

**State University-Higher School of Economics**

**THE NEW ECONOMY – A CHANCE FOR RUSSIA**

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The concept and conclusions belong to Yaroslav Kouzminov who has sole  
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## 1. THE NEW ECONOMY: THE PHENOMENON

- a. The global market is a combination of numerous value chains. The major amount of the added value is concentrated in the units responsible for technological and managerial decisions based on specialised knowledge and intensive use of ICT. In conjunction with the sectors responsible for direct generation of knowledge (science and education) and ICT acting as an instrument of diffusing and distributing knowledge, such "brain centres" appear to be the primary engine of economic development and thus are closely associated with the concept of the new economy.
- b. The new economy includes sectors characterised mainly by a predominance of human over material capital. These are: education, ICT markets, the generation of innovation and the so-called intellectual services (consulting, information processing, analysis, and marketing services). The new economy is sometimes also called information economy, or knowledge-based economy; each of the above terms, however, reflects only a part of the concept.
- c. The emergence and growth of the new economy is the third major economic revolution in human history. The first, called the agrarian revolution, took place when agriculture divided into land tending and animal husbandry, with the separation of handicrafts. The most scarce resource of the period was arable land. The industrial revolution came with the introduction of machine-based technologies that allowed mass production, with the consequence that the human worker's role became supplementary to that of the machine, resulting in a much higher proportion of hired labour. The most scarce resource of the period was the capital's material elements, complex machines that helped to increase the productivity of investment.
- d. The new economy is based on "soft technologies," and its most scarce resource is the skilled and creative worker. The material elements of capital appear as temporary and easily replaceable supplements of that resource, just as the hammer was to a mediaeval craftsman.
- e. The new economy is the engine of overall economic development. It acts as a pace-setter, spurring on the rate of economic growth. Moreover, the new economy has a modernizing effect on the so-called traditional sectors and induces their increased productivity. The new economy diffuses into the "main body" of production units in the traditional sectors: take, for instance, corporate information systems, the new role of R&D as the first stage of

standard production process in "conventional" factories and industrial groups, or corporate universities.

- f. The development of the new economy is paralleled by other, independent processes that have an equally significant actual or potential effect on global economic development. These are the growing problems of environment and resources (meaning the increasing scarcity of resources that form the basis for economic development and the quality of life); the prospects opened by technological revolutions in traditional sectors, such as biotechnology and nanotechnology, or possible medical solution to the problem of the limited length of human life. Since their effect cannot be defined in terms of time-frame or quantity, however, the new economy can still be viewed as a pre-condition for progress in those spheres.
- g. Measuring the new economy. Russia's current economic statistics is failing to capture a considerable part of the new economy's turnover. It is particularly true of education, which is regarded as a fund-consuming sector. Similarly, statistics is failing to account for the corporate elements of new economy (such as non-technological innovation in manufacturing or corporate information systems). If they are included, the share of the new economy in Russia can be estimated at 9-10 % of the GDP (with education accounting for 5-6 %, ICT for 2 %, science and innovation sector - for 1.5-2 %, and intellectual services for 0.3-0.4 %). It is important to note that these figures do not show the new economy's contribution to the GDP, as they reflect the expenditure, rather than the output of its main components, education and science.
- h. The efficiency of investment into the new economy. According to OECD surveys of its member countries (virtually all developed market economies), investment into ICT produces increased GDP growth in proportion of 1:2; and investment into the innovation sector lead to a 1:3 growth of the GDP. It is hardly possible to measure the medium-term effect of investment into education (although one can speak with sufficient certainty about the proportion of 1:1.1). An immediate return on an investment into human capital should clearly not be expected, however, is it equally obvious that sustainable development would be unfeasible without such investment. Worldwide, the higher the general education level in a country, the more adaptable is its economy. It is the adaptability of human capital that facilitates the development of new sectors and ongoing change of economic structure.
- i. For Russia, developing the new economy is especially vital. Given the low monetarisation of the national economy and a virtual

absence of "long money," any project with a relatively low level of initial costs has an obvious priority. Being a sphere of "soft technologies," the new economy is largely based on investment into human capital. Such investment has already been made in Russia, with its high level of general education and the high level professional education in some of the sectors. The country has retained a sufficiently high potential for science and research. It would be up to the government and the corporations to make relatively small additional investments necessary for a modernisation of the existing potential and its reorganisation for "productive" purposes.

## THE NEW ECONOMY: THE INSTITUTIONS

- a. We are just beginning. The old institutions are still in place. Their intensive modernization carried out under the pressure of new goals and new technologies is failing to provide their free development. These institutions are private property in its most classic, absolute and unlimited form, as well as the national state and law (which even now are demonstrating their limitations and inadequacy).
- b. The best and most adequate form of ownership of intangible subjects has yet to be found (for instance, as a gradual transition from patent protection to trade marks). The problem of defining the scope of such kind of property constitutes the greatest challenge to the preset legal system. The negative consequences of freezing intellectual property for the unacceptably long periods of guaranteed protection of intellectual rights often outweigh the losses resulting from a violation of those same rights. In many countries professionals (especially in ICT) are joining efforts to create the so-called "public domains," or free access property objects. The rapidly accelerating rate of technological innovation and the accompanying renewal of technological knowledge make it possible to give up rigid patent protection of inventions and discoveries. If the "first user's" investment is successful, initial returns are so high that a waiver of any further protection of the exclusive right to use the technology becomes economically feasible.
- c. The rapid shrinking of the amount of (verifiable information=competency) compared to (uncritically accepted information=incompetency) has a number of important economic consequences.

- i. Protection of contracts and intellectual rights can be better provided by an effective protection of trademarks ("signals") rather than the intangible objects they denote (such as software, technological solutions, educational programmes, etc.)
  - ii. The increasing danger of falsifying confidential products and services calls for a system of auditing their quality, that would be readily available to all interested market players; the market of auditing services, too, must be built on competitive principles to prevent their falsification. One can anticipate the emergence of a market of confidential control of confidential services, comprising specialised publications, consumer societies auditors' firms, etc.
  - iii. It is the investor who ought to hold the ownership of intangible objects, otherwise the intermediaries' fees would push up transaction costs associated with contracts in this sphere, resulting in unnecessarily high expenses and possibly an unwillingness to introduce innovation into the productive sector. Given Russian market conditions, the path to the most favourable ownership regime would lie along the lines of transferring the majority of titles to intangible objects from the state to the actual developers, such as R&D institutes, universities and companies.
- d. The rapid increase of information and ongoing changes are making it impossible to maintain a traditional approach to business, science and the social sphere. A new generation of confidential institutions is emerging, and confidential knowledge and even confidential actions (or decision making) are becoming a characteristic feature of the new economy. The main outpost of the new institutions is the sphere of intellectual services that has evolved over the past 25 years. (Of course, this sphere appeared much earlier with law firms or stockbrokers providing essentially the same kind of services, but never before did their contribution to the GNP amount to several percentage points.)
- e. Simultaneously, a new type of risks, i. e. confidence risks, have appeared on the business scene, as witnessed by the recent corporate scandals in the United States and Europe. Public interest calls for new instruments of procuring and double-checking information, which are likely to be created on competitive basis. Eventually, the consumer will be provided with access to well-tested, double-checked information .
- f. The lagging development of Russia's confidential institutions can be turned to advantage, as the country could be among the first to build

new-generation institutions unburdened with old, once efficient but now outdated traditions. Such institutions can operate in the form of data bases accessed via the Internet and containing information on the market of managers or firms providing intellectual services. Since working reputations are practically non-existent, we could create new rating systems based on more adequate criteria.

- g. The increasing ecological, terrorist and industrial dangers are fast outgrowing the old insurance market's capacity. Technological insurance is gradually, but rather rapidly supplementing financial insurance, now that insurance companies condition their contracts on investment into technological defence systems.
- h. The lifting of information barriers has allowed a degree of revival of classic free competition markets (or rather, the formation of new markets based on free competition and an increased degree of competitiveness in the traditional markets). This institutional feature of the new economy has fundamental significance for domestic business prospects. Recent surveys (December 2002) of small and medium-size firms show that as many as 25 % are already working for foreign (non-CIS) markets. The degree to which Russia is going to be able to take advantage of this opportunity will depend on two factors:
  - i. an ability to change the managerial culture of the vast majority of Russian firms. At present there is a lack of such elementary things as a knowledge of foreign languages or presentation and negotiation techniques, which are necessary for contacts with foreign business counterparts.
  - ii. Access to the Internet in Russia's outlying regions.

### 3. ICT MARKETS

- a. ICT acts as a driving force of economic growth owing to the following four factors
  - i. due to its extremely rapid rate of growth that is many times as high as the mean figures for overall economic growth, the ICT sector drives up overall growth;
  - ii. due to its effect on the efficiency of markets and firm management;
  - iii. by increasing the quality and affordability of services provided by the state-supported sector, especially education and health care (distance education, telemedicine, etc.)

- iv. by affecting social institutions responsible for increasing government efficiency, reducing corruption and facilitating civil society development.

Utilisation of the full potential of the above four factors to speed up the rate of economic growth largely depends on the efficiency of the country's economic policy.

- b. **Support for ICT development** above all involves the following two areas of activity: exporting software and developing infrastructure for telecommunications.
- c. Today's software market size is estimated at USD400-500 milliard. Just the offshore software market (considered to be the most open and accessible) is estimated by IDC to amount to USD100 milliard by 2005 (compared to USD56 milliard in 2000). The expenditure in west-European market, the most promising from Russian software companies' point of view, is expected to amount to USD26 milliard in 2005.
- d. Given the expanding demand for the export of software and related outsourcing services, Russian software producers have good opportunities for gaining access to foreign markets. According to the estimates made by Market-Visiso/EDC, Russia's export of services to offshore software markets amounted to USD 213 million, and the annual rate of growth reached 12 %. Furthermore, most experts believe in the feasibility of maintaining two-digit figures of annual software export growth rate even in the more conservative scenarios. Owing to the present advantages in competition, market analysts believe it is realistic to expect that software exports will reach USD 1 milliard in the medium term even without government support. Given an active government support policy, the medium-term potential for software exports is estimated at USD 2.0 milliard, and the longer-term potential at USD 5-6 milliard per annum.
- e. The software sector's export potential is at least as high or higher than that of the weapons sector, its growth rate nevertheless remains unsatisfactory. The reason lies in the presence of the following retarding factors:
  - i. ***Excessive administrative regulations*** (regarding certification, licensing, registration, etc.) lead to higher costs for the existing firms and hinder or stop new firms from entering the software market. The government procedures required of issuing consent to software export are complicated to the point of absurdity. The arbitrary nature of administrative control and a total lack of proper analysis of its economic efficiency complicate the procedures of adopting new regulations, to frequent revision or

replacement of many legislative and regulatory standards, frequent appearance of new bureaucratic obstructions to business enterprise, and consequently, to increased investment risks.

- ii. Quality of workforce.* In the absence of an effective policy for improving secondary and higher professional education standards, given the poor standards of training technology specialists and random and insufficient budget funding of university courses combined with a total disregard of the new economy's needs, there is obvious and regrettable waste of funds and a failure to use Russia's competitive potential to the best advantage. Considering the excellent market prospects of the software sector, we need a strong investment policy aimed at increasing the number and quality of university graduates with the necessary knowledge and skills.
- iii. Infrastructure for innovation.* Owing to the small number of technoparks and business incubators and the generally poor quality of their services, as well as the narrow scope of venture funding we are failing to take full advantage of the ICT sector's potential for growth. If Russia's leading universities possessing international standards of learning and research were to be used as a foundation for building and expanding infrastructure for innovation, it would assist in maximum utilization of their potential, while at the same time turn them into the core structures for forming clusters of spin-off firms producing software for export. Such universities can be found, for instance, in Moscow, St. Petersburg, Novosibirsk and Tomsk.
- iv. Taxation policy.* The large proportion of payroll in the expense structure of software firms coupled with excessively high rate of payroll taxation ( 35.4 % social tax in addition to 13 % income tax) and the high level of competition in the marketplace force software firms into shadow, where they lose the transparency sought by investors. The weakness of the tax administration system leaves Russian software producers with no hope of receiving the benefits granted to their counterparts in the rest of the world. Moreover, they have a further difficulty with prompt recovery of the VAT on exported goods and services.

#### ***Telecommunications sector***

f. Compared to the world average, Russia has poorly developed infrastructure of telecommunications providing both traditional services and access to the Internet. It is one of the factors slowing down the rate of economic growth, especially in the areas with the less developed infrastructure. Despite the high rate of



telecommunications development, both in the number of telephone lines and accessibility of the Internet, Russia is lagging far behind Europe and the United States.

g. A shortage of resources is one of the main obstacles to development. But commercial providers are reluctant to expand their services to cover the large numbers of potential users because the expected returns are too low. The following corrective measures are required:

- i. incentives for developing telecommunication infrastructure, and
- ii. incentives for using infrastructure.

h. The measures in question should include:

- i. Co-funding of private investment projects by the government at different levels;
  - ii. Tax incentives to individual users of up-to-date telecommunications services (such as exempting the cost of services from income tax base);
  - iii. Grants to corporate users (mainly for small and medium-sized firms);
  - iv. Full funding of the corresponding costs of government organs at all levels as well as of organisations in the social and cultural sphere. This would require increasing communications expenses by 5-10 times over the next 2-3 years. For instance, the federal budget spending on education would have to be increased from the current 150 million rubles to 1,500 million rubles per annum. Total federal budget spending on telecommunications in 2005 should outpace spending on computers and fiberoptic lines.
  - v. Government spending on opening and maintaining free public information resources, such as educational and information portals, electronic libraries, resources for research, counseling, centralised data processing, etc.).
- i. In addition to insufficient resources, there are institutional factors that hinder the development of Russia's telecommunication infrastructure:
- i. inefficient system of cross-subsidising communications tariffs. It ought to be replaced with direct subsidies from all levels of government budget;
  - ii. inefficient antimonopoly policy on mergers with independent operators;

- iii. inefficient system of setting telecommunication service tariffs leading to a lack of incentives for improving the efficiency of communications services;
  - iv. very firm administrative barriers (i.e., licensing, certification, registration, etc.) resulting in higher costs for the existing telecommunications firms and in obstacles for market entrants; a very high level of corruption.
- j. Accelerating the rate of telecommunication infrastructure development is becoming a key factor that determines the Russian market's capacity for competition. Its reform needs at least as much attention as that of other natural monopolies, such as Gasprom, RAO United Power Systems or railway transport. It has one difference, however. Whereas the "traditional" natural monopolies can obtain resources required for investment by increasing tariffs (all their users are already "in place," so it is only a matter of increasing efficiency), telecommunications have yet to reach many of their potential users (or the vast majority of the users of the more advanced telecommunications services). They face the task of extending their networks and increasing the availability of their product.

### ***Modernising markets***

- k. The development of electronic commerce (commodities markets) is held back by the extremely inefficient Law On Digital Electronic Signature, that gives the government very broad powers while failing to have any effect due to an absence of the necessary regulatory acts (nine months after the law was adopted).
- l. The government is not utilizing the full potential of information technologies for improving market infrastructure. Whereas the capital market is making full use of the possibilities and advantages of ICT, the labour market's efficiency is suffering owing to an absence of a programme to reform its information infrastructure. It is highly advisable for the government to help in setting up information infrastructure supporting services markets, such as scientific, technological and marketing information, consulting and venture funding.
- m. Another priority is a programme for setting up systems of gathering, formalizing and disseminating information about the "good practices" in the state sector, in regional and municipal government organs, in non-commercial organisations belonging to the tertiary sector, as well as in non-governmental organisations involved in disseminating innovation in the spheres of organisation, technology and management.

***Increasing the quality and availability of services provided by the state sector***

m. It is necessary to create a working system of agency collaboration in the matter of controlling government spending on ICT and introduce a system of formal indicators allowing to measure efficiency and productiveness of ICT expenditures in the interest of budget planning and control. There is a need to formalise requirements to the systems of planning, operating and controlling ICT projects carried out in government organs and in the government sector.

n. Furthermore, it is advisable to follow the example set by other countries and introduce formalised personal responsibility for efficient use of information technologies at the so-called micro-level, all the way down to the heads of state-owned organisations and their departments,

o. One of Russia's most fundamental problems is government weakness in the face of corruption and lobbying onslaught combined with fragile civil society. The situation may be considerably improved by introducing e-government based on ICT.

p. The scope of administrative authority (arbitrary judgement) of civil servants, especially those on the lower rungs of the executive ladder, may be effectively restricted by electronic administrative procedures allowing firms and individuals to control the process of reviewing their documents and requests, bringing about real transparency of government agencies.

q. It is necessary to increase the access of civil institutions to developing new legislation and to cut the associated costs. Information about legislation development could be made freely accessible via the Internet, as it is done in the United States and some of the OECD countries.

r. To reduce opportunities for corruption, it is advisable to provide for free publication in the Internet of structured information on tenders involving government purchases, their outcomes and contract prices, as well as auditors' findings (as of now, audits are performed only by the Auditing Chamber).

s. Overcoming the "information barriers" around government organs can be achieved with the help of a united system of government information resources (electronic registers logging individuals and firms, innovation projects and areas, government and municipal property, natural resources, etc.). The registers can be formed from data bases intended for the use of the Customs Committee, the Taxation Ministry, the Transportation Ministry (on shipments), of the Tax Ministry and Finance ministry (on legal persons), etc.

t. Without administrative reform the goal of improving the practice of "doing business" within and among government agencies, it would be impossible to make full efficient use of ICT. Meanwhile, ministries use ICT to serve their own needs rather than those of the individuals. They use ICT to update the existing procedures rather than to create new, and more effective and productive solutions, similar to those generated and implemented in the private sector. A truly effective use of ICT has to be based on entirely new practice of "doing business," it is consequently hardly worth using ICT to upgrade the existing administrative structures, whose functions can be performed by other agencies, or whose staffs may be cut (a prospect disliked by all government agencies). The planning of information systems should be accompanied (or preceded) with improving the agency's organisational structure and aimed at serving future needs of a reorganised government and its agencies for efficient information flows.

u. Government efficiency would benefit from adjusting "spontaneous" introduction of information technologies to the goals and priorities of administrative reform, to curbing corruption and increasing the role of civil society in developing and evaluating legislation. The programmes and institutions of administrative reform and those of introducing ICT must be combined into a single system.

### *Summary*

w. Russia has good potential for rapid growth of software exports and development of telecommunication infrastructure. Radical measures to overcome bureaucratic barriers are needed, as well as programmes for improving the training of ICT specialists, and for reforming and liberalising the telecommunications sector.

x. The government can encourage economic growth by amending the Law on Electronic Signature and developing information infrastructure supporting the key markets, including commodities, services and labour markets. It should design a system of gathering and disseminating information of "good business practice" in the government sector, municipal and regional government organs, non-commercial organisations belonging to the tertiary sector, and some of the non-government firms.

y. A programme of introducing ICT into the social and cultural spheres, education and health care should be based on increased efficiency of budget spending on ICT.

## 4. INNOVATION MARKETS

- a. The impetus for the new economy's emergence and evolution in advanced industrial states came from the changing role of innovation, and the rate, direction and mechanisms used to translate innovative processes into life. The new relationship between science, technology and economic growth serves as one of the most important features of the new economy.
- b. The rate and quality of growth are increasingly dependent on radical economic shifts based on innovation. Some of the indications of this trend are: increasing investment in R&D, technological and organisational innovation, and the growing returns on such investments; a higher growth rate of high-tech industries and services and more innovation activity; and entirely new kinds of economic activity.
- c. The technological process is accelerating while the life cycles of products and services are shrinking, the duration of research, development and application of innovation is becoming so short as to be measured by mere months. There is an obvious tendency toward dynamic, innovation-based sectors and products with short life cycles. This trend is fuelled by rapid ICT development, diffusion of knowledge, emergence of new markets, etc.
- d. Science is increasingly utilised to support economic needs, and it is undergoing radical changes along the way, especially inasmuch as the role of the business enterprise sector, the concentration of science and research in high-tech industries and services, transformation of scientific institutions, the growing contacts between science and the productive sector and the more effective translation of research results into actual products and services. Simultaneously, the methodology, instruments and organisation of research are undergoing changes.
- e. The new economy is an economy of networks, with relations between components assuming organising role. The efficiency and viability of innovation is determined by the presence and nature of bilateral relations between the different stages of innovation cycles and between the generators and consumers of knowledge, that is, firms, markets, governments, et. al., at all levels up to and including the global scale. Local clusters and global alliances have equally important functions in generating, disseminating and applying innovation and direct foreign investment, in creating small firms and business services, in supporting the mobility of skilled workers, etc.

## Russian innovation system: It's there, but not functional

- f. **Russia's scientific institutions remain archaic and totally divorced from market needs.** The recent changes have failed to have any impact on the fundamental Soviet-era principles underlying scientific institutions that still serve Russian science and research. As of early 2002, Russia had 4,037 scientific organisations. But unlike advanced industrial economies, Russia's main unit of research is still an R&D institute unrelated to universities or production; such institutes are even growing in number. While the number of workers in 2001 was only one half, and the expenditure only one third of those in 1989, the number of R&D institutions doubled from 1,800 to 2,700. They account for 70-80 % of the workforce and R&D expenditure. Whatever institutional change is taking place, it is not directed at improving the research capacity of firms and universities. Approximately 2,900 science and research organisations are owned by the state (the number is 39 in the United States, 45 in Great Britain, 82 in Germany, and 96 in Japan). Thus the noticeably smaller share of state budget allocated to science is stretched over an ever growing number of organisations.
- g. Research carried out by firms is considered to have a key role in innovation activity because of its integration into the real sector. It is business firms that are responsible for the bulk of research and development in advanced industrial economies: 65 % in the EC, 71 % in Japan, and 75 % in the United States. Russia's so-called factory-based science has very limited resources (only 6 % of total R&D expenditure), and very narrow tasks consisting in finding technical solutions for the individual production units.
- h. **Russian universities have a very small share of the country's total R&D** (approximately 5 % of total R&D expenditure; cf. 21 % in EC, and 14-15 % in Japan and the United States.)
- i. **Russia's R&D is not sufficiently geared to generating innovation.** The insufficiency of innovation in the Russian markets is not, as one might think, so much a result of the production decline caused by the economic crisis of the 1990's, but rather of a poor coordination between researchers, the institutional organisation of R&D activity and the needs of the economy. Even with the increased investment of the early 2000's, the amount of funds invested by firms into R&D continues to be low.
- j. The extremely low interest in R&D can be largely explained by the fact that their product is poorly adapted for application in the real sector. More than 70 % of total inventions are, in fact,

improvements or adaptations of the existing and mostly outdated technologies and mechanisms. The largest number of the new machines and devices lag far behind international quality standards. As a result the factories with a certain degree of innovation activity prefer to obtain new equipment ready-made, mostly from foreign sources, rather than buy the unsuitable domestic technologies.

- k. Slack diffusion of innovation was a weak spot of the plan-based Soviet economy carried over to the transition period. As a rule, an innovation is implemented only in one or two firms. The low scope and rate of dissemination and implementation continue to characterise the part played by innovation in Russia's technology policy.
- l. **Russia's National Innovation System (NIS) is lacking a proper balance.** Its main components, the R&D sector, firms and infrastructure for innovation are totally unconnected. In the country's vague economic conditions, the productive sector is not setting itself the strategic goal of pursuing innovation. The level of innovation activity in production is as low as 10 %, compared to 51 % average in the EC. In its present state, science is poorly adapted to effective collaboration with production and adequate response to the economic demand. The introduction of an innovation into production is held back by the unresolved issue of intellectual property ownership and the underdeveloped markets of technologies and information services. Furthermore, the current market reforms are failing to create incentives for more innovation activity.
- m. Low as Russian's expenditure on fundamental science is, only 14 % of the total goes to R&D. **Russia is not going to be able to retain its potential for science and research unless they become closely linked to the national economy, while economy is not going to grow and become competitive without a reliance on science and research.** It is not so much that the research sector is failing to serve as the economy's driving force, but rather the post-Soviet economy is pulling back science and technology.

#### **Public goals for research**

- n. The interest shown by Russian business in research and its results is low compared to that in developed economies: in 2001 the Russian business enterprise contributed only 20% of the country's total R&D expenditure, or less than a third of the equivalent OECD figure (64 %). It is not worth hoping for an immediate access to international market of technologies. Russian science has a very low export potential, as witnessed by the small share of foreign

investments in total R&D expenditure (9 %) and small exports of technologies (estimated at USD240 million), ten times less than in Austria (USD2.4 milliard) and even smaller compared to the United States (USD38 milliard). In view of the above, it is necessary to determine the social goals for science taking into account current and future public and economic requirements and the present status of the science and innovation sector.

- o. Formulating the public goals for science should proceed from a realistic assessment of the real scope and capacity of Russia's science and innovation sector. The size of Russia's science sector is medium, while its innovation sector is small relative to developed countries. Its one advantage is the relatively high level of employment, nevertheless, its funding is totally inadequate to the quality and number of workers. Even in this aspect the prospects are less than mediocre. Active specialists are leaving the sphere, while the influx of young specialists is very low (approximately 10,000 people annually). The age structure of the workforce in science and research is growing worse every year: 48 % of Russian all workers are above 50 years of age, the average age of people holding master's degrees is 53 years, while the average age of people with doctorates is 61.
- p. The state being the major sponsor of Russian science, accounting for 56 % of total R&D expenditure, any further delay of the sector's reform and a continued dispersal of resources among the far too numerous organisations and researchers will inevitably have the worst consequences imaginable.
- q. The first step is to make real rather than token acknowledgement that science is one of the national priorities and accordingly, radically increase government expenditure on science. This should be accompanied by a severe restriction of government-set priorities for the actual research. It is high time to follow the approaches to defining priorities similar to those long used in the developed countries, such as "technology foresight" and to use effective mechanisms for their implementation. Any direct involvement of the government in supporting applied research for technological purposes should be reduced to a reasonable minimum. There is a need for flexible mechanisms for co-sponsorship of science and innovation by government and business, as well as for active indirect incentives for science and innovation.
- r. The most important goal is to encourage Russia's science sector to turn toward serving the real needs of the national economy and social sphere and to become more practice-oriented. The government should withdraw support from any disciplines that are



unlikely to bring the national economy defense capacity or social sphere positive results in the foreseeable future. Support for applied science must be distributed on competitive basis strictly with a view to specific results, with the productive sector involved along the principle of matching funding and with obligatory independent evaluation in the form of peer review.

- s. The current position of Russia's science is particularly strong in the technological disciplines traditionally associated with maintaining the country's defence capacity, some of the "intellectual" disciplines that do not require major capital investment, and the methodology of natural resources research. Russia is still in the foreground of aviation and spacecraft designs, nuclear industry and waste disposal, some spheres of information technologies, and lasers. The major intervention areas for new technologies are, on the other hand, the fastest developing international markets like ICT and biotechnologies, where Russia's science lags far behind international achievements. It means that Russia's access to international markets is restricted to a small number of possibilities. Even where Russia was traditionally strong, it will take serious effort to maintain and improve its market positions. Further restriction of access comes in the form of measures taken by western governments for protection of their national markets.

#### **What can be done?**

- t. The only realistic solution seems to be improving the efficiency of government funding combined with institutional reform aimed at achieving an integration of the national innovation system, reorganisation of state science sector and support of new organisations that meet market needs.
- u. A reduction of the government science sector will lead to a concentration of funding in a limited number of viable research organisations. It should consist of institutions involved in fundamental science at international standards, as well as the most efficient organisations working in the interests of the government and the state sector of the national economy.
- v. Any organisations that have lost touch with real science, and lack in proper human and material resources must be ruthlessly eliminated. Other state-owned organisations must be transferred to universities or private owners. Advanced science centres could become a special target for government support.
- w. Budget funding of science should be reorganised with a view to specific practical goals and support mechanisms for innovation cycles. The guiding principle of this reorganisation would be

replacing loans for subsidies in the final stages of innovation process. It is necessary to increase budget funding of science by 30-40 % annually, with the share intended for goal-oriented programmes amounting to 40 % and the share of funds for research to 20 %. The support of public organisations must come in the form of package funding rather than allocations by the item, and depend on regular evaluation of their output. Government support is advisable for international co-funded projects, technology transfer centres, small science-intensive firms with a strong emphasis on research, and for providing substantial grants to young scholars for the term of up to five years. Outside the scope of government priorities, budget funding of specific applied research projects should come strictly on competitive basis and on condition that co-funding by firms amounts to at least 50 % of total project cost.

- x. Promoting commercial R&D and technological markets.
  - i. The present unformed system of intellectual rights ownership should be regularised, so as to facilitate access to the markets for the government-supported R&D products. The process could begin with a transfer of the ownership of R&D products generated with federal government support to the organisations that produced them (under certain conditions for their use).
  - ii. Measures for increasing innovation activity: tax exemption for profits invested into the implementation of new technologies and funding of research and development, accelerated depreciation the tangible and intangible assets used for investment insurance, etc.
  - iii. Incentives for creating a large numbers of spin-off firms and technology transfer centres in R&D institutes and universities.
  - iv. Legislative and economic incentives and removal of all barriers for active participation of Russian firms and organisations in global technological alliances and international programmes based on co-funding.

v.

## 5. EDUCATION MARKETS

- a. Education belongs both to the social and economic spheres of life. It functions as an essential element of modern economic infrastructure, as well as a growing service market accounting for as much as 6 % of the GNP. On the other hand, education is a long-term social priority, as in a market economy it provides social

mobility and equal starting opportunities to people from all spheres, thus assisting in the maintenance of social cohesion and preventing a disintegration of society. It is important to stress that the "Economic" and "social" functions of education are not contradictory; equal access to education serves to increase any country's human capital.

- b. New technologies, globalization of commerce and development of communications opens new opportunities for personal development of the individual, while at the same time entailing considerable risks. Individuals gain more freedom in shaping their own lifestyles.
- c. New education technologies come as a response to the snowballing of "useful" information (a function of innovation) and greater access thereto.
- d. Lifelong education and the need for constant renewal of skills and knowledge. The skills and knowledge acquired at an early age no longer guarantee lifelong success. Lifelong education is becoming a new education model. The concept of lifelong education stresses the duration of continuous education. Education is viewed as a learning process, a permanent process beginning at birth and ending with death and founded on basic skills obtained at an early age. The information society calls for new knowledge and skills, coming from an ever-changing list. The final documents of the EC Lisbon Summit include the following list of such skill: computer literacy, foreign languages, technological culture, entrepreneurship and social skills, with overlapping and interrelated content and functions. Some of these skills (such as computer literacy) are entirely new, while others (foreign languages) are acquiring a new significance. Social skills, such as confidence, responsibility, and a willingness to take risks are also growing in importance. It is extremely important to acquire such skills, but their permanent renewal is equally important. It is essential to possess personal motivation for learning and the availability of new and varied education sources. The overall goal is to guarantee general continuous access to education for the purpose of obtaining and renewal of skills required for remaining a part of the information society.
- e. Given the rapid development of information technologies, the government must take constant measures to improve general public education, in order to prevent "information stratification" that leaves a part of the population cut off from the full benefits of the information society. The following measures are called for:

- i. providing general and professional education structures with appropriate material base and intellectual and financial support for the purpose of achieving general computer literacy and a radical improvement of the quality of information support for the process of learning (including assistance based on the combined efforts of the government and private business);
  - ii. modernizing the programmes of secondary and higher professional schools taking into account the transition to the information society (including the introduction of new specialisations in the sphere of information business and law);
  - iii. regular increase of the teachers' qualifications in the sphere of information technologies;
  - iv. support to libraries, turning them into public centres for computer literacy;
  - v. using the existing institutions of secondary and higher professional education to create a network of mass education of personnel with skills allowing them to work within the new generation communication and information systems;
  - vi. organizing general public access to the Internet using the infrastructure belonging to state-owned organisations: such as educational institutions, libraries and post offices;
  - vii. introduction of distance education technologies and developing a distance information environment, increasing the number of generally accessible educational and information portals, "e-libraries" and "virtual museums."
- f. A new balance between "formal" and "non-formal" education sectors. The new conditions call for a new approach to different education forms:
- i. formal education leading to a generally recognized education certificate or diploma;
  - ii. informal education, usually without a final document, that takes place in educational establishments or public organisations, clubs and societies, as well as in the course of private lessons or training sessions;
  - iii. informal education, individual acquisition of knowledge that takes place in the course of daily life and does not necessarily involve a specific educational target.

Until now, education policy took into account only formal education, while the other two were left completely beyond anyone's attention. With continuous education, formal and informal education appear as equally important components of the process of learning. There is a need for

institutions capable of providing support for such kind of education, such as a system for search and access to information regarding education; a system for providing counselling on the choice of education trajectories and courses, and a system of voluntary measurement of results.

g. The specific feature of education consists in the fact that it freely "gives away" its product to other sectors. The reason is that it is impossible to sell an individual person. Thus education requires a special type of funding. Members of the public "pass round the hat", collecting funds in the form of taxes in order to fund the training of workers "for future growth." Individuals or parents spend their own funds on education with a view of obtaining a better profession or a higher social status. A given firm can perhaps pay for the education of a worker to meet its own particular needs, but there is no guarantee that after receiving the education, the worker agrees to stay on in the terms satisfactory to the firm. Moreover, there is no way to make sure that in future the firm will require a worker with those particular skills. The sphere of "education to order" is restricted to short programmes of further education, accounting for no more than 10 % of funding spent on professional education.

h. It is this feature of education that gives a chance to small firms and beginning entrepreneurs and facilitates innovation in economy. In a country with a high educational level investors can be sure of a free contribution, as they can hire educated workers while paying only for their daily needs. Compare this to an instrument with the need to pay for its purchase before paying for its maintenance.

g. The government continues to be the key investor in education, as formal education in the primary and secondary school as well as primary and secondary professional education remain the cornerstones of any strategy of continuous education. The social partners such as employers, public organisations and individuals, however, need appropriate incentives for assuming an active role in funding (co-funding) education, especially in the sectors (or levels) where their investment would bring a particularly high return, e.g. in higher and further education. It is the function of the government to put in place an adequate system of proper incentives allowing to achieve a significant increase of investment into human resources and to increase the status of that most important type of capital, human capital. Some countries are already categorising investment into human resources as capital costs. It is advisable to examine the possibility of introducing a similar practice in Russia. A transfer of skills to the labour market requires new approaches to combining education with practical experience acquired in the workplace. The concept of continuous education call for new funding mechanisms. A successful operation of the system would largely depend on new forms

of social partnership based on collaboration of government, employers and individuals.

j. **Changing the role of government.** While reconsidering the traditional view on dividing responsibility among individuals, society, private business and government organs, the government should transfer an ever-growing share of responsibilities to individuals, by involving them into decision making and quality control in the sphere of education. A continuous education strategy must be based on co-operation between the authorities and public organisations as the so-called "social partners" as they stand closest to the interests and needs of individuals and groups. Furthermore, it is necessary to improve the interrelation between formal and informal educational institutions, combining them into a single educational network. A system of continuous education cannot be created without introducing new methods of control; education is going to need more resources, thus owing to the limited government funding, measures to improve the system's efficiency and attracting funding from multiple sources would acquire a critical significance.

k. **Transformation of education and innovative teaching and learning methodologies.** As we move closer to the information society, based on knowledge, we change our understanding of the concept of education and learning. The goal is to develop new methodologies for continuous education spanning an entire life cycle. On the whole, it would be correct to say that despite all the changes undergone by society, the process of teaching and learning has hardly changed over the past 50 or so years. Education systems must be capable of flexibility needed for adjustment to the changing environment. This can be achieved not only by increasing the qualifications of educators, but also by attracting those who have learned to resolve similar problems in public organisations or in the professional milieu. The entire profession of teaching (and, generally educating) is undergoing fundamental changes. Teachers are becoming more of counselors, mentors and intermediaries whose task is to assist the students in shaping their own education and assuming responsibility for the process. Consequently, there is a need for changing teaching methodology both in formal and informal education systems.

l. **Formal signals for non-formal education.** Confidential institutions in education. Owing to the growing divergence of special skills required by the actors in productive and social spheres, understanding the measurement of a person's qualification goes beyond the scope of his partners from other spheres. This difficulty could be overcome with a quality assessment scale based on the more effective information sources. Depending on the circumstances, the following can serve as such sources:

- i. professional associations (given a highly competitive and transparent market of the professionals in question);

- ii. government authorities (given a large and non-transparent market of relatively low-qualified labour). The measurement of the quality of such workers may be carried out by government authorities in so-called state qualification tests taken both by people finishing formal education courses or by anyone willing to do so;
- iii. employers (given vaguely determined qualification requirements and performance-based evaluation). This latter method can be used only to evaluate the quality of the worker rather than the person's education.

m. **A system** for measuring education needs to be elaborated to allow for the transition to continuous education that frequently involves informal and non-formal forms. Measuring qualification standards will inevitably remove itself from the previously omnipotent "signals", or documents confirming the consumption of formal educational programmes. We are facing a contradiction: whereas education is growing less formal, the measurement of its outcome, the person's qualification, needs to be as formal and precise as possible. New institutions for measuring the quality of education are bound to appear and measure the outcome (qualification) rather than the expense (the consumption of formal programmes based on specific curricula with a certain duration, structure and qualification of teachers). Even the measurement itself is likely to become less obligatory and to be performed mostly on the personal wishes of the individual.

n. The efficiency of the new education system will depend on free access for all to information on educational opportunities, and to counseling and measurements over the entire life cycle. A market can be expected to appear of firms providing an active user with advice on educational, professional and personal development.

o. A network of educational and counseling establishments and information technologies will bring education into closer proximity to the user.

p. World education market. International standards. The Bologna process and Russia: risk of losing potential education market after being excluded from standards. What can be done about it? If we are not granted formal membership in the convention and its standards, we must try and adapt ourselves to those standards.

q. Education is the largest sector of Russia's new economy, accounting for 5 % of the GNP. It is more than double the size of ICT, which is the next largest sector. Efficiency is education's most serious problem. It would hardly seem that the ratio of expenditure to outcome has a positive value, or that the entire expenditure goes to contribute to the overall economic growth. Russia is suffering from a phenomenon that can be described as "general higher education," with people who join

universities taking courses that prepare them for professions which they do not plan to follow after graduation. The share of such students is as high as 40-50 % in higher educational establishments specializing in medicine and teacher training, it is even higher in schools of agriculture and engineering. The situation in the sector of secondary professional education and vocational training is much the same.

r. Modification of educational institutions. The concept as education as an expenditure-based "non-productive," or "social" sphere must give way to a notion of education as a productive sphere generating the most important type of capital. Accordingly, education investment should be viewed as investment into other infrastructure elements.

s. In Russia it should grow into a market with a increasing government subsidies of the consumption by families and individuals, and direct government orders placed for sufficiently long periods.

t. Integrating science and education. The main criterion for the value of universities is not so much whether they can pass on knowledge to their students, but rather whether they can involve them into the process of generating new knowledge. Science and research should be concentrated in universities, or, in the case of the Russian Academy of Sciences, in academic institutions closely associated with universities.

## 6. INTELLECTUAL SERVICES MARKETS

- a. Intellectual services have a considerably long history. Their function is based on the owner's delegation of some of his rights to make decisions of economic (or resource-related) nature. Managers hired by firms are similar to the broader phenomenon of intellectual property markets. In some of its forms, such as stockbrokerage services, they have existed for quite a long time; however they did not expand beyond their specific niches until the end of last century.
- b. Market structure. Consulting (technological and financial auditing, improving business processes, including IT consulting and market consulting), information services, personnel auditing and recruiting, marketing services, legal assistance, and analysis. The size in Russia remains small, although the market is gradually expanding as it includes more new medium-sized firms.
- c. The most important problem is a lack of proper criteria for evaluating the quality of such services. Accordingly, firms prefer to avoid using the services of expensive outside consultants, instead hiring their own cheap in-house workers, or altogether going without using any such services to plan development.



- d. Factors: insufficient level of competition on the intellectual services market, a dual-sector model, with extremely expensive international consulting firms and Russian firms that have not yet earned a name and thus are hard to choose from. The insufficient flexibility of dynamics in the "classical" sectors (the reluctance to expand market niches and low tendency to innovation).
- e. As a result the majority of clients in the intellectual services market come from three sectors: wholesale and retail trade, the new economy sector (according to 2002 surveys conducted by FOM, it has a very high tendency to innovation and a high degree of competition in its markets), and export-oriented energy and materials sectors (in Russia they are the biggest consumers of intellectual services provided by international firms). We could add firms undergoing restructuring, with outsiders placing orders for intellectual services.
- f. International intellectual services market has yet to be formed. It is strongly segmented along national and cultural lines. This does not mean, however, that this situation will continue for any length of time. Over a period of 10-15 years, the main sectors of the intellectual services market can be expected to become fully international.
- g. The projected growth of Russia's market of intellectual services is 15-25 % annually. By 2007 it can amount to 1.0 % of the GNP. There is a serious danger of further expansion of international corporations into the most lucrative sectors of Russia's intellectual services market, with national firms ousted to its periphery. The continued separation (in terms of prices and cultural bias) of the market into international and national providers may result in unfavorable consequences for the country's small and medium-sized business.
- h. The following measures of economic policy can be proposed: government funding of a single information infrastructure supporting the ISM, strict quality control of programmes in corresponding education markets (for managers, economists and lawyers), ensuring that mass-produced professionals in the above spheres should measure up to international standards.

## 7. IMPACT OF NEW ECONOMY ON SOCIAL STRUCTURE

- a. Russia is still suffering from a poor balance between people's incomes and their education level and social needs. Hence there is a considerably high tendency to social and professional mobility (both inside and between professional groups) contrasting with low

actual mobility. The reason lies in high transportation costs relative to incomes and the underdeveloped housing market.

- b. A social stratum of "lower-middle-class" educated people is appearing, including persons whose pay comes from the state budget (and who are unable to get second jobs), and those who work for the so-called comatose firms. Potentially they present a source of incurable social tensions - or great social and economic dynamics, if resources can be found to help them implement their pent-up ambitions and demands. While 20 % of Russia's population have a higher education, only 9 % are Internet users.
- c. Internet is the most important resource of "upgrading" social status and professional contacts.
- d. The "market" sectors of the new economy, ICT and IS, have a demonstrably higher level of job-related income and closer relationship between the level of education and pay. They can be expected to produce a steady growth of employment rate.
- e. The "non-market" sectors, science and education" can hardly be said to demonstrate the same qualities. The forthcoming five years will see an erosion of fictional, inertia-fuelled employment, a process that can be accelerated by an overall economic reform of the sectors. Employment can be expected to fall by 1.3-1.5 times in science and by 1.1-1.2 times in education (mainly owing to the demographic decline of the number of students). Conversely, the incomes of people employed in these sectors can be expected to grow, bringing them closer to the middle class.
- f. On the whole, new economy sectors can be described as the system-forming foundations of Russia's middle class and civil society.
  - i. A high level of education is required for obtaining a job or getting started in business.
  - ii. An obvious need for "dense" social collaboration networks (covering information exchange, culture, leisure, and professional communication) and indispensable for economic and political coherence of the actors of the new economy. The losses suffered during search and communication would be considerably lower than in other sectors, while the choice is much larger.
  - iii. The present development of technology and markets does not provide sufficient support for large-scale hierarchical structures, while the old Soviet-era organisations such as R&D institutes and universities, have either totally disappeared, or, at best, shrunk to mere shells of their former selves.

## 8. PROSPECTS FOR REFORMING RUSSIA'S POWER STRUCTURE

- a. An effective administrative reform is practically unthinkable in Russia if it relies on paper technologies that continue to exist in other that have stable government structures with long histories and traditions of behaviour appropriate to civil servants. Russian civil servants will continue to ask for much more detailed instructions and rigid control by the society than their western counterparts. ICT can provide the Russian government with a new level of possibilities for improving its efficiency.
  - i. The existing systems of business processing can be adapted and turned into sets of electronic policies and procedures, including "administrative maps" of government agencies, job descriptions and agency policies assisting in daily planning and evaluation of the operation of different government divisions. Electronic policies and procedures provide greater transparency of government operation in the interests of government leaders, interacting agencies and the government's "clients," firms and individuals.
  - ii. Information portals belonging to government organs can serve as a permanently operating "interface" for collaboration with the business enterprise sector and the public at large, a device for increasing the transparency and efficiency of government competitions and tenders.
  - iii. A single united system of government cadastres, or data bases compiled and maintained by different agencies, could in future help to reduce administrative and business costs resulting from difficulties in accessing information about government.
- b. Intellectual services market even now makes it possible to relieve government of a number of analytical and servicing functions, such as accounting and reporting or information services. According to conservative expert estimates, this will make it possible to cut the number of civil servants by 25-30 % in the short term, leading to a 15 % reduction of required budget allocatons.

## 9. CONCLUSIONS

- a. Russia can gain access to international markets and reach a new level of technology only if it succeeds in preserving and developing the potential for knowledge that it accumulated over the past decades and that has not been entirely lost despite the intensive "brain drain" of the 1990's. The government must invest

significant resources in developing education and science, and introduce ICT to all government-funded organisations, conditioned on a radical reorganisation of the distribution of funds in the sectors in question based on the principles of transparency and competitive funding, which should ensure greater efficiency of their operation.

- b. While in itself knowledge can serve to public benefit, it can (and does) bring significant returns when "put to work" within the framework of innovation processes and converted into new technologies for traditional sectors, from machine building to light industry and tourism. In view of this, the key task of economic policy should be to provide incentives for innovation which is a vehicle for introducing the new economy into traditional industries and thus increasing their efficiency and competitive value.
- c. In the sphere of the new economy, the key task of economic policy is to ensure a synergy of its development, with the stakes put on a concurrent development of all sectors of the new economy and their interaction, with the goal of achieving a radical efficiency growth as well as a stable new social and economic environment conducive to rapid growth and renovation of productive and managerial resources, efficient pursuit of long-term goals and a diffusion of the new economic culture attractive to workers employed in the traditional sectors.
- d. The following steps should be taken in the medium term:
  - i. forming effective markets in all sectors of the new economy;
  - ii. replacing government funding of institutions of education and science with mixed, market-oriented and investment-based financing;
  - iii. creating statistics, conducting sociological and marketing surveys and ensuring public access to their results;
  - iv. improving the legislative base, especially in the part necessary for providing Russia's speedy integration into international new economy markets.
- e. The currently operating "liberal" economic policy must be augmented with **measures for supporting the sectors and sources of the new economy**, including the production and diffusion of innovation, ICT markets and an up-to-date education system. This would involve:
  - i. a system of measures to promote the efficiency of existing markets of the new economy and to overcome their artificial segmentation, ensuring a high transparency for all actors;
  - ii. more government funding for firms belonging to the new economy (both to correct the existing underfunding of

science and education and to consolidate the government's role in ordering and consuming services in ICT and Intellectual services markets). On average, the government's contribution, expressed in absolute terms, should double by 2007

- iii. a reform of the forms and institutions of funding education and science that would help to reduce relative and absolute losses in those two sectors by at least three times by 2007, as well as help in turning them toward prospective needs (the government's demand) and the actual needs (the market demand);
- iv. measures providing for ICT employment in the economy, social sphere and government, and for the development of information and telecommunication markets (creating an infrastructure for the infrastructure, embracing the personnel, legal support and telecommunication infrastructure facilitating the use of ICT by firms and individuals).

f. A practical implementation of the above tasks would meet with the following problems, especially in the technologically difficult sectors:

- i. A deep-seated mistrust of business in the government and its policies that comes from past experience and leads to a higher evaluation of risks thus creating additional barriers to innovation and investment.
- ii. A weakness and inefficiency of the government, its inability, in its present form, to carry out its basic routine functions, to say nothing about supporting major long-term projects (for instance, the federal programme called "Electronic Russia").
- iii. A shortage of knowledge and skills necessary to support government in market economies, given the still existing positive knowledge and technologies. As a consequence, even given the right technological solutions and the production of high-quality goods, Russian firms are unable to find effective channels of marketing and disposal of their products.

g. The compensatory factor is the higher level of economic competence of the actors in the new economy markets relative to those in traditional sectors, as well as the relatively lower communications expense. It allows to use self-regulation in the form of producer and consumer associations for the purpose of regulating the markets and maintaining competition and transparency.

h. In providing incentives for innovation and diffusion of the new economy into the traditional industries, priority should not be given to extending government support in its present form, but rather to building

*new institutions for collaboration between business enterprise sector and the government, and between the government and government-funded firms:*

- i. A "nationwide contest" for pinpointing and disseminating the most advanced solutions, especially those in management held both in private business and state-funded sectors, with real moral and material incentives for the winners. One specific example is the competitive access to the Presidential Programme for Retraining Managers.
- ii. Joint projects involving large-scale business (having the status of "national initiatives" or "national projects") with a duration acceptable to the country's highest political leaders, based on co-funding by the government and private business and controlled by the private business. One of the goals would be to demonstrate the ability of government and businessmen to work together and thus to overcome the existing stereotypes and expectations.
- iii. A support, in the form of co-funding at federal level, of initiative and innovation in small and medium-sized business. It should be based on the economic feasibility of such projects, and sufficient guarantees from the businesses and regional governments of their participation in the funding, that must be run on the principles of competitiveness, transparency and clear procedures that would preclude bureaucratic interference into the distribution of funds and be supported with necessary amendments to the legislation and regulations.