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Responding to Impact Technologies
RUSNANO: THE SUCCESSES AND FAILURES OF RUSSIAN-STYLE
INNOVATIVE CLUSTERS
Russian Breakthrough Technologies

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Moderator:

Alexandra Johnson, Managing Director, DFJ VTB Aurora; President, The Global Technology Symposium

Panelist:

Anatoly Chubais, Chairman of the Executive Board, RUSNANO

Dmitry Konash, Regional Director CIS, Intel

Leonid Melamed, Member of the Board of Directors, Rusnanomedinvest; Chairman of the Board of Directors, Team Drive

Konstantin Sonin, Professor of Economics, New Economic School

A. Johnson:

Good morning, colleagues. Let us begin our morning session, which is entitled 'Rusnano: The Successes and Failures of Russian-Style Innovative Clusters'. I would like to give the floor to Mr. Chubais, whose presentation will open our discussion.

A. Chubais:

Good morning, colleagues. I would like to thank everyone who has gathered here, despite the early hour. We would like to continue the discussion that we began a year ago, in this same auditorium, when we talked about our first steps. Today we can take the next step, talk about what we have already achieved, and attempt to analyse our achievements from a new and more serious platform. This is even reflected in the name of this session. Today we are planning to talk not only about our successes, but also about the failures. As we all know, the venture business cannot operate without failure, but at the same time this must be accompanied by successes. I can see some familiar faces in the auditorium from last year's meeting. By the way, I would like to point out that we are simultaneously streaming this live on the Internet and Twitter.

Last year we spoke about introducing new capacities, which were planned for 2011. We called that programme '13+', as we were planning to bring into operation 13 new nano-industrial facilities. A year has passed since then and we can say that our plan was successful. Thirteen new facilities have been brought into operation in Russia. You can see them on this map. All of these facilities, from Novosibirsk to St. Petersburg, are already in operation. This is 2012, and therefore, our next step is to implement projects for this year. This year we are planning to add another 16 plants to the existing 13. This year's programme is called '16+'. You can see the planned facilities on the map: three in Novosibirsk, a second facility at Usolye-Sibirskoye... However, if we consider our existing working projects – you understand, a plant takes longer than 12 months to commission, it is a much more time-consuming procedure – then the list of our facilities is much longer. There are another 60

facilities, plus the 13 new ones and the 16 planned ones, 89 plants in total. All of these are either plants and facilities currently in operation, or are approved for 2012 and the coming years, based on our approved plans. This is quite a significant number of plants. The main goal of today's presentation is to attempt an analysis of this emerging array in Russia's innovation economy. We think that this is a large enough number of facilities for detailed analysis and to study what exactly these little islands of the innovation economy that are springing up all over the country represent.

For us, these business sites are united into clusters. Here we can see only 14 clusters, ranging from metal production and polymers to a medical cluster, which includes therapy, diagnostics, and surgery. These 14 clusters include the projects which have already been implemented or which will be commissioned in the near future. Each of them deserves an individual discussion, but I am afraid that we will drown in excessive information. Therefore, for today's discussion, we have chosen two clusters as examples. One of them is an optoelectronics cluster, and the second is an energy efficiency cluster. Today we will talk about these two clusters, which are completely different in terms of their construction.

Let us begin with the first, the optoelectronics cluster, and what it entails. I have to point out that this analysis, like everything that follows, is based on existing facilities, which are either currently active or are under construction, and not on some abstract ideas. To simplify, the optoelectronics cluster is presented here as a processing chain, which begins with raw materials to grow monocrystals such as corundum. Then the monocrystals are crystallized further, into ingots. The ingots are used for cutting a plate with a special wire, which are then used for the epitaxy growth process with the use of particularly pure gases. This, in turn, creates microchips. The chips are the foundation for the source and reception of light, and for the light-emitting diodes or fibre optics, which are used for transferring light. This is the heart of the cluster, the end process of which is equipped in turn with special equipment or lighting instruments and systems, such as light-emitted diode

equipment, or optoelectronic sensors or equipment, or photodetectors as a result of the processing chain.

This processing chain is the foundation enabling one to see how our facilities are expanding. Let us consider this same cluster not from the perspective of the technological process, but based on the objects which are either currently active or are being built. Here you can see the list of these technological plants. It is impossible to list all of them. For instance, Monocrystal in Stavropol is a unique facility which was created by one man, Mr. Novikov, who managed to build one of the largest facilities in the world today for the production of sapphire substrate. This facility has holdings of up to 20%, or up to 25% if counting other products of sapphire substrate production in the world market. Therefore, in our process chain, it is located at the production stage of monocrystals from corundum.

Another example is fibre lasers. Here is our company that was built together with IPG Photonics, the world leader in laser construction. IPG Photonics was founded by Professor Gapontsev and is listed on NASDAQ. We have built an active branch of this company in Fryazino, which produces the key elements of laser systems. I could go on and on with the list of companies. This list also includes producers of light-emitting diode fixtures. For example, there is the company Optogan, well known to many people in St. Petersburg. It produces solid-state lighting technology. So, in general, this is the configuration of our cluster if you look at it from the perspective of our current projects. However, we can clearly see that for the implementation of each of these projects, we need very serious and powerful research support. Without R&D, none of these projects could have been implemented. When we analyse the companies that we have created, we can see that each of them is supported by one or several highly-respected research institutes. They provide scientific support to our business development. As an example of this, I would like to cite the Tomsk State University of Control Systems and Radioelectronics, or the St. Petersburg Ioffe Physical Technical Institute of the Russian Academy of Sciences, which recently commissioned a large R&D centre due to be launched in November–December of this year and which will support the

company Khevel in Novocheboksarsk. This company will be producing thin-film solar batteries. To aid the development of the industrial process at Khevel with scientific and research support, the Physical-Technical Institute has opened up a research centre. The costs are roughly as follows: the cost of the plant, which will be built in Novocheboksarsk will be about RUB 14 billion, out of which RUB 1 billion will be spent on this research centre at the Institute. Thus you can see the emergence of a scientific and technical research and development support network around the industrial cluster.

In addition, as the analysis has shown, we must have solid personnel and educational support, which is also needed for just about every project. To ensure productivity of this particular cluster, we have collaborated with many institutes and universities, ranging from the St. Petersburg State Polytechnical University to the Moscow State Technical University. This list illustrates the volume of educational input necessary for the successful implementation of the cluster.

The next factor, essential for the successful functioning of a cluster is infrastructure support. This is important for our nanotechnological centres in Zelenograd, Mordovia, Dubna, and Ulyanovsk. Each of these has their own profile and where, basically, start-up companies can be launched for the development of this cluster's technologies or specific elements in the technological process chain for this particular cluster. For example, our Dubna nano-centre will be working with electronic components. The centre in Mordovia will be working with fibre optics and in its capital Saransk we are currently developing one of the largest fibre optics plants in Europe. Therefore, infrastructure support is one of the key elements of a cluster. So, this was a very short overview of the optoelectronic cluster.

The second cluster that I would like to mention as an example is the energy efficiency cluster. It is constructed completely differently. As you know, this cluster depends on a group of products that provide energy efficiency, rather than a technological process chain. However, we still break it down into production, regeneration, accumulation, transferal, and consumption of energy. Therefore, the production cell includes accumulated traditional and alternative energy sources:

condensers and batteries, with the simplest possible classification in transfer and consumption, and efficient energy use and heat consumption.

Let us now overlay this cluster structure with the facilities that are already built or which are going to be built in the next few years. I have already mentioned the Novocheboksarsk facility. It includes construction of a solar cell battery factory. In December 2011, we launched the world's largest lithium battery factory in Novosibirsk. In Moscow this year we will be commissioning a heavy-duty cable factory. The production of low-emissivity glass in the Moscow Region is a very interesting project, which includes production of float-glass in partnership with the Pilkington company. We are planning to begin construction on this plant in the next few months. So, this is a rough sketch of the energy efficiency cluster, which is supported by a range of currently active projects. To make this a reality, we need strong research and technical support. Here is a list of research centres, which provide the foundation for the cluster's development. It would not be able to exist or be developed without them. As for the previously mentioned cluster, apart from research and technical support we also need educational support. Again, there is also a list of universities which provide our companies with employees. I will repeat myself: this is not an abstraction, these really are universities that specifically prepare specialists for our clusters.

This also includes its own infrastructure support, however in this case it includes not only nano-centres, such as the Zelenograd nano-centre, but also engineering companies. For example, Smart Engineering is one such company. It is a new type of infrastructure support, which we create, an engineering company that works in the area of one of the technologies in the field of energy efficiency. Venture funds are also emerging here. For instance, the closed mutual fund 'Peredovye nanotekhnologii' is a venture fund which works in the field of energy efficiency. There is also a nano-centre here. So, this is what the infrastructure support of a cluster looks like. It includes the production, research, educational, and infrastructure divisions. This is what a cluster looks like from the inside.

Apart from that, we think that it is important and interesting to look at this 'solar system' from the outside, from the perspective of volumes and rates of production, expenditure on R&D, and staff who are involved in the business within these clusters. Let us have a look at the previously mentioned clusters from the outside.

First of all, here are the production volumes. These graphs show that the production of the first cluster of optoelectronics in 2011 was equal to slightly over RUB 7 billion, and in 2015 it is projected to reach RUB 62 billion. The energy efficiency cluster will grow from RUB 4.9 to 36 billion. Again, we are talking about real figures, not theoretical projections. In 2011, we are talking about facts supported by the appropriate financial sales information. Obviously, the other figures are our planned figures, which we are using as a guide. So, these are the volumes of production and their progress.

Let us consider another very important characteristic, that of R&D, and in particular, the expenditure in this area. Here you can see the progress of each cluster. This is a reflection of the year 2011 and plans for the next few years.

The next parameter is the number of research personnel. It is also growing quite substantially, which is easily explainable, since the growth of production volume requires a corresponding growth in staff numbers.

The next factor is development, the rate of production growth. I think that this is particularly important. If we compare the entire Russian economy and the knowledge-based economy according to this parameter, then in 2011, the traditional economic figure was a 4.3% growth in GDP. This year it is projected to be about 4.0–4.2%. By the way, within the traditional economy, the price of oil is not growing, and will not be growing in the near future either. Here are the numbers for those two clusters, and the rate of annual growth. Another comparison is that of expenditure on R&D. It should be compared not according to total size, but by the revenues, as it is traditionally measured in a knowledge-based economy. In total, in the Russian economy 1% is spent from the production volume on R&D, and in a knowledge-based economy about 4–5%. Another parameter for comparing the traditional and new economies is the preparation of the workforce. In a traditional economy the

expenditure on professional employment training is RUB 1,000 per person. We allocate RUB 5,500 per person, in other words five and a half times more than in the traditional economy. Labour productivity in the traditional economy is RUB 800,000 per person per year. However, in our facilities this number is RUB 3 million per person per year. This is about 3.7 times greater. The average national Russian salary is RUB 23,000 per month, while at our facilities the average salary is RUB 70,000 per month. This is about three times greater, but then again the productivity in terms of production is much greater than in the differences of salaries. What this says is this is not simply pay for work, but that it provides for the real creation of products for consumption in the economy.

Another parameter is the percentage of personnel with higher education. In the traditional economy this percentage is 29%, but in our sector that number is 50%. This explains the high salaries, the production rates, the need for advanced research, and development activity and the educational potential.

An overall comparison of traditional and knowledge-based economies is even more emphatic if we consider that we are talking about real facilities, which are producing and selling products and generating profits.

This is the positive part of our analysis. However, in our experience, we have also seen problems and failures. We have attempted to summarize the typical problems which we most often encounter in our business. We are not attempting to find the absolute truth, just to try to formulate what we consider to be the main problems and risks in the enterprises that we create, risks that we have already experienced ourselves.

Here we have stated four types of risks: the business grows faster than the management team; the business model is erroneous; the market does not reflect expectations or our market assessment was wrong; and the technical and research risks were underestimated.

These four kinds of reasons can be logically broken down into controllable risks. These are risks that allow us to improve the situation and hard-to-manage risks,

which significantly prevent us from doing something in earnest. However, some recommendations have already appeared in that area.

Let us look at these reasons in depth. The first typical unsuccessful situation in innovatory businesses is what we called the 'business grows faster than the management team' risk. We have encountered this on several of our projects, when the generators of the business ideas or products, people with very high scientific and technical qualifications come to us, we create a business, invest in it, facilities emerge and as it grows, we realize that it has grown larger than its creator foresaw. We have dealt with a situation where the business went every which way, the operating assets were uncontrollable, where the production capability was there, but not enough to assure the market, and the current management of the facility was unable to handle the demands of the business. It is one thing when it is a family business with RUB 10 million in sales, but completely another when we are talking about an average of RUB 150–500 million in sales. This is obviously a very painful situation, because this reflects poorly on those who created this business. We did not create it, we simply supported it. Unfortunately, in those situations we have to be quite harsh, right up to removing the management from their roles, and we have had to do that a number of times. This was the situation that we faced with the project 'San', where the creators came up with a unique printer that could print on glass, plastic, and wood, a product that could be exported to the USA or Singapore. But the business was limping along, then it found itself in a difficult situation, only a step away from bankruptcy. We had to remove the creators of the project from management positions, but left them in the company because their role in product development was very important and we certainly could not develop it without them. The new management company immediately brought down costs, created a realistic budget, improved the business process, and thanks to that we were able to save that business. We were all very glad that the project creators were able to understand us. We do not want to take over a business, merely support it. In this situation, the solution that we sometimes have to employ is the renewal of a management team.

The 'Business model is erroneous' risk. What does this mean? I will give you a real example from our experience. There was a company in St. Petersburg, based on the unique technology of nano-ceramic frit, which had the strength properties equal to the best tungsten and cobalt alloys, and which gave cutting tools characteristics that did not exist in any similar projects. Everything seemed great in theory, but it turned out that the team were unable to sell the tools which were created from this material. This was not due to the lack of the team's qualifications, as they were not new to this. This is a situation where we have probably made in a mistake in the business model. If our ability lies in the production of the material, the nano-ceramic frit powder, then the company should be making the powder itself. But to try to jump to the next stage and sell metal-cutting tools in a market where there are dozens of world leaders with 50 years of experience to their names and try to push them out of the market was a mistake. It was an error to try to create a business based on a material, and then sell products directly to the incredibly difficult to penetrate market of metal-cutting tools. This placed the company in a rather difficult position. We were forced to make a serious decision to prevent a crisis and to change the business model itself: stop selling metal-cutting tools and concentrate on selling the nano-ceramic frit powder, which is what the team was good at.

The risk situation, 'market does not reflect expectations' is more complex. The errors here are very difficult. Many specialists are aware of what is currently happening in the solar energy industry in general, at all stages of the cycle, starting from the first stage, called 'silicon polycrystals'. The market situation is radically worsening in the world. On this graph you can see the price movements on silicon polycrystals, a commodity. In the last three years the prices dropped from USD 120 to USD 23. There are some complex issues happening in the world. The US has declared a market war on China and introduced protective tariffs on prepared solar panels. The nature of this phenomenon consists of two points. The first point is the introduction of massive capacity in China, the volumes of which considerably exceed the requirements of the market. The second point is a significant reduction in subsidies for solar energy programmes, mainly in Europe, due to the financial

crisis. These two reasons have massively affected the entire market. We have several active projects in this area, including one project which is at a very early stage, related to production of these silicon polycrystals. The project is NITOL, located in the Irkutsk region. This project was having great difficulties, but fortunately we were able to overcome the crisis. We had to significantly revamp the management team and installed some very strict managers, who are now able to bring down costs, enabling us to hold on to the project even when the prices are very low. In the near future we should be able to reach a production capacity of 5,000 tonnes per year, and even the expansion of the production volume of polycrystals can drop the cost per tonne of the produced product. We believe that even under these difficult conditions, we will be able to hold on to this business due to our very strict programme of cost reduction. However, in general, you have to understand that there are situations that we cannot deal with successfully, when we have misunderstood the market so badly or when the market collapses so significantly, which is possible in the innovation sector, that we have to make some very unpleasant decisions, right up to closing the business. Thankfully, we have not had to do that yet, but it would be a mistake to forget about this risk. The main solution here is only the diversification of our project folio, to manage it overall, balancing more and less risky projects and ensuring an acceptable level of risk in total.

The fourth risk is the underestimation of scientific and technical factors. This is the most challenging risk, which we have to face in almost every one of our projects. It can create very complex and difficult situations, which do not always have a simple solution. I will give you an example. A company that we have spoken about at length, called Plastic Logic, created non-silicon electronics, at the highest standard in the world. First of all, the company was able to demonstrate that they were a unique developer of e-paper technology which could be used on colour screens, not only with black and white. Secondly, it demonstrated technologies which could support animation and movement on this e-paper. Nobody else in the world can make these products at this level of quality. At the same time, it turned out that the

company had moved forward so much in creating these technologies that the costs were too high. Here we can see a cross-over with the second aforementioned reason – the failure of the business model. It is possible that moving to the stage called ‘creating tablet computers’ also came too early. It is possible that we will be able to hold onto its creation, but maybe not. However, it is obvious that the technology which this company possesses is valuable in itself, and perhaps we will need to shift the focus of this company from production to a more technological orientation. The technology which was created by this company could be used in partnership with other production companies, which is something we are working on, and I think we will be successful in this.

This analysis of the failure here is, of course, incomplete. We are not pretending that we know everything, but we have made some mistakes already, survived some failures, and we did learn some lessons. Obviously though, these failures are not going to be the only ones we encounter on this thorny path of venture development. To summarize everything and to draw some conclusions from my presentation, I must say that we clearly understand that the risks in knowledge-driven economies are high. There are controllable and uncontrollable risks, and of course, individual projects are also risk-prone. However, we understand that there is not a problem out there that is insurmountable. We have heard many times that it is impossible to create a knowledge-based economy in Russia, that the personnel in Russia is not sufficient, that there are no engineers, that the scientists do not understand anything, that a modern business environment cannot be created in Russia, that the only thing we can do is re-sell oil, and that nothing else is working, there is only corruption and so on and so forth. I am so tired of hearing that! Our real work is showing that, among this entire list of existing problems, there is not one that cannot be solved. I will remind you that we are talking about the entire country, not just Moscow or St. Petersburg. Our business projects are currently being implemented in Novosibirsk, Novocheboksarsk, in regional centres, beyond the Ural Mountains and in the European part of Russia.

All of this means that, even though building an knowledge-based economy in Russia will be hard, it is still possible, and even more important is that we build it. Thank you for your attention.

A. Johnson:

Thank you very much. We are going to have a very unusual discussion, because what we have just heard has changed our impression of how the innovation system works, and not only in Russia. We are going to be discussing the innovation ecosystem as a whole. The Russian innovation ecosystem is still currently being built. You may not know this, but before Rusnano came to the American market, the attitude towards Russian innovations was quite sceptical, possibly for the reasons that Mr. Chubais has mentioned earlier. But when Rusnano came to the world market, global-level partnerships began to appear and all of those mistakes and problems that we have heard about pale in comparison to what has been achieved. That is why I would like to address the Intel corporation. If you experience mistakes, are they on the same scale? In general, have you found any similarities between the problems of a growing company and what happens in a mature corporation? Mr. Konash from Intel, please go ahead. What do you think about the mistakes made by large corporations?

D. Konash:

I will speak about the mistakes, but I would like to begin on a positive note. First, I would like to compliment Mr. Chubais on his optimism. Ms. Johnson and I just an hour and a half ago were at the forum of IT specialists in Russia. We listened to successful people with large assets made in that industry speak about problems they had encountered. Therefore, I think that Mr. Chubais gave a good presentation and I would like to thank him for being a positive man, who infects everyone around him with his energy. I love optimists.

About the mistakes, of course, all large companies make mistakes and Intel has also made mistakes, and still does. In particular, I remember our attempts to enter

the smartphone market. As you know, 99% of smartphones and telephones in the world are made with microprocessors. The core microprocessor was developed by the English company ARM. Intel made several attempts to enter the market. Ten years ago, we made a processor based on the ARM core, moving away from our traditional architecture. This did not have good results and the project failed. Then we sold this architecture to another company, Marvell, which is now successfully selling it all over the world. Our error was probably due to the fact that we lost confidence in our own architecture. We felt that it worked well for products such as desktops, laptops, and servers. We did not have the confidence that our architecture could be adapted for smartphones.

A. Johnson:

As what category, as mentioned by Mr. Chubais, would you classify this mistake?

D. Konash:

I think that this was a human error. I agree with almost everything that Mr. Chubais said earlier. From my point of view, this is a human factor, a belief in your own ability. Today we understand that we can take the same architecture which supports the same commands, as in desktops, laptops, and servers, and make it more energy efficient so that it can be used in smartphones. Twenty–thirty years ago we were told that it was impossible in principle, but it turned out to be quite possible. To return to the last thing that Mr. Chubais said, there is nothing which is insurmountable. These are all just mental obstacles. The telephone which will be launched in Russia this year, using our microprocessor is not inferior to any other smartphone, and in many respects it is even better. Similar devices have been launched in China, the United Kingdom, and France. This year we will be launching it in Russia.

In conclusion, I would like to say that I support optimists, am in favour of the idea that nothing is impossible, and that I support the diversification of risky projects. I even wrote a book for private investors called Diversification – Topic No. 1. We do

not know which technologies are going to go forward and which will stay behind. The only way to succeed is to diversify your business, especially in a risky environment such as innovations.

A. Johnson:

However, to do this, you must understand what is going on in the world and who is your real partner, not only today, but who will move in that direction during the next five years. I would like to welcome Mr. Sonin, a professor at the New Economic School. You often write lengthy analytical articles. You see the world as a whole. What do you think, has Rusnano joined the world innovation ecosystem from the Russian market or was it immediately oriented at the global market?

K. Sonin:

Thank you, but I cannot accept a compliment stating that I see the world as a whole. There is nothing particularly special about that. I was very impressed by Mr. Chubais' presentation, because it was filled with a lot of details. Many people speak in general terms about innovations, but there are so many details that it is unclear how you could possibly remember everything. I think that the presentation slide that illustrated large clusters shows that Rusnano in one way or another is attempting to be involved all new trends of modern business. Moreover, Rusnano, besides being an investment fund, is also a sponsoring umbrella. In that respect they are more insured from the risks of new technologies emerging in the world. Their risks are probably different.

A. Johnson:

And what do you think are the risks?

K. Sonin:

I think that one important risk that everyone was afraid of when Rusnano was being created, is that this business in general and the innovatory business in particular,

will come up against many failures, and this is perfectly natural. You might launch five projects and only one will be successful.

A. Johnson:

Mr. Chubais, would you say that this is your experience, that one in five is successful?

A. Chubais:

I would like to state two different numbers. We accept about one in 20 proposed projects, and the number of implemented projects that experience problems is currently about 10% of the whole.

K. Sonin:

Usually, in the innovation business, the percentage of failures can be much higher, even up to 80%. However, every time that we use government money there is a risk that someone will come and ask, "How is this possible? You spent money on a project, which did not achieve anything and that you had to shut down." Everybody feared that, because of this, Rusnano would not be able to close projects and change management if necessary. This is why I was very happy to hear in today's presentation that there are projects where mistakes were identified or where some unforeseen risks occurred, and they were able to change management and some part of a project was closed or reformed.

A. Johnson:

Perhaps this is an element of Russia's own innovation system?

K. Sonin:

In any case it is connected with government funding.

A. Johnson:

So, someone could come to Intel and say, “this project that you invested in, it turns out that...?”

D. Konash:

Of course. Do you mean that auditors could come? The company management could come with an auditor and say, “Tell us how you spent the money.”

K. Sonin:

Shareholders could come.

D. Konash:

It is unpleasant, but the main thing comes down to the conclusions you can make from the unsuccessful project. There are people who understand and who can do things, and if they make the correct conclusions, then they can be transferred to another potential project. However, if the person says that it is not their fault, that it is all about external factors, then it is best to let a person like that go.

A. Johnson:

I would like to bring to our discussion another participant, Mr. Melamed. Everybody knows you, but not everyone knows the details of your last company. You went into partnership with one of the leading funds in Silicon Valley, called Domain Associates. Please tell us a few words about that. After that, I would like you to respond to this question: when you worked in a local company, SISTEMA, for example, and the question of whether you should continue investing in some project came up, how was that different from your current position as a venture capitalist? Can you discern the difference, depending on who you are answerable to?

L. Melamed:

Thank you, Ms. Johnson. We were lucky as the company Team Drive, where I work, is carrying out for Rusnano and Domain Associates a very interesting venture

financing project of pharmaceutical companies that create intellectual property (IP) in the USA and involve the transfer of IP from these companies to Russia. Here, we are creating an industrial plan for the local pharmaceutical company Novamedika, which will be producing, distributing, and selling the most innovative medications in Russia. There are a million reasons why this project is very profitable and interesting – firstly, because it creates new expertise in the country in the area of life science venture capital (VC), in the areas of developing new medicines and creating portfolio companies which develop IP for new pharmaceutical products and medical equipment. Most importantly, this means that medicines that will enable us to treat tens of millions of people with very complex illnesses will be available in Russia much sooner. These medicines will come three, four, five years earlier than if this type of technology transfer was not created. Of course, we receive extensive experience thanks to the mandates of Rusnano and Domain in the area of life sciences venture capital.

A. Johnson:

Is Domain coming to Russia to look for unique products and invest in them, or are they bringing their own technologies here?

L. Melamed:

As we worked it out, there will be two development stages in this project. At this stage, we will study and transform technologies here, that is, we will invest in American companies. At the next stage, we will create the next fund, which will finance development in Russia.

A. Johnson:

Who are you going to be responsible to in this matter? To the investors in your fund, or is the government going to also come around and ask how you are investing?

L. Melamed:

Trust me, there are plenty of organizations in Russia who we will be responsible to. Therefore, we are responsible for what we do. Of course, the management of companies or funds are responsible to the shareholders, and there are also corresponding government organizations, ranging from the taxation authorities to Roszdravnadzor, and so on. But the glass is always either half full or half empty. If we talk about mistakes and risks all the time, we will never move forward. It is great that in Mr. Chubais's report and in Rusnano's very actions there is courage and positivity, because without courage, competence, a positive outlook, and a readiness to make quick decisions the innovations industry is not going to move forward at all. Everyone knows that Rusnano had a difficult beginning. It is very difficult to start something moving from zero. Today, thanks to the qualities that I mentioned, we have reached the speeds that allow us to analyse our errors, look into the future with confidence, and feel hopeful that we will be able to create a knowledge-based economy in Russia. The key question is, why do we need this?

A. Johnson:

We will come back to that. I have promised the audience that they would be able to ask questions. Please introduce yourself and state your question.

E. Evdokimov:

My name is Mr. Evdokimov, I represent the company Bekaert. We are the world leader in the field of metal goods. I have a question for Mr. Chubais. It is very symbolic that your presentation was done with the galaxy as the background. Wise people learn from others' mistakes as well as from their own. Are you planning to come back to the solar system in the sense of attracting other companies to investment projects after they have made mistakes? To be precise, I am talking about the situation where the risk in the market was not thoroughly understood or was overestimated. If we think about the pipeline from the point of view of your project, it is going to last for 3–5 years from the moment of approval to the implementation and construction of a plant. My question is, as Rusnano is a minority

stakeholder, which is temporarily included in the company equity, you want to have an exit strategy. How do you envisage being replaced by some strategic investor, considering that many projects are not going to be completely feasible? In respect to this, how do you see the experience of Western investors and at what stage are you prepared to collaborate with them in order to have potential partners for your exit?

A. Chubais:

You have actually asked two questions. The first is the question about unviable projects, and the other is about exits. Both of these are very challenging and critical issues for us. Regarding unviable projects, I tried to outline the reasons that lead to their appearance and how we try to, more or less successfully, deal with them. This is a particular part of our managing strategy. The other part concerns the exits. The exit in our strategy is at the top of the pyramid. You did everything right, selected the right project, provided the correct operation, lined up the correct market and the value of your business has grown. As a result, you found a partner who is ready to buy your project, then you exit and earn your profit. This is the best case scenario. We are working towards this, but since we are still young and starting out, the first examples have just started to appear. Not so long ago, we had one exit from a company, which was created by Professor Yaminsky from Moscow State University. He created a very interesting business, related to tunnel electron microscopy. It was a very small company. We invested in it, the business expanded, they acquired equipment, and they expanded the market. The company is developing well, and in this case an exit was a classic management buyout scheme. The manager of the company himself came to us and said, "We are doing well and we would like to buy the company out from you." We were very happy to do that, since the IRR in our deal was 29%, which is very decent. By the way, the creator of this technology asked that one share of Rusnano in the company remained, just in case. Not for corporate governance reasons, but to keep contacts and for support. We were happy to oblige him with this too. I think that, in the next few months, we are going

to see another 2–3 big examples of this. In the case of Yaminsky's company, which is called RMT, the dimensions were small, about RUB 50-60 million. I hope that after this first exit we will see more of them, this is our main goal. A completed factory is great, it is the paramount task. But if you manage to exit after building the factory and make some money on the deal, and the factory continues to operate, that is what we consider our main goal.

A. Johnson:

Mr. Sonin, do you have any comments? It seemed like you wanted to say something.

K. Sonin:

No, I was just thinking about Mr. Chubais' words. I have been thinking about what was said about the creation of some advanced technology, but it is very expensive. I think that these words are very outdated. If Apple made an iPad that cost USD 4,000, then nobody would ever buy it. That is to say that, if you make something expensive, then it almost does not really matter that it is advanced technologically. A significant part of innovations involves a considerable drop in prices of what can already be made. In this sense, to say that they have created something very good, but that it is too expensive is the same as saying that they have not made anything at all.

A. Chubais:

I somewhat agree and somewhat disagree. I think there are two important issues in what you just said. Think about it. If you created a new and wonderful product with incredible features, which had never existed before, but which is also too expensive, then you are not going to achieve anything by that business strategy. In this respect I completely agree with you. However, if this technology is truly cutting edge and substantive, then you have to task your management with using this technology as a foundation and develop a different business model. You could use this technology

to make a dozen products. In our case, you could make a tablet, which probably would be a mistake, but we have not given up on it yet, or you could come up with the next generation of credit cards, which would contain the face of the owner, both on the front and back, and some other bioidentifications. These technologies need to be embodied on e-paper, not traditional screens. And such technologies can also be much smaller in size. The same technologies can be used in a different product if you can change the business model correctly and find a partner manufacturer. This is why there are two aspects in what you said.

A. Johnson:

In respect to what you have mentioned just now, the role of the investor is very important. A good investor does not just hand over the money, he also works with the company to determine the strategy. For example, if a company such as Plastic Logic is stuck in the American market without an investor like Rusnano, it means that you are together trying to find other ways to develop, because this technology is unique and interesting.

A. Chubais:

Mr. Johnson, I beg your forgiveness, but I must make a comment here because you have touched on my personal experience, a very important one. The role of an investor in an innovative business is, I think, fundamentally different from the role of an investor in a usual business. In any normal, typical company, an investor or a shareholder is basically an inspector. Here is your budget, and give a summary about the quarterly results. If you fulfilled everything, great, if not we will find someone else to. In innovative business, as we can see from our mistakes and experience, an investor is practically a partner. We do not control from the outside based on whether they worked well or not, but from the inside, working together with the creators, updating business models almost every quarter, and updating our goal parameters. After a year, we may see that everything that we invested in the

business a year ago was quite erroneous, and that we need to completely change direction.

A. Johnson:

However, it is important for your partner company to show exactly what they have. Because there are some companies who say, “fine, fine, fine”, and then suddenly, “oops!” And they collapse.

A. Chubais:

Yes, but that means that the investor is not involved in the work of the company. You need to be inside and not outside; you must be a partner, not an inspector.

A. Johnson:

Mr. Melamed, at Domain do you see a style like that? Is that why you chose to go into a partnership with that fund? There are many funds in America and not all of them work with entrepreneurs in the way that Mr. Chubais has just pointed out. Does Domain work like that?

L. Melamed:

Yes, that is how Domain works. But in general, that is how all venture capitalists work, in any case, the successful ones.

A. Johnson:

Successful, yes.

L. Melamed:

The successful ones are those that survive.

A. Chubais:

In the venture business we also have the term 'CEO', chief executive officer. But for us it means current executive officer, that is to say, that he is temporary – for the time being only.

A. Johnson:

Does Intel make investments like this? Do you look at companies for Intel to purchase them later?

D. Konash:

Actually, no. We had a press conference yesterday, where we explained how Intel Capital, our investment subdivision, works. Obviously all the principles that our colleagues have spoken about today can be applied to our business. I would also like to touch on one philosophical aspect of this business – the leadership qualities of the person who manages it. Mr. Chubais has mentioned examples of a company where the business outgrew the manager. Incidentally, Intel Capital in Russia also has similar examples with our investments. There was a company, where at some point we discovered that its founder was much more interested in traveling the world and enjoying life's bounty than in handling the day-to-day operations of the business. We also have examples of people who launched their businesses during difficult times, when everyone said that it was impossible. From my point of view a good example of a Russian company like that is Yota. Let us recall how they launched their company. They came up with their idea at the beginning of 2008, when everything began to teeter. By the end of that year, when it seemed the entire world was falling apart, they were working at pushing their idea forward.

A. Johnson:

You know, it has been proved statistically that the best companies were given investments in times of crisis.

D. Konash:

This is why Denis Sverdlov founded a company which was the first one to launch 4G in the world, and where did he launch it? In Russia. Everybody said that this could not happen, because it could never happen, but there it is, and it is working. Now they are switching over to new technologies, one of the first companies in the world to do so. I think that the success of a company like that largely depends on leadership qualities.

A. Johnson:

Let us come back to the topic of discussion. We were talking about investment clusters. We have established that you need an entrepreneur, an intelligent investor, that you need corporations as partners, and education. Shall we talk about education? Mr Sonin?

K. Sonin:

I can talk about education for hours and hours.

A. Johnson:

Let us try to summarize in one minute what role education plays in this investment system.

K. Sonin:

First of all, the presentation discussed marketing challenges with an appraisal of future market demand. Problems related to business strategies were also mentioned. But if you look at partnership with universities, then you could get the idea that only technicians are working in your companies, that there are no universities or departments that produce good economists, marketing specialists, managers, and others.

A. Chubais:

I will gladly comment on this. Of course, there are good universities which produce good managers. We all love and respect the Higher School of Economics. But at the same time, we see the requirement for a different type of skill set. There is a need for a skill set that integrates classic managerial, legal, and economic competencies on the one hand and technological ability on the other. We are acutely feeling the need for personnel that can understand both sides of the process.

A. Johnson:

And where do you find people like that?

A. Chubais:

We do not have enough of them. We are making the first attempts right now. Among other things we ourselves have partnered with the Moscow Institute of Physics and Technology to create a department of Technological Entrepreneurship. Right now students are finishing their first year, and just recently their Master's thesis proposals were heard. This is an attempt to integrate managerial and technological competencies. Without both of these, a venture project cannot be understood as you will lose half of your vision. This is very important. Even the respected Higher School of Economics, as I see it, has not yet...

A. Johnson:

Mr. Sonin is ready to join the fray.

K. Sonin:

First of all, I am a Professor and Vice Rector of the New Economic School, although the Higher School of Economics is also a very good university. Secondly, I would like to say that even in the most innovatory places in Russia there is a tendency to very clearly carve everything up into the basis and superstructure. Technology is the basis, and marketing and management form the superstructure. Even in your own words, I think there is some hint of a thought that the most important thing is a good

engineer, who will learn marketing and management as they go along. The New Economic School does not have a managerial department, so I am not advertising anything. But I think that a good manager can learn the technology – quantum physics is easy, but management and marketing are difficult.

A. Johnson:

We could definitely spend many hours debating the differences between physicists and lyricists.

L. Melamed:

An important issue was brought up and I would like to jump in. This issue was clearly stated in Mr. Chubais' report, but when we switched topics we forgot about the conditions of successful knowledge-based economies. A key requirement of the development of the innovatory sector is a large internal consumer market. In this respect, Mr. Sonin, your words are completely fair, because we need to know how to sell what we can make. We need consumers for this market. What Mr. Chubais said about the trade war between the US and China concerning the production of silicon plates – that is what can get companies' backs up that are being bankrolled by Rusnano, for example, if they are going to exclusively orient themselves towards the global consumer market. So, if we want to see a knowledge-based economy in Russia, the government and the players in this market have to do all that they can to ensure that this market is a large one.

A. Johnson:

We have been talking about the fact that Rusnano is moving forward and is not paying attention to the fact that first they need to create elements of an innovatory ecosystem, and then it will be possible to get down to work. It turns out that we are already working. So does that mean that we need to wait until the innovatory ecosystem is created?

L. Melamed:

We will hardly achieve anything in any area while we wait. As the saying goes, a journey of a thousand miles begins with a single step. Another matter is that there is a very big problem and that is the volume of internal consumption of innovative products. This is an area in which we must create tax preferences. I have spent a lot of time speaking with Brian Dovey, who is the founder and partner of Domain Associates. He also spent many years as the Chairman of the National Venture Capital Association in the United States. He told me that the main goal for his work as the head of the National Venture Capital Association was keeping the American government from interfering in their entrepreneurial activities. They do not need any help or any tax breaks. They just want to be left alone, without any interference. But this relates to portfolio companies. Where should we interfere is in consumer motivation, in the size of the market, and so on. For example, in pharmaceuticals, what is the key problem in the area of innovative medicines? It is the fact that the majority of the Russian medication market is price-regulated. This means that some very effective medicines can come to Russia, but they will definitely be very expensive. There are no new medicines which truly help with managing serious illnesses that are cheap at the same time. These medicines might not be able to find the demand, because it is very difficult to deal with government agencies that regulate prices. B2G dialogue – discussions between business and the government – is a very difficult task.

A. Johnson:

The government cannot force the company to purchase any specific product. Mr. Chubais, how do you work with large clients, how do you go about proposing that they buy your products?

A. Chubais:

There are a few things I would like to say. First of all, I would like to speak about the size of the market. Let us not forget that Russia at the present day is the 6th largest

economy in the world, which is not bad at all. By the way, from 1 January in Russia there will be a common customs space with Kazakhstan and Belarus and however sceptical some of my colleagues may feel about this, I think that this is a very important factor for market expansion. Russia plus Belarus and Kazakhstan make up the 5th largest market in the world, larger than Germany. If we compare our rate of growth with Europe's, then it becomes clear that this is a serious market. At the same time, we see the situation as follows. We think that if we have created a product intended for the Russian market alone we will fail. However, for us the Russian market can be used as a springboard. We know how to work in this market, how to sell to Gazprom, to Russian Railways, how to sell products in the regions. We understand how to open up Russian markets. However, while relying on this, we cannot stop here. We need to take the next step and orient ourselves towards world markets. We still have not quite learned this lesson yet, but it is a very important task. Lastly, I still do not agree with Mr. Sonin. I feel that my professional feelings have been wounded. I am an engineer and an economist. I graduated from the Leningrad State University of Engineering and Economics, and I will be forever grateful to my teachers here in St. Petersburg, on ulitsa Marata. I think that the idea of the integration of skill sets is very important. Where I differ, Mr. Sonin, is that I think that a physicist can be taught management, and this is why we came to the Moscow Institute of Physics and Technology. I think it is the best Russian technical university and we are adding managerial competencies to their skills. However, to teach physics to a manager is much more difficult.

K. Sonin:

You are right in a technical respect, that all smart children traditionally went for specializations in mathematics and physics. (I should note that I am also still a teacher at a school.) This is why the best specialists are located in these knowledge areas, and not only because they were particularly well-taught. However, I think that it would be a tragedy if Rusnano, this engine of projects in Russia, did not use the generation of present-day managers, who can master these technologies.

A. Johnson:

We have more questions from the audience and on Twitter, so please make it brief. Mr. Konash, please.

D. Konash:

I would like to connect diversification and internal consumption in terms of solar energy, which was already mentioned here. I am currently finishing my second book about investments in developing markets, and I have researched this topic in depth. It seems that in 1995, the United States was the leader in using solar energy and in the production of solar batteries. They controlled 50% of that market. But in 2010 they only had 7% of that market left. So, who is now the number-one supplier and controls 50% of that market? China. Are there problems in that industry at this time? Overproduction is the main problem. However, a representative of a leading company in the solar energy business said on the podium in Davos that by 2015, in his opinion, half of the countries in the world will sell solar energy at about the same price as traditional energy sources. Is that man crazy? We understand that there is such thing as overproduction, and that the United States has introduced protective measures for the importation of Chinese batteries. That means that the Chinese are going to aim at other markets.

A. Johnson:

This means that Rusnano needs to participate in the world market.

D. Konash:

But why is diversification important? It is important because if Rusnano invested all of its money into the solar energy business, we would have a sad situation on our hands. However, if a portion of their funds was invested into this business, which will have its own cycle, like other kinds of energy businesses, then we can expect

that after a few years, when solar energy becomes a significant part of the world energy system, growth will occur.

A. Johnson:

We have 20 questions, so we are going to do the following. We will choose the most interesting one from Twitter. We shall also have one more question from the audience from the person holding the microphone.

G. Antsev:

My name is Georgy Antsev and I am the General Director of Concern Morinformsystem-Agat, Moscow. Mr. Chubais, my question is this: Rusnano is quite active in Russia. It is obvious that any innovative climate in a country depends on the region. This is what we have in Russia. We have major cities such as Moscow and St. Petersburg, and we have the wonderful city of Tomsk. The management teams in the regions change. As an experienced bureaucrat, who is familiar with running a country, can you please tell us in your opinion where today the most active innovative climate is located? Is it in the regions or in large cities?

A. Chubais:

This is my favourite topic. We are already working quite extensively in the regions and go there all the time. I think that what is happening in the country right now is that we have about 25 powerful governors in strong regions, who understand the scale of this challenge and who really grasp it and who have made it a part of their daily work. They have begun by changing the structure of the government, and have created a new team for innovations, passed standard legislation in their region, provided infrastructure support, and solved dozens of issues. There are about 25 of them. Obviously, the rest are out of the game. It is obvious that not all of these 25 people will be out-and-out winners. There will be successes and failures. What is particularly interesting, is that we have a number of regions which, in my understanding, are incredibly well suited for innovations, but the governors in these

regions are not doing anything and absolutely do not understand this issue. The main task when high-level officials come to visit is to report on successes in the area of knowledge-based economies. And the region is stalling in front of our eyes, that is, something tries to break through from within, but the management team is in no condition to support it. We have other kinds of examples in regions, from which we did not expect anything in particular. For example, it is somewhat difficult to associate the Republic of Mordovia with being one of the most innovative regions in Russia. However, their former governor, Mr. Merkuskin, set up work there so well that our nano-centre there won a bid. We are building a large fibre optics factory there and solid-state electronics is developing. The potential there is enormous and other projects are in the works. I think that Mordovia will become one of the regions that in about five to seven years' time will look completely different. The reconfiguration of the regions is occurring right before our very eyes. We are used to the traditionally rich regions in Russia: Tyumen, the Yamalo-Nenets Autonomous Area, and then the ones that straggle along. I am convinced that in the next 10 years this picture will completely change. Many who are considered leaders today will find themselves in a new capacity. I have some ideas about who it will be, but I will hold my tongue or I may upset some of the governors.

A. Johnson:

Is there a question from Twitter?

G. Antsev:

Are you not worried about Tomsk? It is a great region for innovations. They are currently changing the management team and the innovators are leaving. This is a region that may be lost, particularly to Rusnano and nanotechnologies.

A. Chubais:

I think that Mr. Kress should be rewarded with a state medal of the highest order for what he has done in the Tomsk Region. This is a man who literally spent 18 years

working on the issue of innovations. He began working when Russia was completely different, when there was no modernization. In the end, he turned a rather depressed region into one of the top three leaders in innovative development. There is a huge range of projects there, beginning with the free economic zone and ending with at least three world-class companies with sales in the range of hundreds of millions of dollars, which were built out of sheds and garages. I am not ready to evaluate the new leadership, as they have only just begun. Let us give them another six months to find their footing. Of course, we must do everything we can to preserve this potential in Tomsk.

A. Johnson:

We have just enough time for one more question from the audience, so we will answer questions later on from Twitter in written form.

From the audience:

Good morning. My name is Cameron. I have about 30 years of experience in Silicon Valley. I started 10 companies. Six of them were successful, and three of them were multibillion dollar companies, but I have also been fired by my Board of Directors in three of the companies I have failed. For the last ten years I have been in global venture capital, with investments in the US, Japan, China, India, and Israel.

A. Johnson:

What is your question, sir, please?

From the audience:

I wanted to give you the background before I ask you a question. When you look at how to bring entrepreneurship into the region, my belief is that there is a big asset that Russia and the regions have that probably has not been really tapped into; the power of the diaspora. There are Russian-Americans who live in Silicon Valley, and

who have worked in companies like Google, HP, Cisco, and Intel. One of the models that has worked for us in the past...

A. Johnson:

So, the question is how we work with the Russian-speaking – sir, are we done?

From the audience:

If you give me ten more seconds, I will be done. One of the ways that has worked for us is working with the entrepreneur. Have them set up the R&D in their home country and develop a product that is globally acceptable and sellable. Are you looking into providing that kind of model?

A. Chubais:

Well, that is quite a serious problem for us. I could spend an hour reporting to you on the job we have done with the Russian diaspora everywhere, including in Silicon Valley where, by the way, there are 40,000 Russian-speakers. Sasha is one of them, so she knows better than me. That is the kind of bridge which helps us a lot. We get great help from the Russian diaspora in Silicon Valley, as well as on the East Coast, although to a lesser extent. They help us a lot in bridging our efforts to find people. But at the same time, I will say something which may not be deeply welcomed. We believe that it would be wrong to only rely upon the Russian diaspora. We need to rely upon the best people in the world, the best people in the United States, the best people in Silicon Valley, definitely with the help of Russians, but we should not concentrate only on the Russian diaspora. That is the kind of balance we need, to keep the help of the Russian diaspora, but not to limit ourselves only to the Russian diaspora.

A. Johnson:

The best investor deserves the best entrepreneur, the best company.

Thank you very much, you were a great audience. Mr. Chubais, Mr. Sonin, Mr. Melamed and Mr. Konash – as you said together in chorus, what do we need to do? A knowledge-based economy in Russia will be difficult to build, but we can and need to do it. Thanks very much to Rusnano.