

ST. PETERSBURG INTERNATIONAL ECONOMIC FORUM

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Russia's New Horizons

**KNOWLEDGE-BASED ECONOMY – A STRATEGY FOR GETTING AHEAD
OF THE CURVE**

Panel

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16:00–17:15, Pavilion 3, Amphitheatre

St. Petersburg, Russia

2013

Moderators:

Alexey Kovsh, Executive Vice-President, Optogan Group

Leonid Melamed, Chairman of the Board of Directors, Team Drive; Chief Executive Officer, RusnanoMedInvest

Panellists:

Igor Agamirzyan, Chief Executive Officer, RVC

Abel Aganbegyan, Academician, Russian Academy of Sciences

Andrey Fursenko, Aide to the President of the Russian Federation

Ilya Golubovich, Managing Partner, I2BF Global Ventures

Alexander Kashirin, Head of Innovation and Strategic Development, Russian Technologies State Corporation

Georgy Poltavchenko, Governor of St. Petersburg

Vladimir Vasilyev, Rector, St. Petersburg National Research University of Information Technologies, Mechanics and Optics

Front row participants

Oleg Goshchansky, Chairman, Managing Partner, KPMG in Russia and the CIS

Vladimir Kvint, Head of the Financial Strategy Department, Moscow School of Economics, M.V. Lomonosov Moscow State University; foreign member, Russian Academy of Sciences

L. Melamed:

Ladies and gentlemen, please take your seats. We begin our panel discussion on what is an important and widely discussed topic in our country today: the state and development of the knowledge economy.

My name is Leonid Melamed, and I am honoured to participate in this session. Together with my colleague Alexey Kovsh, Executive Vice President of Optogan Group, one of the most innovative companies in Russia, we will try to make our debate meaningful, interesting, and relevant. It is our hope that we will all leave this room in a great mood, having acquired new knowledge and ideas. Alexey.

A. Kovsh:

Here in the audience, in addition to the panellists, we have almost every component of the production chain of the knowledge economy. Firstly, science is represented by Vladimir Vasilyev, Rector of the St. Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO), Academician Abel Aganbegyan, and Professor Vladimir Kvint. We also have Igor Agamirzyan from RVC, Ilya Golubovich from the private venture industry, and Alexander Kashirin from Russian Technologies. And we also have government officials: Governor of St. Petersburg Georgy Poltavchenko, who invited us all here, and Aide to the President of the Russian Federation Andrey Fursenko. So indeed, here we have all the components of which a knowledge economy should consist.

L. Melamed:

The phrase 'knowledge economy' has become a common term that we use often, without always fully understanding what it means. This is something that Russia has invested considerable time, effort, money, and human resources into for quite a while. This is something that the Soviet Union was believed to be strong in: it is a positive legacy (in addition, of course, to many other important things) that we have inherited from our Soviet past. But there are different opinions as to how intensively Russia should now invest itself and its various forms of capital in the knowledge economy. There are views that state that we

should not be persevering in this. And in regards to the innovation economy, the old slogan, 'We will catch up and overtake America', is no longer relevant.

There is the so-called Russian domestic game, which is the raw-materials-based economy. The country has huge potential in this sector, and it should develop it further, rather than playing a game which is foreign to us, the innovation economy. It is important to excel in what is commonly referred to in business as 'homework'. Indeed, today the Russian economy is growing much faster than Western economies, which are considered to have knowledge economies. Furthermore, prominent agencies have projected that in the next eight to ten years, Russia's annual GDP will continue to grow, and the major Western economies of France, Germany, and the United States are likely to fall behind.

So there is an objective opinion that, from the point of view of the development of its industrial and post-industrial economy, Russia is well positioned, and that we need to invest in the sectors of the economy in which Russia is strong, as opposed to new sky-high technologies.

A. Kovsh:

When Leonid and I were preparing this panel discussion, we disagreed a lot, because I am on the other side of the fence. I would like to present the very different point of view that it is always easy to start from scratch. Any physical process that starts from zero develops fairly fast, but then becomes saturated. I happen to have lived and worked in three innovative regions: Taiwan, Germany, and Silicon Valley. And I have realized that the classical definition of a knowledge economy is the highest stage of development of an innovative society. This means that the road to a knowledge economy starts with an innovative society. The capital asset of a knowledge economy is its people.

According to various analytical UN reports, if you evaluate the capitalization rate in countries such as America, Germany, Switzerland, and Japan, 80% of the value of these countries is to be found in human potential. And when I lived in these countries, especially of course in Silicon Valley (I think Ilya Golubovich, who studied at Stanford, will confirm this), I experienced the unique sensation of this human potential, when people work and create added value, when people

are not getting rich on the redistribution of added value, but on its creation. In my opinion, our country is in desperate need of a nationwide policy to move in the direction of a knowledge economy, and not just to create a handful of development institutions (RUSNANO, RVC, Skolkovo), but namely a wide-scale public awareness campaign, so that our people realize that if we do not produce anything, our children will have to go to China to work in Chinese factories in the same way that people from the republics of Central Asia are now coming to Russia to find jobs. This also means instilling true patriotism, which means buying goods produced in Russia, and teaching students that earning money by creating added value is far more interesting and worthwhile than redistributing it. And finally, it means protection at the state level, because unfortunately there cannot be an innovative economy without protectionism.

L. Melamed:

So we are building our discussion as if between an angel and the devil's advocate. First of all, I would like to give the floor to Mr. Aganbegyan. He is considered the father of the term 'knowledge economy'. I would like to know what your current studies indicate: whether Russia is on the right path towards the transformation of its economy, how significant its successes are, and how difficult the road ahead of us is. Please proceed.

A. Aganbegyan:

A knowledge economy typically incorporates science, education, information technology, biotechnology, and healthcare. The share of these sectors in the creation of GDP in Russia is about 15%: science accounts for 1% of GDP, education less than 5%, healthcare 4.9%, information technology 5%, and biotechnology almost zero. In Western Europe, the share of biotechnology is 35%, as healthcare accounts for 10.2% of GDP, rather than 5%; education accounts for 8%, science 2.5%, and the greatest difference is of course in information technology, with the share of GDP in Western Europe of this sector at 15–20%. In America, the knowledge economy is responsible for 45% of the economy as a whole, because healthcare in America accounts for 16% of GDP,

education accounts for 11%, science 2.6%, and of course, information technology even more.

The notion that we are developing the fastest is obsolete, and not true. The fact is that we do not believe that the crisis has affected us as much as it did other countries. If you compare our growth to that of 2008, we now have one of the lowest relative growth rates, and it has become clear that we have now taken a new path. Manufacturing in Russia is barely growing; agriculture is on a downward path, and has not seen any growth in recent years. According to the Ministry of Economic Development's forecasts, GDP will grow this year by 2.4%, but as of now we are at a rate of 1.6%. But we do not need to look at these indicators. After all, we live for the sake of people. Life expectancy in Russia is 70 years, while in Europe it now exceeds 80. Life expectancy was 70 years there half a century ago. We are lagging behind.

In education we are doing quite well, and we rank 20th. Our workforce has approximately 11 years of education on average, while in advanced countries this figure stands at about 15 years. But relatively speaking, we are lagging behind to a lesser degree in education.

In information technology, we are lagging behind to a horrendous degree. Everyone can see this. India exports mathematics software to other countries, and exported USD 65 billion worth just last year. This is equal to how much gas we export, and this is more than our exports of ferrous and non-ferrous metals combined. A knowledge economy is not thin air, but hard money. Most importantly, a knowledge economy is the catalyst for everything: not only the economy in general, but also for increasing the quality of life.

What is a modern third- or fourth-generation factory machine? It is entirely based on computer technologies, on supercomputers and machinery. What is modern healthcare? This has now gone high-tech, with the MRI, CT, PET, and positron factories. Everything is based on mathematics, on hundreds of programs. Did you know that in most developed countries, mortality rates from cardiovascular disease have been superseded by cancer? These countries have managed to reduce the mortality rate from heart attacks, strokes, coronary heart disease, and so on by 300%, and everywhere mortality rates from cancer are falling. Here in

Russia, people die of diseases: men die 14 years younger in Russia than they do in those countries; women die more than nine years younger. That is what IT is, and what the knowledge economy is all about.

We must accelerate socioeconomic development at all costs. If we are going to grow at a rate of 3% per year, our country has no prospects, as we will not join the ranks of developed countries. In terms of economic development, we lag behind European countries by a factor of 1.5–2 times and the United States of America by 2–2.5 times. In terms of social indicators, we lag even further behind than in the economic sense. With time we need to somehow reduce this gap, and for that we need faster growth rates, as a more backward country in terms of economic and social development. We are completely dissatisfied with this growth rate of 2.5–3%. Believe me, I have been a resident of Switzerland for 25 years. And I am telling you that Russia is not Switzerland, where I have lived and worked for many years for several months a year. It is a completely different world in many respects. Men do not live for 65 years there, like they do in Russia now, but for 81 years. Men! That is amazing. So we need to think about what economic drivers we have that will enable us to accelerate our growth.

If you want to accelerate growth, you have to take a large sector, which should grow faster with a large multiplier effect, and which drives you forward. The main sector through which we can dramatically accelerate our growth is the knowledge economy. This accounts for 15% of our GDP. If our knowledge economy grows by at least 8% per year, the gross domestic product due to that alone will grow by 0.75% per year, so our growth will increase from 3% to 3.75%. And with the other effects that would boost growth even further, such as the growth of IT and so on, GDP will reach 4.5%.

The main source of our future growth is information technology. This is not the only source, but it is the most important one, even in purely quantitative terms.

In global terms, where do we rank in knowledge economy development? Unfortunately, we are ranked in 60th place. In education we are in 20th place, and, as I said, in economic development we are in 43rd place (out of 146 countries). Vladimir Kvint even wrote a book on ratings, and came up with a ratings system of his own. By the way, he is not only a professor, but also a

foreign member of the Russian Academy of Sciences, and actually he is an American of Russian origin. It happens.

What other drivers are there? There is housing construction, which has a huge weight and multiplier effect. If housing grows by 8%, it will accelerate overall growth by 0.5%. There is the automotive industry, which is growing at 7%. If it grew by 8% per year, this would add another 0.3% to overall GDP, and so on.

I just want to say that, of course, IT and the entire knowledge economy is not a magic wand to solve every issue. You cannot take just one sector. In general, there is not just one solution that can resolve the problems of this huge country. Therefore, we need to take a comprehensive approach. Part of that is to upgrade our outdated facilities and equipment. It would be ridiculous to reach the heights in IT while 40% of our electricity is still produced by 30–40-year-old generators. That would not be right. We need to give a boost to the high-tech sectors. And, accordingly, the workforce will be better qualified. We need to change the structure of the economy by enhancing the share of high-tech industries and the production of consumer goods with high added value, and do much, much more. So we do not need to have a literal understanding of the role of the knowledge economy, such as, 'If we grab this opportunity things will get off the ground straight away.' No, what we need is a comprehensive programme that includes a large number of social programmes.

Let us look at housing. Twenty-three percent of housing in Russia has no sewage system; 27% has no cold water, and 35% has no hot water. This is the 21st century; just think of it! These are our official statistics. And you can quote many similar figures from other areas. We are perhaps the only country without a modern two-way motorway connecting two major cities. In France there is no city with 100,000 inhabitants not connected by a two-way motorway. In Russia there is no real high-speed railway, and in France, except for Nice, there is not a single city that is not connected by the high-speed railway system, where a train can run at a speed of 350 kilometres per hour, and where its average speed between cities is more than 200 kilometres per hour. And so on and so forth. We need to move forward.

I am convinced that our country has great potential and huge capabilities. I was taken aback by what you said about us not playing our own game. Tell me, please: why is education not our own game? If you remember, when the first satellite was launched by Russia and the entire management team of the CIA that failed to predict it was dismissed, a commission was set up headed by the Vice President of the United States to investigate the reasons. And what was the conclusion of the six volumes written by the members of this committee? The reason was that Russia had the better education system. How is this “not playing our game”? And who invented the first computers in parallel with the US? Japan? Italy? England? No, they were not even close. It was the Lebedev Institute in Russia that developed the first computers, so IT originated here in Russia. We should remember our Russian science. We spent 3% of GDP on science. So we are playing our game, not someone else’s, that someone else created, and we do not even know how they created it. Thank you.

L. Melamed:

So you are confidently voting for the first response?

A. Aganbegyan:

Sorry.

L. Melamed:

Colleagues, there are two questions on the screen. Please vote using the handheld device.

And now let me give the floor to Mr. Poltavchenko. St. Petersburg probably has a better claim than any other city to being the growth point of the knowledge economy. So please tell me, how do you see the role of St. Petersburg and the role of the state authorities in helping the economy?

G. Poltavchenko:

Thank you. I would like to start by saying that the knowledge economy accounts for not 15%, but 25% of the economy of St. Petersburg today, in contrast to the

average for Russia as a whole. I believe that the city must set a goal to increase this to 30% by somewhere around 2020, and 35% or 40% in the next 10 years. I think that St. Petersburg is more than capable of this, because everything that is required is already in place: a strong scientific base, a strong educational base, fairly well-developed healthcare, and associated research centres working in the field of biotechnology. And most importantly, there is the so-called human capital, about which much has been said.

I would like to point out that not only this city, but the country as a whole, has no choice, especially as the objectives set one year ago by the President of our country in his May decrees are almost all aimed at enhancing the quality of human capital and developing the knowledge economy. Our two esteemed moderators contrasted the knowledge economy and the commodity economy. I think this is not an appropriate approach, because our country has, in my view, a very significant competitive advantage compared to other countries. We have a commodity economy, which can and should complement the knowledge economy, and then I believe that Russia will be beyond the reach of many countries, including developed ones. The most important thing is to develop these two economies together.

Speaking of St. Petersburg, I believe that in our city there is a large number of ways we can apply the knowledge economy and invest in it. What do I mean by this? We need to create (in order to improve the quality of human capital) an appropriate urban environment, where the people who make up the human capital can live in the 21st century. We are working hard on fully upgrading Vodokanal of St. Petersburg, the city's main water supply company. It is one of the best in the country and compares favourably to many in Europe, but nevertheless, it requires a significant amount of investment. And via a public-private partnership, we are procuring modern technologies, and plan to carry out a large-scale reconstruction of this very important company.

We are interested in procuring so-called green technologies for our city, in developing, designing, and implementing these technologies, especially in the so-called previously developed industrial areas, or, as we still call them, the grey areas: the industrial areas surrounding the city centre. We are very interested in

using new technologies to preserve the cultural centre of St. Petersburg, to build a smart city system and, of course, to develop the healthcare system.

Healthcare in St. Petersburg has an excellent scientific base. Its level has been evaluated (by experts at any rate) as quite high, but of course, it requires additional investment, both intellectual and material, including investment based on public-private partnerships. I think that we also have the opportunity to make significant progress in this.

As for the contribution of St. Petersburg to the knowledge economy of the country, important things here (which are, by the way, related to the commodity economy) include the latest technological developments in the field of exploration and mining operations, which a number of companies boast in our city. We need to implement these technologies, and they are already being implemented. We have built up significant scientific capability in the study of the Arctic region. Did you know that high on today's global economic agenda are important issues related to the exploitation of the Arctic? I think that the capabilities that have been amassed by the city of St. Petersburg will become in demand and could yield very high returns.

And probably the last thing I wanted to say is that we have not yet learned how to properly implement what the human capital of Russia produces. But we must not forget (and the distinguished Abel Aganbegyan, who had the floor before me, has already said this) that many things invented in Russia were unfortunately exported, improved, and completed abroad. We have not only the opportunity but the duty to ensure that the technologies created by our scientists – our human capital – are implemented in our country, and that we export not only our raw materials, but also highly intelligent products with high added value. I believe that both Russia and St. Petersburg have the capacity to do this. Thank you.

L. Melamed:

Thank you, Governor Poltavchenko.

I would like to give the floor to Andrey Fursenko. I have a question that should interest you today. To what degree does the knowledge economy of today require a large number of experts? To what degree are the people who go

through the education system in the Russian Federation, in light of the current quality of education, in demand in today's economy, and to what degree will they be in demand tomorrow?

A. Fursenko:

Thank you. I think that, as always, any discussion should begin by clarifying the definitions. We are talking about the knowledge economy, and in fact this definition today is very traditional. Strictly speaking, the IT sector will continue to develop – it is always developing – as will any other sector, such as energy. But if you are talking about a breakthrough, I think that this will not happen tomorrow, but rather today, and in some respects it has already happened.

I believe that the knowledge economy refers to the economy in which fundamentally new knowledge may lead to a breakthrough. Let us take shale gas. Is this the knowledge economy or not? On the other hand, the new knowledge that has evolved in the last few years has completely changed the face of the energy sector. So if that is not the knowledge economy, then what is? I would therefore not get too attached to the notion that IT is the knowledge economy, and the energy sector is traditional knowledge. I think the same thing can be said about almost every industry. What about aviation, which uses fully composite materials? Is this the knowledge economy or not? Yes, it is the traditional aircraft industry, but it enables the fuel economy of the plane to be almost halved. It allows you to fundamentally change the concept of transport, the concept of logistics: this is the knowledge economy.

I think that when we discuss issues such as 'catching up and overtaking' and 'we can or we cannot', then firstly we need to draw up a very precise definition, and secondly we need to prioritize. I think one of the problems that we have is that we identify priorities based on what we want to see as a priority, or what we are more familiar with, or what we see in other countries. I think that based on the logic of catch-up development, it is quite difficult to assure that a breakthrough will be made. We should probably try to build our priorities based on something completely different.

I have one suggestion that I propose we discuss. The President set the goal of creating 25 million high-tech jobs. Perhaps we should start out from this. What is a high-tech job? It is a job that produces a product that is qualitatively better than what is available today. It is absolutely clear that we are saying that from somewhere we will find 25 million new Russians: this means that all the people who are employed today must demonstrate a fundamentally new level of performance with fundamentally new added value, with a fundamentally new product. And we should think about what our priorities are, where these jobs should be created, and where the large demand for new jobs is. It is not just in IT. It may be, first and foremost, in all the segments of the domestic market that determine the quality of life. Yes, this includes healthcare, but not modern-day healthcare, because healthcare today is what we turn to when a person is sick. We should talk about modern day healthcare in terms of what is before and what is after; how we prevent illness; how we diagnose it, and how we rehabilitate people. And these branches of medicine are, in terms of added value, the most effective, because life expectancy and quality of life (which is no less important than life expectancy) will be determined by the standard of healthcare.

In education today, the quality of work at schools is completely different. Teaching is now high-tech. This has happened in just a few short years, because today the teacher is immersed in IT, in radically new methodologies and approaches. And by the way, teachers nowadays receive a completely different salary, and this also should not be forgotten. This means that there is room for new consumption and a new impetus for producers to meet this consumer demand through the creation of new products.

So I think that when we are talking about the technology of the knowledge economy, we must start out by asking who will work in this economy, and how will we create jobs in this economy. And this is the main motivation. What are the risks inherent in this? That is also an interesting question, but I think we should give other people the chance to speak.

A. Kovsh:

Andrey, I have a question for you about the definition. After all, when we talk about the knowledge economy, we are not just talking about an abstract value, but rather the competitive strength of a particular industry in a particular country. What do you think about the definition 'revenue per person'? Let us find out. For example, Intel's revenue amounts to USD 500,000 per person, and Microsoft's revenue totals USD 700,000 per person. Take any sector of our economy that requires knowledge: what is the revenue per person? What do you have to say about this definition?

A. Fursenko:

I believe that, as with any definition, it is not all-encompassing, but it is very motivating. But why not? Because there are subsidiary areas in which it is not possible to achieve such revenues, but which enable surrounding people to achieve very high revenues. And you cannot expect that the market will level out revenues universally and everywhere. There is the social sphere, which is very difficult to level out.

In America, for example, healthcare has long been a very high-paying industry for its doctors. But teachers in America are not as highly paid, even though education is no less important than health care. However, both of these sectors determine the revenues in the IT sphere. For example, when there is good education and good healthcare, IT revenues are very high. Therefore, I agree with your definition, but do not believe it to be all-encompassing. We need to talk about it, and use integral estimations, categorical estimations, when we include all of the participants in the category, without whom this high revenue would not be possible.

A. Kovsh:

Thank you, Mr. Fursenko.

L. Melamed:

Mr. Agamirzyan, what experience gained by the Russian venture capital industry supports what the previous speakers have said? Or do you have a different

opinion? What specific sectors of our economy are the most receptive to new goods and currently most willingly consume them?

I. Agamirzyan

Thank you. I want to start by disagreeing with Mr. Fursenko, whom I deeply respect. I think the question with which Mr. Fursenko began is in fact closely linked to the question which was discussed at the end about the high-performance workplace and productivity rates in the economy. It is a question of the role of IT in the modern knowledge economy. I hold a radically different position, and believe that what Mr. Aganbegyan said about the importance of IT also points to an underestimation of its role in the modern economy.

The fact is that, in my opinion, right now, in our generation, the modern economy at the global level is experiencing a paradigm shift. A fundamental change. And the development of IT in the past decade is not a short-term one-off process. It has been going on for at least 30, and maybe even 40 years.

IT has become the major platform for innovative development. Today, without IT nothing is possible. There are currently no sectors of the economy that in one way or another do not use IT. Modern medicine and medical equipment are based on specialized computers. Modern production lines have dedicated management and design systems for manufacturing. Any modern gadget such as a dictaphone or a microphone includes a microprocessor.

Today, IT is everywhere. It has become the backbone of the modern economy in the same way that engineering was the backbone of the industrial economy. And this brings us to an extremely important, and what I would call a paradigmatic, shift in the creation of value-added centres. While at the centre of the traditional industrial economy, added value lay in production, in the centre of the modern economy, added value lies in design, development, and engineering. And there are many examples which demonstrate this. In many industries, this division is complete (which is, incidentally, very well reflected in the trends seen in recent years in our country). For example, in my opinion, it is clear that today the share of software exports in technological exports (non-commodity exports) from our country is considerable. Software exports from Russia in 2012 reached USD 4

billion, and this year exports will reach about USD 6 billion, and this is in fact close to the volume of arms exports. And there are no other technological exports.

In recent years, there has been a lot of talk about the new industrialization. This term is not used exclusively in Russia. Everywhere, people are talking about the new industrialization. In America, the largest IT companies are beginning to build factories and return their production facilities to America from China. However, we are forgetting that actually this is not only a new period of industrialization: this is different to the industrialization that took place in the 20th century. With modern plants and fully automated production facilities, production costs are approaching zero. And the main centre of added value is shifting to product development and to engineering the creation of these automated production facilities. Therefore, the knowledge economy is not something that is isolated; it is the primary driver of the modern economy and economic development.

In conclusion, I want to go back to what we discussed regarding the high-performance workplace. An absolutely correct factor has been suggested: revenues of USD 500,000 per person generated at Intel, with USD 700,000 at Microsoft. In fact this exceeds the GDP per capita in the country by a factor of 10–15, and in some cases by a factor of 20. And it is clear that out of the USD 700,000 generated by a programmer working for Microsoft, at best he or she is paid USD 100,000. In this sense the productivity per person and his or her salary are not one and the same. So what Andrey said about teachers' pay, in my opinion, is completely incorrect: a teacher receives his or her salary, and he or she produces a much more valuable product that creates future added value for the entire economy. So the issue of high-performance jobs is directly related to the knowledge economy. And, unfortunately, it is still not very well defined in Russia. In my opinion, a high-performance job is one which at least exceeds the GDP per capita in the country.

We must understand that in Russia today, based on parity, the GDP per capita is about a third that of the United States, and stands at about USD 15,000. This is roughly the same as what we had back in the Soviet Union. But it means that for our conditions we need a high-performance workplace that generates more than

USD 15,000 per year. There are few such jobs in our country, and as for jobs which generate 20 times the GDP per capita, I am not sure that they exist, other than at Yandex and possibly in a handful of high-tech IT companies.

Therefore, in my opinion (and I fully agree with what Mr. Aganbegyan said about the impact of the knowledge economy on economic development in general), it is about time we made a shift from talking about innovation as a separate activity to innovation and the knowledge economy as part of the economy which exerts a major influence on economic development.

L. Melamed:

Thank you very much. And what is preventing us from grasping this? You said, "It is about time we made a shift." Where are the barriers?

I. Agamirzyan

Personally, I talk about these barriers quite often. However, at the moment this is not conventional rhetoric. I am not a professional economist, but I have practical knowledge, as through my work I talk to economists often, and in terms of modern business practices, I see some gaps.

For example, there is a large, dark area associated with the country's GDP. Besides the quantitative characteristics that it has in the traditional sense (it is an assessment; it is always a number), GDP has some more qualitative characteristics as well: what share of GDP is spent on development, and what share on consumer growth, rather than on manufacturing costs. Today, GDP is considered the established standard (by economists all around the world), regardless of what this GDP means. At the same time, it is clear that the modern-day driver of growth is consumption. This is the consumer, so development is becoming less and less business-oriented. All the technological innovations and the entire knowledge economy is becoming increasingly geared to serving the needs of a particular person, and that is a share of a country's good GDP. At the same time, there is an important part of the GDP which in no way affects neither the standard of living nor the way of life, or which affects it indirectly.

L. Melamed:

Thank you very much.

We have the preliminary results of the voting, which the system is giving us now.

Let's ask the organizers to show us where we are at.

Please vote once again. Let us vote at this stage. Please proceed. The time is up. Press the button.

The winner is the knowledge economy, as the road which Russia should go down. We will return to the voting at the end of our panel discussion. And now, back to Aleksey.

A. Kovsh:

I want to give the floor to the Rector of ITMO. I am proud that we have our own training department in your university. I have, in addition to the general view of this problem, a personal question. Sometimes I give lectures to students, and every time, I ask them, "Hands up: who wants to work for Gazprom; who wants to leave the country; and who wants to create their own business." It is well known that 60% of Americans want to set up their own businesses. I reckon that an undisputed positive result of the wave of modernization (maybe the first, because I get the impression that it is being somewhat stifled) is that young people are now passionate about creating their own IT start-ups and earning money from that. Have you seen amongst your student body that this entrepreneurial streak has swung in the direction of business, in the creation of value-added products?

V. Vasilyev:

Thank you. After Mr. Agamirzyan, I would really like to continue the theme of IT, but I will not do that.

I would like to offer the following idea, a viewpoint from higher professional technical, computer science, and mathematical education. It has been said that the main object and subject of a knowledge economy is its people. It seems to me that there is a fairly large gap between needs, not only in Russia but also worldwide. The needs of young undergraduate students revolve around their

desire to realize their intellectual and spiritual potential. These are not just words; they translate into completely understandable decisions on their part. They think in very short-term, from my point of view (from their point of view, they are thinking long-term), projects: two- to three-year projects. The needs of the state and the needs of the employer are relevant to the industrial paradigm and the paradigm of the consumer society. So there is clearly a large gap between what young people want today, and what the state and employers need. They require people who can fulfil a certain function and generate revenues of USD 600,000 to 700,000 (I do not know quite how much). Young people do not want that any more. Paradoxically, an increasing number of people are now no longer interested in career growth. They have completely different interests.

And I can see that in my university: when companies offer my young programmers a salary of USD 150,000–170,000 per year, they are refusing these offers. They think differently and want to earn, by their calculations, RUB 40,000 a month. That is enough for them: but they want to develop their potential, and implement their own projects. I would like to say that this is not only a Russian problem, but also a problem in higher education worldwide. Believe me, I have been talking to my colleagues who are rectors in Silicon Valley. We can draw one conclusion from this: as soon as we become aware of this problem and state it clearly, then we are already halfway to solving it. And if higher education in Russia, including in St. Petersburg (which I genuinely believe is the leader in Russia), understands this and finds the right tools and mechanisms to deal with it, then we will be in a position to make a major breakthrough.

The second gap that we have now is that the level of demand can also vary. This is very specific to Russia: where is the competition higher, in what areas of study or specialization? We know the answer to this. And what professions are in demand in the Wild West or the developed West? The science, engineering, and technical professions. But this is a medical fact.

The third gap arises when our technical and engineering schools are not in demand for various reasons, such as low wages and other factors.

Gaps such as this arise: a parent or child wants to go in one direction, whilst the competitiveness of the education system lies elsewhere. So it seems to me that as soon as these gaps are clearly stated, especially in the knowledge economy – where, I stress, the main subject and object is people – then we will be able to take a big step forward.

I will say a few words about start-ups. The adoption of Federal Law No. 217 in 2009 was of great importance. Remember that we were almost 30 years behind Bob Jones (I am referring to the law that was passed in the United States). With regard to what has been said about the university, this is something I see. Thirty-six startups were set up, and they were created by undergraduates and graduate students.

However, there is a serious problem. The problem is not where my friend and colleague Igor Agamirzyan is, but in RVC, which supports companies in the late stages. The pre-seed and seed stage is vital, and it is not that we have insufficient funding, but insufficient mentors: there are not enough tutors who are able to form and train up a team, turn an idea into a business model first, then into a specific model, and then into a product or a service. This is another serious problem that needs to be addressed. The Agency for Strategic Initiatives is now working on finding solutions. I very much hope that we will reduce this gap, but we know that there are no mentors. And so in Russia, business accelerators are also not very effective (three-month programmes, when a team is given USD 15,000).

However, I stress once again that in spite of the problems, I am very optimistic about the students and their prospects. I believe that we have a decent future. Young people are better than we are; otherwise, there would be no progress. The younger generation can move our knowledge economy forward not in words but in deeds, and it is already doing so. Thank you.

A. Kovsh:

Thank you very much. So you have observed a qualitative change in the consciousness of students in the last few years?

V. Vasilyev:

Absolutely. I think that it began sometime in 2006–2007. Without a doubt, Federal Law No. 217 has been an additional driving force.

A. Kovsh:

Thank you; you touched upon a very important issue that we had not yet mentioned.

The floor now goes to Alexander Kashirin, who is essentially the founding father of the business angel movement in Russia. However, perhaps business angels in Russia have a lot to learn themselves in order to become mentors for younger people. The first question is: how do you view the business angel movement, and how can it help the knowledge economy develop? And I have a second question. From my point of view, the fact that a conventional company such as Russian Technologies invited a person from the business angel community to work on innovative development is unique. What would you say about this?

A. Kashirin:

Thank you very much, but I guess this is an imperative of our time, and a consequence of the fact that big businesses must join forces with small businesses to increase their competitiveness. I have been working for a little over two years, and I myself am going through all the processes involving interaction between large and small businesses. I have made a presentation with visuals in order to speed up my speech.

I want to start by saying that a knowledge economy, first and foremost, is when knowledge is converted into money. Then it becomes an economy. Now, on the screen, let us look at the specific features of the global innovation economy. First of all, this is a new phase in the development of productive forces. This happens when the share of GDP generated by innovation becomes more noticeable and grows at an accelerated pace. Production, distribution, and consumption develop at a higher rate, new knowledge is created, and the roles of management, competition, and cooperation are significantly enhanced. Our analysis has shown that expertise is becoming the key to the competitiveness of companies. It should

also be noted that the emergence of a new sector – the sector of small, innovative companies – has also changed the landscape of the economy. On this slide, I wanted to compare the industrial economy and the economy based on knowledge. You can see that the market is changing very rapidly compared to the speed of change in the industrial economy. The product life cycle is very short compared to that of the industrial economy. The main driving force is now innovative entrepreneurial firms, alongside large industrial companies. Competition is becoming global, there is no denying this, and this competition is a game of ‘the quick eating the slow’.

When we now look at the industrial and post-industrial economy from the point of view of companies and teams, we should note that the foundation is not stability, but the management of change. Management is not integrated vertically, as before, but is based on the internal leadership of the employee. The organization of production is flexible and small-scale. The organizational structure is no longer based on hierarchical systems, but rather networks and matrices, with powers delegated to employees. The key to growth is not capital as it used to be, but knowledge and innovation. I would also like to draw your attention (our colleagues have already talked about this today) to the fact that the missing resource is not financial capital, which essentially is not in short supply, but human capital, which creates knowledge. In addition, the processes are now continuous rather than periodic, and it should be noted that continuous training is necessary, because changes are happening every day.

We have already talked about this today, but still, I want to reiterate: the main protagonist, the most important component of a knowledge economy, is the company. It does not matter if the high-tech company is big or small: it is the company that creates added value; it is the company that is capitalized, and the company that contributes to GDP. Who are the participants in this company? Who makes up this company’s team? Who is its creative source? This is primarily one or more developers who create new knowledge. It is managers who run the business and sell the products that are created on the basis of this knowledge, and investors. So the challenge of a knowledge economy is to

provide favourable conditions for the operation of these four main subjects of the innovation or knowledge economy.

Pay attention to the other trends we are now witnessing. First of all, major manufacturers are now outsourcing a lot of their work. While 50 years ago, Boeing produced 70% of its aircraft itself, it now produces only 30%. Why? Because in the context of dynamic development, it is very difficult to maintain your level of expertise. Current experience shows that the most rational thing to do is share expertise, and so while you possess your own expertise, you plug into the expertise of others. Therefore, expertise is becoming the key to development and growth. Now I will move on to fast growth.

I will not say that expertise is the basis of competitiveness for a company, but expertise is required at all phases of the process: at the creation, production, sale, and product support phases. I want to draw attention to the fact that, from my point of view, the basis for fast growth is superiority in expertise, new approaches, and new concepts. We need to introduce new categories, new measurement systems, and new approaches. The path through the categories of global superiority and global expertise is the path to faster thinking, positioning, and action. The effectiveness of how knowledge is utilized is also determined by expertise. Now we are beginning to understand what global superiority is, but in the interest of saving time I would like to show you by using an example. Apple had global superiority after releasing the first iPhone. But then its global superiority came to an end, because Samsung and other corporations also began producing similar products, and they had (and have) enough expertise to hold onto a certain segment of the market. The transition to a new understanding of the superiority of expertise makes it clear to us where we stand and what needs to be done to achieve fast growth. However, as the main holder of expertise is people who possess knowledge, skills, and abilities, then it follows that we need well-educated people who will focus on achievement and excellence. An important task for business and our government is to create the conditions for those kinds of people to come to the fore. Thank you.

A. Kovsh:

I have a question for you. Professor Kvint said that this is exactly what young people want, but there are no jobs for them. So are we aiming to create 25 million jobs?

A. Kashirin:

Absolutely.

A. Kovsh:

We are going to educate and train people up? But we have no manufacturing industry. How can we (and you are a representative of today's industry; you have a lot of plants) create a manufacturing sector in a short period of time?

A. Kashirin:

At Russian Technologies, revenues are growing fairly fast, as are our exports of high-tech products. In the last five years, we have increased arms exports by nearly a factor of five. I spend a lot of time at our plants, and I would like to add that our equipment is being modernized and updated. Young people are working on the shop floors that already have modern equipment. Young people are working with equipment where everything is computerized, as Mr. Agamirzyan said, and they are interested in this. And on the shop floors with machines from the 1930s, there are no young people to be seen. So the problem is being solved, but how fast or slow this is happening is another question. But that is a secondary question. There are already some specific solutions, and some concrete results.

L. Melamed:

Thank you. Our next question is for Mr. Golubovich, Managing Partner at I2BF Global Ventures. Ilya, tell me please, what is the role of private companies and private money in the development of the knowledge economy?

I. Golubovich:

They of course play a very important role, because in the ecosystem of a knowledge economy, there are a number of phases that are impossible without private capital. Startups are the first important phase, and I believe we have moved forward in Russia in recent years, in part with the assistance of development institutions (such as RUSNANO, RVC, and Skolkovo), to create an ecosystem for startups and, accordingly, for the engagement of investors in these startups. I must say that comparing the quality of today's projects to those we saw five or six years ago, when we just started coming to Russia to see its projects, is like comparing apples to oranges. The quality of the teams – and even the quality of the presentations, business models, and strategies – are just not comparable.

We have achieved something. Is it enough to create a knowledge economy in Russia just through startups? Unfortunately, I do not think so. The reason for this is that in Russia, the economy has a slightly different structure. While two thirds of America's GDP is made up of small and medium-sized companies, most of our industry is dominated by large companies: in some situations monopolies, oligopolies, and syndicates, all very large businesses with which startups would struggle to compete. So, perhaps with the exception of IT, the scaling up of a startup into a large company in Russia is a hugely difficult challenge, and we have seen very few examples of success.

What does this mean? It is indicative of the fact that the creation of an innovative environment should include big business. Unfortunately, this is currently not happening. If you take the cost of R&D as a share of GDP, which in Russia is somewhere around 2%, the bulk of it is funded by the government, and business funds less than 20%. Why? Because, apparently, there are no mechanisms that can involve large business in R&D. We can look at the example of the Korean economy, which in the 1980s and 1990s made its transition to a knowledge economy by introducing tax breaks for R&D and by establishing regional industry research hubs, all in an effort to engage big business in R&D. This has not yet happened in Russia, or at least there is no system which would enable this to be done at scale. There are, of course, some positive signs. Many large Russian companies, including state-owned ones, already have their own venture capital

funds, but again, start-ups alone will not be enough. Startups alone cannot create the 25 million jobs that we are talking about today.

L. Melamed:

Thank you. But private money is not only about venture capital investments, right? Private initiatives and private money have a place in other aspects of the knowledge economy.

I. Golubovich:

Of course, but as I have already said, with regard to private equity venture funds, which are fairly active in Russia, these investments are typically in IT. Why? Because there are clear exit strategies and examples of success, and large public offerings have been held. However, if we compare these investments to the amount of private capital that has been invested in innovation not related to IT (this is the basis of industrial and energy technology), we can see that much less private capital has been raised. Non-IT innovative fields are still largely supported by the government and development institutions. So I fear that private equity funds are not playing a significant enough role in creating high-tech manufacturing on the scale required to change the structure of the economy to a knowledge economy. We need major investment on the part of big business, and for that we need the right conditions to make such investments attractive to business.

L. Melamed:

We thank our speaker and give the floor to Oleg Goshchansky, Managing Partner of KPMG in Russia and the CIS. It would very interesting to get your view on how fast the knowledge economy in Russia is developing compared to those of our neighbours.

O. Goshchansky:

Thank you. I would like to start by answering that question. I believe that the knowledge economy in Russia is not just one of the options available to us, but

rather something that should be recognized as a necessity. Why? Because if Russia wants to remain an advanced, leading country, at least at the regional level, never mind about our ambitions to become a superpower, then we have no choice. Whilst to win in the 20th century you needed to amass the required capital and investment in the right place at the right time, the beginning of the 21st century shows that the most important factor in global integration, in taking your rightful place in the global economy, is the ability to accumulate intellect and innovative capacity. Therefore, it is very important not just to put a halt to the brain drain from Russia, but to think about how to create a surplus of intellect coming into Russia. To win, you need to export intellect through the creation of new technologies, new products, and know-how, rather than ensure a brain drain from your country.

Now I would like to talk about what knowledge economies are about. I will repeat part of what I have said. First of all, a knowledge economy concerns IT, bioenergy, and healthcare: that is, to classic industries where the knowledge economy is most or least apparent. This is correct, but nevertheless, we must not forget that each country has historically strong industries. In regard to Russia, we have historically had a very strong MIC sector, and it remains strong to this day. And yes, we must not forget that we are an energy-producing country. But the example of the upcoming so-called shale gas revolution was completely spot on. For me this is a perfect illustration of the fact that a knowledge economy is possible in traditional and orthodox industries like oil and gas. Here, too, there is room for progress. Therefore we need to create new products, technologies, and know-how, precisely in the sectors in which we are already strong, and not forget about the industries in which we can be successful and competitive.

A knowledge economy is completely dependent on a range of factors inherent in a specific country. On the one hand, it is dependent on the legal system, the bankruptcy laws, and the intellectual property laws, and on the other hand, it relies on the incentives provided to small and medium-sized companies. Of course, the big corporations and the government play a major role in this.

But the growing medium, the real environment for innovation, for creating something new, is still small and medium-sized companies. Therefore, it is vital

that we not only stop harassing small and medium-sized companies, but provide support for them the best we can with the help of financial incentives, tax breaks, preferential loans, and administrative solutions.

Also, I think that there is an important cultural factor. Historically, people in our country have been very afraid of making mistakes. We are petrified of making mistakes. The history of the country, the emphasis on the military-industrial complex and the energy sector, is clear. However, coupled with the development of small and medium-sized companies, the innovative environment also consists of teams with members who are both enterprising and creative. It is clear that it will be very difficult to find innovative solutions without making a certain number of mistakes first. In Canada, for example, there is a society of failed engineers, and people there are not ashamed of making mistakes, of the fact that the companies they created went bankrupt. They are not stigmatized, and it is not the end of their career. Just the opposite: this is a platform for the engineers to share experience, think aloud with their colleagues, and discuss what went wrong. Practice has shown that this society of failed engineers is a fantastic platform for creating new ideas, from which new start-ups and successful ventures are born. So we should never be afraid of making mistakes, because people who make mistakes are typically creative people, and today Russia needs such individuals. And it is vital that these cultural shifts in how we think are made today.

To answer your question, I would say that the claim that we already have a knowledge economy in Russia would probably be a little premature. However, it would not be fair to say that we are at point zero. After all, we have Yota, Yandex, QIWI – which even the Japanese envy – and the latest air show in Le Bourget, where (back to our historically strong trump card!) Russian military aviation made a strong stand. Therefore, things are not so bad, but this is still a far cry from referring to the Russian economy as a knowledge-based economy.

Responding to the question about how we measure up in comparison with our neighbours, I cannot say that any of the CIS countries have created a knowledge economy, and in this respect are more advanced than we are. If we draw an analogy, perhaps Finland would be a better case in point, which in the 1970s

was very much a resource-based country, drawing on wood processing, pulp production, and so on. At some point, there was no more room for development in these industries, and in the 1990s, through investment in IT and in the knowledge economy as a whole, Finland came to the forefront of Europe in this respect. Thank you.

L. Melamed:

Thank you, Oleg. The last person to take part in our discussion, before we give the audience the opportunity to ask some questions of our distinguished panellists, will be Professor Kvint, Chair of the Department of Financial Strategies at the Moscow School of Economics at Lomonosov Moscow State University.

Vladimir, you recently published a study on the strategic management of emerging economies in the global market. What business management techniques and economic methodologies do you think are the most effective for creating a knowledge economy?

V. Kvint:

Let me give you a specific example. It was recently a backward country, an appendage of its northern neighbour. I am talking about South Korea, which was an agricultural appendage of the North. Initially, South Korea sent its students abroad. Then it began to acquire patents for products that these well-trained graduates had learned to create. Then it abolished the Ministry of Economy and established in its place the Ministry of Knowledge Economy. The country redirected all public investment into areas where at least 30% was innovation-based. Today, South Korea is 15 to 20 years ahead, no, not of Russia, but of the United States of America in many technological areas. I travel there regularly, and I see how they have brought about this scientific and technological revolution.

Now, back to the 25 million jobs. It is not about the jobs, but about the quality. You can get people to build roads, by simply picking up a shovel, and there you

will have your 25 million jobs. But the issue is in quality. I would say that quality is the key to the understanding of success.

Let me give you an example. America was an advanced technological country, far ahead of everyone in the late 19th and early 20th centuries. Today, in terms of the main facets of the knowledge economy, America is in ninth place or so. Who are the leaders? St. Petersburg's neighbours – Denmark, Sweden, and Finland – followed very closely by South Korea and Israel. What did these countries do? Firstly, they changed knowledge, just as I explained in the example of South Korea. What happened in Russia with the collapse of the Soviet Union? A huge number of study places were created at universities, or at so-called universities, to prepare low-skilled lawyers and semi-skilled economists with mass-produced degrees in subjects that are not in demand, whilst dramatically reducing the number of engineers and designers in all fields, which our industry needs. Therefore, we now need to rebuild the education system, to focus on the problems of specific industries or products which embody the national strategic interests of the country, and not just the interests of a specific district or region. Along with this, we need to focus on providing social stability. Everything should revolve around the technological priorities that will consolidate Russia's technological leadership in the areas in which it is a leader now, and closing up the small gap that has emerged over the last 30 years. And finally we need to focus our resources on the ideas and technological achievements of Russian science, which are still being successfully generated, but on the whole are still taking shape abroad.

Let me come back to South Korea. As a result of its policy on technological innovation led by the Ministry of Knowledge Economy, South Korea now ranks first in the world in terms of the number of patents per 100,000 inhabitants, and South Korea and Singapore have put a halt to the brain drain (a colleague has already said we need to do this). Nowadays scientists from Britain and America are moving to South Korea. They have created professorships with salaries of at least USD 100,000 a month. They provide teacher housing, and several Nobel laureates have moved there.

Finally, let us go back to the previous example of how America was the leader in the 19th and beginning of the 20th century in scientific technology, but is now in ninth place. Edmund Phelps, economist and winner of the 2006 Nobel Prize in Economic Sciences, analysed this phenomenon. He proved that acquiring patents is not enough for a country, as this will make it lag further behind. In order to formulate asymmetric strategies, as opposed to catch-up strategies (and only such strategies can be victorious), you must provide what he referred to as 'home-grown innovations', innovations and patents that are scientifically and technologically created using domestic potential.

In Russia, it is very important to focus on quality indicators. In St. Petersburg, we have Academician Vladimir Okrepilov, and all of his work is devoted to these indicators and their implementation in practice. But they are also being implemented abroad.

And the last thing I want to say is that despite what some people have said here today, we should not think that the role of the government in ensuring that we make scientific and technological breakthroughs is limited, and that everything can be solved by private companies. Of course this is not the case. In all countries that are technological leaders, the state sets the technological and scientific priorities and invests huge sums in them, including in areas such as education and in the training of specialists. In this way, they consolidate their current position and create new technological horizons. Thank you.

L. Melamed:

Thank you, Professor Kvint. Distinguished guests of our panel session, please raise your hands if you have a question for our speaker.

A. Kovsh:

Yes, Igor Maksimtsev, Rector of the St. Petersburg University of Economics and Finance.

I. Maksimtsev:

Vladimir, I would like to clarify something. Professor and Academician Vladimir Okrepilov is head of the sub-faculty of the St. Petersburg University of Economics and Finance, so he also is very successful here in Russia. This is the first thing. Secondly, for me, as the head of a very large economics university established nearly a year ago, the issues discussed today are of course very important. We believe that St. Petersburg is not only the cultural capital of the country, but also the capital of the economy, of education, and science. The issues discussed today by our panellists are of course very relevant for our higher education institutions. I am pleased to note that we are aware of these problems. We are pleased to bring top executives from major Western corporations and prominent scholars to our beloved city of St. Petersburg. But, of course, we would like step this up, and for that we need additional financial support, and support from the city's authorities and federal agencies.

But today we can see that our young students have changed. We have a completely different quality of education, in spite of all the difficulties. We are always criticizing young people, but at the same time we see that they are clearly better than we are.

In my view, the conditions which we have discussed today will allow us in the next few years (if we truly do move in the direction that we have discussed today) to make a significant leap in the knowledge economy. I am convinced of this, colleagues. Thank you.

L. Melamed:

Gentlemen, we are fast running out of time. Today's session was extremely interesting and informative. I have one request for our guests: to vote once more on these two issues. Time is up.

So the knowledge economy is the clear winner, and in our opinion, it is the road which Russia should go down in the next phase of its development. All the speakers have made a significant contribution to this victory here today, and tomorrow in the country as a whole. You can ask the speakers questions after we go offline. We thank them, and thank you for your active participation and for the interesting discussion.