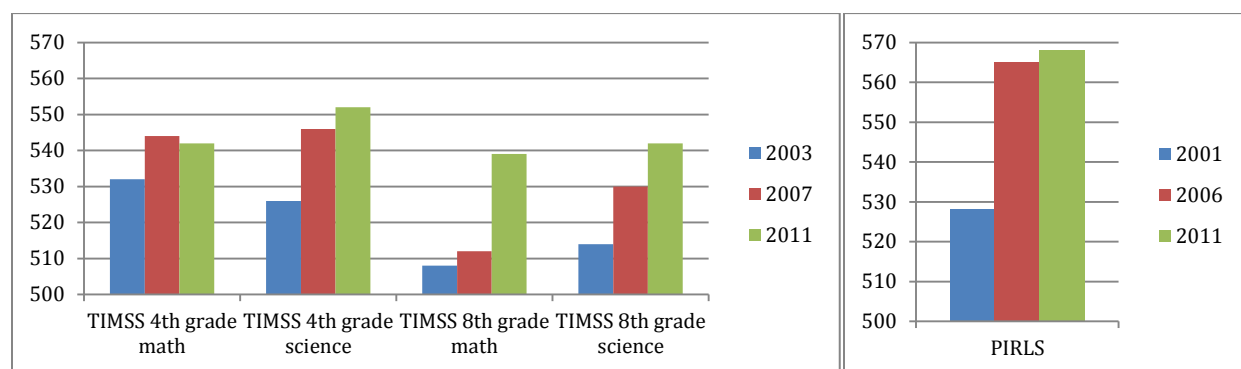
²³ Economic growth has positive effects on children standards of living which translate into better and more educational and cultural goods (such as books, desks...) but also better nutrition and health.

²⁴ See G. A. Zuckerman, G. S. Kovaleva, M. I. Kuznetsova (2011) Victory in PIRLS and defeat in PISA: the future of reading literacy of 10–15-year-olds, Journal of Educational Studies №2, 2011, Higher School of Economics, Moscow.

²⁵ See Lee and Newhouse (2012).

require in particular (i) the promotion of best pedagogical practices and; (ii) curricula revisions to focus on teaching skills acquisition over knowledge content.

Figure 3.6: Change in TIMSS and PIRLS average score 2001–2011



Source: The International Association for the Evaluation of Educational Achievement (IEA) TIMSS and PIRLS

Section 3. Skills Development at the University Level

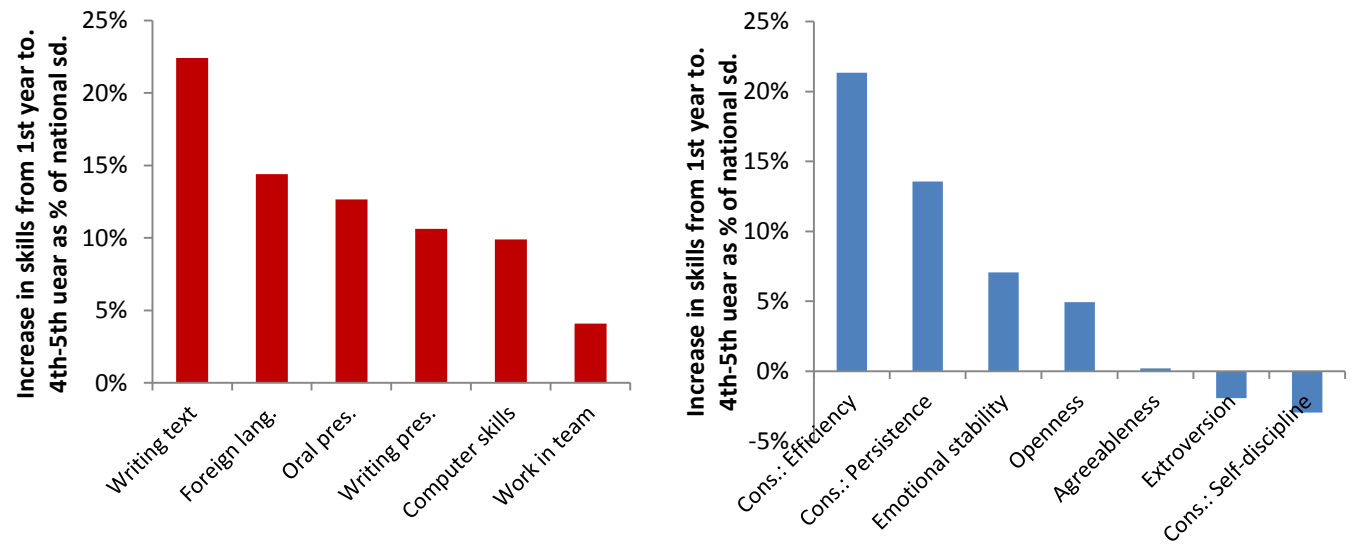
3.1 Skill-building is insufficient

96. Although a direct measurement of cognitive, social and behavioral skills is currently unavailable in Russian universities,²⁶ evidence suggests that students are not trained adequately in the specific skills that are in high demand in the labor market.
97. Some students' cognitive, social and behavioral skills improve substantially during their studies (see Figure 3.7). Indeed, students in their fourth or fifth year of study are more skilled than freshmen. However, universities focus on developing basic cognitive skills rather than the high-order cognitive, social and behavioral skills that are critical for employers. Thus, seniors have become more comfortable writing long texts, preparing presentations and oral speeches, and delivering them in front of an audience. Older students also report better computer and foreign languages skills. However, gains are limited or even negative for highly demanded skills such as: (i) The ability to work in teams; (ii) The ability to manage time (as approximated by self-discipline scores)²⁷; (iii) Leadership, which can be captured to some extent by extroversion scores, and (iv) Openness to new ideas, which is linked to decision-making and innovation.

²⁶ Russia will participate in the AHELO (OECD) feasibility study in 2013 that should assess the competencies of Russian students in economics.

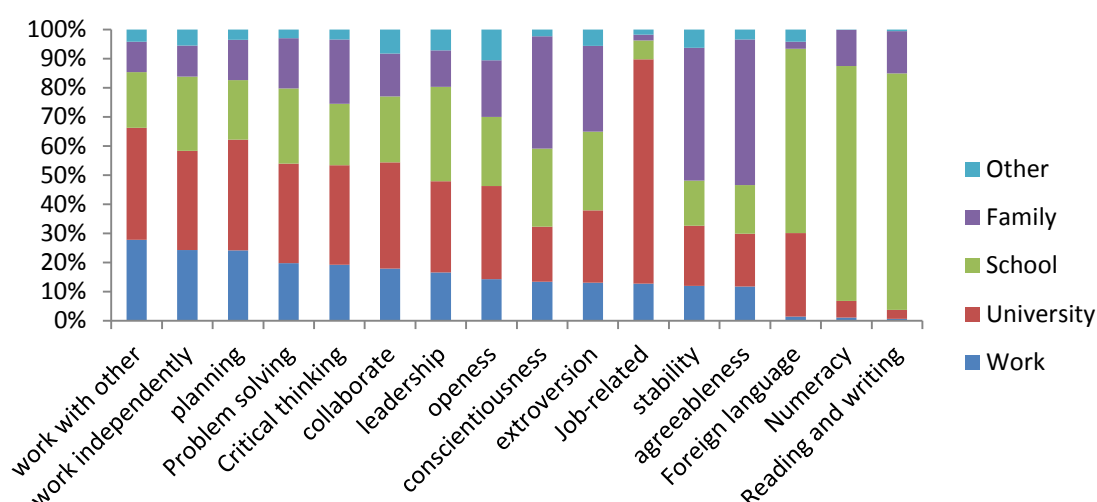
²⁷ See Appendix D for details.

Figure 3.7: Change in cognitive, social and behavioral skills among students from first to fourth/fifth year of study.



98. Job experience appears to be an important source of skills development, especially social and behavioral. Students who hold jobs during their university years often acknowledge that they learned both high order cognitive and non-cognitive skills on the job (see Figure 3.8). It is striking that the most highly-demanded skills, such as problem-solving, critical thinking, working in teams and independently, and time planning, are specifically those that are more often acquired directly on the job rather than at the university. Meanwhile, numeracy and literacy were acquired almost entirely at school.

Figure 3.8: Where students who worked during their studies acquired skills



Source: Students skills survey

99. Students' views on how well universities prepared them for the labor market show challenges ahead. Initially, students expect universities to develop their technical skills and equip them for a smooth transition to jobs. Later in their university lives, however, 27 percent of students deem their education will be insufficient for them to obtain a good job. Even more of a concern is that 29 percent of students do not know what they will do at the end of their studies, while seven percent plan to continue their education. These findings indicate that the integration between university and the labor market is very poor.
100. The quality of Russian universities remains weak by international comparison. Research output by Russian universities rates poorly compared to other nations. The Shanghai ranking²⁸ places only two Russian universities among the 400 best worldwide: Moscow State University (No. 232) and Saint Petersburg State University (ranked between 301 and 400). Note that the Shanghai ranking emphasizes research output. For historical reasons, research has been divided between science academies and universities in Russia. This dichotomy might play a role in the limited access of university graduates to the innovative sector.
101. With the Shanghai ranking sometimes criticized as too subjective, other rankings with different methodologies have been developed. For instance, World University²⁹ derives its ranking of higher education institutions from a quantitative analysis of Internet links associated with those institutions. According to this system, Moscow State University ranks

²⁸ The Shanghai ranking is the most famous ranking of worldwide universities, published by the Shanghai Jiaotong University on a yearly basis since 2003. It is based on a formula taking into account Nobel prizes, Fields medal laureates, top researchers and citations in famous scientific journals.

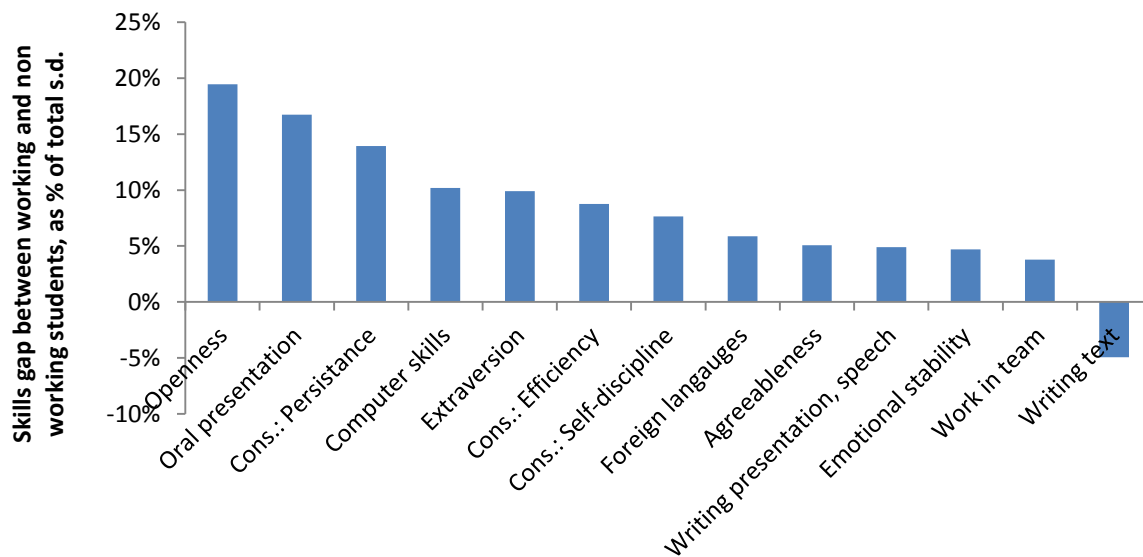
²⁹ This methodology has been developed by the Cybermetrics Lab, part of the National Research Council of Spain.
<http://www.webometrics.info>.

147 and Tomsk State University ranks 465. These rankings confirm the limited international visibility of Russian universities.

3.2 Challenges for skills development at universities

102. Survey data shows that the gains in skills provided by work experience are positive and large, no matter the level of study (see Figure 3.9). The benefits of working while studying appear to be higher the earlier they occur in a student's course of study. Working students acknowledge that they have more difficulty writing long papers and that they acquire foreign languages more slowly. However, working during the years at university provides a net positive gain in all the other skills monitored by the survey. The beneficial effects of paid work for students indicate that skills development at university could be fostered by better integrating curricula with the labor market.

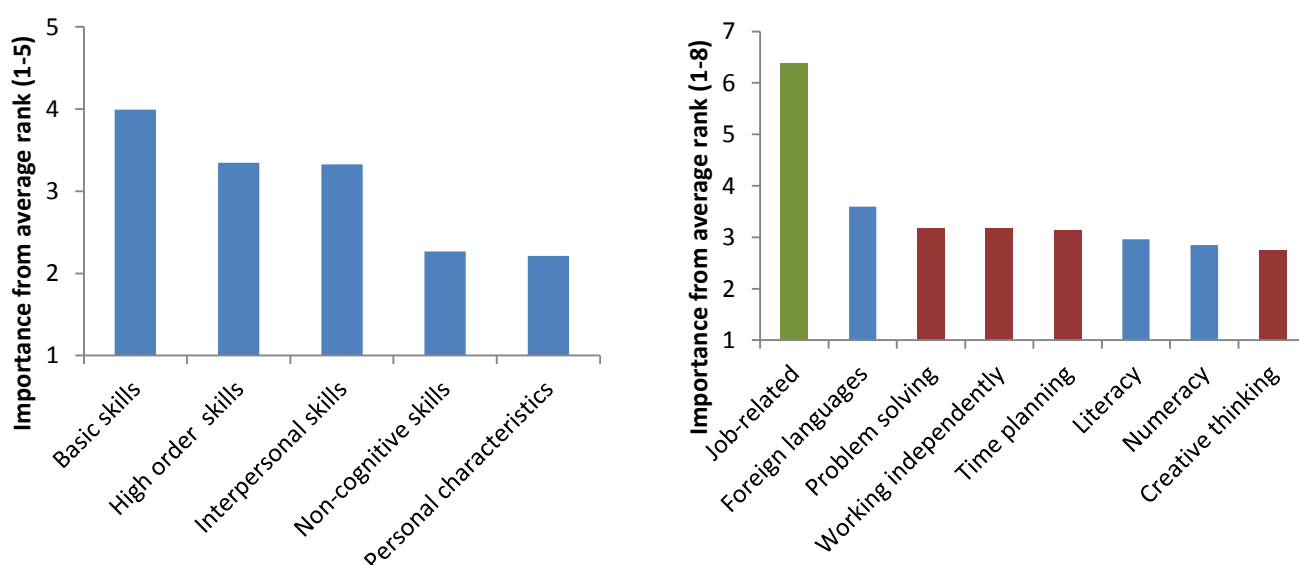
Figure 3.9: Gains in skills among students who worked compared to those who did not



103. Students' perceptions of the skills they will need are not well aligned with the reality of the labor market. They tend to rate basic cognitive skills (literacy, numeracy, foreign languages and also job-related skills) as most important (see Figure 3.10). High-order cognitive skills (problem solving, working independently and planning), which are in high demand by employers, are seen as less important. Nor do students see personality traits as very important, although labor market returns show that perseverance, efficiency and emotional stability are critical for employment (see Section 4 below).

104. A detailed comparison of specific basic and high-order cognitive skills (see Figure 3.10, right) reinforces this conclusion. For instance, students perceive foreign languages to be more important than problem-solving ability, even though employer surveys and labor market returns show that foreign languages are not valued, while problem solving is one of the most sought-after skills. The importance of critical/creative thinking is also largely underestimated by students. It is also striking that students value job-related skills more than any high-order cognitive skills.

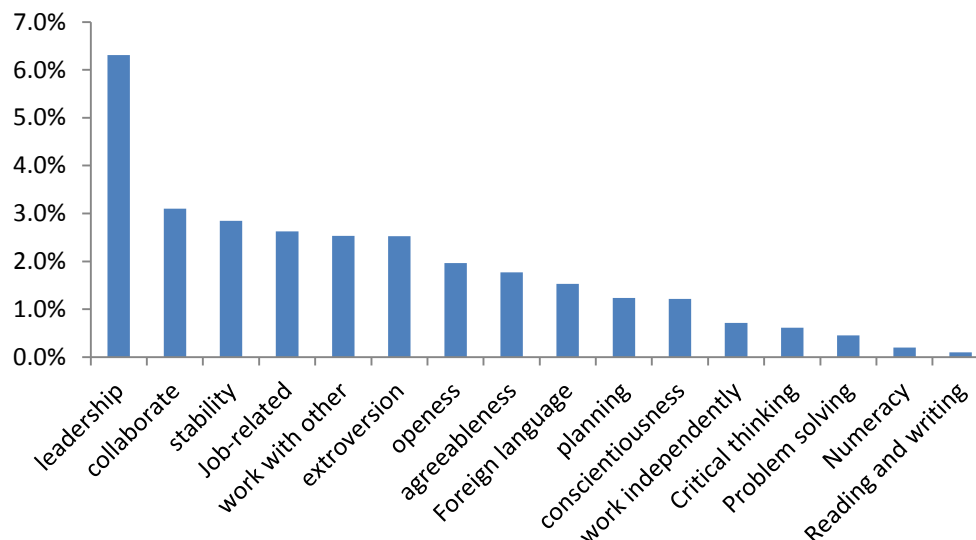
Figure 3.10: Skills rated important for job success by students (left), including cognitive skills (right)



Note: Indexes of importance are computed from the average rank of each skill. An index of n for a given skill among a set of N skills means that this skill was ranked in average as $N+1-n$ th most important skill. This means that for instance the group of basic skills was ranked in average as the second most important skill by students.

105. Students rarely acknowledge that they lack skills (see Figure 3.11). For instance, only 0.5 percent of the students confessed that they lacked the ability to solve problems. This percentage is remarkably small, given the magnitude of employers' concerns about the lack of such workers. The share of students who admit they are unable to work independently or to plan their work is also very small.

Figure 3.11: Share of students who admit they lack skills



Section 4. Skills in the Working Population

4.1 Distribution of skills in the Russian population

106. The household survey data provides a self-assessment of both cognitive and non-cognitive skills in the adult Russian population.³⁰ Overall, it appears that Russians tend to have a low assessment of their openness and emotional stability than of other non-cognitive skills. This is of particular concern because those skills are particularly demanded in innovative Russian firms.

Box 3.2: Comparison of self-assessed social and behavioral skills in Russia & Germany

Some questions in the skills survey are similar to those asked in a survey of the German workforce in 2005.³¹

Because social and behavioral skills tend to differ substantially between males and females, gender disaggregation is necessary to compare the distribution of skills across countries. The composition by gender of the Russian and the German working age populations also differs as high mortality rates of adult males in Russia tends to unbalance the gender composition of the adult population. In both

³⁰ Four different indicators of cognitive skills can be defined measuring: (i) the writing habits; (ii) the use of math; (iii) the knowledge of foreign languages; and (iv) computer skills. Seven other indexes related to non-cognitive skills could also been computed, measuring the components and some sub-components of the five factor model: (i) extraversion; (ii) agreeableness; (iii) emotional stability; (iv) openness to new ideas; (v) perseverance; (vi) efficiency and (vii) self-discipline.

³¹ Guido Heineck and Silke Anger (2008), "The Returns on Cognitive Abilities and Personality Traits in Germany," German Socio-Economic Panel Study, p. 124.

countries: women tend to be much more emotional, more extraverted, more agreeable, more open, and slightly more open in Russia and Germany

Although the scales used to answer the questions differ, it appears that both women and men tend to assess their own non-cognitive skills more positively in Russia than in Germany. It appears that Russians are relatively less open and less emotionally stable. They indeed tend to rate those two skills much lower than the three others, for both male and female, while such a difference is not observed among the German population.

Figure 3.12: Average non-cognitive skills in Russia and Germany, male

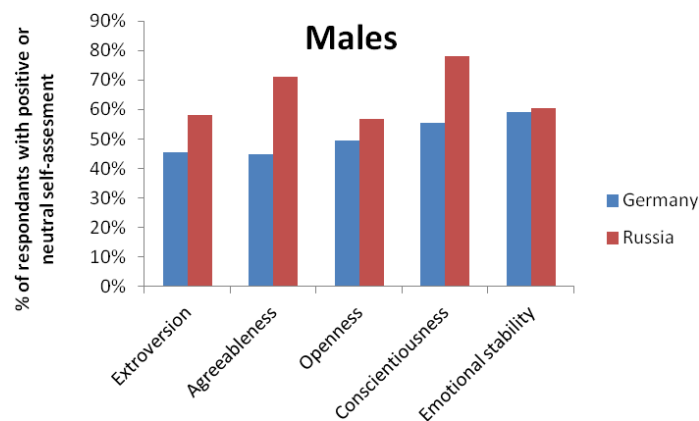
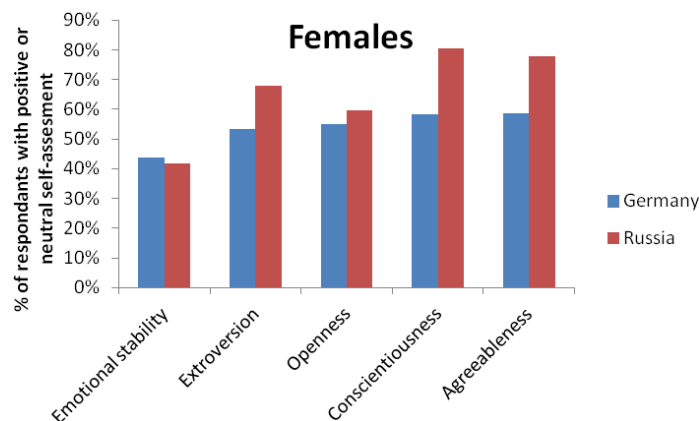


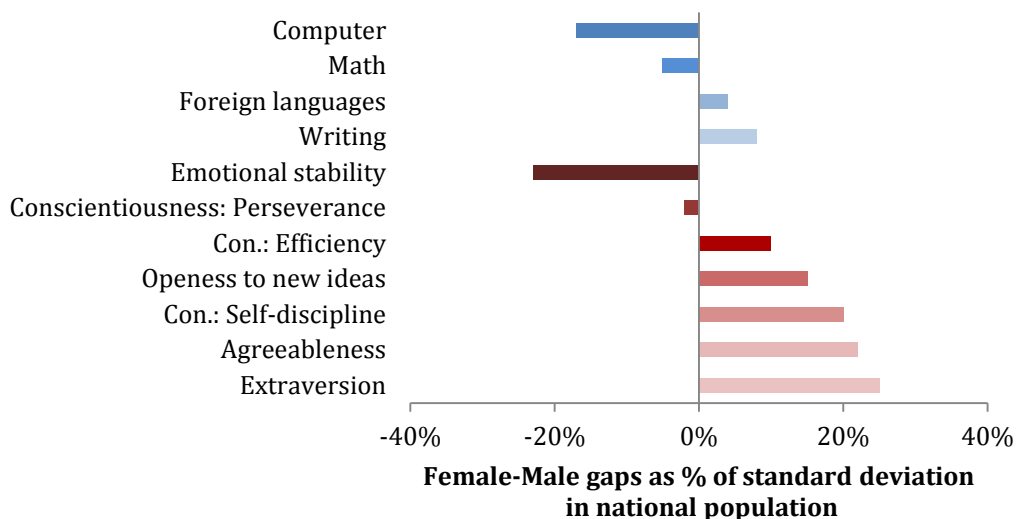
Figure 3.13: Average non-cognitive skills in Russia and Germany, female



107. The assessment of skills endowment between sub-groups of the Russian population also allows identifying specific gaps between (i) gender; (ii) age groups; (iii) education levels; and (iv) place of residence.

108. Women are ahead in term of writing skills and foreign languages, which is consistent with the PISA reading scores.³² Men assess their math and computer skills higher. Non-cognitive skills also differ, with women being much more emotional, less perseverant but more open (see Fig. 3.14).

Figure 3.14: Female-Male gaps in self-assessment of cognitive and non-cognitive skills

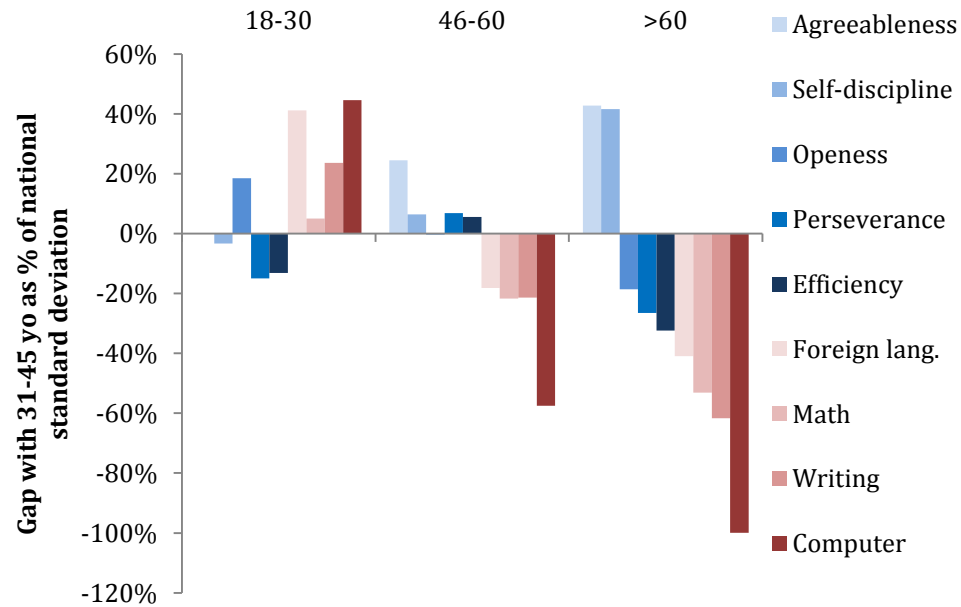


Note: In this graph and the all the ones which display skills gaps, the measure of any skill gap is the difference between the value of the relevant skill index in the considered group and the value of this same skill index in the reference group rescaled (i.e. divided) by the standard deviation of the skill index in the general population. For this specific gap, one should read that the gap between male and female in terms of emotional stability amounts to 20 percent of the standard deviation at the national level. This type of measure allows comparing the gap between two groups two the “natural” variation in that skill provision among the general population.

109. Self-assessed skills vary significantly with age, (see figure 3.15). The distribution of cognitive skills by age provides a snapshot of the progress made in education access and quality during the last decades, with large gaps in technical skills among older populations. Non-cognitive skills, however, vary differently with age. Openness to new ideas clearly decreases with age, while other non-cognitive skills, such as self-discipline or agreeableness tend rather to improve while aging. This “maturity” phenomenon is also consistent with what has been witnessed abroad. Emotional stability and extraversion do not vary with age as these personality traits are known to be very persistent.

³² In PISA 2009, girls score about 45 points above boys in reading, while score were similar in math and science.

Figure 3.15: Skills gaps by age group with reference group (31-45 year-olds), as share of national standard deviation



110. Self-assessed cognitive skills clearly improve with the level of education, (see Figure 3.16). Skill gaps between people with higher education and people with secondary or less are large.
111. Some non-cognitive skills also improve with education, (see Figure 3.17). While both agreeableness and emotional stability are not affected by education, extraversion, openness, persistence, efficiency and self-discipline tend to increase with education level. The Russian education system also manages to have beneficial impacts on non-cognitive skills.

Figure 3.16: Cognitive skills gap with upper secondary education as graduates, as share of national standard deviation

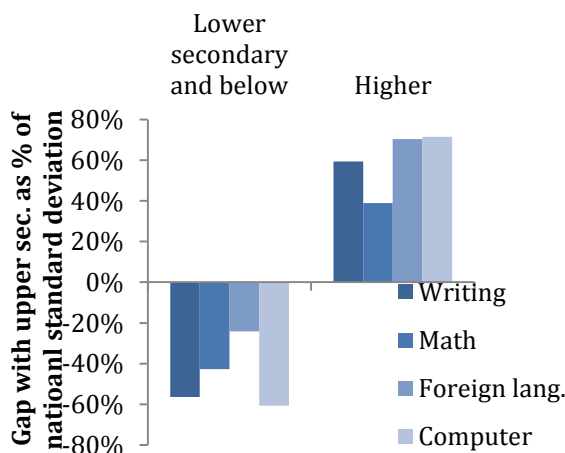
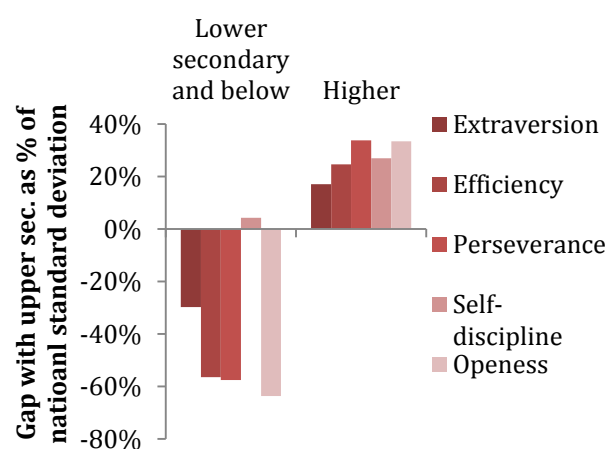
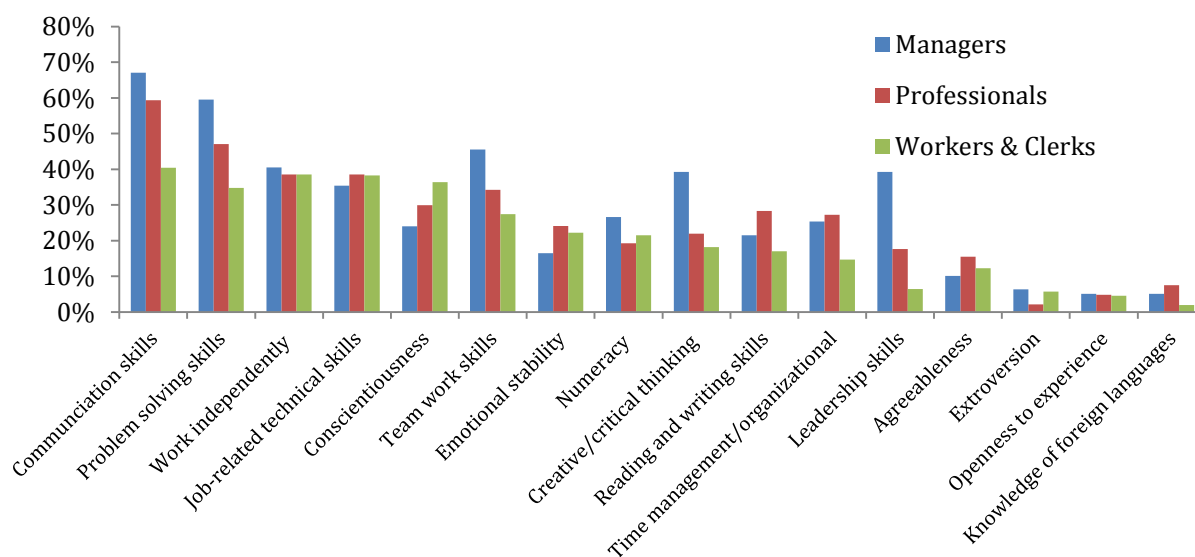


Figure 3.17: Non-cognitive skills gap upper secondary education as graduates, as share of national standard deviation



112. When asked which skills matter the most in their current positions, workers flag communication and problem-solving skills (see Figure 3.18). The ability to work independently and job-related technical skills are also seen as important. Between 40 and 50 percent of respondents identify these four skills. By comparison, only 19 percent of workers cite the ability to manage time as important.
113. Skills valuations differ by worker category. Managers are more conscious of the importance of high-order cognitive and interpersonal skills than are clerks and blue-collar workers. Clerks and blue-collar workers report that their occupation requires them to be conscientious. Knowledge of foreign languages and openness to new ideas are not flagged as critical job skills, consistent with the very weak market returns on those skills. Over all, workers tend to value skills similarly to employers.

Figure 3.18: Specific skills reported as necessary for the job, by occupation



114. Overall, the level of non-cognitive skills as self-measured by the Big Five model (see Appendix E for details) appears to be relatively high in Russia's working population (see Figure 3.19). Non-cognitive and cognitive skills do vary by occupations, with managers displaying overall better self-assessments than professionals. Workers and clerks present large gaps, especially in cognitive skills (see Figure 3.20) from managers and professionals. Those gaps suggest that the current provision of cognitive skills in Russia may represent a barrier for the economy to diversify into higher order occupations and economic activities.

Figure 3.19: Distribution of non-cognitive (social & behavioral) skills among the employed

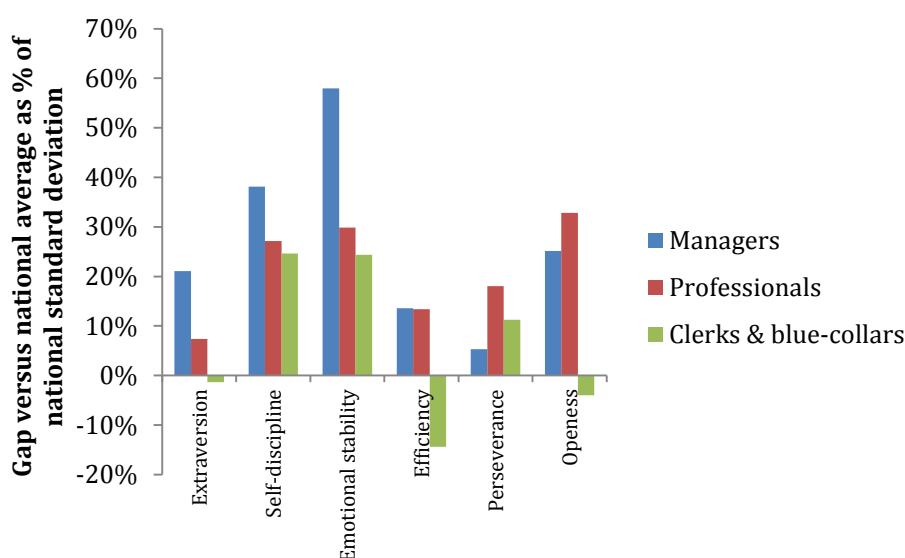


Figure 3.20: Distribution of some cognitive skills among the employed

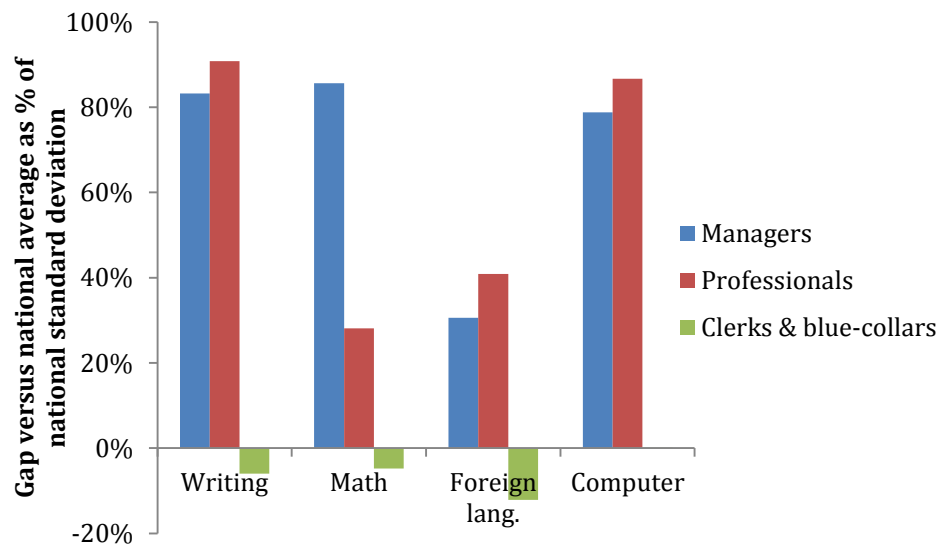
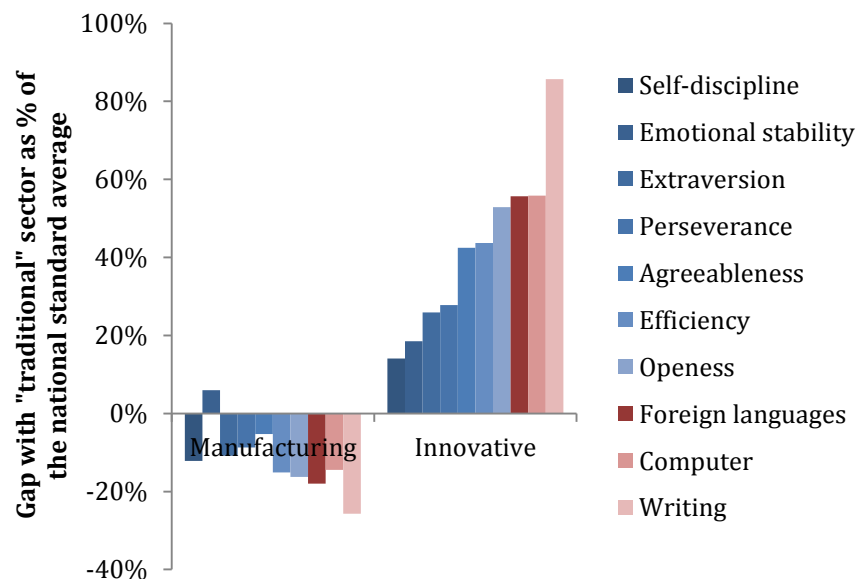


Figure 3.21: Skills gaps among employed by economic sector



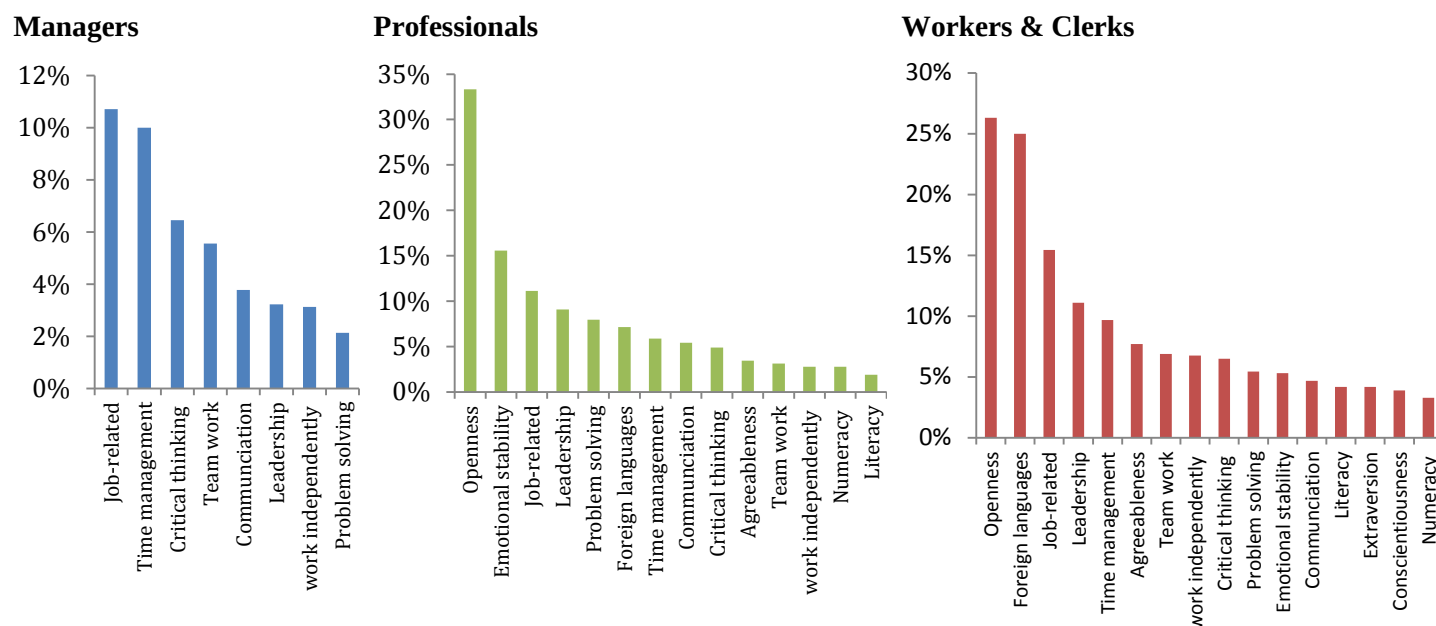
115. The self-assessments of endowments in skills of Russians employed in the “traditional”³³, manufacturing and “innovate” sectors tend to differ tremendously, as displayed in Figure 3.21. People employed in the manufacturing sector however, tend to have lower skills overall than people employed in the rest of the economy. Workers in innovative firms have

³³ The innovative vs. traditional sectors are here defined using the economic sector in which the surveyed worker is employed. By definition, the innovative sector regroups the sectors of (i) science and high tech industries, (ii) health, (iii) media, (iv) information technology and communication and (v) financial and banking. Employed in those sectors represented about 7% of the sample.

higher assessed cognitive skills than the average employed. Workers in the innovative sector also have better non-cognitive skills, being especially much more open, agreeable and perseverant than average. Those gaps confirm that the supply of skills currently represents a strong limitation for the innovative sector to grow in Russia.

116. A majority of Russians admit lacking at least some skill, although the percentage of people feeling adequately skilled is higher among managers (see Figure 3.22). In addition, managers do not feel lacking basic cognitive skills. Job-related technical skills are considered lacking in all occupations. Beyond that, skills gaps seem to be rather specific to occupation. For example, managers regret their inability to manage time, while professionals are more concerned about their emotional stability and workers and clerks worry about not knowing foreign languages. Managers are also the only group where people do not acknowledge not being open enough.

Figure 3.22: Percentage of workers who say they lack specific skills for professional development, by occupation



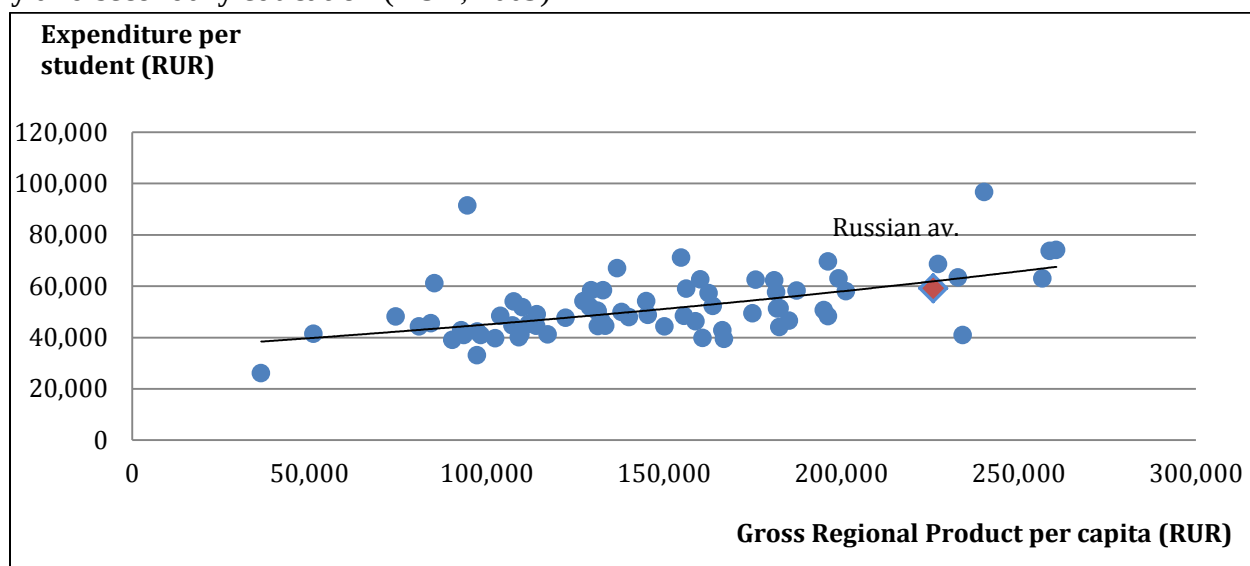
117. Workers believe they lack skills that would help them get a promotion or a better job. However, they rarely acknowledge being insufficiently equipped for the position that they currently hold, which is not consistent with the skill shortages experienced by employers. This suggests: (i) that workers may not have the means to assess properly their actual skills and (ii) that employees are not fully aware of the skills needed by employers, because of some information asymmetry within companies. The current inability of Russian employees to assess correctly their skills gaps reveals that (i) information about current skills demand

on the labor market is not sufficiently available to workers and (ii) workers lacks opportunity to evaluate their own skills.

3.2 Regional inequalities in education and skills distribution

118. There is a large and significant variance among Russian regions in terms of inputs and educational outputs. General education is financed from regional and municipal budgets (about 75 percent of funds come from municipalities and 25 percent from regional budgets). Since the government implements the policy of fiscal decentralization, the regions rich in natural resources have been enjoying substantially more funding per student while the less wealthy have suffered chronic shortages. Data on educational expenditures on general education show wide variations between Russian regions in their levels of total public expenditure as a share of GRP ranging from 0.3 to 13.6 percent.

Figure 3.23: Distribution of Russian regions by GRP per capita and public spending on primary and secondary education (RUR, 2009) *

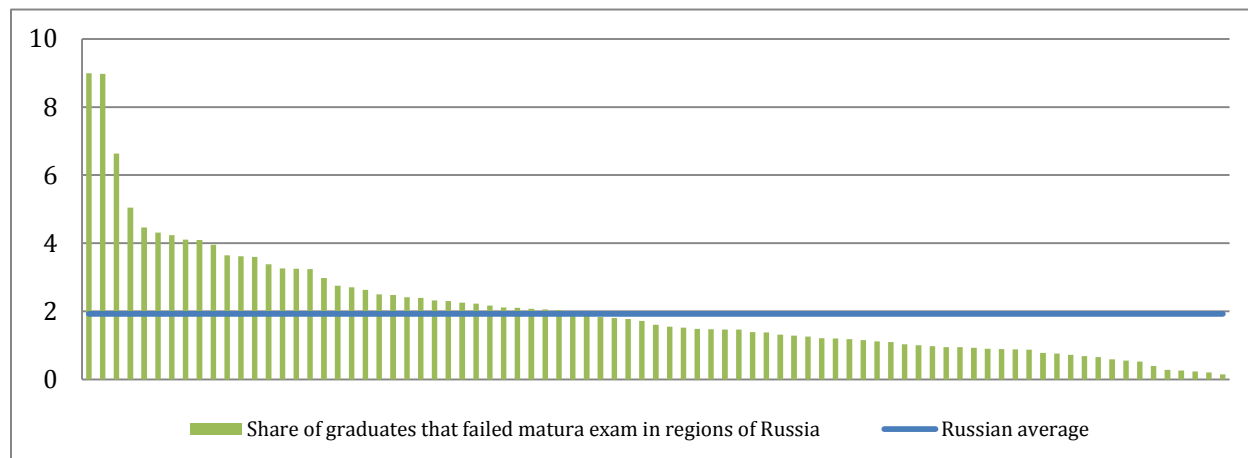


Note: Chukotka Autonomous Okrug, Moscow, Sakhalin and Tumen Oblasts and excluded from the sample as outliers.

Source: Calculations based on the data of Federal Service for State Statistics of the Russian Federation.

119. Limited publicly available data on results of the matura exam (Unified State Examination³⁴) lit some light on differentiation of education quality in the regions of the Russian Federation. In 2012, about two percent of upper-secondary school graduates failed at least one of the two obligatory tests (Mathematics and Russian language tests) and thus received no diploma. Regional analysis shows high variance of that indicator in the regions: from 9 to 0.15 percent.

Figure 3.24: Distribution of Russian regions by share of upper-secondary school graduates that failed Matura exam (percent, 2012)



Source: Calculations based on the data of Federal Service for State Statistics of the Russian.

120. In addition, there is some evidence of significant variance in skills stock from one region to another. Regional disparities in cognitive skills can be roughly gauged by the distribution of PISA scores in reading by federal districts (see Figure 3.25).³⁵ Geographic disparities in cognitive skills seems to be very large, with average scores in reading representing about 3.5 years of schooling (137 points). Results in some low performing regions of 393 points are comparable to countries like Argentina, while pupils in the city of Moscow perform as high as an average Canadian pupil.

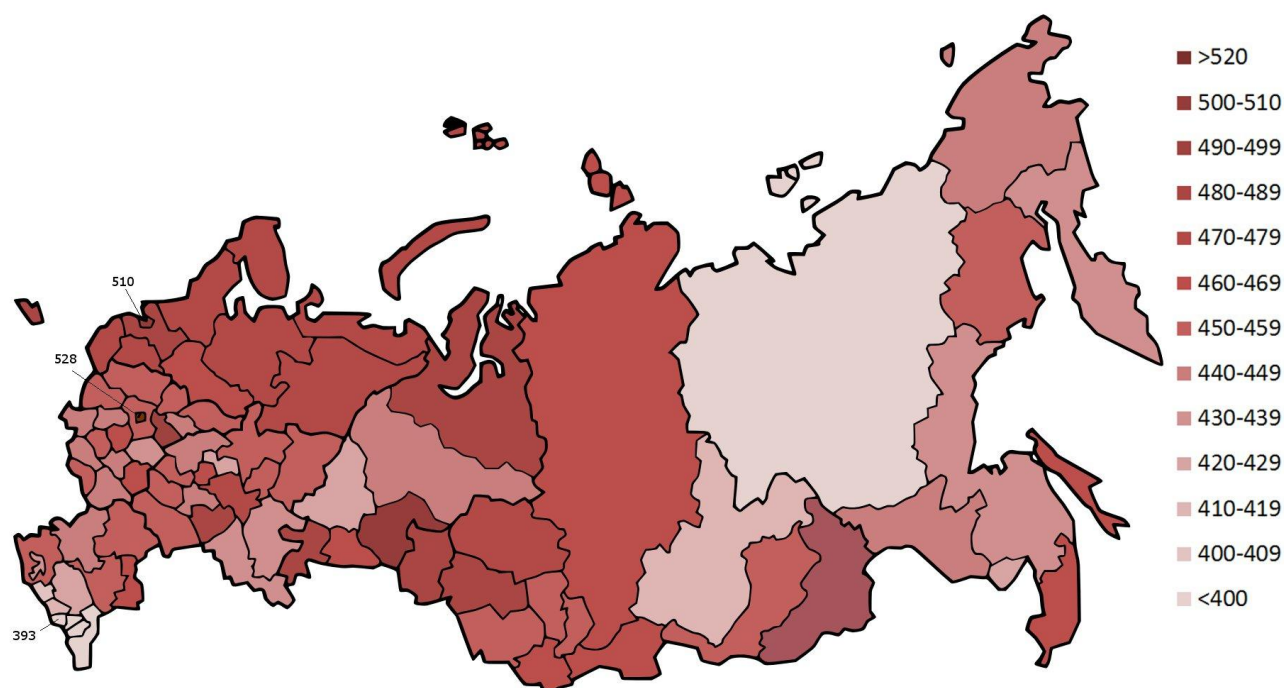
121. Performance in the Northern regions remains above 480 points, about what can be measured in Eastern Europe. Reading scores tend to be lower however, close to the national average of 460, lagging about one year of study below OECD countries in the Central and Southern

³⁴ The Unified State Examination (USE) for school graduation and for university entrance was introduced in 2001 on an experimental basis, and has been rapidly spreading across Russia from an initial 5 regions in 2001 to all 83 regions of Russia in 2009. The Education Reform Project helped bring the best international experience into design of the USE at its initial stage. The USE replaced the existing examination system in May, 2009 when all 83 regions of Russia implemented it on obligatory basis.

³⁵ Unfortunately, PISA sample does not allow to measure pure effect of education and training systems on student performance despite the background influences on the regional (sub-national) level. Thus, simulated (modeled) approach is used.

federal districts. Functional literacy is much more problematic in the Far East and North Caucasus. Average reading scores in Yakutia and North Caucasus are around or below 400 points, 2.5 years of study below OECD average pointing to a threat of a majority of 15 year-olds to be functionally illiterate.

Figure 3.25: Distribution of PISA reading score (2009) by federal districts



Source: World Bank staff calculations from PISA (OECD).

Note: Regional averages are directly computed from the sample in 44 out of 83 federal subjects. Values in the remaining regions have been estimated using a linear model based on level of education of parents, employment status, occupation and fixed effects at the level of federal districts (see Appendix E). This analysis is a simulated/modeled approach which has some limitations as it draws a straight line between background characteristics of students and performance and not captures the effect of regional education and training systems on student performance despite the background influences. However, it provides additional indicative evidence on the important issue of regional disparities.

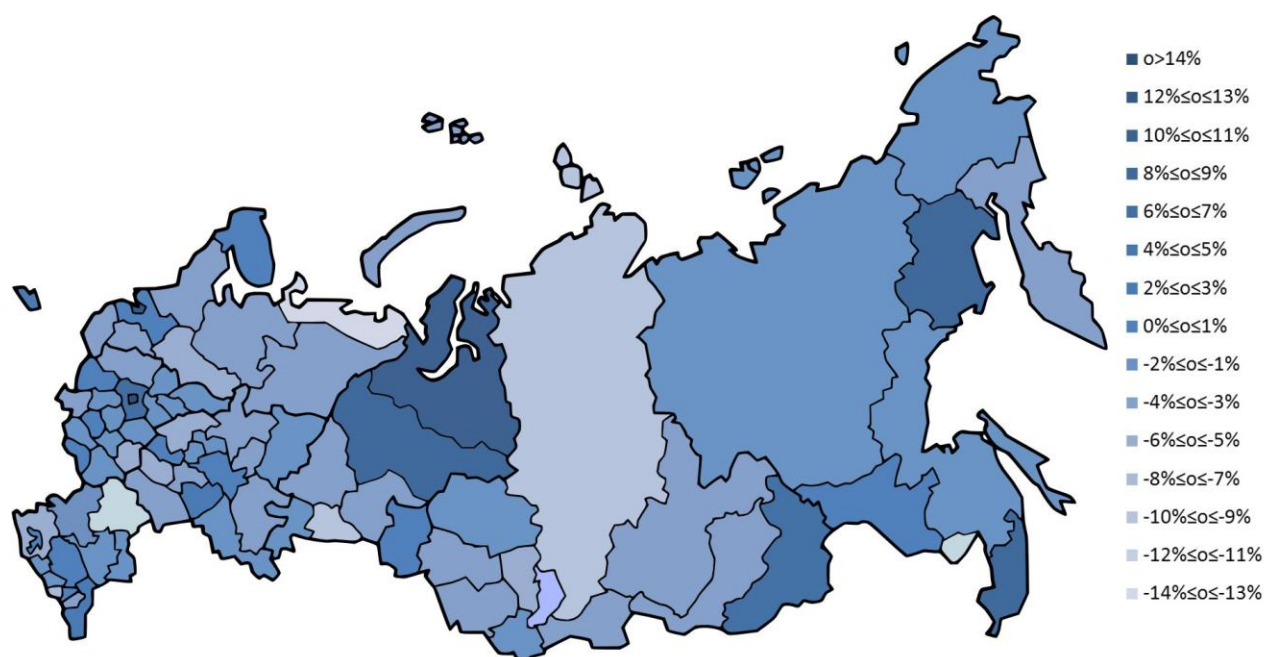
122. Assessed endowments in non-cognitive skills also vary by region. Given the size of the household survey and the available instruments, it is possible to project regional variation of the index of openness to new ideas.³⁶ Figure 3.26 displays a map of the spatial distribution

³⁶ While other non-cognitive skills are not sufficiently correlated with variables that are available in the survey and whose regional averages can be computed from existent surveys.

of openness to new ideas.³⁷ Openness is also higher in big cities, like Moscow and Saint-Petersburg. However, the spatial distribution in this non-cognitive skill, which is critical for innovation, do not match the spatial distribution of cognitive skills as measured by PISA.

123. For example, people living in the Far East and North-Caucasus tend to be more open than people living in the Northern regions where reading performance is better. But firms, especially in innovative industries, need both high cognitive and non-cognitive skills.

Figure 3.26: Distribution of openness to new ideas using the deviation to the national average as a share of the national standard deviation



Source: World Bank staff calculations from regional distribution of the working age population by age and level of education and the household survey. For instance, openness to new idea is about 14 percent of the national standard deviation higher in Moscow than in the country as a whole.

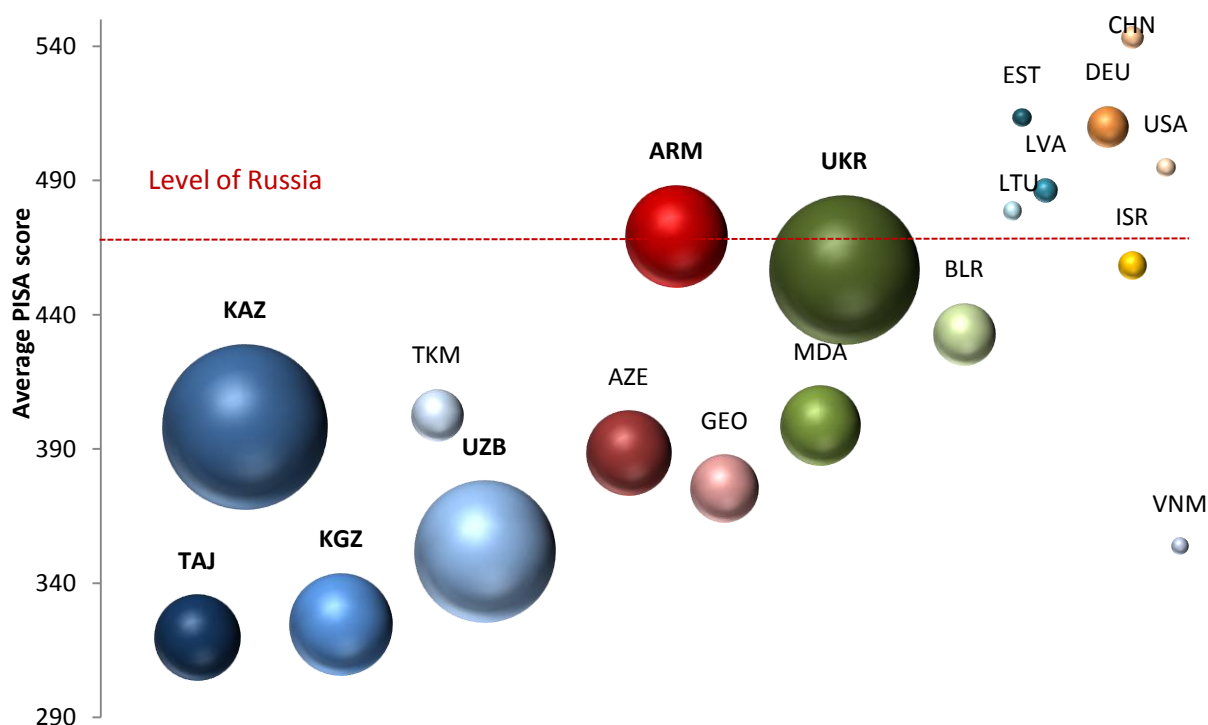
124. But the diversity of skills in the working age population does not simply depend of the distribution of skills beyond the native population. Human capital in Russia is also widely affected by migrations from and to neighboring countries.
125. The yearly net inflows of migrants represented in average over the decade 2001-2010, about 0.14 percent of the total working age population.³⁸ As a consequence, the contribution of foreign countries to the stock of skills in the working age population (including the influx of

³⁷ The regional distribution of non-cognitive skills has been projected from the distributions of education levels, gender and age of the working age population at the regional level, using the correlations between skill endowment and the instruments available in the survey.

³⁸ One assumes implicitly that most of the migrants are in working age.

migrants in the 90s) could range from 4 to 6 percent of the working age population. By comparing the average PISA scores³⁹ from countries which provide the largest population of migrants (Figure 3.27) and the Russian average scores, it appears that almost 90 percent of the migrants coming to Russia have lower cognitive skills than the average Russian national. Most of the migrants arriving in Russia are from Central Asia, the Caucasus or Central Europe.

Figure 3.27: Average PISA scores from countries sending migrants to Russia by geographic area and number of migrants



Source: World Bank staff calculations from PISA, TIMSS, World Bank indicators and migration data from Household survey on employment problems of Federal Service of State Statistics.

Note: The size of bubbles is proportional to the population who arrived in Russia during 2001-2010. PISA scores are projected from TIMSS 2007 scores (for Armenia & Ukraine) when available or using GDP per capita in PPP 2005 International dollars (for Tajikistan, Uzbekistan, Turkmenistan and Belarus).

126. At the same time, more than half of the people leaving Russia are entering non advanced economies. This suggests that Russia may lose a small share of its human capital: around 0.5 percent of the working age population educated in Russia emigrates to advanced

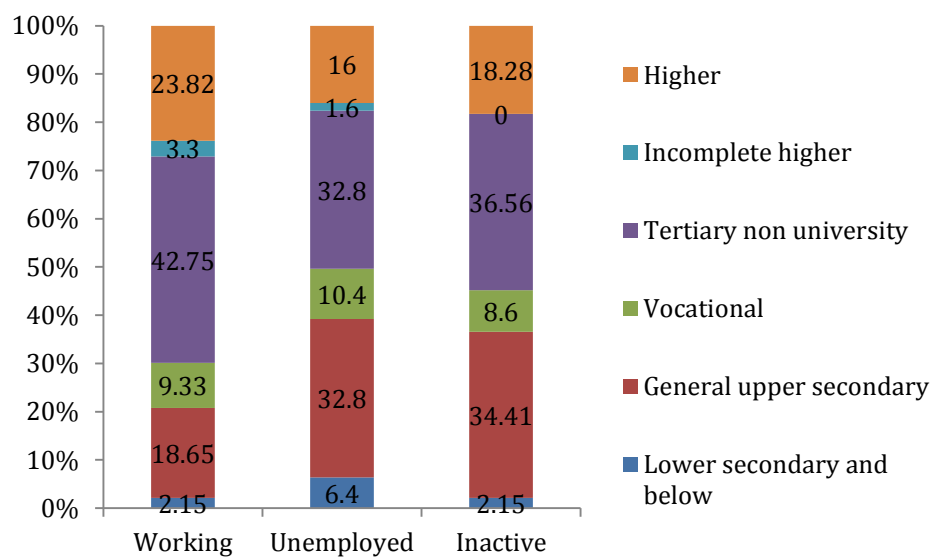
³⁹ Here the simple average of scores in reading, math and science had been used.

economies. Over the decade 2001-2010, about 300,000 Russian emigrated to advanced economies.

Section 5. Skills Shortages in the Non-Working Population

127. Although the unemployed and inactive are less educated than the working population, their formal level of education is high, as more than half of the working-age population has completed tertiary studies (see Figure 3.28). This characteristic in the Russian workforce is a strong asset when it comes to further skills development in adults.

Figure 3.28: Education level for workers, unemployed and inactive



128. Despite similar education credentials, the supply of cognitive and non-cognitive skills is highly correlated with employment. The gap between those who work and those who do not is large for both cognitive (see Figure 3.29) and non-cognitive skills (see Figure 3.30). Inactive people have lower levels of non-cognitive skills than people who work, but the unemployed appear to be the least skilled of all.

129. The biggest skills gap relates to perseverance. Overall conscientiousness also seems to be lacking in the unemployed. Finally, low levels of sociability and reduced emotional stability are an issue for the unemployed. These large gaps are clear manifestations of the importance of non-cognitive skills for the functioning of the labor market.

Figure 3.29: Cognitive skills gap for the unemployed and inactive

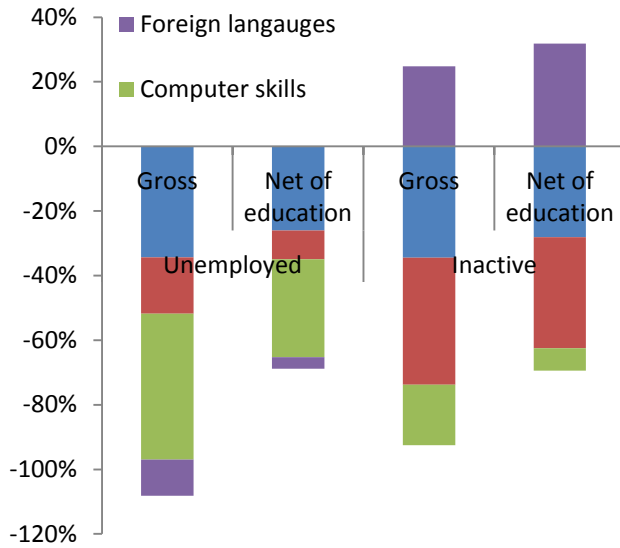
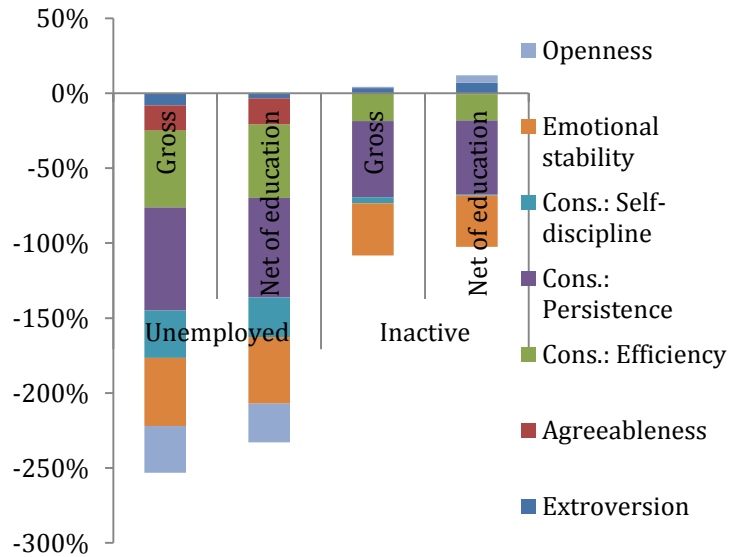


Figure 3.30: Non-cognitive skills gap for the unemployed and inactive



Note: the skills gaps are measured as the difference in the skill index between the considered group and the employed, expressed as a share of the standard deviation of that same skill index computed among the total population. The skill gap “net of education” is adjusted for differences in education level between the group considered and the group of the employed, using a linear regression of the skill indexes displaying education level and labor status as explaining variables.

130. The level of cognitive skills held by those who are not even seeking a job is much worse than the skills of the employed. Inactive people have much less exposure to math and calculus than workers and the unemployed, and also exhibit a large gap writing skills. Surprisingly, the inactive assess their foreign language skills as better than workers, underlining the fact that such skills are not presently an asset on the labor market.⁴⁰ Inactive people also suffer from a gap in computer skills, although it is narrower than the computer skills gap for the unemployed.

Conclusion

131. In spite of an adequate primary education system and widespread access to tertiary education, Russian adults are still suffering from critical gaps in both high order and non-cognitive skills. Those skill shortages are not only a strong barrier to employment, but they also tend to sustain spatial inequalities because of heterogeneous access and quality. Moreover, the skills needed in the current traditional economy are not the same that are sought by firms of the innovate sector and that will be more and more needed in a

⁴⁰ The knowledge of a foreign language can also be statistically more frequent among migrants who may have either lower (unobserved) skills or could be discriminated against in the labor market.

knowledge-based economy. Finally, migrants that contribute substantially to the labor force suffer from even larger skills gaps. As a consequence, the education and training systems in Russia need to adapt to be able to face those distinct challenges.

132. Drawing from the findings on both the demand and the supply side brought forward by chapters two and three, the next chapter will propose key recommendations to tackle the constraints that the development of skills are facing in Russia.

Chapter 4: Summary Findings and Issues, Constraints to the Skills Development System and Policy Options

Introduction

This chapter summarizes the key findings and issues derived from the previous chapters, discusses the main constraints to the education system which cause these issues and suggests policy options for addressing these. Section 1 highlights the main findings and issues of the study namely (i) the unmet demand for skills as a main barrier to productive and innovative growth and (ii) the inadequate supply of skills leading to the widening and growing skills gap. In Section 2, the underlying causes behind these issues and the major constraints are discussed. These constraints fall into three main categories: (i) the inadequate and limited incentives, (ii) the low capacity of the system, and (iii) the high level of information asymmetry. Section 3 describes policy options to address these issues and constraints.

The chapter concludes that Russia is facing an urgent skills gap as a result of the growing mismatch between what employers demand and what the education system is delivering. Specifically, the study shows that higher order cognitive and social skills are in high demand by Russian companies, especially innovative firms, but are not adequately being taught in the education system. This situation is a result of several constraints which can be derived from the legacy of the largely supply driven education system from the Soviet times: (i) weak incentives, both financial and institutional, to underpin skills development system, (ii) on the demand side an institutional void and lack of mechanisms effectively linking employers to education and training providers; education standards and curriculum content detached from occupational standards; low teachers and trainers capacity with regards to teaching the demanded skills, and (iii) high level of information asymmetry as stakeholders do not have the relevant information and are not aware of the labor market needs or outcomes. Finally, the chapter suggests a set of policy measures to address these issues, highlighting the importance of effective financial and institutional incentives for employers and education providers to change, a strategic approach with strong employers involvement, so as to build the new institutions and processes that will be required for a modern liberalized economy that requires a continuing renewal of skills. This new system will need to be supported by better collection, analyses and use of labor market information. This will take time and funding and will require a national vision and strategy.

Section 1. Summary Findings and Issues

Issue 1: Productive and Innovative Growth Requires Adequate Skills

133. Innovative, highly productive and knowledge-based economic development is at the center of most OECD governments economic, political, and social objectives which in turn is closely related to national levels of competitiveness. Improving productivity levels and shifting the economy toward innovative and knowledge driven growth requires a broad set of policy interventions. A vital precursor is human capital development conducive towards developing a society characterized by skilled and innovative individuals nurtured through quality education, employment, and broadly accessible continuing professional (life-long) learning opportunities. In this regard the adaptability and congruence of skills formation systems and constituent actors able to respond to internal or external social or economic changes are critical if productive and innovative growth is to be supported.
134. As discussed in Chapter 1, Russian economy is rather traditional and is ranked low (55th out of 145 countries) on the Knowledge Economy Index. This is explained by Russia's weak institutions, poor investment climate, low levels of private sector R&D and a significant skills gap. There are few innovative firms (about 10 percent) engaged in technological development compared to an OECD average of 50 percent.
135. Russian workers are among the least productive among modern developed countries as reflected in Russia's low productivity level, with the value of output per hour worked about half of the OECD average. A Russian worker puts in approximately 2,000 hours of work a year to produce an average of \$20 per hour worked. In the top-performing countries, employees work just 1,400 hours a year to produce three times as much.
136. A critical policy challenge to increase GDP outputs in the future is also constrained by low unemployment rate and the workforce losing one million workers a year due to demographic challenges. Furthermore, the continuing opening up of the economy with Russia's membership of the WTO in July 2012 will add to the pressures on the private sector to grow further increasing productivity and raising competitiveness.
137. The challenge to support productive and innovative growth sets a demanding requirements to the workforce skills. At the same time, the scarcity of adequate skills in the private sector is confirmed by repeated surveys of private sector firms ranking of skills shortages as a critical constraint to business development (BEEPS study). Addressing this challenge under the constraints summarized above should urge Russian policy makers to invest in skills development.

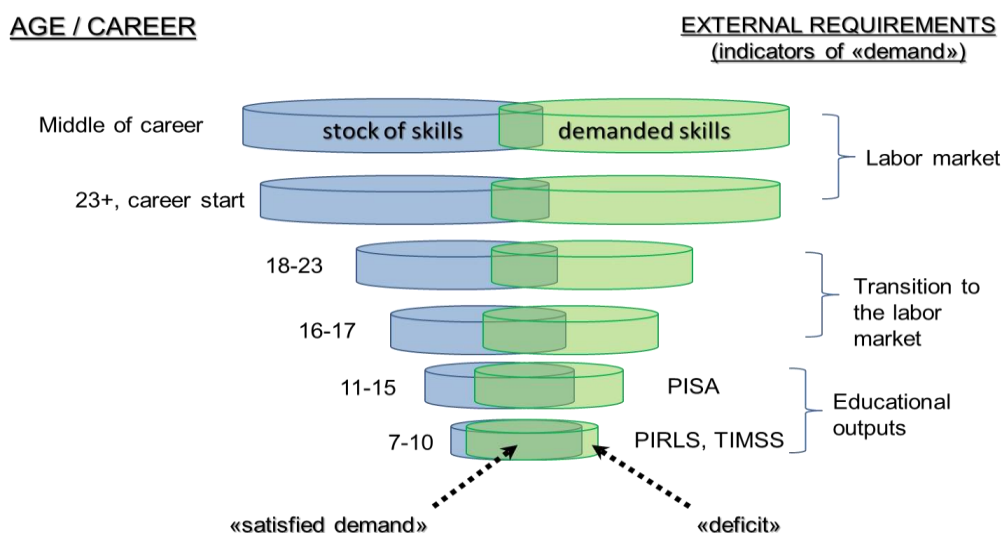
Issue 2: Widening Gap in the Demand and Supply of Skills

138. International experience demonstrates that any modernization of an economy has been accompanied by changing the demand for skills (Figure 1.7, chapter 1). This modernization

or shift towards a more technological, innovative and knowledge-based economy, increases the pressure on the education and training system and requires flexibility to adapt to these demand driven constant changes.

139. Indeed, as discussed in Chapter 2 and summarized in Table 4.1 (page 96-101), the development of social and behavioral (e.g. communication, collaboration), and higher level cognitive skills (such as the ability to solve problems) are a major challenge for the Russian economy. One third of Russian firms report an unsatisfied demand for at least one workplace skill, and this unmet demand is particularly high among innovative companies, which report a larger gap in *all* types of skill sets compared to traditional companies. The combinations of skills sought by innovative companies - open-minded, creative leaders, specialist-communicators, and creative blue-collar workers who show initiative - are difficult to find in the marketplace and increasingly so with the rapid narrowing of the labor supply.
140. While the education attainment level is very high in Russia (Chapter 1), the education system has not been able to keep up with these changing demands for modern skills (as shown by findings of Chapter 2 and 3, and summarized in Figure 4.1 below). While, at the lower levels, the system does better in meeting the demands for skills, as Russians progress through the education system and pursue a working career, the skills gap widens significantly.

Figure 4.1: The Gap between the Skills Demanded and the Actual Skills Available among Age-cohorts.



Source: findings of Chapters 2 and 3.

Note: the benchmarks for the demanded skills are set by the expected learning outcomes reflected in the international education quality assessments and reported by employers under the firm survey conducted for this study.

141. From Figure 4.1 (based on findings of Chapter 2 and 3 as summarized in Table 4.1) the following can be observed:

- a. *Primary school level:* There is a good stock of basic cognitive skills (numeracy and literacy) among *primary school* students and the gap is negligible as confirmed by the PIRLS and TIMSS scores. Achievement levels are close to Japan and Finland and thus among the best in the world.
- b. In *secondary schools*, students begin to fall behind other OECD countries in the rate at which they learn high-order cognitive skills and the quality of those skills as shown by PISA (low overall achievements but relatively high score in problem solving) and TIMSS. Moreover, there are significant disparities in the skills gap across Russia's 83 regions.
- c. At the level of *tertiary education* the gap expands even further as years spent in universities do not result in significant increase in the stock of higher-order cognitive and social skills. However, at the same time the basic cognitive and, to a certain degree, technical skills improve during a course of study. Underscoring the weak alignment between the skills stock of the university students and labor market demand is the fact that about 27 percent of students deem that their education is not sufficient to obtain a good job.
- d. The *population in the workforce* lacks higher-order cognitive and social skills that are relevant for the workplace (especially in innovative and modern firms). At the same time, workers are relatively well equipped with basic cognitive and technical skills, while the *unemployed population* has lower levels of basic skills, most notably non-cognitive skills such as persistence, efficiency, conscientiousness and emotional stability. Labor migrants have even lower level of cognitive skills as compared to Russian peers. As Russia will continue to rely on migrant workers to replace the reduction in the labor force it will become an important issue to tackle as well.
- e. Moreover, the skills shortages are most pronounced for the *unemployed*. While their overall education level is lower than that of the working population more than half have a higher education degree. What seems to be an impediment to their employment relates more to issues of perseverance and emotional stability.

142. Thus, the development of these skills in high demand remains a crucial outstanding issue, requiring more attention from both policy makers for education and employment and the

businesses and firms themselves. The question then becomes what are some of the underlying policy issues that has led to this situation in Russia today.

Section 2. Constraints to the Russian Skills Development System: Causes of the Skills Gap

Constraint 1: Inadequate Incentives

143. *Incentives for public sector education and training providers are focused on diplomas, not skills.* From the perspective of public education and training providers the incentives are weak. As universities and colleges are not accountable for the success of their graduates in the labor market they have no strong incentive to improve the relevance and quality.⁴¹ The current education system is evaluated, assessed and financed against a set of criteria other than what would be needed to meet labor market requirements. For example the tertiary education system in Russia is oriented towards producing or demonstrating quantitative outputs (number of students and graduates, faculty, researchers, research laboratories, issued diplomas, etc.) rather than equipping students with the right skills for the workplace. According to a recent research paper about a third of the university students recognize that learning is primarily for the sake of a diploma, which is more important than learning.⁴² Universities comprehend this message (and perverse incentive) e.g.: “two thirds of Russian universities just trade diplomas but do not provide any learning”.⁴³
144. *Poor incentives for students and workers.* The Russian system is concurrently characterized by the absence of effective incentives to drive a better alignment of the skills demanded and supplied. Students are focusing on obtaining diplomas (not skills). According to results of a survey conducted by Higher School of Economics 1/3 of students report that they entered higher education only in order to get a diploma, otherwise it will be impossible to get a job after graduation, 22 percent reported that higher education is needed for personal development, and 19 percent reported that the qualification they are getting will allow to find a job they want⁴⁴. At the same time workers have little or no incentives to enhance their skills as they are often secured in their employment in addition to few and limited options for continuing professional education outside the company in which they are employed (in many OECD countries companies are compensated for lost working hours or the individual worker can receive subsidies to compensate for reduced hours worked when enrolled in continuing education programs).

⁴¹ Froumin I. (2012), Negative Stability in Russia Higher school of Economics.

⁴² Abankina I. (2012), Education does not work, Higher school of Economics.

⁴³ Kuzminov Y., Human Capitalization: Universities in Russia in 10th and 20th of 21 century, HSE, 2010.

⁴⁴ Based on results of a survey conducted by National Research University – Higher School of Economics in 2009 // <http://ecsocman.hse.ru/expresspolls/results/23407776.html>

145. This situation is further supported by anecdotal evidence suggesting that students are able to design their programs⁴⁵ and receive a diploma with as little effort as possible rather than to prepare for the labor market (e.g., students chose “easy-to-pass” courses and pick accommodating teachers, rather than pursuing courses that will lead to more substantive or better-remunerated employment). Some universities even create special barriers to prevent early exposure of the students to the labor market, e.g. they design very intense and inflexible curriculum for the first 2–3 years of study, monitor and strictly require for attendance at all the courses and apply strict sanctions for lack of compliance, etc., since they have a strong incentive to produce graduates – and the more, the better. Almost 80 percent of students never participated in real projects for real customers during their studies (4 percent did this often).⁴⁶
146. *Poor incentives for firms.* The companies are not rewarded for investing in the skills development of their workers. As long as firms can continue to prosper or even merely survive in pursuit of low cost / low value-added production or activities, there is little incentive for them to modernize by changing their product range or improving the quality of their services. This fact is underscored by the low and limited number of innovative firms in Russia as discussed in Chapter 1. Moreover, in Russia today there are no or few incentives for bringing the key stakeholder together in a manner that is beneficial to all - the employer, student/apprentice and education provider.
147. *Weak incentives and enforcement of past reforms.* Many attempts to reorient the current system towards skills development and competencies needed by the labor market have been attempted but with limited success (e.g. universities pretend that they comply with the new requirements, but do not comply and there are no sanctions). For example, many university courses require development of new skills and competencies. However, in practice these requirements are often treated as formalities. The reasons are that there are few incentives (and sanctions) for teachers to actually implement the new requirements, mechanisms to monitor skills development are lacking, and faculty has a poor understanding of how to develop and assess skills.
148. In sum, in Russia today the reforms to re-orient the education and training system in Russia and improve the engagement between the employers, students and education and training providers have been limited or unsuccessful because of the absence of effective incentives – both financial and institutional incentives – and a number of perverse incentives.

Constraint 2: Limited Capacity of the Skills Development System

149. *Supply driven systems and institutional gap.* The current skills gap in Russia, similar to other CIS countries, can be mainly derived from the legacy of the Soviet Union during which skills needs were defined through manpower planning and delivered by government

⁴⁵ In other words, to build an individual learning path.

⁴⁶ Ibidem.

and public education and training institutions, with no or very limited involvement of the stakeholders on the demand side. One critical example is the development of occupational standards which remain the responsibility of government. Furthermore, outdated (but mastered well over the years by Russian teachers) pedagogical practices emphasizing rote learning and technical skills development continue to dominate and influence how education and training is being taught and delivered. As discussed in Chapter 2 (par. 27), even in the private companies those legacy practices continue to dominate training priorities and approaches.

150. *Limited engagement of stakeholders, including employers.* The private sector and businesses limits cooperation with the university sector. According to a recent study in 2010-2011, 29 percent of industrial companies had "cooperation plans with the universities", having decreased over the last 4 years from 36 percent. The share of construction companies, financing training of its future employees at universities, during this period of time decreased from 26 to 17 percent in trade – from 31 to 22 percent.⁴⁷ Moreover, anecdotal evidence suggests that recently introduced educational standards for higher education are being set through supply driven interactions dominated by public stakeholders, universities and policy makers with limited employer or private sector participation and with little attention to what is really demanded and required by the labor market and employers.
151. In technical and vocational schools employers are rarely present in the school boards and there exist few agreements or contractual arrangement that would allow the private employers to effectively work and engage with these schools. In comparison in the OECD, the private sector and vocational schools operate through clearly defined and signed learning contracts, employment of apprentices or interns as well as clearly defined interventions to help improve the trainers' capacity in the firm.⁴⁸ In Russia today, employers rarely influence the competencies required for specific jobs and do not participate in the assessment of the student/apprentice. In most OECD countries sector associations and unions (e.g. Association of Electricians, Chamber of Commerce etc.) participate actively in the assessments of the students/apprentice.
152. *Low relevance of tertiary education standards.* Higher education standards are often vague in defining learning outcomes focused on developing job specific professional skills, and pay limited attention to development of social and high-order cognitive skills which is in high demand. The evaluation of the higher education standards, conducted by the World Bank under this study demonstrated that such important skill as problem solving is not required as an expected learning outcome by neither bachelor or master degree educational standards. The new standards however do require development of reading and writing competencies. On a further positive note, the requirement to develop collaborative or team

⁴⁷ «Public Opinion Issues» 4(106), Levada-Center, 2010.

⁴⁸ See for instance: www.trainersguide.eu.

working skills (which is in high demand by employers) is presented in the new and revised master level standards. Similarly the same study showed that the new vocational education standards, which were developed with greater participation of the employers, often refer to the communication, collaboration and problem solving skills as desired learning outcomes and competencies. Thus some efforts are clearly being undertaken.

153. *Poor teaching and pedagogical practices:* Another relevant and telling example of this is the fact that current teaching practices at the university level are very inward looking. For instance, there is no regulation, requirement or culture of referencing international literature during studies or research. As a result nearly 35 percent of engineering students never read or reference English language publications in their essays or other academic papers (20 percent reported they did this often).⁴⁹ And like at the primary and secondary school levels, the higher education system is still oriented towards memorizing factual content rather than developing the skills required for the labor market.
154. *Lack of job experience:* Empirical evidence (Lall, 1999) suggests that while basic cognitive skills are developed through formal education, occupational training must be complimented with specific technology and real production based experiences to develop technical skills and specific social skills required by employers. The positive impact of practical work experience is confirmed by findings of this study (Chapter 3 and Table 4.1). This makes workplace experiences, apprenticeships and internships a critical element of any technical and vocational training program and university education. In Russia these programs are less effective as they are more often part of an institutional arrangement placing the student or apprentice in a workplace for a period, but in rather formal manner with little support or guidance from a supervisor, master worker or trainer and little attention to their future employment. In most cases, apprentices perform courier functions and one-time supervisor's tasks⁵⁰.
155. *Assessment criteria:* The focus educators and trainers place on learning outcomes is also a factor of the criteria set in the evaluation and assessments of the students. Currently internal assessment systems at the university and secondary vocational school level often measure knowledge rather than skills providing little incentives for students or teachers to focus on these social and higher-order cognitive skills. Over years of assessment practices owned by the school faculty are simply not suitable for measurement of students' competences⁵¹.

⁴⁹ Dobryakova M., Froumin I. (2010) Higher Engineering Education in Russia: Incentives for Real Change, Int. J. Engng Ed. Vol. 26, No. 5, pp. 1032–1041.

⁵⁰ Materials of the First International Scientific-Practical Conference “Organization of apprenticeship in higher education institutions: problems and prospects”, Vladimir, Russia, 2010.

⁵¹ Develop skills is much harder, than just give knowledge to students / Materials from a discussion. January 23, 2011. Federal Educational Portal “Economics, Sociology, Management” // <http://www.ecsocman.edu.ru/text/33517719/>

156. *Limited mastering of technical subject matters among faculty.* Even with regards to technical subject knowledge of the staff the current systems are weak. University teachers are rarely involved in research, and thus they do not have the cutting edge knowledge in a specific subject area. According to HSE data, 84 percent of lecturers do not do any research at all, and use outdated knowledge and materials⁵² when teaching. Such teachers are unaware of the range of knowledge generated by others, and are limited in the scope and range of their teaching skills. As a result, development of professional skills is often compromised and what is taught is outdated and with little relevance to the jobs in the labor market.
157. *Few private training providers.* The skills gap in the workforce also reflects the very limited access to relevant education and continuing training opportunities for the employed and unemployed population. A specific supply side issue relates to the few training providers, most notably private training providers, that could help address the significant training needs in the workforce. As will be discussed later, to develop this market will require time and the introduction of appropriate incentives and funding.
158. To address the skills shortages, many Russian companies (and in particular, innovative firms) heavily use in-house training. As analyzed in this study about 95 percent of training takes place inside the companies and the market for any training provision outside the company is largely dominated by public providers. Most of the in-house training delivered is traditionally focused on developing technical (job-specific) rather than higher order cognitive or behavioral skills. Despite the fact that employers recognize the importance of building social skills and higher level cognitive skills, they have yet to learn how to teach these to their employees. As will be discussed later firms and businesses are unlikely to invest more in training without better and stronger incentives.
159. *Weak policy coordination across sectors.* Giving the number of institutions and stakeholders involved in the provision of education and training and the devolution of provision and funding to the 83 regional authorities, coordination of policy interventions across sectors and institutions, including investment, labor market and macro-economic policies, remain weak.
160. In sum, it is not surprising that there is a significant and growing skills gap across the education system and once people enter into the workforce it grows even further given the institutional gap and lack of mechanisms to communicate the needs of employers and translating these into relevant education and training programs. At the moment the current public and private education and training system and government policy makers have limited capacity to respond to these needs and at best respond to these needs in a fragmented manner and often at too slow a pace to meet the needs of the employers in a timely manner.

⁵² Kuzminov Y., Human Capitalization: Universities in Russia in 10th and 20th of 21 century, HSE, 2010.

Constraint 3: Poor Communication and High Level of Information Asymmetry

161. *Lack of labor market information on market needs, jobs and career paths.* Effective skills and education provision relies on continuing communication, information sharing and market signaling. In Russia, there is no systematic analysis of the skills employers demand, jobs in high demand, availability of jobs, expected salaries, possible careers, conditions of labor, etc. This information shall be a public good and the government fails to produce it. This failure leads to gaps in perceptions and misplaced expectations among students, workers, employers and education service providers as analyzed in the study.
162. While the *working population* itself understands employers' needs, students' notions of necessary job skills are strongly distorted. If *students are unaware* of both their educational pathways and career paths, including types of jobs, employment and remunerations, they are less likely to optimize their choices and make rational decisions. This was clearly analyzed in Chapter 3 showing the perception gap of what skills workers and university students perceived as being important, and what is actually demanded. In most OECD countries these systems are in place in addition to schools, universities, employment offices being able to provide education and career guidance.
163. Similarly, if *employers are unaware* of the quality (branding) of graduates it is difficult for them to acquire the right employee. If they are excluded from defining occupational standards and curricula content and they are unable to direct the training provision towards their needs in a flexible manner they have little interest in entering into training and assessment arrangements with colleges and universities. Another big obstacle for many companies is their lack of knowledge of national and international training providers (and their reputation) making it very difficult for these firms and businesses to acquire the external training provider. On this latter issue in most OECD countries the industry associations themselves accommodate these needs and enhance market information and sharing for their members.
164. For the *public and the private education and training providers* the lack of market information and market signaling about needs becomes an obstacle for bettering and aligning the enrolment and curricula content to what is demanded and where jobs are created. The pre-condition of developing an effective education and skills system are the development and the renewal of clearly defined occupational standards and in turn the adjustment to training and education programs. This requires a careful institutional structure and processes by which changes in standards are reviewed and discussed with key stakeholder before changes are made. One industry standard or requirement may differ from another and may not be appropriate to change, but instead be accommodated during the students or apprentice work-place/on the job training experience.

165. On the other hand, in Russia today, the professional *education system is closed* and resistant to external influences, which contributes to a high level of information asymmetry. The private sector has limited access to the educational system and ability to enter into a dialogue whether on developing or upgrading occupational standards or proposing new vocational or higher education degree programs⁵³.
166. At a much higher level within *government* the absence of information about labor market outcomes and changes in skills requirements also limits the government in designing and launching effective policy interventions⁵⁴. For the federal and regional governments a key objective is to ensure that policies across various sectors are aligned with the objectives set out. Thus policy coordination becomes critical and this in turns requires a good base of information about private sector needs, labor market outcomes and education and training.
167. In sum, strengthening market information, data sharing and signals so that the stakeholders involved, including employers, students, government and tertiary education institutions and technical and vocational schools are well attuned to the demands of the labor market is a key area for policy attention.

Section 3. Policy Options for Eliminating the Constraints: Introducing Incentives, Strengthening Capacity, Improving Information and Building a Strategy

168. In the previous section we have described some of the major constraints and multiple policy challenges facing Russia. In the following we will consider some of the policy options and recommendations needed to eliminate the constraints to the Russian skills development system and, ultimately, how to close the skills gap. As mentioned earlier, Table 4.1 below summarizes the detailed study findings, linking these to possible consequences and possible policy options based on the best international experiences.
169. As the detailed findings listed in Table 4.1 below have already been elaborated upon in the study, an emphasis will be placed on synthesizing these into three major policy options and areas that will need to be addressed if Russia is to eliminate the constraints to the current system. The three policy areas relate to the need to introduce effective financial and institutional incentives, strengthen the capacity of the system, and finally to improve the collection and use of information to reduce information asymmetry. These policy issues and options will need to be articulated in a national skills development vision and strategy for Russia, as will be discussed at the end of the chapter.

⁵³ Participation of employers in the implementation of educational programs and external assessment of learning outcomes, Agency for Higher Education Quality Assurance and Career Development, 2012 // <http://www.akkork.ru/general//upload/rabotodatel.pdf>

⁵⁴ Ibidem.

170. The report provides a broad set of measures to clearly guide the education system to meet the demands of the labor market. Thus, there is a need to prioritize the implementation and start from introducing the most crucial measures which would have a systemic long run effect, i.e. development and introduction of incentives for business and education system to change. In other words, “the rules of the game” need to be adjusted. However, changing the incentives structure requires time and it is hard to expect its immediate effect. As Russia already lags behind its competitors (according to various development indexes) and faces the challenges of improving productivity and raising innovation level, a fast-track is needed. Significant investment to the capacity improvement (human and institutional) of Russian skills development system would accelerate the progress. Moreover, Russian development strategy could prioritize and select an industry or economy sector to pilot several measures and mechanisms of improved incentives to link employers to education and training providers, implement such pilots through the country or in selected regions, and then disseminate the experience among other territories and economy sectors. Improved information exchange would make the task of better linking the education with labor market easier.
171. Also important here is to distinguish the role of public and private sectors in the process of upgrading the skills development system in Russia. The public sector should largely be involved in the regulating the system, establishing the enabling environment for cooperation of education and employers, coordinating various state and private initiatives, enhancing the stakeholders dialog and sharing information, and, finally, delivering formal education (e.g. first professional education that develops broad generic set of skills at the vocational cycle). The private sector, employers, business should play a key role in overall skill development system governance and management, establishing and running the quality assurance system, supporting communication of the labor market demands (including occupational standards), delivering specialized professional and job specific training, providing opportunities for internships and co-financing of lifelong learning opportunities for it employees.

Table 4.1. Summary of the report findings/issues, possible consequences and recommendations to address the issues.

Finding / Issues	Consequence	Policy Option(s)
DEMAND		
1. Russia's companies consider lack of skill as one of the top obstacles for growth [Chapter 1, para 20-21]	The skills shortage, if not addressed, may hinder creation of more productive jobs and, consequently, inhibit growth of the Russian economy.	Educational and training systems need to become more responsive to the changing labor market demands. One way of achieving this is through building the partnership between educational institutions and the business community, and involvement of employers in the definition of occupational and educational standards and curricula design.
2. Problem-solving ability is a key skill in demand for all categories of workers. [Chapter 2, para 39-40, Table 2.1.]	Insufficient problem solving skills may hinder the creation of high-productivity jobs that require these skills. This may negatively affect productivity growth.	More emphasis in the educational system on the development of problem solving skills.
3. The greatest unmet need for problem-solving skill is among specialists at innovative companies. [Chapter 2, table 2.3.]	As above. Lack of problem solving skills may become a barrier to innovation, and to modernization of the Russian economy.	Same as above.
4. The development of social and behavioral (communication) and high-level cognitive skills (such as the ability to solve problems or make non-standard decisions) is a major challenge for the Russian companies [Chapter 2, para 38-39].	If Russian firms continue to suffer from a shortage of social and behavioral skills, and higher order cognitive skills this will have a negative impact on their productivity and competitiveness	The educational system needs to put more emphasis on the development of social and behavioral skills, and higher-order cognitive skills especially during the early years of study.
5. Innovative companies demand higher order skills than traditional ones [Chapter 2, para 51-52, table 2.2.]	Lack of providing this skills may affect innovation and modernization efforts of the Russian economy.	Educational and training system needs to address this key skill shortage in order to support innovation, modernization and growth of the Russian economy. This involves a regular identification of skills shortages and introducing incentives for making supply more responsive to these unmet demands.
6. Innovative companies cannot bridge the gap simply by raising salaries, because the skills they need differ in nature from those available in the labor force. [Chapter 2, para 47]	Wage adjustments are insufficient to address the skills shortage. If the supply of the required skills is not increased, firms will continue to suffer from a skills shortage with a negative impact on their growth and	The educational system needs to increase the supply of skills that are demanded by innovative firms in order to support growth of these firms. Incentives to providers needs to be changed to make them more responsive to demand changes and needs.

Finding / Issues	Consequence	Policy Option(s)
	modernization prospects.	
7. Russian companies use both in-house and external training programs. They prefer to develop their internal workforce with in-house training in technical, job-specific skills while the issue of social and higher order cognitive skills shortage is rarely addressed by the employer financed trainings [Chapter 2, para 54, 58].	Russian firms are active in addressing the skills gap, however the problem of insufficient higher-order cognitive skills remains. Firm financed training cannot offset the failure of the educational system in developing higher order cognitive skills.	The educational system needs to put more emphasis on the development of higher-order cognitive skills, in particular problem solving skills.
SUPPLY		
8. The development of cognitive skills is adequate at school's primary levels. [Chapter 3, para 86-87]	Not applicable.	Maintain high performance standards.
9. Secondary education in Russia is less capable of developing high-order cognitive skills. [Chapter 3, para 88-89]	Skills gained at primary level can be deteriorated and/or not used to acquire higher-order skills in secondary education contributing to further widening of the gap.	Conduct diagnostics: introduce classroom observations exercises to measure on which specific type of interactions there may be the need for adjustments; review the current curriculum to identify areas for skills development rather than acquisition of knowledge. Improve capacity by adjusting curriculum, training teachers on delivering the new curriculum, aligning assessment to the revised curriculum and assessing the learning outputs. Adjusting current assessment (e.g. the unified states examination) to the revised curriculum and make it more problem solving oriented rather than being based on rotten/factual knowledge.
10. There are cross regional disparities in the level of basic and high-order cognitive skills. [Chapter 3, para 118-123]	Growing inequity in access to quality education, deviations of learning outcomes, increasing economic inequity.	Provide targeted support for disadvantaged regions to eliminate cross regional disparities.

Finding / Issues	Consequence	Policy Option(s)
11. Universities focus on developing basic cognitive skills rather than the high-order cognitive, social and behavioral skills that are critical for employers; study years do not result in significant increase in the stock of the demanded skills. [Chapter 3, para 97]	Growing skills gap.	Shift focus of the curriculum from knowledge transmission and development of basic cognitive skills to skills demanded by the employers and the economy. Support learning from students' projects and involvement in social activities. Include in the curriculum case studies, work in small groups, and team work. Support integration with labor market: include in the curriculum mandatory internships, with credits to be earned; organize professional forums for university students, where all employers active in a given field can present the type of jobs and positions they can offer and students can apply for internships before the end of their studies.
12. The gains in skills provided by work experience are positive and large [Chapter 3, Figure 3.8]. Job experience appears to be an important source of skills development, especially social and behavioral. [Chapter 3, para 98, Fig 3.7].	The employer would continue facing and addressing skills imbalance.	Same as above. Expand opportunities and remove barriers for early work experience (through internships, apprenticeships and real life educational projects).
13. Students' expectations towards HE are not fulfilled - 27 percent of students deem their education will be insufficient for them to obtain a good job. [Chapter 3, para 99].	The demand for retraining and adult education will increase, as well as skills mismatch.	Provide better opportunities and information for making informed learning and career choices.
14. 29 percent of students do not know what they will do at the end of their studies. (the integration between university and the labor market is very poor) [Chapter 3, para 99].	Same as above. Students will continue choosing easy diploma oriented learning pathways.	Support establishing career guidance and information services to enable youth and adults to make informed career decisions.
15. Students' perceptions of the skills they will need are not well aligned with the reality of the labor market. [Chapter 3, para 103-104]	Same as above.	Same as above. Increase information sharing.
16. Students rarely acknowledge that they lack skills [Chapter 3, Figure 3.11].	Students will not adjust learning pathways to develop right skills, skills gap with grow.	Introduce skills assessment tools and disseminate successful experience/best practice of dealing with the issues requiring demanded skills (real life projects, etc.).

Finding / Issues	Consequence	Policy Option(s)
17. The Russian population suffers from critical gaps in non-cognitive skills such as openness to new ideas and emotional stability. [Chapter 3, para 106]	Increasing skills gap will challenge increases in innovation and productivity increase.	Provide / expand opportunities for adult education and training; provide competitive financing for developing these skills, support private sector providers.
18. Workers rarely acknowledge being insufficiently equipped for the position that they currently hold, which is not consistent with the skill shortages experienced by employers. [Chapter 3, para 117]	Employees will not invest in developing / upgrading skills, skills gap with grow.	Collect and provide efficient feedback on the individual performance. Introduce and encourage qualification certification.
19. The Russian education system is not preventing large spatial disparities in the distribution of both cognitive and non-cognitive skills across the territory. [Chapter 3, para 118-123]	Growing cross-regional inequity in skills supply, increasing economic inequity.	Provide targeted support to eliminate cross-regional disparities.
20. The unemployed and the inactive have a high level of formal education. [Chapter 3, para 127]	The economy is not using this reserve of manpower to increase growth and productivity.	Provide extended opportunities for continuous learning to utilize the high level of the formal education of the unemployed population.
EDUCATION SYSTEM CONSTRAINTS		
<u>Incentives</u>		
21. The system is evaluated against a set of criteria other than satisfying labor market requirements. [Chapter 4, 143, 155]	The providers will continue with the supply driven education and training delivery.	Introduce a system of incentives to orient the education sector towards labor market requirements.
22. Poor incentives for students and workers [Chapter 4, para 144-145]	Low participation in the lifelong learning / continuing qualification and skills upgrade programs, ultimately contributing to low productivity.	Introduce mechanism to support continuous learning (e.g. personal vouchers). Increase variety of the adult education service providers and programs. Raise efficiency of existing internship schemes, scale up opportunities for apprenticeships.
23. Poor incentives for firms to participate in the skills development process [Chapter 4, para 146]	Growing gap between skills demand and supply.	Increase investment in skills by providing public and private sector with incentives (tax incentives and subsidies) to invest in skills development in house or out-sourced. Establish national training / skills development

Finding / Issues	Consequence	Policy Option(s)
		funds.
<u>Capacity</u>		
24. The systems is supply driven with limited engagement of employers. [Chapter 4, para 146 and 149-151].	The skills supply will not match the demand contributing to widening gap.	Open the education system for employers' participation; establish intermediary bodies between the labor market and education; introduce special institutes (e.g. sector skill councils, occupational standards, certification qualification, among others) to improve orientation to the demand.
25. Low relevance of tertiary education standards, programs and teaching practices [Chapter 4, para 152-155].	The system will continue to be focused on teaching basic skills, ignoring higher-order demanded skills contributing to the skills gap.	Reinforce skills as crucial learning output. Provide capacity building opportunities for faculty to develop and evaluate skills. Introduce requirements of referring to international literature/curricula. Provide wide access to electronic libraries and subscriptions.
26. Limited capacity of the faculty [Chapter 4, para 156].	Same as above.	Provide incentives and opportunities for faculty and researchers to participate in business/international projects.
27. Weak policy coordination across sectors. [Chapter 4, para 159].	Duplication of efforts and little focus on the skills agenda.	Establish a body / council responsible for skills development agenda with relevant policy development, coordination and enforcement mandate.
<u>Information asymmetry</u>		
28. Lack of labor market information on market needs, jobs and career paths. [Chapter 4, para 161, 166]	Remaining barriers for the education system to align to the labor market demands. Growing skills	Launch regular information collection, analyze the results. Make the results available in public domain. Train tutors to use this information for the career guidance purposes. Provide incentives and opportunities for the private sector to share information about skills demands and qualification requirements.
29. Limited cooperation between education system and stakeholders, including employers. [Chapter	Limited opportunities to match supply and demand.	Introduce intermediary agents or institutions which can promote, facilitate and improve the information

Finding / Issues	Consequence	Policy Option(s)
4, para 150]		exchange, cooperation and linkages between employers and educational and training services providers.
30. Students' notions of necessary job skills are strongly distorted. [Chapter 3, para 103-104; Chapter 4, para 162]	Students will not adjust learning pathways to develop right skills, skills gap with grow.	Collect, analyze and share labor market information. Support establishing career guidance services to enable youth and adults to provide for informed career decision making.
31. The lack of market information and market signaling for public and the private education and training providers. [Chapter 4, para 164-165]	Limited opportunities to match supply and demand, growing skills gap.	Collect, analyze and share labor market information. Introduce intermediary agents which matches supply and demand.

Option 1: Improving Incentives

172. To re-orient the education and training system towards the labor market and improve the engagement between the employers, students and education and training providers, incentives – both financial and institutional – will have to be introduced. Special sanctions in case of lack of compliance may also play a role. Regulations and laws will not suffice in overcoming these impediments.
173. A system of *incentives* can be introduced to increase competition in the adult education / in-service training segment of the educational market, and private providers can be brought in to offer quality services that meet the needs of employers. Public financial support will be required to launch that process. As customers of the services, Russian businesses shall also provide co-financing for these services. In particular, institutional mechanisms and incentives, including monetary incentives, can be used to increase access to skills development with employees, employers, students and the unemployed.
174. Many countries efficiently address the issue of the active workforce's skills deficit through *national training / skills development funds*. Skills Funds are used to subsidize strategic areas of skills development that are demanded by the market. More than 60 countries used to have such funds⁵⁵ or have them now. Good examples exist in the European countries, Latin America, and Africa. The main objective of national training funds is to accumulate resources to finance training programs; to raise the level of inclusion of the adult population in the system of vocational training; to develop the network of training centers; to provide access to training programs for small and medium businesses, and vulnerable groups of the population; and to implement national policies in the sphere of skills and professional competence development.
175. In most cases such funds are financed by the assessment of targeted levies, tax reliefs and loans (similar to the “train and pay” type), or through budget funds received through the system of grants, vouchers, co-financing programs, repayment of expenses, etc. Out of all these methods, the schemes using the repayment of expenses are less efficient, as they are the most complicated to be managed and controlled. Many states implement hybrid financing systems. Money from the fund could be awarded competitively to support training or skills-improvement initiatives suggested by employers. Public money from the fund could be allocated to enterprises on a co-financing basis.
176. Another mechanism to support continuous learning is *personal vouchers*. Personal vouchers for employees stimulate individual demand for professional educational services, and also increase employees' understanding of the importance of continued professional

⁵⁵ Johanson, R. (2009). Review of National Training Funds, World Bank, Social Protection and Labor Unit, SP Working Paper No.0922.

growth in a rapidly changing world. Vouchers for the unemployed and those who are seeking jobs helps to mobilize additional labor resources.

177. The advanced formal technical and vocational systems in the world (e.g. Germany, Canada, USA, etc.) formalize both the educational plan and job contract in a bilateral or tripartite arrangement in addition to providing *financial subsidies and tax incentives* to the stakeholders involved. Thus often companies receive subsidies or tax incentives for engaging and hiring interns and apprentices, but more often they use these as a recruitment base providing a strong incentive to deliver quality training. Furthermore, giving the direct cost to the employer, they have an additional strong incentive to provide the training and support to the student. Most OECD countries spends hundreds of millions of euros every year on workforce development and training to provide the private sector businesses with the financial incentives to engage in training activities. In contrast (besides training of the employed) Russia today is spending very little except through the formal education system.
178. A strong *quality-assurance mechanism* must be introduced into the vouchers and funds schemes to ensure that i) the training proposal addresses the priority demands; ii) the training program is of high quality; and iii) intended training outputs are carefully assessed and objectives are achieved. Inter alia, such support would contribute to creation of a market of flexible and relevant training services highly oriented towards serving real demands. Such a fund could also provide information with regard to national and international training providers. Finally, it could be extended to operate through economic sector representatives (associations, councils, etc.).

Option 2: Improving the Capacity of the Russian Skills Formation System

179. *Retaining and enhancing cognitive skills already taught in general education.* It is necessary for cognitive skills that were successfully developed at the primary school level to be further enhanced at the secondary school level. This will require, first, building smooth transitions for students between primary and secondary school levels acknowledging individual / personal achievements; second, ensuring the continuity of cognitive skill standards between primary and secondary school with an emphasis on developing higher-order cognitive and social skills at the beginning of secondary cycle; third, incorporating the guidelines of modern performance evaluation practices to adjust the current assessment systems.
180. The recently introduced primary and secondary educational standards provide greater opportunities for developing adequate skills. A special intervention might be suggested to conduct detailed diagnostics of the capacity of existing curriculum and teaching and learning practices to evaluate to what extent these opportunities are utilized in the schools. Classroom observations exercises can be introduced for this purpose to review the current

teaching of the curriculum so as to identify practices like problem-based learning rather than practices that emphasizes the acquisition of rote knowledge. This will also allow measuring which specific type of interactions are effective and make appropriate adjustments. Existing teacher professional development programs can be revised and adjusted to include these better practices so as to place a greater emphasis on developing and measuring social and high-order cognitive skills in the teaching and learning practices.

181. *Measures to improve education programs and curriculum in tertiary education.* The following concrete measures to improve the educational programs and curriculum can be considered:

- a. Open the tertiary educational system to the private sector to enhance university-industry linkages. Higher education institutions and innovative businesses must work in partnership on these goals. Universities should provide opportunities for innovative companies to conduct joint education and research. University-industry linkages can be also improved by joint definition of competencies and expected learning outcomes.
- b. Adopting a multi-disciplinary approach to teaching and learning in universities. Working in problem-solving teams encourages students to understand complex systems that rely heavily on modeling and simulating real world situations, often using case studies, with the additional advantage of improving practical job understanding.
- c. Train faculty members to develop and assess skills. An array of programs is needed to give teachers the tools to develop the skills in their students that are demanded by the labor market. Teachers must be equipped, through pre- and in-service programs to both assess educational outcomes and monitor progress in skills development.

182. *Introduction of workplace experiences.* Tertiary educational programs are of special concern. Changes in the systems of professional education and training are in the direction of early students' involvement in the practical working activities and transforming of workplaces into places for studies. This is especially typical for the initial and secondary vocational training systems. However, university curriculums can also adopt this trend. This is achieved through internships, apprenticeships, creating of enterprises in educational institutions, etc. Such teaching methods at workplaces provide the possibility to get not only technical skills, but also high-order cognitive and social skills. In some OECD countries both the public and private sectors offer formal part-time jobs to university students. These are jobs with flexible working schedule: during exam periods students can work less and during semester breaks they can work full time. These are term-contracts and once students graduate their employment is automatically terminated. Thus the government may consider introducing this job category in the labor law.

183. *Workplace training as part of tertiary training programs.* Changes are needed in the systems of professional education and training to promote students' involvement in the practical working activities and transforming workplaces into places for studies. This is especially crucial for the vocational training system. Such exposure can be achieved through internships, apprenticeships, creating of enterprises in educational institutions, etc. Such learning at workplaces provide possibility to get not only technical skills, but also demanded high-order cognitive and social skills. Besides, internships are useful for businesses too, allowing them to get to know students better and to select potential candidates for their vacancies. This will require:
- a. Clear definition of composition of the education standards and content and the time in school and the time on the job training. This needs to be formalized in a legal agreement (learning plan) signed between the student, school and workplace.
 - b. Introduction of employment contracts for the internship and apprenticeship formalized in a bilateral agreement signed between the student and employer and governed by the appropriate labor laws and regulations.
 - c. Introduction of trainers guide for industry based trainers.
184. *Active involvement of employers to the process of training programs development and delivery* in vocational education could be considered as a powerful example of orienting the skills development towards the market. In Brazil this private initiative led to the creation of a range of independent training centers (Box 4.1).
185. Employers shall also play a leading role in assessing the results of the vocational education and training. Centers for *occupational qualifications evaluation and certification* would serve as a powerful tool for this task. Such centers help to link skills demand and supply as, on one hand, they ensure quality, but on the other hand provide valuable first-hand information on the real employers demands. Qualifications evaluation centers may also provide services to foreign labor migrants (e.g. retraining and skills enhancement, including learning of the Russian language, etc.).
186. A *formal assessment* of high-order cognitive (e.g. problem-solving) and social skills for both freshmen and university graduates would be valuable, given the high demand for such skills in the labor market, and the uncertainties that surround the provision of such skills at the university level. Although standardized assessments at university level are yet not widespread, tests do exist to measure problem-solving⁵⁶ and critical thinking, which could

⁵⁶ As in the 2003 module for the OECD Programme for International Student Assessment (PISA).
http://www.pisa.oecd.org/pages/0,2987,en_32252351_32235731_1_1_1_1_1,00.html

be used in large-scale assessments across Russian universities. In vocational schools the assessment of the apprentice or students practical skills will have to be done with the master trainer present and is often done with the involvement of the industry association to ensure they meet industry standards.

Box 4.1: Development of the system of independent training centers in Brazil

Brazil has succeeded in creating a non-state sectoral system of vocational training capable to provide a quick and flexible response to any changes in the demand. The core of this system is formed of sector organizations, of which SENAI formed in 1942, is the oldest. These organizations service industrial, transport and communication industries. It is managed through the National Confederation of Industry. SENAI is financed through a one-percent payroll levy assessed on enterprises from these industries (+0.5 percent levy on enterprises employing more than 500 persons). The funds for SENAI are collected by the Social Security Fund. Additional funds are received in the form of state subsidies and incomes from paid services provided by training centers.

SENAI has 27 regional departments. The national office provides overall normative guidance and technical assistance. 85 percent of all revenues are channeled to the regional departments for vocational training centers and other training services to enterprises. SENAI's training infrastructure includes over 500 vocational training centers, more than 200 mobile training units and several personnel development centers. SENAI trains more than 2.8 million people per year. About 80 percent of its training programs are short courses of 20-80 academic hours, but there are also more lengthy apprenticeship programs.

SENAI's distinctive features are its close relationship with employers which is achieved due its funding mechanism and subordination to the Confederation of Industry. Neither workforce nor the state can have a direct influence on SENAI. Most of its training centers operate as training cooperatives established by their respective enterprises – at present enterprises are allowed to channel part of levies assessed for SENAI directly to training centers.

Source: Johanson, R. (2009). Review of National Training Funds, World Bank, Social Protection and Labor Unit, SP Working Paper No.0922.

187. *Faculty skills and qualifications* (especially at recently established research and federal universities) need to be measured as objectively as possible. One way to stimulate improved performance at such universities could be a compulsory certification requirement for teachers. Teachers would be able to train for the certification, perhaps through brief training programs at first-class foreign universities. The research oriented faculty shall also be encourage to get engaged in business projects outside the academia (e.g. a sabbaticals practice can be piloted in Russia).

188. *Professionals and researchers with cutting edge knowledge and skills*, as well as private sector experience, can be recruited into teaching. This will require universities to stop the

practice of designing a fixed curriculum based on the existing capacity of the faculty. Existing lack of capacity among the faculty can be compensated by attracting external practitioners using flexible part-time schemes allowing relevant compensation for the professionals. Another way to address the issue of outdated and inward looking faculty is to introduce a requirement of referring to international literature together with providing wide access to international electronic libraries and subscriptions.

189. *Promote knowledge of foreign languages.* While this skill is not quite demanded now it will be in the future when the economy liberalizes and certain sub-sectors continue to grow (innovative firms already need more of this skill). This is an example of longer-term investment that the country needs to be doing to avoid an important bottleneck when the demand for this skill finally rises. Learning of foreign languages shall be not only promoted through the formal English classes, but what is more important, through introducing teaching and learning practices which require utilization of foreign literature during studying the key courses. Under this approach, economics, engineering or medical courses would strictly require familiarity with modern literature in contrary to the current practices which often directly prohibits usage of the foreign literature (in order not to put English-illiterate students into disadvantaged position). Even at the secondary school level and in vocational schools many programs (like electricians, CNC machine operators etc.) nowadays requires English skills.

Option 3: Improving Communication and Reducing Information Asymmetry

190. *New systems and mechanisms* needs to be build, both to collect data and information, but also to communicate and make this information available to the stakeholder involved – including students, parents, education, workers, unions, employers, industry associations and policy makers.
191. *Better early dissemination of labor market information* might help students build their educational paths and careers, as well as informing policymakers' decisions. Collecting information and data about labor market outcomes, including tracer studies, and the quality of educational outputs (e.g. employment and career) of particular institutions and programs should be made widely available. These shall help to align students' perceptions and valuation of skills with their actual economic returns and employer demand.
192. International experience supports the need for *career guidance and counseling services* to enable youth and adults to provide for informed career decision making during the lifecycle and especially during initial and continuing training. Development of these systems require an in-depth knowledge of labor market, experience in working with youth and adults during job search and career decision making. Materials on career opportunities and labor market information shall be disseminated to a wide range of stakeholders.

193. Poor cooperation of labor market and education system can be improved by *intermediary agents* or institutions which can promote and facilitate the information exchange, cooperation and linkages between businesses and educational and training services providers. They shall serve as catalysts in linking the labor market demand and skills supply and establishing ties among individual institutions in the network. Such institutions shall act primarily on local level to be instrumental for the adaptation of the training programs to the changing employers' demands. The agents could be also tasked with such functions as professional appraisal of educational programs, assistance in arranging independent external (public) assessments of vocational education institutions, evaluation and certification of qualifications etc.
194. Other areas for policy interventions include *coordination of education and labor market policies* at ministerial level (both federal and regional), improving data on and analysis of labor market outcomes, and encouraging flexible provision and continuing (life-long) learning options at tertiary institutions. Vocational education and training systems can be made more open through increased involvement of the business sector and unions in curriculum development and staff exchanges. To improve continuing professional development possible policy avenues to explore include improving information about programs and training providers in the market.
195. The issues, consequences and policy options listed in Table 4.1 and discussed in the previous sections highlight the multiple and complex interrelationships and issues facing the Russian skills development system today. Some of these can be addressed through discrete interventions, but giving the scope of the issues, it would be important to take a more comprehensive approach as will be discussed in the following.

Option 4. Developing a Vision and Strategy

196. Adopting a *national skills development strategy* like Singapore or Norway (see Box 4.2) has become a key component of many national approaches to the challenges created by the global economy and the necessity to change national educational systems. This would embody a strategic vision for skills development — including the overcoming current problems —to increase the Russian economy's competitiveness and enabling its transition to innovation. This vision should be based on a deep, thorough analysis of Russia's situation and of international experience in skills development. The results of this analysis should be reflected in specific plans and programs.

Box 4.2: Development of a detailed strategy or shared vision

Singapore has developed a strategy for technology development which emphasizes industries' particular skills needs and addresses shortages through a number of measures. Singapore's government has established a Skills Development Fund (SDF) and a Skills Program for Upgrading and Resilience (SPUR). These fund and program encourage employers to invest in

upgrading workforce skills by sharing the cost of training that is relevant to the economic development of Singapore. The government also welcomes skilled foreign talent to Singapore.

Norway is implementing its Competence Reform that has various policy approaches towards SMEs with respect to workplace development and innovation. This reform seeks to move beyond simply increasing the supply of skills to deploying them to develop innovations and create value.

197. Special attention should be devoted to the *distribution of roles and the mechanisms for cooperation* among key stakeholders and choosing a lead agency to drive the reform process (see Box 4.3) is one important action. The major mechanism for cooperation should be a specific inter-ministerial commission on skills development, with significant representation by Russian businesses/employers and subject/occupation experts. The key tasks of this commission are to match the interests of the educational system with the labor market, to monitor progress toward this goal and assess the results of measures designed to achieve it.

Box 4.3. Specialized national agencies responsible for the elaboration national skills development strategies

Skills Australia is an independent consultative agency under the Department of Education, Employment and Workplace Relations. Its main task is the analysis of the demand for and supply of skills by sector, assessment of the evidence from commissioned research, consulting stakeholders, providing advice on issues pertaining to skills development and reforms in the sphere of general and vocational training. In 2012, it was transformed into the Workforce and Productivity Agency directly reporting to the government.

UK Commission for Employment and Skills (UKCES) was established in 2008 at the recommendation of Leitch Review of Skills which assessed UK's workforce needs and outlined 2020 development objectives. UKCES assesses progress in meeting objectives, recommends strategy and policy issues for the government, monitors the system of vocational education, and provides general guidance for the sector skills development councils. UKCES includes representatives of businesses, trade unions, nonprofit organizations and educational institutions.

Expert Group on Future Skills Needs (Ireland) advises the Irish government on current and future skills needs, and other issues related to labor markets. The Group includes experts from business, education and trade unions. The Group, created in 1997, reports to the Department of Enterprise, Trade and Innovation and the Ministry for Education and Skills. The Group cooperates closely with the Irish Council for Science, Technology and Innovation and the Irish Vocational Education Association, which lead scientific and analytical research.

Source: OECD (2012). *Better Skills, Better Jobs, Better Lives: A Strategic Approach to Skills Policies*

198. *Involvement of Employers and Industry Associations and Unions.* If Russia is to improve the quality and relevance of education and training it needs to shift the supply driven skills development system with leading role of the government towards demand driven model, which requires significant strengthening of the employers mandate. This is a major policy, institutional and psychological shift and will pose a challenge and new role for employers. Raising the employers' influence will require:
- d. Industry and economic sector associations, councils and unions to pro-actively lead and engage in the definition of occupational standards and the related education and training standards, curriculum content and training programs.
 - e. Delegating governance, management and financing responsibilities to the employers.
 - f. Develop the mechanisms for collaboration and protocol they will guide the different stakeholders (schools, employers, ministries, associations, employment offices, evaluators etc.).
 - g. Develop a system for jobs and apprenticeships as integral part of training and define levels of payments and salary levels (and government subsidies), contracts, rights etc.
199. The federal strategy shall ensure a comprehensive and sustainable set of measures to address the *issue of cross-regional disparities* in the skills stock and supply. A special monitoring shall be conducted to identify large spatial disparities in the distribution of both cognitive and non-cognitive skills across the territory. Targeted support shall be available to the regions to eliminate such disparities.
200. *Public support* for change is important. The public will need to adjust its expectations of educational benefits away from receiving diplomas to building the skills that will prove fulfilling in a modern society and economy. It will be necessary to educate parents, students, teachers, and the business community, rather than dictating to the public through the educational system.

Conclusion

201. While the Russian economy has undergone significant changes over the past two decades, the education and training system have fallen behind. This poses a very serious policy constraint to future economic growth and productivity improvements. While the Russian workforce is characterized by a very high educational attainment level, there is a significant skills gap, particularly of higher-order cognitive and social skills. The current skills gap is more pronounced in innovative firms compared to traditional firms pointing again towards the institutional void and lack of mechanisms enabling meeting the needs for the most

competitive and innovative Russian businesses. This skills gap widens as students' progress through the education system and enters into the workforce with a wide variance observed across Russian regions. The gains from practical job experiences appear to be positive with regards to learning these skills, but are limited in the current system.

202. The reasons behind the skills gap can be derived from the legacy of the Soviet Union and a predominant supply driven approach to education and training. There are no incentives (neither financial, nor institutional) to drive any change and force a better interaction between the stakeholders involved. Indeed, few incentives exist for education and training providers to improve the relevance and quality of services rendered. On the contrary the system is suffering from a number of perverse incentives making public providers focusing on producing diplomas and not the skills required by the labor market. At the same time, there are very limited incentives for the private employers to direct invest their own resources in training or engaging existing public tertiary education institutions or training centers in bettering the relevance of their education and training programs.
203. Moreover, the system has very low capacity to adjust to the changing demands through establishing institutions and processes that links employers with training providers and adjust the substance of training to the changing demands of the economy. Concurrently most teaching practices across the education system emphasize rote learning and knowledge transmission, placing less attention to developing skills demanded by the labor market. Furthermore, occupational standards are still being developed and updated through largely government driven processes with limited employer participation and the mechanisms for using these in a process to update education standards and training programs are very limited.
204. Furthermore the system is adversely affected by the high level of information asymmetry about the skills needs, jobs and training providers, lack of communication between stakeholders and a limited analysis of labor market information and outcomes. Thus it is not surprising that the skills gap in Russia is growing and is likely to become more severe with Russia's membership of the WTO which will increase the competitive pressures even further.
205. Addressing these policy challenges will be necessary for reorienting the system and building the new institutions and mechanisms that will allow Russia to close the skills gap. Employers will need to be at the center of this process. Public education and training providers will need to re-assess their current governance and management practices. They will also need to open up to new and different teaching and training methods and practices while retaining the current high level of educational attainment with a new emphasis on skills, not diplomas.
206. A new system for continuing professional training of the workforce needs to build. Such a system needs to be driven by employers needs supported through collecting, analyzing and sharing labor market information which in turn can be reflected in timely updating of

occupational standards – the basis for aligning the quality and relevance of education and training programs to the market needs. This will also entail a reassessment of the role of employers and public entities in the assessment, evaluation and certification processes.

207. At the first place, strong incentives, financial and institutional, should be introduced to motivate these changes and underpin any policy direction. In Russia today, this will require building new institutions, processes and procedures to link the stakeholders together. Building these new institutions and systems will require financial resources, efforts and time. Given the large number of social partners and institutions involved developing a vision, principles and strategy may be good options to pursue as has been done in other countries.

Appendix A: Surveys Methodology

A1: Description of the Household Survey

Study description

The study titled “Consistency between the Demand and Supply of Professional Education Services and Skill Gaps in Russia” was implemented by the Public Opinion Fund from November 10 – December 15, 2011.

The field phase of the study was conducted from November 16 - 29, 2011. It included a representative survey of the population of the Russian Federation. The interviewed sample consisted of 1500 individuals. Data was collected through formalized individual interviews using a special questionnaire.

Data Collection and Quality Control Procedures

The main phases of the study included the preparation of a questionnaire and related documentation, development of the sample design structure, selection and training of interviewers, conducting interviews with respondents, monitoring of the work of interviewers, development of a data input model and verification formulas, and input and verification of the survey data.

During the field phase, a total of 1,500 completed questionnaires were collected. The average duration of interviews was 35 minutes. The maximum duration of interviews was 80 minutes.

All the interviews were completed in accordance with the agreed-upon timeframe for this project. To implement the survey of the population in the regions, a total of 40 organizations that are regular business partners of the Public Opinion Fund were engaged.

A total of 105 interviewers participated in the field phase of the survey. The data was collected through formalized personal interviews at the place of residence, using a specially designed questionnaire. All the collected data were visually verified to ensure the completeness and quality of filled-out questionnaires. The average workload per an interviewer was 14 questionnaires, and depending on the location of the survey, the maximum workload per interviewer was 20 questionnaires.

Interviewers received standard instructions used by the FOM for conducting similar surveys. Instructions were provided in two phases: during the first stage instructions were provided to survey team leaders, who then provided instructions to interviewers. Prior to commencement of the survey, the regional partners received by email the following methodological materials: location of the survey, sampling, quota assignments, route maps, the letter to the survey manager, instructions for interviewers, questionnaire and questionnaire cards.

Each interviewer received instructions on how to select respondents and conduct interviews, as well as a set of field documentation, including a route map with quotas, questionnaires, and cards. Data input programs and data verification formulas were sent separately.

Ten percent of interviews were subject to quality checks, including analysis of the route maps and checks on the quality of interviews with individuals.

Questionnaire

The questionnaire used for the survey included 90 questions on 16 pages and 31 supplementary cards. The initial draft of the questionnaire was prepared based on the list of questions provided by the World Bank. The draft was then finalized and agreed with the World Bank.

Sampling

The survey was conducted using a three-stage stratified random sampling methodology. The sampling was stratified as follows: The first stage focused on the selection of administrative districts of Russia; The second stage sampled the polling stations; The third stage involved selection of households through the route method. Selection of respondents at the household level was carried out in line with pre-established quotas. Gender, age, and education quotas were applied.

The sample was drawn from the population aged 18 or older permanently residing in the Russian Federation. The survey conducted in 40 regions of the Russian Federation and 95 locations (35 rural and 60 urban).

A2: Description of Student Survey

Sampling

Sampling was conducted in 10 regions of the Russian Federation with the greatest number of higher education institutions (according to actual data of the Federal Service of State Statistics of Russia).

Target population: students of higher education institutions of Russia The total number of respondents was 2000. The surveyed population of students included: (i) 1000 students in the first year of study; (ii) 1000 students in the graduation year of study: 4th year of study for those studying in bachelor degree programs and 5th year of study for those studying in specialist degree programs. The survey was conducted at institutions.

Questionnaire

The survey was conducted in the form of formalized individual interviews using a special questionnaire that consisted of 85 questions including general questions (social and economic characteristics) and questions on skills.

Pre-field phase

In the first stage, the ten regions with the greatest number of higher education institutions were selected. Sampling was made based on the actual statistical data of Federal Service of State Statistics.

Table 1: Russian regions included in the sample:

#	Region	Regional centers	Number of higher education institutions in the region
1	Moscow	Moscow	207
2	St. Petersburg	St. Petersburg	90
3	Tatarstan republic	Kazan	32
4	Rostov oblast	Rostov-on-Don	33
5	Samara oblast	Samara	30
6	Chelyabinsk oblast	Chelyabinsk	20
7	Sverdlov oblast	Yekaterinburg	28
8	Novosibirsk oblast	Novosibirsk	23
9	Tyumen oblast	Tyumen	21
10	Nizhny Novgorod oblast	Nizhny Novgorod	18

In the second stage, three groups of higher education institutions were defined in order to cover students studying in different types of institutions:

- Classical universities-400 persons, including:
 - a. 200 students studying in social sciences/humanities
 - b. 200 students studying in sciences/engineering
- Science/engineering institutions-800 persons
- Social sciences/humanitarian institutions-800 persons

At the third stage, five leading higher education institutions were selected in each of the regions including:

- One classical university
- Two science/engineering higher education institutions
- Two social science/humanitarian higher education institutions

At the fourth stage, quotas by year of study were applied:

- 50 percent were students in the first year of study;
- 50 percent were students in their final year of study (4th year of study for students studying in bachelor degree programs and 5th year of study for students studying in specialist degree programs)

Implementation of the field phase

During the field phase, a total of 2000 filled out questionnaires were collected. The duration of interviews varied from 20 to 35 minutes.

A total of 52 interviewers participated in the field phase of the survey. Data was collected through formalized personal interviews at the place of study of respondents with the use of a specially designed questionnaire. All collected data were visually verified to ensure the completeness and quality of filled-out questionnaires.

Before beginning the field phase, all interviewers and supervisors were instructed to work with the questionnaire. Pilot interviews were conducted to familiarize interviewers with the questionnaire, to identify possible problem places in the questionnaire and to define interviewers' readiness to implement the field works.

Each interviewer was given a package of field documents: names of selected higher education institutions; sampling instruction; questionnaires; answer cards, business cards of WCIOM with names of interviewers and dates of interviews implementation.

Student surveys were conducted via questionnaires consisting of multiple choice and open questions. In some cases, the interviewer showed the respondent a card with a list of possible options/answers. In others, the respondent independently formulated an answer, which the interviewer wrote down precisely as stated.

A3: Description of Employer Survey

Sampling

The sample was drawn from regions of the Russian Federation with high, average and low levels of socio-economic development. The total sample size was equal to 1,500 establishments.

Professional categories of employers surveyed

Interviews were conducted with heads of human resources departments via questionnaires, at establishments with more than 50 employees. The sample included establishments from the main branches of Russian economy (mining; manufacturing; production and distribution of electric power, gas and water; construction; wholesale and retail trade; transport and communication; financial activity; real estate, and business service; education; health and social services). Thus, representativeness of firms was ensured at the national level but not at the industry level.

The sampling of establishments was based on actual statistical data of the Rosstat on the number of employees in certain categories and the development of infrastructure in each region of the Russian Federation. Distribution of the number of surveyed establishments by regions is given in Table 2.

Table 2: Regional distribution of the sample

#	Region	# of firms
1	Krasnodar krai	85
2	Republic of Bashkortostan	56
3	Republic of Tatarstan	71
4	Orenburg oblast	27
5	Sverdlovsk oblast	95
6	Khanty-Mansiysk autonomous okrug	22
7	Chelyabinsk oblast	79
8	Irkutsk oblast	52
9	Kemerovo oblast	43
10	Magadan oblast	42
11	Novosibirsk oblast	86
12	Samara oblast	71
13	Nizhny Novgorod oblast	56
14	Rostov oblast	64
15	Tyumen oblast	70
16	St. Petersburg	97
17	Altai krai	41
18	Perm krai	44
19	Moscow city	137
20	Primorsky krai	45
21	Republic of Karelia	25
22	Krasnoyarsk krai	59
23	Komi republic	22
24	Voronezh oblast	40
25	Kaliningrad oblast	41
26	Saratov region	30
	TOTAL	1 500

Appendix B: Overview of Russia's Education Sector

Education in Russia is provided predominantly by the state and is regulated by the Ministry of Education and Science. Regional authorities regulate education within their jurisdictions within the prevailing framework of federal laws.

Preschool education

Attendance at a preschool establishment is optional in Russia; parents are free to enroll their child if they wish. However, in contrary the state is obliged to provide parents with the services if they are requested. High demand in preschool services generates inequalities in this area – coverage by preschool services varies from 9 percent to 86 percent among Russian regions. Average coverage of preschool educational institutions of children at the age of 1-7 in the Russian Federation was 52 percent in 2000. The situation has insignificantly improved in recent years: in 2010 59.4 percent of preschool age children were covered by services in pre-school educational institutions.

Almost all Russian regions face significant shortage of places in kindergartens for children between the ages of 4 and 6. The number of required additional places in preschool establishments is growing over time, likewise the demand for services. However, the public system is not that effective in addressing such fluctuations quickly. In the situation of places shortage in kindergartens regional authorities developed several measures to solve the enrollment problem.

In some Russian regions the compensation schemes are introduced. This scheme is designed to make money transfers to parents who cannot receive ECD services and are in waiting lists. Clearly, this scheme is designed to promote the private providers. However, this doesn't guarantee that this money will be purposefully used.

Under the new Federal law (N 148-FL of July 17, 2009) indemnity payment (compensation) to parents whose children attend non-state pre-school educational institutions and pay tuition fees has been defined. Such changes were made in order to provide equal rights to children in obtaining pre-school education. With all positive signs of this change, this is only a half-way measure. The compensation for sustaining costs of the private kindergartens will be paid to only those parents whose children attend full day services licensed kindergartens. The share of such private KGs in Russia is 2 percent.

Primary and secondary education

Primary and secondary education lays the foundation for the development of a broad range of skills and prepares young people to become lifelong learners and productive members of society. Since 1997 Russia has faced a steep fall in the compulsory-school-age population.

The gross coverage ratio for the secondary level of education in the Russian Federation is largely in line with the figures for developed countries and shows a high level of participation of relevant age-cohorts. At the primary level, the country has seen a steady rise in enrollments compared to the US, Finland, Canada, Norway, and the UK.

The dropout rate in the Russian Federation has been among the lowest in the world. Moreover, the literacy rate has been among the highest in the world reaching almost 100 percent for the past 10 years.

Facing the problem of the fall in the school-age population, the Russian government has started the program of primary and secondary school optimization. A large number of small schools were either closed or consolidated in recent years. The changes were even more visible in rural areas where the number of school has decreased by almost $\frac{1}{4}$ over the recent decade. Another feature of the restructuring process has been the decrease of the number of primary schools. In 2000-2010 their number has been cut by 80 percent. However, decrease was not only due to closure of schools, but that was a part of the process of schools consolidation for system effectiveness increase. Often primary schools were merged with bigger schools offering several sublevels of general education.

Against the background of shrinking school network the number of specialized schools in Russia – lyceums and gymnasiums – has been increasing for almost two decades. Those schools are provided with better resources both financial and personnel; and thus, have better conditions for provision of high quality educational services. Despite lyceums and gymnasiums represents approximately 5 percent of school network in Russia, students studying there represent almost 13 percent of all children in general education system. Such trend will lead to the challenge of growing inequality in education system.

The student to teaching staff ratio in the Russian Federation is 17.0 for primary education and 8.8 for secondary level. For OECD countries average student/teacher ratios are 15.8 for primary and 13.8 for secondary education (Education at a Glance 2012, OECD). Compared to the OECD averages, there is an excess of teachers at the secondary level, which translates into inefficient use of resources.

In Russian Federation, more than 75 percent of funds allocated to education are raised and spent at regional level. Primary and secondary education is totally financed from regional budgets (99 percent in 2010). Russian regions spend annually on average 62 thousand RUR (USD 2,033) on general school student, though the number across regions varies about 12-fold in actual spending (2010).

The volume of government spending has significantly increased over the past 7 years, growing three-fold from 237 billion RUR (USD 7.7 billion) in 2003 to 827 billion RUR (USD 27.1 billion) in 2010. This translates into an average annual increase of 20.0 percent. However, in

fixed 2003 year prices general education financing had been increasing till 2007 and afterwards began to decrease.

By international comparison Russia spends less than most of European countries. In primary education OECD average is USD 7,719 per student and in secondary USD 9,312 per student (EU21 average is USD 7,762 and USD 9,512, respectively). However, according to its economic development Russian expenditures on secondary education lay in line with other countries

Vocational education and training

Professional and vocational education and training plays an important role in providing the skills, knowledge, and competences needed in the labor market. In 2000–2009 coverage ratio in vocational education decreased by 38.3 percent for initial vocational schools and by 9.3 percent for secondary vocational schools (down to 20 percent and 32 percent respectively)⁵⁷ mostly due to decrease of the number of entrants. The number of students pursuing higher education in the Russian Federation on the contrary has significantly increased over the past 18 years, growing almost three-fold from 2.8 million in 1990 to 7.4 million in 2009⁵⁸, what translates into an average annual increase of about 5 percent. Enrollment of 17 to 22 year olds to institutions of higher education doubled over this period mostly due to the growth of private sector in higher education.

Facing the problem of the decline in the corresponding age population, state authorities intended to restructure the present network of state IVET institutions. The number of IVET institutions has changed dramatically decreasing by almost $\frac{1}{3}$ in 2000–2009. Nevertheless, the network of higher education institutions has experienced significant growth. The number of HEIs has increased by almost 20 percent in 2000–2009. The expansion has resulted significantly because of increase in the number of non-state higher education institutions. Their number increased by 26 percent (against 9 percent growth in the number of state HEIs).

Student-teacher ratio in both sectors has not changed significantly. Internationally, Russia is close to the European estimates of student-teaching staff ratio in vocational education: in initial vocational education OECD average is 15.8, EU21 average—14.4⁵⁹ (in Russia—12.7); in secondary vocational education OECD average—16.4, EU21 average—12.9⁶⁰ (in Russia—15.8).

The number of teaching staff in SVET institutions has increased in line with the growth of the network of SVET institutions—their number increased by almost 5 percent in 2000–2008. Teaching staff in IVET institutions were to be terminated as a consequence of the closure of educational institutions. Currently the staff not classified as instructional personnel (staff other

⁵⁷ Rosstat.

⁵⁸ Ibidem.

⁵⁹ Postsecondary non-tertiary education.

⁶⁰ OECD. Education at a glance 2012: OECD Indicators. Paris: OECD.

than teaching staff, teachers' aides and research assistants) represent on average slightly less than a quarter of the total teaching and non-teaching staff in initial vocational schools. In higher education, staff not classified as instructional personnel represents on average nearly 20 percent of the total teaching and non-teaching staff (40 percent for tertiary education in OECD).

The volume of government spending on professional and vocational education and training has significantly increased over the past 5 years, growing in VET three-fold from 54.5 billion RUR (USD 1.8 billion) in 2003 to 169 billion RUR (USD 5.6 billion) in 2009 and in higher education almost six-fold from 61.2 billion RUR (USD 2.0 billion) in 2003 to 347.2 billion RUR (USD 11.5 billion) in 2009.

The proportion of GDP per capita earmarked for vocational education (both initial and secondary VET) increased from 14.4 percent in 2003 to almost 20 percent in 2009. However, the share of public expenditure on vocational education in total public expenditure on education has dropped during that period. At relatively stable public spending on education represented by share in total public spending, per student investments on state higher education institutions (as a share of GDP per capita) has increased by almost 13.2 percent point. Higher education became a higher priority in the area of education financing—share of spending on higher education in total public spending on education increased by 6.6 percent in 5 years.

Higher education

In 2003 Russia signed the Bologna Declaration, which launched the process of migrating from Russian traditional tertiary education model to a modern degree structure in line with Bologna Process model. In October 2007 in Russia a law was enacted that replaced the traditional five-year model of education with a two-tiered approach: a four-year bachelor degree followed by a two-year master's degree. In 2010 the admission to the traditional five-year programs was stopped. So in 2014 in Russia there should be no five-year programs students excluding just a few specializations.

The number of students pursuing higher education in the Russian Federation has significantly increased over the past 18 years, growing 2.5 times from 2.8 million in 1990 to 7.1 million in 2010. This translates into an average annual increase of about 5 percent. Gross coverage by higher education doubled over this period. However, a closer look at the data reveals that the expansion has been significantly due to the growth of the number of students studying on commercial places – a unique feature of the post-Soviet era.

Interesting feature of Russian higher education system is that starting from 2000 number of entrants to educational institutions exceeds number of school leavers. Such fact constitutes that not only graduates from schools are applying to higher education institution but also leavers from vocational schools in order to increase their educational level.

Looking at the number of entrants to higher education institutions it should be noted that beginning from the same year (2000) number of students applying to fee-based services at educational institutions has been exceeding number of students applying to state funded places. This is quite alarming as training in universities on fee-based basis has been providing mostly in areas that are popular among students (economics, management, law), but already in low demand by employers due overproduction of such specialists in previous years.

The network of higher education institutions has experienced significant growth. The number of HEIs has increased by more than 15 percent in 2000-2010. However, a closer look at the data again reveals that the expansion has resulted significantly because of increase in the number of non-state higher education institutions. Their number increased by 29 percent (against 8 percent growth in the number of state HEIs).

Higher education has hierarchical management system that includes 3 levels: federal, regional, and municipal. In addition to existent network of higher education institutions there is widely spread network of institution branches in the regions of Russia: in 2008/2009 academic year there were 1,663 branches of higher education institutions including 1,102 branches of public HEIs, and 561 of private. That means that one higher education institution on average have 1.5 branches (1.7 in public sector of higher education system, and 1.2 in private).

State HEIs are mostly financed from the federal budget with only 3.5 percent of total funding in 2010 coming from regional budgets. The volume of government spending on higher education has significantly increased over the past 5 years, growing almost six-fold from 61.2 billion RUR (USD 2.0 billion) in 2003 to 377.8 billion RUR (USD 12.3 billion) in 2010.

Looking outside the Russian border OECD countries as a whole spend 13,728 USD annually per tertiary student (Education at a Glance 2012, OECD). On average, OECD countries spend nearly twice as much per student at the tertiary level as at the primary level. Russia also spends, on average, two times more on educational institutions per student at the tertiary level than at the primary level.

Today the process of higher education institutions stratification on two groups is occurring: strong research and innovative (with additional federal financing), and regional high schools, that cannot compete with first group but also very important particularly for regional labor markets. This process should not stop. Returning to equal financing for all universities - strong and weak - could destroy the first early gains in innovation in higher education, of the past 3-4 years.

Appendix C: International Experiences in Adjusting the Educational System to Suit Changing Economies

Many countries are concerned with skills gaps and mismatch and already have gained significant experience in developing systems to help their workforces acquire needed skills. Approaches differ; however, often countries use the same mechanisms to adjust the current system. Review of measures and approaches from different countries suggests the need to focus on the following key areas:

A: Development of a detailed strategy or shared vision

- Singapore has developed strategy for technology development emphasizes industry's particular skills needs and addresses shortages through a number of measures. Singapore's government has established a Skills Development Fund (SDF) and a Skills Program for Upgrading and Resilience (SPUR). These encourage employers to invest in upgrading workforce skills by sharing the cost of training that is relevant to the economic development of Singapore. The government also welcomes skilled foreign talent to Singapore.
- Norway is implementing its Competence Reform that has various policy approaches towards SMEs with respect to workplace development and innovation. This reform seeks to move beyond simply increasing the supply of skills to deploying them to develop innovations and create value.

B: Provision of incentives for businesses to participate in training and skills formation

Tax incentives

- The Netherlands recently experimented with an extra deduction from taxable profits on training expenditures, plus an additional deduction for firms spending less than a specified amount. In targeting firms with low absolute levels of training expenditure, the incentive both automatically targeted small firms and minimized deadweight losses.
- France has long operated training tax credit for those SMEs that, year after year, invest in vocational training beyond the statutory obligation, with a higher credit for firms with fewer than 50 employees. Through being related to the previous year's training, the device is an incentive for increasing training expenditure and restricts deadweight expenditure.
- Belgium's (Flemish) Vlamivorm project, offering a reduction of property tax equivalent to spending on worker training, achieved good results without undue deadweight cost through targeting sectors with a poor training record. It also achieved very high

participation of micro firms, by making internally-organized informal training eligible for the reduction.

- Malta has developed elaborate and highly targeted tax-related scheme, where eligibility for deduction is focused on training of full-time employees in particular sectors. The rate of reimbursement is higher for small than large enterprises, and respectively higher still if the training is generic rather than workplace-specific.

Training subsidies for firms

- In France there is a subsidy of up to 70 percent of training costs offered, with a further 10 percent for special groups of employees. Targeting is effective: 90 percent of beneficiaries have fewer than 50 employees. Evaluation suggests that training in small firms is relatively sensitive to the availability of subsidies – its incidence rose significantly in those enterprises assisted – where both qualified and unqualified workers were found to have received training.
- Singapore's government has established a Skills Program for Upgrading and Resilience (SPUR) that encourage employers to invest in upgrading workforce skills by sharing the cost of training that is relevant to the economic development of Singapore. SPUR offers financial incentives to employers when they send their workers for SPUR courses conducted by approved training providers. The incentives are course fee subsidy and compensation for workers' absence during the period of training (absentee payroll subsidy). Under the program, there are over 1,000 courses ranging from healthcare, education, security, social services to tourism, available until 30 November 2010.

Pay-back contracts

Pay-back contracts are made to permit employers to recover at least part of their investment in training staff members in the event that they leave voluntarily soon afterwards. Through reducing the risks involved, this encourages employers to support training. While such arrangements are in rare cases enshrined in law, they are relatively common in individual contracts and collective agreements.

- In Germany, they are found to operate in perhaps 15 percent of firms.
- In Switzerland – proportionately more, but no example is found of the mechanism targeted on small firms specifically or specifically adapted to their needs.

Training levies

Training levies including (i) 'train-or-pay' systems requiring employers to invest a particular amount (a share of payroll) on training, or pay a tax based on the shortfall; (ii) employer contributions to a common fund (administered nationally or through a sector body), from which training costs are met.

- In France and Québec based upon statutory arrangements rather than voluntary agreement, are perceived as having so few benefits for small employers that they often regard it simply as a tax.
- In Spain, training levies are deployed to encourage firms with fewer than 100 employees to cooperate over training. By requiring sector or territorial groups of such employers to submit joint plans, group training programs have resulted that benefit from reduced costs through economies of scale. Some bids for funds (e.g. auto-repair shops) are from groups made up of virtually all the enterprises in a sector.
- South Africa's 1 percent national training levy, which embraces many micro firms, operates to encourage the development of such capacity. Part of the levy can only be re-claimed by enterprises if they have appointed a Skills Development Facilitator – either an externally-appointed consultant, or someone assigned the duty internally – to help enterprises develop an annual skills plan and to inform employers of developments relating to accreditation, available courses etc.
- Belgium's levy, set by collective agreement at 0.25 percent of payroll, supports a fund that operates according to sector training priorities, but includes a specified minimum to be spent on 'at risk groups', defined to include small businesses.

Job-rotation schemes

Job-rotation schemes support continuing vocational training through addressing the need to replace an absent worker and to meet the cost of a replacement. Job-rotation potentially offers a solution to the problem of worker absence for purposes of training. Originating in Denmark, such schemes now operate in a several countries.

- Such initiatives in Germany have been designed so as to play a significant role with respect to smaller enterprises, including micro-firms. Some localities have developed a substantial support infrastructure purposely orientated to the needs of small firms in particular sectors, where replacement workers are carefully prepared in advance of taking up a position. The scheme is used mostly for replacement of skilled workers and managers rather than the unskilled; thus, not all unemployed people are suitable for such programs.

C: Provision of incentives for working individuals to participate in learning and (re)training;

Rights to training leave

Whether by statutory right for employees or collective agreements, training leave is a direct means of encouraging continuing vocational training.

- Some countries (such as Spain and South Korea) fund such leave through employer (and employee) contributions to a special training fund.

- In others (e.g. the Netherlands), leave is funded through special sector training and development funds.
- By contrast, in Portugal employers are expected to bear the cost of the compulsory training leave (20 hours per year).
- Scandinavian countries achieve somewhat higher rates of leave take-up among smaller firms, not because of targeting by firm size, but because of their more generous financial support overall, plus institutions and social norms that encourage employers to grant such leave.
- France is notable for its integrated system granting a general right to training with special provision for small firms to receive support to replace a worker on approved training leave.

Training vouchers for individuals

- Belgium's training vouchers scheme, targeted upon small (and especially micro) firms, accommodates these needs. Vouchers purchased on-line (matched by government up to a €6000 maximum) are used by employers to purchase training from accredited providers.

D: Furthering collaboration between businesses

Pooling resources and networking (to provide opportunities for businesses to share skills, knowledge and experience with other business people)

- Austrian automobile manufacturer Magna Steyr organizes training for its supplier network, partly motivated to do so because of quality and other production gains. SME engagement is encouraged by prospects of access to the supply chain, on achieving the requisite accreditations.
- Belgium's Strategic Plan Kempen (European PLATO program) funds large enterprises to provide an intensive counseling program for owner-managers of small local firms. Managers act as mentors, providing individual coaching alongside structured seminar programs and activities. Evaluation found sustained benefits in terms of both business performance and network building.
- In South Korea, companies like Sanyo, aided by payroll tax monies, operate joint training centers for their suppliers, including small firms. Alongside these networks, training consortia of SMEs appoint training managers to liaise with local providers to deliver members' training needs.
- Joint action by business associations, colleges and groups of enterprises is facilitated by programs such as Canada's Workplace Skills Initiative. WSI funds partnerships to explore innovative ideas for building SME workplace skills through forming new local or sectoral networks of training providers and enterprises, including larger firms.

Appendix D: Case Studies of Selected Russian Companies Addressing the Skills Shortage

The cases presented in the annex are based on the short interviews with representatives of the organizations and review of the publicly available information. The cases aim at providing some good practice examples of the skills development initiatives. These materials do not present official position of these organizations.

[1] United Aircraft Corporation (UAC)

UAC is a Russian open joint stock company. With a majority stake belonging to the Russian Government, it consolidates Russian private and state-owned aircraft construction companies and assets engaged in the manufacture, design and sale of military, civilian, transport, and unmanned aircraft.

Problems in the area of workforce skills development

Aviation is a high-tech industry demanding high level qualifications and skills from the employees. This is a challenge for several reasons: i) VET professions/occupations in Russia have low prestige so it is hard to attract graduates with solid cognitive and technical skills mix, ii) right technical skills can be developed only at specialized high-tech expensive equipment which is not available in colleges and universities, iii) the demanded skills and qualifications shall be regularly updated while the capacity of formal education and training system is low.

Proposed Solutions

- 1) Continuous corporate learning aimed at building leadership skills, enhancing professional skills of the Corporation's employees as well as ensuring the communication of corporate culture.
- 2) There are several Russian regions, where UAC is successfully cooperating with the local institutions in VET programs implementation: Voronezh, Ulyanovsk, Kazan, Rostov-on-Don, Taganrog, Komsomolsk, Novosibirsk, Irkutsk. Every year the enterprises-members of UAC provide the Corporation's Education Department with forecasted number of personnel with special skills needed. Based on their request, UAC Education Department is planning the recruitment of new employees and professional development programs for current staff.
- 3) There are several possible forms of VET educational program delivery:
 - a. Specialized classes organized on the basis of secondary school;
 - b. Training-industrial complex centers;
 - c. Trainings organized on the basis of the enterprises;

d. Partnership programs with educational institutions

- 4) Formation of a base of profile educational institutions capable of providing the Corporation with young professionals trained in accordance with world standards. UAC is carrying-out a program of audit of aerospace high and special schools with corresponding specialties in their curriculum. This program includes 78 institutions of higher professional education and 34 primary and secondary VET schools. The purpose of this work is to form a complex of professional education schools of all levels in training and retraining of specialists of different areas of design, development, support, testing and operation of aircraft. Moreover, participation in the development of the federal state educational standards of profile specialties that employ the developed professional standards and industry competences is one of the basic directions of the cooperation of profile educational institutions and enterprises.
- 5) Establishment of a rotation, career making and personnel reserve formation system to provide continuous professional development for the Corporation's employees. System personnel reserve created job at all entities of the Corporation consists of two levels. It involves working with the personnel reserve the Corporation and personnel reserve of each of the companies in the UAC. In the reserve Corporation candidates get the highest levels of management of each company. Subsequently, the staff included in the reserve of the Corporation, will be considered as candidates for executive positions, both in the Corporation and its subsidiaries.
- 6) Reforming of compensation and benefit system as well as creation of KPI-based motivation system. Currently the Corporation started a project to improve compensation and benefit systems of JSC "UAC" member companies. The purposes of this project are to: (i) create a corporate wide motivation system; (ii) introduce a unified compensation policy in all UAC's companies; (iii) develop and implement a unified policy in social benefits and guarantees area in all companies of the Corporation (in particular, the project is working to create a corporate mortgage program).
- 7) Formation of a modern corporate culture as the basis of becoming an attractive corporate employer and an internal communications system that provides transfer of cultural norms.
- 8) UAC is lobbying for the changes in VET education standards through the professional network – the Association of aircraft construction colleges

[2] RUSNANO Corporation

Rusnano and the Fund for Infrastructure and Educational Programs are state instruments dedicated and empowered to fostering the growth of the nanotechnology industry in Russia. Rusnano carries out its charge through commercial mechanisms, by co-investing in nanotechnology projects with substantial economic potential. Rusnano's mission is to build a competitive nanotechnology industry based on the advances of Russian scientists and the transfer

of cutting-edge technologies from other countries. The Fund for Infrastructure and Educational Programs supports development of infrastructure to enable nanotechnology innovation in the country.

Problems in the area of workforce skills development

Nanoindustry is a young branch of economy, and traditionally there was no specialized education and training programs available to prepare workforce for this industry. Nanomanufacturing companies require large number of workers with very specific technical skills which are not sufficiently produced by the higher education system. So the demand for retraining of existing specialists is high. Rusnano has established a training Fund to link nano-companies with universities in order to develop joint training programs.

Proposed Solutions

- 1) Development of educational programs: by 2012 by request of the companies and with support of Fund more than 80 programs of preparation and retraining of staff of the companies of a nanoindustry were developed: technological and administrative profile. Customers of educational services of Fund highly appreciate quality of educational programs which are created by leading higher education institutions for the solution of their personnel tasks.
- 2) Development of occupational standards: The Fund develops professional standards for the most demanded types of labor activity, and on their basis offers the following types of service: (i) creation of educational programs taking into account demand on a labor market; (ii) formation of system of an assessment and certification of qualification of the technical personnel of the enterprises and graduates of higher education institutions, including development of the system of an assessment of their readiness for performance of certain labor functions; (iii) carrying out a public and professional assessment of educational programs of higher education institutions from the point of view of personnel requirements of a nanoindustry.
- 3) One of the department's activities is work with secondary schools. Since 2012 the comprehensive program "School league of RUSNANO" which purpose is advance at schools of Russia of modern ideas and the best experience of the teachers, able to interest children in natural-science education and by that to open them the road to the world of high technologies is realized. One of the most considerable events of the program – annual summer schools "Nanograds" on which every year gathers more and more participants. In 2012 academic year 31 schools from 13 regions of the country became members of the league.

[3] Russian Union of Industrialists and Entrepreneurs (RUIE)

Russian Union of Industrialists and Entrepreneurs /RSPP/ is an independent non-governmental organization. The Union serves as a driver and mediator to communicate the demands of the employers to the education sector.

Problems in the area of workforce skills development

The state doesn't provide a strong message to the private sector concerning the qualification standards development, doesn't facilitate the cooperation in this field and provides little incentives for engaging with the training provision. Therefore the private sector has no real interest in resolving nation-wide issues of skills development.

Proposed Solutions

- 1) In 2006 RUIE has created National Agency for Qualification Development aimed to develop occupational standards, qualification frameworks, and independent qualifications centers.
- 2) RUIE is promoting the idea of business participation in qualification standards development. Currently 80 qualification standards have been developed and around 100 are under way.
- 3) RUIE is actively lobbying for legislative innovations in order to change the situation with qualification and skills development: Labor Code – the definitions of “qualification” and “occupational standard” have been introduced; New law on education – public-private accreditation of VET programs will be introduced; National Plan on Human Resource Development – budget funds have been allocated; Ministry of Labor – development of regulatory documents, coordination of Expert council
- 4) RUIE is analyzing international experience on VET development/occupational standards, especially of Germany, France, Finland, UK, USA, South Africa, Australia, New Zealand
- 5) UK functional analysis of labor functions was taken as a model for occupational standards development

[4] National Agency for Qualification Development

Problems in the area of workforce skills development – experts' view

Today in-firm TVET training is implemented within big companies; very few SME in Russia are capable to provide such training. Today many qualification standards are outdated and education programs are focused on training for not very sophisticated qualifications. The old TVET education system is not able to adapt to raising demand for new skills due to the lack of resources and inability to transfer new professional knowledge.

Proposed Solutions

There is a need to create new type of institutions – Centers of applied qualifications – new private-public institutions. These centers are aimed to prepare specialists with high level skills

according to the new qualifications and can be potentially founded by business sector organizations or successful educational institutions. Another aim of these centers is to facilitate creation and reviewing of professional/occupational qualification standards. The accreditation of such centers should be implemented by business associations.

The Centers of applied qualifications should be oriented mainly for current employees present on the labor market, labor migrants, youth with primary professional education and company employees seeking new skills.

[5] Capital Group

Capital Group is one of the leading Russian real estate development companies that entered Moscow property market in 1993. Capital Group carries out high-end residential projects (Business, Premium, and Deluxe class), as well as office projects: class A business centers, shopping malls, hotels.

Problems in the area of workforce skills development

Real estate development is a new sector of economy that currently experiences heavy growth. Primary importance in the sector is assigned to effectiveness of business. On the company level the main source for improving effectiveness is seen through enhancement of labor productivity – improvement of effectiveness of work on individual level. Capital Group stresses much attention to attracting best cadres as well as to regular retraining and qualification enhancement of current staff. Currently the company is faced by the following problems in the area of Human Resources (HR):

- There is a lack of uniform occupational standards in real estate development sector in Russia (description of working duties for the same positions in different companies strongly differs);
- There is a strong deficit of qualified specialists in the area of management of investment and construction projects;
- There is a lack of educational standards for higher and postgraduate education and training of managers of real estate development projects that meet the business requirements;
- Labor market in Russia is overheated, i.e. there are too many expensive (costly) professionals of moderate (low) qualification.

Proposed Solutions

Willing to solve the existing problems in the area of workforce skills development Capital Group applied to educational institutions (public and private) and conducted negotiations with them regarding development of new or improvement of existing educational programs that would satisfy their skills needs. The company has conducted dozens of negotiations; however, they failed to find common language with education providers, their needs were not heard.

In 2009 Capital Group decided to develop its own educational program, and the company became one of the institutors of the specialized professional training center Real Estate Management University (REMI) in partnership with HR executives of the top industry representatives. In 2010 more than 100 Capital Group line managers took a 9-month module training course “Effective Leader”, and took part in a series of master classes “Practical Experience Workshop”. The course’s trainers and authors are professional business trainers and REMI-participating companies’ practitioners.

In 2011, REMI and Russian Presidential Academy of National Economy and Public Administration created the joint retraining program “Project Manager in Development” – first educational standard in development. The MA staff includes 50 teachers, including Academy teaching personnel, sitting heads of real estate companies, authors of REMI educational programs, representatives of legislative and executive powers. As a result, qualification of Russia’s development project managers will allow to achieve ambitious targets and will be confirmed by state-recognized degree.

In addition to the above mentioned activities Capital Group regularly implements professional educational courses for the employees in the company’s office.

Appendix E: Technical Appendix

Questionnaires for both skill surveys have 31 questions that can be used to measure non-cognitive skills according to the Big Five model (see Table 1). Questions that measure the same non-cognitive skill can be grouped together. By using the answers to several questions to gauge a certain skill, one obtains a more accurate measure, as noisy answers are averaged out. Table 2 shows how the 31 questions in the survey were grouped to map the different non-cognitive skills. Given the numerous questions related to the “conscientiousness” dimension of the Big Five model, it has been broken down into three sub-components: “efficiency,” “perseverance” and “self-discipline.” Later analysis of the correlation between the skills indicators and labor market outcomes validates this strategy a posteriori (see Table 3).

Building non-cognitive skill indexes

The questions that measure non-cognitive skills are based on a statement describing an attitude or a recurrent behavior. Respondents were asked to specify how often they might adopt this attitude or behavior using a four-level discrete scale: from 1 for “always” to 4 for “never.” Statements in the questions are phrased in such a way as to receive either “positive” or “negative” answers. When an answer is positive, respondents who agree with the statement are likely to have a high level of non-cognitive skill.

The questionnaires contain several questions related to each component or sub-component of the Big Five Model in order to limit measurement errors. One can build indexes measuring non-cognitive skills by compiling answers from each group of questions. However, to calculate linear combinations of answers from different questions, one computes new variables from the positively phrased questions. Basically, when the question is phrased positively, the new variable is then set to “5—score.” Then in all cases, a high score, for instance 4, means that the negative question is fully rejected and thus the contestant is likely to have a high skill index.

Two different procedures are used to compute indexes for non-cognitive skills. First, a simple arithmetic average of the answers of each group of questions is calculated. Second, weighted averages are built using factor decomposition. All indexes are continuous variables varying from 1 (low skill endowment) to 4 (maximum skill endowment) and can be compared to the previously computed simple averages. Estimated weights are displayed in Table 2. Partial correlations displayed in Table 4 indicate (i) that indexes measuring different non-cognitive skills are not highly correlated and (ii) that the three sub-components of the conscientiousness dimension are distinct.

Treatment of missing data⁶¹

Given the large number of missing data and the limited number of observations on the labor market—only 1,197 contestants in the household survey were of working age (15–64)—it would not be possible to obtain any significant correlation using only raw data. After discarding all missing values, only 552 observations remained in the sample. However, the answers to the 31 questions should correlate with each other, assuming that they derive from a similar non-cognitive skill that remains directly unobservable. One therefore can exploit these correlations between answers to project the missing data.

To do so, linear regressions of the missing data are performed on the set of the available (non-missing) variables within each group of variables (see Table 2). As available data varies from one observation to another, we project the missing data for each observation using the maximum number of available data. This process allows us to limit the number of missing observations to 20, increasing the number of usable observations to 1,177 out of 1,197 working-age respondents. The process provides the best possible estimates of each non-cognitive skill index, given the data available.

Correlations between skills indexes and labor market outcomes

The correlation between the constructed indexes and labor outcomes is then examined. Here, analysis is limited to the working-age population, 15–64 year-olds. The probability that someone is currently working is estimated using a probit model. Then, an income variable is built and modeled, using a linear model.

Among the 1,197 contestants in the working force, 57.1 percent reported working at the time of the survey. The probability of being employed is closely tied to gender and age. All other things being equal, once skills are taken into account the probability of working is 17.6 percent lower for women. The probability of working at a particular age follows a bell-shaped curve, increasing sharply with age until 40, and decreasing sharply thereafter. For example, the probability of being employed is 40 percent lower for either a 20-year-old or a 60-year-old than for a 40-year-old. The marginal effects of skills as measured by the indexes are reported in Table 3 below.

Information about income level is provided in the survey but the number of missing observations is unfortunately too high to draw any significant information from that variable alone. To overcome that issue, we built an income index using available information about (i) the financial situation of the household, (ii) the highest level of education among household members, (iii) the size of the city of residence, (iv) the current occupation of the contestant and (v) whether he/she is currently working. A linear regression of the logarithm of the income category is

⁶¹ Education level is used to reconstruct income but no information on skills is used to build this projected variable.

performed on those variables and the results used to project an income index. This variable is later used as a dependent variable in a linear regression (see Table 3 below).

Table E.1 Components of the Big Five Model

Dimension	Facet (and correlated trait adjective)
Extroversion vs introversion	Gregariousness (sociable)
	Assertiveness (forceful)
	Activity (energetic)
	Excitement-seeking (adventurous)
	Positive emotions (enthusiastic)
	Warmth (outgoing)
Agreeableness vs antagonism	Trust (forgiving)
	Straightforwardness (not demanding)
	Altruism (warm)
	Compliance (not stubborn)
	Modesty (not-show-off)
Conscientiousness vs lack of direction	Tender-mindedness (sympathetic)
	Competence (efficient)
	Order (organized)
	Dutifulness (not careless)
	Achievement striving (thorough)
	Self-discipline (not lazy)
Neuroticism vs emotional stability	Deliberation (not impulsive)
	Anxiety (tense)
	Angry hostility (irritable)
	Depression (not contented)

Openness vs closedness to experience	Self-consciousness (shy)
	Impulsiveness (moody)
	Vulnerability (not self-confident)
	Ideas (curious)
	Fantasy (imaginative)
	Aesthetics (artistic)
	Actions (wide interest)
	Feelings (excitable)
	Values (unconventional)

Table E.2 Grouping Non-Cognitive Questions According to the Big Five Model

Components	# question	Description	Positive/negative	PCA weight
Extroversion	q42	Do you talk much?	+	9.3 percent
	q59	Do you think about how your actions could affect other people?	+	27.2 percent
	q65	Are you easy-going and sociable? For example, do you find it easy to make new friends?	+	23.1 percent
	q67	Are other people unfriendly towards you?	-	11.9 percent
	q70	Do you give much thought to how your actions could affect other people?	+	28.6 percent
Agreeableness	q49	Do people use you for their personal gain?	-	11.0 percent
	q51	Do you forgive other people easily?	+	23.1 percent
	q60	Are you rude to other people?	-	22.3 percent
	q64	Are you generous when it comes to sharing your money and/or time with other persons?	+	17.8 percent
	q72	Are you very patient?	+	25.8 percent
Conscientiousness	q46	Do you pursue your goals in spite of setbacks?	+	9.5 percent
	Perseverance	Do you carry through with all tasks that you start working on?	+	28.5 percent
		Do you work hard?	+	31.3 percent
		Do you prefer leisure over hard work?	-	15.6 percent
		Do you like working on tasks that require a substantial amount of time to complete?	+	15.1 percent
Efficiency	q43	While working on some task, are you attentive to details?	+	50.0 percent

	q61	Do you work very efficiently and fast?	+	50.0 percent
Self-discipline	q56	Do you do things which give you temporary enjoyment but which you subsequently regret?	-	38.6 percent
	q62	Do you find it difficult to give up bad habits?	-	39.7 percent
	q66	Do you consider different choices before making a decision?	+	21.7 percent

Emotional stability	q47	Are you able to keep your composure in stressful situations?	+	11.2 percent
	q52	Do you worry a lot?	-	15.3 percent
	q54	When angry, do you yell at people?	-	18.6 percent
	q63	Do you easily get into a state of anxiety?	-	19.4 percent
	q69	Do you easily get angry?	-	22.9 percent
	q71	When you find yourself in a crowded place, do you push and shove other people?	-	12.5 percent
Openness	q44	Do new ideas come to your mind that other people did not even think of?	+	15.6 percent
	q45	Do you prefer not to share your views with other people?	-	0.8 percent
	q53	Are you interested in learning new things?	+	34.4 percent
	q58	Do you value artistic, aesthetic experiences?	+	34.6 percent
	q68	When you do not understand something, do you ask for help?	+	14.5 percent

Table E.3 Marginal Effects of Skills Endowment on the Probability of Employment and on Income among the Working Age Population (15-64 years old)

Skill indexes	Standard deviation in the general population	-----Employment-----			-----Income-----		
		Marginal effect of index	P-value	Marginal effect of one s. d.	Marginal effect of index	P-value	Marginal effect of one s. d.
Extroversion	0.55	-0.07	0.05	-13 percent	0.03	0.53	6 percent
Agreeableness	0.50	-0.06	0.14	-12 percent	-0.06	0.20	-13 percent
Efficiency	0.68	0.15	0.00	22 percent	0.13	0.00	20 percent
Persistence	0.54	0.22	0.00	41 percent	0.28	0.00	52 percent
Self-discipline	0.62	-0.04	0.19	-6 percent	-0.01	0.72	-2 percent
Emotional stability	0.54	0.13	0.00	24 percent	0.13	0.00	24 percent
Openness	0.58	-0.04	0.27	-6 percent	-0.11	0.01	-19 percent
Use of PC	1.36	0.06	0.00	5 percent	0.12	0.00	9 percent
Foreign languages	0.71	-0.06	0.02	-8 percent	0.01	0.86	1 percent

Table E.4 Correlation of the PCA Weighted Index with Simple Average Indexes

	Simple average indexes	Extroversion	Agreeableness	Perseverance	Efficiency	Self- discipline	Emotional stability
Extroversion	0.959	1					
Agreeableness	0.982	0.409	1				
Perseverance*	0.692	0.311	0.276	1			
Efficiency*	0.788	0.314	0.314	0.518	1		
Self-discipline*	0.588	0.200	0.253	0.173	0.232	1	
Emotional stability	0.99	0.022	0.261	0.094	0.145	0.280	1
Openness	0.878	0.459	0.306	0.318	0.308	0.088	0.009

Projections of reading performance at the regional level

The average reading scores at the regional level are estimated in three steps from PISA 2009 data.

First, individual reading scores y are regressed over personal characteristics X including the mother work status, the mother education, and both parents' occupation (see table E.5).

$$y_i = X_i\beta + \varepsilon \quad (1)$$

From equation (1), one can compute for each student the endowment z , from its vector of characteristics X and the estimated vector of multipliers, β .

$$z_i = X_i\beta \quad (2)$$

To take into account the peer effects at the school level and the effects of the regional human capital at the system level (mainly to capture the human capital of teachers), one regress individual scores on the individual endowment z_i , the school average endowment z_s and the federal district endowment z_f , which are both calculated using weighted average of the individual endowment z_i .

$$y_i = z_i\alpha_i + z_s\alpha_s + z_f\alpha_f + \varepsilon \quad (3)$$

As expected, all three multipliers are well identified, see Table E.6. Moreover, the adjusted R² also increased significantly from the first step estimation, indicating that the endowments aggregated at the school and regional level actually carries information.

To take into account local factors that may not be embedded into the endowments, one adjusts the projected values $\hat{y}_r$ by adding a constant γ_f for each federal district that allows the projected federal district average (using population weights ω_r) $\hat{y}_f = \sum_{r \in f} \omega_r \hat{y}_r$ to match the actual estimated score in the PISA sample (see equation 5).

$$\hat{y}_r = z_r(\alpha_i + \alpha_s + \alpha_f) + \gamma_f \quad (4)$$

$$\gamma_f = y_f - \sum_{r \in f} \omega_r z_r(\alpha_i + \alpha_s + \alpha_f) \quad (5)$$

Finally, the projected scores are only used for regions from which actual data is not available in PISA. For other regions, the actual average score is used.

Table E.5 Estimation of Reading Score on Individual Variables

Dependant: PISA Reading score	Estimate	Student
woman education: 2	44	1.8
woman education: 3	65	2.4
woman education: 4	62	2.6
woman education: 5	80	3.3
woman education: 6	84	3.4
woman status: 2	-15	3.1
woman status: 3	5	1.6
man occupation: 2	13	2.4
man occupation: 3	-1	0.1
man occupation: 4	-23	1.4
man occupation: 5	-24	5.0
man occupation: 6	-29	2.4
man occupation: 7	-26	6.8
man occupation: 8	-30	8.0
man occupation: 9	-35	7.2
woman occupation: 2	13	2.8
woman occupation: 3	-8	1.7
woman occupation: 4	-8	1.4
woman occupation: 5	-29	6.3
woman occupation: 6	-39	4.1
woman occupation: 7	-33	5.6
woman occupation: 8	-30	3.8
woman occupation: 9	-48	9.5
# observations	4547	
Adjusted R2	0.15	

Table E.6 Estimation of Reading Score Taking into Account Peer Effects

Dependent: PISA Reading score	Estimate	Student
Endowment (individual)	0.62	15.8
Endowment (school)	1.30	14.8
Endowment (regional)	0.66	4.5
# observations	4547	
Adjusted R2	0.22	

Bibliography

- Abankina I. (2012) “Education does not work”. Interview. Higher school of Economics.
- Abdrakhmanova G., Gorodnikova N., Gracheva G. (2011) Russian innovation index. Moscow: HSE.
- Aggarwal, V.S. (2010) Skill formation systems and strategies for economic competitiveness in countries,” Delhi Business Review, Vol. 11, No. 1 (January - June 2010)
- Alam, A. (2010) “Productivity Growth in Eastern Europe and the Former Soviet Union,” World Bank.
- Almeida, R. (2009) “Innovation and Openness in East Asia: Are They Increasing the Demand for Educated Workers?” Background Paper prepared for Flagship on Higher Education in East Asia. Washington, DC: World Bank.
- Almeida, R. (2009). “Does the Workforce in East Asia have the right skills? Evidence from Firm Level Surveys.” Background Paper prepared for Flagship on Higher Education in East Asia. Washington, DC: World Bank.
- Almeida, R., Behrman, J., Robalino, D. (2011) “The Right Skills for the Job?: Rethinking Effective Training Policies for Workers,” Washington, DC: World Bank.
- Androushchak, G., Prudnikova, A. (2010) “Returns to education in Russia: role of higher education institutions,” Laboratory of institutional analysis, Moscow: State university—Higher school of economics.
- Avraamova E., Gurkov I., Karpukhina G., Levinson G., Mihailuk M., Polushkina E., Stutchevskaya O. (2006) “Employer requirements for the professional education system,” Academy of national economy, Moscow: MAKSS Press, series “Management. Finance. Education.”
- Axmann M. (2010) Linking Education and Training to Employment—The Role of NQFs, International Labour Organization.
- Bakatina, D., Duvleusart, J., Klintsov, V., Krogmann, K., Remes, J., Shvakman, I., Solzhenitsyn, Y. (2009) “Lean Russia: Sustaining economic growth through improved productivity,” McKinsey Global Institute.
- Belokonnaya L., Gimpelson V. et al. (2007) “Salary Formation: View through the Prism of Profession,” Preprint WP3/2007/05—Moscow: State University—High School of Economics, p.44.

- Bessonov, V.A. (2004) "On Dynamics of Total Factor Productivity in the Russian Transition Economy," Moscow: Institute of Economics of Transition Period.
- Brunello G. (2009) "The Effect of Economic Downturns on Apprenticeships and Initial Workplace Training: a Review of the Evidence," *Journal of Empirical Research in Vocational Education and Training*, OECD.
- Buiter, W. H. (2000) "From Predation to Accumulation? The Second Transition Decade in Russia," *Economics of Transition* 8 (3): 603–622.
- Cawley, J., J. Heckman, E. Vytlačil (2001) "Three Observations on Wages and Measured Cognitive Ability.," *Labour Economics*, 8(4), pp. 419-42.
- Clarke, S./ Metalina, T. 2000. Training in the new private sector in Russia. In: *International Journal of Human Resource Management* vol. 11.1, 19-36.
- Denisova, I., Lazareva, O., Tshlo, S. (2006) "Hiring or retraining: experience of Russian enterprises," Moscow: Scientific study of Institute of transition economy.
- di Gropello (2011) "Skills and Research for Productivity and Growth: Higher Education in East Asia," Washington, DC: World Bank.
- di Gropello, E., Kruse, A., Tandon, P. (2010) "Indonesia Skills Report: Trends in Skills Demand, Gaps, and Supply in Indonesia," Washington, DC: World Bank.
- di Gropello, E., Sakellariou C. (2010) "Industry and Skill Wage Premiums in East Asia." Policy Research Working Paper Series No. 5379. Washington, DC: World Bank.
- di Gropello, E., Tan, H., Tandon, P. (2010) "Philippines Skills Report: Skills for the Labor Market in the Philippines," Washington, DC: World Bank.
- Dobryakova M., Froumin I. (2010) Higher Engineering Education in Russia: Incentives for Real Change, *Int. J. Engng Ed.* Vol. 26, No. 5, pp. 1032–1041.
- Fajnzylber, P. Fernandes, A. M. (2004) "International Economic Activities and the Demand for Skilled Labor: Evidence from Brazil and China. Policy Research Working Paper Series No. 3426. Washington DC: World Bank.
- Fey, C., Engström, P., Björkman, I. (1999) "Doing Business in Russia: Effective Human Resource Management Practices for Foreign Firms in Russia". In: *Organizational Dynamics* vol. 28.2, 69-79.
- Froumin I. (2012) "Negative Stability in Russia". Interview. Higher school of Economics.
- Gimpelson V., Kapelyushnikov R., Lukyanova A. (2007) "Skills Shortages and Training in Russian Enterprises," Moscow: State University—Higher School of Economics.

Gimpelson V.E. (2010) "Does our industry needs qualified workers? History of the recent decade," WP3 series "The problems of the labor market," Moscow: Higher School of Economics, 72 p.

Gimpelson, V., Kapeliushnikov, R., Lukyanova, A. (2010), "Stuck Between Surplus and Shortage: Demand for Skills in the Russian Industry," Labour, Vol. 24, Issue 3, p 311-332, September 2010.

Gorodnichenko Y., Sabirianova Peter K. (2004) "Returns to Schooling in Russia and Ukraine: A Semiparametric approach to Cross-Country Comparative Analysis," IZA Discussion Paper No. 1325.

Gorodnichenko, Y., Sabirianova Peter, K. (2005) "Returns to schooling in Russia and Ukraine: A semiparametric approach to cross-country comparative analysis," Journal of Comparative Economics, Elsevier, vol. 33(2), pages 324–350.

Guryanov S., Kostin L. (1973) Trud i zarabotnaia plata na predpriatii. Moscow: Ekonomika.

Hanouz, M.D., Prazdnichnykh, A. (2011) The Russia Competitiveness Report 2011. Laying the Foundation for Sustainable Prosperity //

http://www3.weforum.org/docs/WEF_GCR_Russia_Report_2011.pdf

Hanushek, E. A., Wößmann, L. (2007) "Education Quality and Economic Growth," Washington, DC: World Bank.

Heckman J., E. Vytlacil (2001) "Identifying the Role of Cognitive Ability in Explaining the Level of Change in the Return to Schooling." Review of Economics and Statistics, 83(1), pp. 1-12.

Heckman, J. J. (2008) "Schools, Skills, and Synapses."; Economic Inquiry, 46(3), pp. 289-324.

Heineck, G., S. Anger. (2008) "The return on cognitive abilities and personality traits in Germany." German Socio-Economic Panel Study, German Institute for Economic Research, Berlin.

Hill, H., P. Tandon (2010) "Innovation and Technological Capability in Indonesia." Background Paper prepared for Flagship on Higher Education in East Asia. Washington, DC: World Bank.

Johanson, R. (2009). Review of National Training Funds, World Bank, Social Protection and Labor Unit, SP Working Paper No.0922.

Kapeliushnikov R. (2010) Evolution of Human Capital in Russia: 1990-2000s, M.: Higher School of Economics.

King K., R. Palmer (2007) “Skills development and poverty reduction: a state of the art review,” European Training Foundation.

Kuboniwa M. (2011) Russian Growth Path and TFP Changes in Light of the Estimation of Production Function using Quarterly Data, Russian research center, The Institute of economic research, Hitotsubashi University, Kunitachi, Tokyo, Japan.

Kuruvilla, S., Erickson C. (2001) “An Assessment of the Singapore Skills Development System: Does it Constitute a Viable Model for Other Developing Countries?”, World Development Vol. 30, No. 8, pp. 1461–1476.

Kuzminov Y. (2010) “Human Capitalization: Universities in Russia in 10th and 20th of 21 century”. Press release. Higher school of Economics, 2010.

Kyui, N.E. (2009) “Education, selection of category of professional employment and salary in Russia” Economic journal of Higher school of economics

Lederman, D., Maloney, W. F. (2003) “R&D and Development,” Washington, DC: World Bank.

Lee, J. N., D. Newhouse (2012) "Cognitive Skills and Youth Labor Market Outcomes", World Bank.

Lukyanova A.L. (2010a) “Returns to education: what meta-analysis shows,” WP3 series “The problems of the labor market,” Moscow: State University—Higher School of Economics, 60 p.

Lukyanova A.L. (2010b) “Wage differentiation in Russia (1991–2008.): Facts and explanations,” WP3 series “The problems of the labor market,” Moscow: Higher School of Economics, 67 p.

Majumdar, Sumon.(2007) “Market Conditions and Worker Training: How does it Affect and Whom?” Labor Economics.

Ministry of Economic Development of Russia (2008) Strategy of socio-economic development of the Russian Federation up to 2020.

OECD Programme for International Student Assessment 2011, Organization for Economic Co-operation and Development,
http://www.pisa.oecd.org/pages/0,2987,en_32252351_32235731_1_1_1_1_1,00.html

OECD Secretariat (2004), “Problem Solving for Tomorrow's World – First Measures of Cross-Curricular Competencies from PISA 2003,” Paris: OECD, 158 p.

OECD. Education at a glance 2012: OECD Indicators. Paris: OECD.

Orbeta Jr., Aniceto C. (2008) “Background Paper on Higher Education in the Philippines,” Washington, DC: World Bank.

Organization for Economic Cooperation and Development (2010) “OECD Science, Technology and Industry Outlook 2010, Science and Innovation.”.

Prakash, N. (2010) “The Returns to English-Language Skills in India,” Cornell University, IZA & CReAM.

Rodriguez, A. (2008) “Knowledge and Innovation for Competitiveness in Brazil,” Washington, DC: World Bank.

Sabirianova P. K. (2006) “Skill-Biased Transition: The Role of Markets, Institutions, and Technological Change,” William Davidson Institute Working Paper Number 616.

Sakellariou, C. (2010) “Access to and Equity of Higher Education in East Asia,” Washington, DC: World Bank.

Schleicher A. (2008) PIAAC: A New Strategy for Assessing Adult Competencies, International Review of Education DOI 10.1007/s11159-008-9105-0, Springer.

Sigov I.I. (1972) “Organizatsionnaia struktura upravleniia proizvodstvom v SSSR, in: Sigov I.I. (ed.), Osnovy ekonomiki i upravleniia proizvodstvom. Uchebnoe posobie dlia rukovoditelei i specialistov podrazdelenii predpriatii i drugih oblastei”. Moscow: Ekonomika, 132-152.

Singapore Ministry of Education (2008) Education in Singapore. “SPUR.” Singapore Workforce Development Agency // <http://app2.wda.gov.sg/web/Contents/Contents.aspx?Id=174>

Sondergaard, L., M. Murthi (2012) Skills, not just diplomas; managing education for results in Eastern Europe and Central Asia, The World Bank.

Stone, I. (2010) Encouraging small firms to invest in training: learning from overseas. <http://www.ukces.org.uk/assets/ukces/docs/publications/praxis-5-encouraging-small-firms-to-invest-in-training.pdf>

Tvorogova, S. (2007) “From telling fortunes by coffee grounds to determining perspectives: how to define needs in qualified cadres,” Forsyte.

World Bank (2005). Dying too young: addressing premature mortality and ill health due to noncommunicable diseases and injuries in the Russian Federation (2005). Washington, DC, World Bank.

World Bank (2010, 2012, forthcoming 2013) BEEPS At-A-Glance, Russia, The World Bank Group.

Zhelezov, B., P. Kudiukin, , O. Shuvalova (2009) “Education system effectiveness: view of educational service consumer” Statistics and sociology of education.

Zuckerman, G., G. Kovaleva, M. Kuznetsova (2011) “Victory in PIRLS and defeat in PISA: the future of reading literacy of 10–15-year-olds.”, Journal of Educational Studies №2, 2011, Higher School of Economics, Moscow.

_____. (2010) “Develop skills is much harder, than just give knowledge to students”. Materials from a discussion. January 23, 2011. Federal Educational Portal “Economics, Sociology, Management” // <http://www.ecsocman.edu.ru/text/33517719/>

_____. (2010) «Public Opinion Issues» #4(106), Levada-Center, 2010.

_____. (2010) Materials of the First International Scientific-Practical Conference “Organization of apprenticeship in higher education institutions: problems and prospects”, Vladimir, Russia.

_____. (2012) “Participation of employers in the implementation of educational programs and external assessment of learning outcomes”, Agency for Higher Education Quality Assurance and Career Development // <http://www.akkork.ru/general/upload/rabotodatel.pdf>

_____. (1999) “McKinsey Report 1999: Unlocking economic growth in Russia. London: McKinsey Global Institute. URL: <http://www.mckinsey.com/mgi/reports/pdfs/russia/RussiaE.pdf>

_____. (2004) “Identifying skill need for the future: from research to policy and practice,” Federal Ministry of Education and Research, CEDEFOP // http://www.biblioteca.porto.ucp.pt/docbweb/MULTIMEDIA/ASSOCIA/PDF/REC_A.PDF

_____. (2006) “Prosperity for all in the global economy—world class skills,” Leitch review of Skills, Final Report // <http://www.official-documents.gov.uk/document/other/0118404792/0118404792.pdf>

_____. (2007) Beyond the Three Rs Voter Attitudes toward 21st Century Skills, Partnership for 21st Century Skills.

_____. (2008) “CBI education and skills survey 2008,” CBI // <http://www.investorsinpeople.co.uk/Documents/percent20Hidden/Research/CBI/percent20education/percent20and/percent20skills/percent20survey.pdf>

_____. (2008) “Preparing Americans to Triumph in the Global Skills Race,” Transition Brief, Policy Recommendations on Preparing Americans for the Global Skills Race, Partnership for 21st Century Skills, November 2008 // http://www.p21.org/documents/p21_transition_paper_nov_24_2008.pdf

_____. (2008) “Professional skills furthering productivity growth, employment and development,” Report for International labor conference, 97th session, International labor organization.

- _____. (2008) “Skills for improved productivity, employment growth and development,” Report for International Labor Conference, 97th Session, International labor organization.
- _____. (2008) “The Concept of Long-Term Socioeconomic Development of the Russian Federation to 2020.” GoR Resolution № 1662-p, Government of Russia.
- _____. (2010) “AMA 2010 Critical Skills Survey, Executives Say the 21st Century Requires More Skilled Workers,” Partnership for 21st Century Skills.
- _____. (2010) “Are They Really Ready To Work? Employers’ Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century U.S. Workforce,” Partnership for 21st Century Skills.
- _____. (2010) “BEEPS At-A-Glance 2008, Russia,” The World Bank Group, 2010 // http://siteresources.worldbank.org/INTECAREGTOPANTCOR/Resources/704589-1267561320871/Russia_2010.pdf
- _____. (2010) “From Technological Mastery to Innovation.,” Background Paper prepared for Flagship on Higher Education in East Asia. Washington, DC: World Bank.
- _____. (2010) “Maximizing the Impact: the Pivotal Role of Technology in a 21st Century Education System Task Force Members,” Partnership for 21st Century Skills // http://www.setda.org/c/document_library/get_file?folderId=191&name=P21Book_complete.pdf
- _____. (2010) “The skill matching challenge, analyzing skill mismatch and policy implications,” Luxembourg: Publications Office of the European Union.
- _____. (2011) “Academic ranking of World Universities 2011” (the Shanghai ranking), Shanghai Jiaotong University. // <http://www.arwu.org/index.jsp>
- _____. (2011) Progress in International Reading Literacy Study and Trends in International Mathematics and Science Study, Lynch School of Education at Boston College, <http://timss.bc.edu/>;
- _____. (2011) Report on Russian economy, World Bank.
- _____. (2011) The Global Competitiveness Report 2011–2012, World Economic Forum, Geneva, Switzerland // http://www3.weforum.org/docs/WEF_GCR_Report_2011-12.pdf
- _____. (2012) “Ranking Web of World Universities”, Consejo Superior de Investigaciones Científicas (CSIC) (National Research Council of Spain). // <http://www.webometrics.info>.
- _____. (2012) “Science and Engineering Indicators 2012”, National Science Foundation. USA.