# What Future Awaits Universities

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**Abstract.** Which non-educational processes will influence the development of universities in 15–20 years? Whom will universities compete with? How will education markets change? What will be the relationship between future universities and external environment, society, government, businesses, and other universities? The future of universities is discussed between Yaroslav Kuzminov, Rector of the National Research University Higher School of Economics (HSE), and Dmitry Peskov, Director of the Young Professionals Direction at the Agency for Strategic Initiatives. The meeting was organized by the journal *Voprosy obrazovaniya*.

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**Irina Arzhanova**, *Executive Director of the [National Training Foundation](#).* Good afternoon. I don't know how familiar the Higher School of Economics is with this meeting format, but personally I see it as a rare opportunity to listen to a dialogue between two of the foremost experts in Russian—and, broader, global—education, whose views sometimes align and sometimes differ, though are always very interesting. We are talking about the future of universities today. The subject will be discussed by Yaroslav Kuzminov, Rector of the National Research University Higher School of Economics, and Dmitry Peskov, Director of the Young Professionals Direction at the Agency for Strategic Initiatives. The conversation may grow a little futuristic, but I believe we'll be able to avoid losing our heads in the clouds because both Yaroslav Kuzminov and Dmitry Peskov keep their feet firmly on the ground and understand the existing situation in Russian higher education as well as the global trends. They have an extensive background

working in our universities and thus can provide adequate assessments. *Voprosy obrazovaniya* journal, which organized this meeting, set the time frames we will be talking about at 15 and 30 years from now. This future is not too far, it is pretty foreseeable. If we talk about the next 15 years, looking to 2030–2032, this is the period for which major national development documents are designed, and I know that HSE experts and Yaroslav Kuzminov himself have already been deeply involved in this. Dmitry Peskov has led a foresight project since 2011, trying to visualize education in 2030, including universities—so, the subject is all too familiar for the discussants.

Our speakers will be asked to discuss three, maybe four issues in their speeches, but they will be free to extend the list. Time will be our only limitation: each of the discussants will have 20 minutes. The first topic to cover questions which large-scale social, technology, economic and geopolitical transformations will take place in the next 15–30 years, and how those exterior transformations will affect universities and the higher education system as such.

The second point we would like to touch upon is: what will university's main activities be? Will it retain its functions and roles, or will the "stuffing" change?

Question number three is a very important one to avoid being university-centered in this discussion. What will the market of 2030 or 2060 be like, and what will the role of university be in this new market? Whom will universities compete with in those markets and who will be their partners? This leads us onto another one: how will university's roles and probably functions change in the context of its environment, society, the government or even governments, businesses, organizations, and other universities—if there are any left at all.

As soon as the discussants have presented their visions of the university of the future, they will have five or ten minutes to respond to the arguments of their opponent, or partner, or colleague—whatever roles they assume. Next, I will use my opportunity as moderator to ask them a couple of questions, and then our colleagues from the audience will also be allowed to ask their questions. I am sure that, as in *The Master and Margarita*, "some chess journals would pay a fortune to be allowed to print it."

So, this is our framework, and this is where I'm giving the floor to our participants. However, before Yaroslav Kuzminov and Dmitry Peskov start expressing their points of view, I would like to ask them one specific question. Yaroslav Kuzminov represents the university he has been working for, and he has been deeply involved in higher education, so I believe the university environment is one of the most important things in his life. Although Dmitry Peskov has extensive experience working in university and with universities, he assumes a slightly third-party perspective today—that of an expert. In this regard, I believe, university is perceived in different ways by our discussants. So,

do you see the university of the future—the one you will be talking about—as a subject or as an object?

**Dmitry Peskov**, *Director of the Young Professionals Department at the Agency for Strategic Initiatives.* Thank you very much. From my current perspective, university is naturally an object today, and we engage in designing that object. How to combine such objects and how to change their form to solve specific problems is what has been on our minds at least over the last six years. So, what we do is purely applied thinking: we devise ways to use university as a tool, not as a value in itself.

**Yaroslav Kuzminov**, *Rector of the NRU HSE.* Well, it is clear that university for me is a subject, a collective subject. What is the difference between university and enterprise, for example? Enterprise owners may treat their employees as factors of production, which means they can replace them with other employees or new equipment as soon as it becomes more profitable, and this never raises any questions. Employees can work "from here to here" and that will be fine in terms of the outcome. University is a different thing. Whoever its formal founders and "owners" are, the real participants of the organization called "university"—its co-owners in fact—are its professors, teachers, and students to a lesser extent (although in some institutions students also feel their responsibility and their rights for the university). In this regard, treating university as an object is wrong and even dangerous. Any education reform will be put at risk of failure if we devise flawless optimal patterns but never make allowance for the sentiment inside those patterns, which may bring down virtually any reform. If a teacher who has been given a salary rise but who has also been made to work excess hours and spend two hours a day reporting—if this teacher responds in a negative way to our efforts and concerns, the reform will ultimately fail. The same works for universities: programs fail if professors cannot feel themselves part of them. So, of course, university is a subject, a collective subject. Every single university has its subjectivity, which is never represented by its rector but by a complex, elaborate faculty system.

**Arzhanova.** Well, these are our starting positions, and now we can listen to what Dmitry Peskov and Yaroslav Kuzminov have to say about future universities, or the university of the future.

**Peskov.** My points come down to the following. 'The next 20-years' scenario is pretty clear to those who design the future in terms of one pivotal trend—the trend of technological revolution, a subtype of which is the tendency towards global digitization and digital mediation. This trend seems fundamental to me, as it changes all the established models, in terms of their content as well. Whereas employees

used to be treated as assets, the new logic turns successful enterprises into joint-stock companies where most workers hold a share of the social capital. In this sense, enterprises become more like universities. To my opinion, the trend towards technological revolution and digitization is mediated by two other trends, equally important but unable to change the main vector of development. These are economic and demographic trends, which I merge into one on purpose, on the one hand, and geopolitical and ideological ones, on the other. In fact, these are Scylla and Charybdis for the process of technological change that we are going to observe in the 20 years to come.

I'm focusing on the 20-year period because my prognostic abilities don't work beyond this horizon. Beyond it, we will enter an era where even the economic trends that used to seem unshakeable… Because what is our normal way of reasoning? Well, we have nuclear power plants, or railroads, or large passenger aircrafts which have a lifecycle of 30, 50 or 70 years, so we can calculate the payback period and develop business models. But what is beyond this 20-year period, beyond the year 2035 is what gamers refer to as "the fog of war", i. e. trajectories barely discernible.

So, we have the basic trend and the trends that can slow it down or speed it up. Meanwhile, constant acceleration is the key property of technological revolution today, i. e. every new wave comes sooner than the previous one, which makes forecasting and responding even more challenging. If we look at our own products, for instance, the *Atlas of Emerging Jobs* seemed absolutely radical in 2011, while now we regard it as conservative. A number of transformations come much sooner than we expected.

How do universities respond to those trends today? I think we shouldn't paint them all with a broad brush. I distinguish between four types of universities in the modern world. The first type is the old "cloakroom" model, i. e. everything that works in analogous economies; this is a social function of retaining active young people at a certain age. The second type—let's dub it "growth servants"—is when university solves applied problems to ensure a rapid growth of relevant economies. It used to be typical of Russia at one time, probably in the 2000s, whereas now this is an ultimate characteristic of Southeast Asia and Australia. Another type is universities that foster cultural monopolies, i. e. leading British and French universities that still exploit the legacy of their countries as once cultural empires, collecting "cultural rent" from students who come to study there. Finally, "funnel-type" universities: they also include some British institutions but are mostly represented by leading American universities. Their situation is unique in that they don't need to build full-fledged ecosystems, being oriented towards attracting talents from all over the world and seeing themselves as such "funnels". And then, as they say, trash in—trash out, genius in—genius out. That's what the Harvard model is: if you gather geniuses from all over the world, they will yield a perfect

outcome even if you make next to no effort. Meanwhile, I have never seen a modern university model that would be adequate to the challenges of the digital economy. There is a typical process proving the inability of universities to meet those challenges: the major players in the global digital economy—most often understood as the world's 7–8 largest companies that lead the global digital transformation today: Microsoft, Google, Facebook and Amazon in America, and now Elon Musk's industrial empire will probably join them, plus three Chinese giants—do not engage in symbiotic collaboration with universities, instead training experts inside the company, thus acting as "funnels" too or designing learning and training processes of their own.

I would single out four requirements that the digital, or data, economy will apply to economies and societies within the next 20 years. The first one is, of course, to develop thinking skills, as people capable of thinking and building their own models instead of working with someone else's are of paramount value to the data economy. Meanwhile, templates constitute the cognitive basis of teaching in the great majority of modern universities, i. e. students are largely taught to think templates. Even the most advanced education models do so; consider Harvard's case method, for example—it is also about templates and reproducing practices of the past. The second requirement is to encourage risk taking, because the newly-emerging reality requires taking risk all the time, so the risk maximization function is needed. Meanwhile, by actually creating a sort of graduation "bottleneck", universities force students to adopt personal strategies of risk avoidance instead. Requirement number three is speed, which means the data economy wants immediate results, whereas universities operate on an interval basis. Finally, the fourth requirement is customization—and universities mostly deal today with mass processes.

In addition, we need to discriminate between universities based on their motivation models. "Cloakrooms" often use the model we can define conventionally as "without regaining consciousness": students don't need to think; they work within industrial models, and nothing special is expected from them. A number of universities comply with this requirement pretty well. However, a much more significant role is played by the 15% of universities that use role models and the 5% of students capable of setting personal goals. It seems to me that the value of classical universities is plummeting as students approach the "bottleneck", being the lowest for those 5%. Unfortunately, experience and statistics indicate that this distribution persists, i. e. the overwhelming proportion of students give up university because of lacking motivation, while those who go all the way and obtain excellent results make up the student elite of modern universities. I believe this fact proves that low motivation is not the fault but the problem of education systems all over the world today, and the mass motivation requirement is a foremost challenge posed by the digital economy.

The Russian education system today is entering an extremely complex situation where two barriers prevent it from satisfying the data economy's needs. The first one—I would call it the basic effect of all the Russian educational policies over the last decades—is that educational policy makers, to whom I attribute myself, have recently been facing a conflict: the better we train professionals for the existing analogous economy, the less chances we have to build an economy of data, a digital economy. It's simple logic: if we reproduce the model of dual education and industrial departments, maximizing the function of relations between university and the primary sector, university and the existing economy, it means we barely have any human resource for the breakthrough. It means only a thin streamlet is available for startups. In this regard, the better we work, the worse it is for the economy.

The second inhibitor is the cognitive barrier. Since we cannot take new human resources, and given that the demographic trough is going to reduce the population of graduates by half in years to come, maybe we should retrain our old human resources? Well, it turns out we can't: advanced training programs existing within the analogous economy do not work at all because the competency framework is totally different, the requirements to competencies are totally different, and no one even knows whether we can retrain human resources quickly and effectively. I haven't seen an answer to this question in terms of systems analysis and statistics yet. And this means that universities still have some irremediable defects that will prevent them from fulfilling their key function in the future.

The first of those defects comes as no surprise: universities are prisoners of CAPEX. They live in buildings which are too expensive, and this is bad for thinking. In fact, thinking that students develop is largely inflicted by the traditions embodied in the eternity of university buildings and other related values. Uniformity of education is another irremediable defect of university. In fact, the "four plus two system" (four-year Bachelor's degree plus two-year Master's) and other predetermined formats of uniform education do nothing but sacrifice talents for the retarded students. Thirdly, the possibility of concentrating the best teachers in one place entails quality deterioration and template thinking. Fourthly, universities operate in a competitive environment, while the modern market requires not only competition but also platformization above all. Finally, universities' time-consuming processes of procurement and everything else do not allow for using the latest technology. At the same time, it is clear that some functions typical of universities will survive and remain critical, including the development of fundamental thinking, the formation of relations and student communities, the traditions, and what is referred to as "science schools". I guess all of this will undergo a drastic change some day, but not within 20 years, rather within the period of 50 years, the second timeframe proposed for discussion.

Now, as for university's roles and functions in the global context, I think we have treated those roles as attributes for too long, and this has been quite a mistake. We would talk about teachers' university, research university, then entrepreneurship university, etc. Any phenomenon of social life undergoes an essential transformation at some point, and it's time for university to do the same thing. From the economic perspective, universities must become generators of new industries, new business models, and new companies. They must reject their passive stand and engage actively in creating all those new things because there are no other actors capable of fulfilling this ambitious function with due regard to the technological revolution requirements. University must interbreed its model with that of venture funds, not only those investing in startups but also those investing in talent. This function is not yet assumed by university, so return on investment should be introduced as an economic function of tuition fees; and, of course, the function of knowledge generation and translation will be maximized in this model quite naturally. However, this function is not analytical, rather projective or associated with the emergence of new industries.

I believe new university models are possible. We have analyzed potential revolutionary university models, which are available today in some parts in the world but not in Russia. And we have identified a number of functions that could be underlying those models. For example, the function of world modeling—we call it *setting university*. This is a function of maximizing the function of world modeling, i. e. squared modeling function, where the university trains, figuratively speaking, demiurges capable of modeling and creating worlds around. Next, the function of resource maximization. For poor economies, we should have the function of resource hyper-concentration. As a policy maker well known to us has said, "Russia only has resources for one university." Then, we should maximize the function of startup generation—the model that we refer to as *rocket unicorn university*, i. e. university that generates unicorns. Next, the function of ideology maximization, which is manifested today in the *singularity university* model. This is an ideological university, which may well have a competitive model of a similar type. Then, the function of maximized motivation, where we solve the problem of 80% of college and secondary students who have no interest in learning. Next, the function of maximizing talent discoveries: it's curious how we raise talents to satisfy some predetermined requirements, while the world and the revolution want maximized extremes, i. e. encouragement of any talent sprouting in any area. Then, the function of maximizing the competitive advantages of the Russian economy, first of all in terms of digital economy, programming and companies operating on a global scale. And then, the function of challenge maximization, when university dedicates all of its mission to creating a single revolutionary product that will change the world. Finally, there is *Russian fundamental univer-*

*sity*, i. e. maximization of accumulated research capital. That's what they discuss today in terms of the elections in the Russian Academy of Sciences: how to create a single large-scale network research university based on the achievements of Russian science. Well, there is probably one more—the function of ecosystem maximization. It consists in involving as many people with relevant competencies as possible to solve problems in teaching, which is limited today by the regulatory framework set by the regulating authority.

So, here are the new models, none of which is represented in the market today. This is our semantic field, in which we reason about the future and the new types of university that may emerge in Russia. Thank you.

**Arzhanova.** Thank you. Maybe a couple of words about whom universities will compete with?

**Peskov.** Everyone competes with everyone in each of these models, because university is a function, not a location. Each of these models develops a function to maximize its own competitive advantages. As they say, everything you touch becomes a university. Again, everyone competes with everyone for the key to the holders of our identity, whom we see merge today. So, who are these holders of identity? They are banks, social media, national regulators, mobile operators—in short, institutions to which we entrust our identities today. Platformization logic will demand that these providers of identity keep merging. Will university be able to become such a provider of human identity? Yes, if we succeed in constructing a lifelong learning model, allowing the university to assume this important function. However, I'm afraid this requirement is beyond the power of the existing university system, which has neither the hands nor legs or any other organs to do this.

**Kuzminov.** I think we should identify the factors that will determine the development of tertiary education within the next 20–25 years. These factors can be recognized and outlined today. We might misestimate them but they can certainly be named. The first one, and Dmitry has mentioned it, is the qualitative transformation of the role that human capital plays in the economy. Fifty or sixty years ago, when Gagarin flew to outer space, the percentage of people who were paid for creating innovations—not by chance but in response to an order and as part of their direct responsibilities—was extremely small even in the more developed economies. Nowadays, experts that are hired as innovators and paid for creating new things instead of replicating the old ones make up at least 20% of the labor market in developed countries. This is apparently a trend now: their proportion will increase even more, almost reaching the size of the middle class, which is the largest stratum in the more developed countries, as compared to 25–35% in Russia and China. This is a sort of new middle class, the creative mid-

dle class. It will shape the demand for universities that don't replicate knowledge or impose templates but teach to be creative and justify innovations. In this sense, we can expect the Humboldtian university to be reborn from this trend, however strange it may sound, because constant engagement with science and constant denial of the old patterns were exactly what the 19th-century Humboldtian model was built around. The only difference is that it was designed for the elite back then, while the version of tomorrow will be for everyone. So, university will develop a demand for creative thinking and ability to justify innovations.

The second factor consists in the fact that productive life will become much longer. Even today, life after university is half as long as a generation ago. Productive lifespan is more than 70 years now, and there is every chance it will increase by another 15–20 years by the end of the period we are looking at. Together with the next factor of constant technology upgrade, it will instigate a steep increase in public demand for lifelong learning. This term has unfortunately become overused and trite, but I still insist on using it as a perfectly legitimate one. It is not continuing education, it is exactly the demand for learning new things throughout one's life: at least up to the age of 60 mostly for earning purposes, and later for self-development. This demand will develop a huge sector of competitors with the existing formal structures (universities). The new sector will include both training centers within corporations and specialized education startups born in the market. That is, the greatest challenge for university to face is being created by a rapid growth in unconventional demand. Universities are too inert to satisfy this quickly shifting and deeply individualized demand, which inflates the possibility of another wave of commercialization in education.

The fourth factor is the rapid growth in effective demand for education. Commercialization of education does not depend on the desire of universities to sell their services; rather, it depends on effective demand. The urban population moves massively into the middle class. And what is middle class? This is an economic situation where people can select vectors and forms of their consumption, where they spend most of their earnings not on the products to satisfy their physiological or routine needs but on something they can choose at their own discretion. Middle class is free consumers. This expanding field of choice will ultimately embrace effective demand for education. We can now see how people have become more willing to pay for good and better education for their children over the last five years. The most recent Monitoring of Education Markets and Organizations in December 2016 found that 31% of respondents were ready to spend 5% of their income to provide decent education for themselves or their children. Another 10% were ready to spend 15% of their earnings to ensure the best possible education for their kids. That makes over 40%, which is nearly half of the population! These indicators are

extremely high as compared to the 2011 survey results. So, what will the growth in effective demand entail? The same new forms of education provision I have mentioned before; in addition, universities themselves will enter the market more actively. I have no doubt that newly-emerging training centers, education startups and small educational companies will move ahead of them. There is a strong presumption that universities will later buy those startups, just like pharmaceutical giants buy pharmaceutical and chemical startups, but it will anyway be a perfectly natural, decent, highly cost-effective niche that will fuel the economy.

The fifth factor is a global language. English will have become a global professional and business language. It is actually becoming as such in front of our eyes. National borders are vigorously erased whether the states want it or not, and it means that the market of education—at least tertiary, but very likely secondary schools too—will be globalized. Competition in education will shift from national scales to the global one.

The global spread of English has the same vector as the sixth factor, namely the development of e-learning and the revolution of online courses. What's the revolution of online courses? People will see that they can take a course directly from a Yale professor instead of listening to a bad, stumbling lecturer who hasn't read many new books. They will see that, instead of learning a production process on obsolete, poorly functioning equipment in their trade school, they can find some outstanding formats of doing so with more advanced technology online, either in the local market or, say, in Australia. This opportunity is provided by simulation software that can be accessed online—the problem thus comes down to Internet connection speed. New opportunities will upset the applecart in higher and applied professional education—and in all other types of education as well—as early as ten years from now.

The seventh factor is changes in the labor market. As I have already said, we will observe qualitative changes in labor as such, and Dmitry has mentioned that competencies and qualifications in the market will keep upgrading. Hence, along with college degrees, there will be a great demand for professional certificates and micro degrees indicating that someone has attained a specific level in, say, system programming, health technology, etc. Curriculum vitae will not be restricted to a college diploma anymore but will be composed of such indicators, such micro degrees. That will be another challenge for universities, as they will definitely want to be a part of this micro-degree system. In fact, many have already engaged somehow in this game—take Cisco Innovation Centers, for example—but this is no more than 2–3% of everything that universities offer in the market today. Now imagine a situation where this type of offer amounts to 30–50%. We can only guess how universities will be reorganized under such conditions, but obviously the reorganization will be in-depth.

How will the structure of higher education change under the influence of all these factors? New stable segments will appear in virtually every country, with the exception of the poorest and the least developed ones. Global research universities will emerge and develop as project universities in addition to their research activities, generating a network of startups around them and providing a fertile ground for alumni's new businesses, social initiatives, clubs, etc. This is where I also agree with Peskov, this is for sure. Such global projects and research universities will appear in every country as capable of competing in the new global education system, at least by means of acceptable quality combined with low costs or as "bridges" to the vast regional market.

What are the parameters of global competition? First, salaries. Russia's leading universities pay their professors about 4–5 times less than the average salaries in universities of developed countries. Patriotism is helpless here; low salaries can only be tolerated through inertness, getting used to low pay—a poor ally in the process we are talking about. Inert professors rarely make good innovators. That is why having a group of leading universities competing in the global market is an issue of national safety for any state, and we will soon have to spend as much as we must, not only on aircraft carriers and missiles but on brains as well. By the way, it is not only about universities; it also concerns research centers, corporate labs, etc. We cannot keep surviving by inertia with salaries in science, education and medicine 3–4 times lower than in leading countries. So, the number of such universities will correlate positively with government revenue. In Russia, there is a possibility to recreate and sustain 25–30 such universities within a decade at a relatively relaxed pace. If a lot of effort is invested, the number will increase to some 50—and that will still be too low. We need to find an asymmetric answer to this competition, because if we have as many global universities as Germany or France, which are much smaller countries, it means we are facing a very serious problem and a very strong challenge.

Another problem is that our 5–100 Group, once criticized by Dmitry Peskov, is indeed structured in a weird way. It includes a few aerospace engineering universities but no transport university, no agricultural university, and only one medical institution. And this is certainly weird, because our country needs a global level of technology in every industry. It cannot be an excuse that those universities did not provide adequate programs. Well, let's bump the management, do something else, but we cannot possibly abandon the transport industry or agriculture. There are a few more industries where nothing has been done so far to create universities of this type. I am talking first of all about arts, where economic significance is growing, plus construction and service technology.

Another important category of universities is represented by institutions unable to compete in global science but indispensable for

providing "centers of intelligence" in regions. Their primordial function will be the social one of raising local businesses and social projects and creating a broad cultural horizon. The same will be true for the first category of universities, but those will have international laboratories, while regional institutions will have some local lab elements. By the way, I consider it very important that we provide an infrastructure to support such decent regional universities, each with at least two or three strong labs, because if the ceiling is low... well, you can't duck all the time, right? Regional universities will be able to replace a large part of their basic courses with granting credit for the best online courses, thus saving funds to invest in real, unsimulated science.

Yet, the extended university function that Dmitry Peskov talked about—and I fully agree—will be fundamental for the key regional universities. Let's take business incubators and business parks that exist today in nearly every region and show little efficiency, make this "innovation belt" part of universities, and provide these universities with some basic funding to retain the best quarter or even third of their graduates, helping them create new forms of activity and projects. There is virtually no alternative to this solution in the regions. We should not forget that university is a fostering environment. So, this function, this format of universities as regional centers of intelligence and creative thinking is absolutely indispensable. And, it will be better if there are at least two in every region, since if there is only one, there will be risk of stagnation. That is, we are talking about approximately one hundred universities of this type around the country.

The third type should involve universities that basically provide e-learning services. Half of the college students in Russia are enrolled extramurally, and the trend is going to persist. In fact, these universities help people construct degrees from numerous short courses they have taken. Why can such degrees not be awarded by universities that provide those online courses? Because that would jeopardize their reputation. I cannot see any incentives for leading universities to award their degrees to a much larger population of students, obviously less skilled than their current graduates. Hence, there is a platform for such "construction set" universities, in a good sense. They have another important function of local consulting, i. e. providing local support to online students. Such universities will exist for sure, and their mission will be to ensure maximum participation rates in higher education, which is a social imperative for the population of any developed country today.

The fourth type of university is what should evolve from today's trade schools. This is now referred to as applied Bachelor's degrees, but there is more to it. Manual occupations will become sought after and highly prestigious in the labor market of 2030. Even now, look at a chef or a good hairdresser: these people are at least as respectable and smart as professors. This sector will grow and expand, and there

will be large categories of occupations involving complex routine operations but higher responsibility. Why is an aircraft pilot expected to have a college degree or even two and a train driver is not? Their levels of responsibility for human lives are pretty much the same. In the end, a huge proportion of a doctor's work is about executing protocols, but no one says a doctor doesn't need a university degree. So, a cultural cushion is required for the new generation of manual workers; they won't account for more than one third of the future economy but that will be a very important and respectable one third. And, of course, specialized vocational schools should exist, similar to acting ones. A number of Western-European countries have already introduced them, so we can learn from them how to train chefs, cabinet makers, bookbinders, etc. The narrowest specializations are available, and even in variations. You can simply learn bookbinding or enroll in a program with a number of courses around the books of the 17th century that you bind: what the 17th century was like, what its culture was like, and so on, so you accumulate a certain body of seemingly optional knowledge. What actually is the crucial point of the university and why, I am perfectly sure, will it survive as an environment? University is a lode and generator of optional knowledge—a kind of knowledge that you don't have to apply professionally but which may be applied at your discretion, unexpectedly for others. You don't just put this knowledge on the backburner but obtain it because you are into it. This property of optionality will become extremely relevant in 10–20–30 years. And what is optionality? It's creative thinking. This is when we generate something new ourselves, if you like.

We can find some other formats too, such as corporate universities that will obviously evolve. However, I would like to dwell upon commercialization of education, upon commercial projects in education paying their way.

What can educational business become like? First of all, it will grow around universities because innovators who own intellectual property or a part of it naturally want to capitalize on their innovations—not always but quite often—and feel themselves entrepreneurs. One of the key challenges for the lawyers of the future will be partitioning intellectual property, i. e. intangible assets created, say, by a university professor in her lab. To what extent can she use this property and appropriate the results exclusively? Where are the limits of the rights of her university and colleagues? Colleagues' rights are a more intricate issue than those of a university, by the way. I believe the next 20 years will be filled with hot debates over intellectual property rights, legal battles and so on, as happens every time a newly-emerged phenomenon is not yet formalized in legal practice. My forecast is this: at least one third of offers in the education market of 2035 will come not from universities but from corporations into which large publishing houses like Prosveshchenie or Drofa will have evolved, as well as by corporate training centers, education startups and specialized education-

al companies, though I think the average lifespan of such companies will be relatively short.

Now, I would like to touch upon the subjects that Dmitry has brought up. He listed numerous university roles: generators of new formats, new associations and new businesses. I agree: universities can and must generate new formats. However, it should be done not by the academic council but by alumni, associate professors, i. e. individual people retained by the university. Why should they be retained by the university, why do we want them to stay in its zone of influence? Because university is a huge network of free communication, where information, speed of access to it, and trust-based relationships are the greatest values of all. How did Silicon Valley appear? Through immense concentration of the brainpower and businesses that use it. Universities are similar points of concentration and intellectual exchange. And you don't have to pay for searching, for making contacts, for the opportunity to have a breakfast with Warren Buffett—you get it all for free because you are part of the system. This membership, this being part of a specific community will definitely work and may even become the primary prerequisite for success, provided that the role of information as an economic resource keeps growing. Moreover, this will provide a means of attracting alumni back to universities by offering them low-cost comeback opportunities.

Now, what concerns university defects. I'm not sure I understand what eternity of buildings means, so I would rather define it as inadequate investment. I think the successful development of the HSE is explained, among other things, by adequate investments from the very beginning. It was a tough issue of space during the first 15 years, but we decided we would only invest in faculty and libraries.

I remember driving in St. Petersburg with a rector and seeing a building with a marble front. I asked, "Whose is that building?" "It's such and such university's." "What salaries do they pay if they can afford marble?" "No way, they pay a pittance!" And that was when I got the strategy: as a bad rector, you may never raise salaries to survive; instead, you may build fountains or marble façades, i. e. make investments that have nothing to do with professors. Why? Because the feudal university model of the 1990s was based on non-involvement. A professor paid 6–8 thousand rubles cannot make a living, so he naturally looks for additional sources of income. And if he only earns 1/5 of his income at the university, he will never team up with other professors to tackle that stupid rector because emotional costs and possible monetary gains will be absolutely disproportionate to his efforts and losses. However, if the same professor gets 70% of his income from the university, he will become dangerous, as he can vote against you and drive you out. At meetings of the HSE Academic Council, at least 20% of draft solutions proposed by administrators are rejected in their original versions. Newcomers watching our passionate debates sometimes think a revolution is about to happen. It's just that mem-

bers of the Academic Council perceive the university as their home, not as an institution that invites them to give lectures.

By the way, that university with a marble façade does not exist anymore.

I have known perfectly honest rectors who invested in passive assets and erected buildings. I can understand them, but investing like that is wrong. Even five square meters per student can be enough. We now live with eight square meters per student in the HSE, and everyone thinks we're well off. We always run low on materials and resources, and I know a few other universities in the same situation, such as Plekhanov Russian University of Economics or ITMO University. So what? Does anyone care? Quite the opposite: everyone believes these universities are cool. Meanwhile, universities that boast 30 square meters per student but invest in passive assets often lag behind. I would probably agree that this is a defect of university, but I don't think it's irremediable. It's just that these passive assets lose their importance as society is growing richer.

Uniformity in education is a very interesting point. Indeed, it puts the brakes on both university and school education. As a mechanism, the education standard is designed to have everyone complete the program, but we will always have underperformers and top performers. Is there a way out of this situation without the need to refuse uniformity, which structures university activities and saves a lot of assets? Yes, there is one: underperformer support tools coupled with labs for top performers. Thus, top performers will have access to an additional track, while at the same time providing guidance for low performers to keep them in. However, the problem is not specific to the university, being typical of any education system and even much more acute in school, where children are unprotected and unable to stand up for themselves or even, not infrequently, explain what their problem is.

It is possible to concentrate the best professors in one place? I guess the online sector makes this task feasible.

As for the rigid and ineffective financial model, the first thing to do is solve the problem of underfunding with the help of the government and any other university founders. That is, university's production function must get rid of its current distortions, when labs stall with no money for chemicals, or when professors are finally paid enough but there is no manager in the department. As soon as there is sufficient funding, we will be able to discuss financial policies. Today's university financial model is invalid first of all because universities receive almost no subsidies for new equipment or building maintenance—about one third of what is needed—and no adequate funds to pay at least 50,000 instead of 10,000 rubles to teaching staff members, so that we could find decent professionals at those salaries… I am convinced that financial models must be discussed in a broader context, with due account taken of governmental and societal obligations.

**Arzhanova.** Thank you, Yaroslav. Dmitry, do you have anything to say, any questions to ask, points to comment on?

**Peskov.** Yes, I do. I see that we agree on most points: national policies in university development, the future of Project 5–100, and the idea of having leading specialized universities. However, I think this logic requires additionally answering the question of which technology solutions will help us ensure the leading positions for such specialized universities. The thing is, the key technologies shaping the future are much less numerous than relevant industries and domains. Roughly speaking, the basic technology package is more or less the same across all industries. The link "big data—AI—blockchain" is equally important for institutions in transport, agriculture and even humanities. I don't think the country has the potential for creating 20 or 30 universities with equally strong schools to provide such specialization. We need a situation where universities ensure their own specialization through customizing the content of education, while sharing the same technology platform, or maybe a few such platforms. It is only this type of weird synergy that can provide us with high quality, because we don't have the minimum sufficient human capital to implement other variants.

What I'm not quite sure about is the social imperative of higher education. I think this imperative is a legacy of the previous global and Russian trend, but it has mutated greatly. Fifty-six percent of middle school graduates preferred trade schools over high school in 2017. Even if we take into account that their choice was largely inflicted by their fear of taking the USE exam and they were still going to enroll in college some day, the amount and value of practical skills increase considerably. I believe there is some perception of university as the exclusive generator of optional knowledge, inherited from the past. Don't games and social media provide people with the same social ties and optional knowledge? Don't people obtain the same through micro degrees or micro models of social communication, like at a fest or in a camp? They perfectly do, and such social ties turn out to be quite effective in terms of friendship and community values. Let's compare who is stronger today, Harvard alumni or "alumni" of the Burning Man, the large-scale annual gathering in the Black Rock Desert? I'm guessing that Burning Man outdoes Harvard several times by the level of cultural transformations that people undergo when building social ties. It seems that universities are being denied this exclusive function as well.

And the last one. When I was talking about financial models, I meant not only and not so much underfunding—this is the *minimum minimorum* for any discussion, I totally agree—but also the ability of universities to attract and design new investment models. Investment models are actually what shapes communities, we just haven't yet come to the point of this logic. I know what will happen when and if the

HSE wants to create a full-fledged community and get back not even to the Humboldtian model but to the medieval university of the 14th century, which is also feasible today. In that case, the HSE will consider IPO and the so-called "bounty professors" will appear. Investments that can be attracted in this new technology-based reality are considerably greater than those that can be seized from the government. So, these are the marginal notes I would like to make, although we're certainly thinking in the same direction on the whole.

**Kuzminov.** Dmitry has made some very interesting points that I will try to respond to. The first one is about the technology platform that will be shared by a group of universities. Clearly, we're not a very rich country, so we obviously need to begin with a shared knowledge center to construct such systems. This idea has long been recognized. As you know, only 20–30% of equipment capacity is used in various research centers, even corporate ones, so this is the first thing to do when it comes to asymmetrical answers. If the Agency for Strategic Initiatives works with us in this direction, we should explore and report to the government: look how many empty spots there are, let's announce a competition to fill them with users, so we can create new research teams, new opportunities for research and training out of thin air. I think this proposal is very good and right, so I cannot but vote approval.

The alternative university point is a very curious one. To what extent is the university able to lose its role of the social imperative? Only history will tell. But I think I have already made my fundamental argument: university is an immense community with minimized costs of communicating and obtaining information and access to various associations. Festivals, independent search, forums and interest groups are much more local than universities. If we look for no-university forms in the future, it must be some large online network associations. To what extent they will be able to provide an alternative— well, let's see, because we have agreed that a lot of things cannot be figured out, only vectors can be identified.

As for the choice of vocational trajectory, Dmitry has already said that 80% of trade school graduates enroll in colleges within a year after graduation. Over 60% of them do not use their acquired knowledge and skills at work in any way. I'm afraid today's vocational education model needs to get rid of people who are not willing to work manually, who don't see themselves in manual careers and simply exploit the ingenuousness of the government that enrolls them in trade schools and hopes they will become manual workers. One simple thing needs to be done here: the USE should be made the only admission test. Then, we will again have 20–25% instead of 56%, but those will be people actually willing to work. Twenty percent of middle school leavers and 10% of high school graduates—that's the adequate size of the cohort of qualified and responsible manual workers that society needs.

However, we should find ways to prevent secondary schools from pushing their losers to this track. Manual work requires special aptitude and talent, which must be encouraged by the public and inculcated through professional success stories, through technology that children will consider cool. Therefore, these policies and new technology should be applied not in high school but at least in grades 5–6.

The idea of academic community capitalization and university IPO sounds interesting to me. If the value of communities, communication and access to information actually increases and can be capitalized on, universities will have to use the opportunity and capitalize on themselves—and become corporations, if you like. Shareholders of such corporations will not only earn money on their shares but they will also have better chances for social advancement and education of their children. This option seems to be a good one for leading universities, at least an interesting one. I doubt we will have mastered this format by 2025, but the vector is quite palpable.

**Arzhanova.** Thank you. I might be wrong, but your visions look like totally different pictures of the future to me, despite your agreement on many specific points. While Dmitry talked more about the transformation of university, its borders virtually becoming blurred, and its existing formats being at least ineffective in their future content, functions and roles, Yaroslav believes that universities of the future are clear and well-defined institutions that are still dressed in their buildings. They have different missions, opportunities and objectives, but they are still part of the evolution pattern that drives today's system of higher education. That's how I see the speakers' viewpoints, very different in their nature.

I've got two questions for you. First, suppose that we put aside the economic needs and digitization and talk about people: the future children that will enroll in universities—or parents sending their children there—what will they seek first of all? Will it be important for them to obtain a set of competencies, which can be acquired as a package from some companies, some institutes or universities, and develop a unique body of knowledge and skills with a focus on salary, employment, and position in the national or global labor market? Or will those children 15–20 years from now chase brand credentials that will literally become lifelong trademarks indicating that you have graduated from Harvard, HSE, MGIMO, etc. and confirming a specific level of knowledge, capabilities and status that you have attained? As for all the rest, you just take it from those supplementary companies absorbed by the university or affiliated with it. What will people seek? Anyway, the university's primary customer is people, who may give no credence to national or economic policies but still want to obtain some specific type of education in a specific university.

And the second question right away. Both Dmitry and Yaroslav said that universities, especially leading ones, whatever form they

will take, will produce new industries, new domains, new majors, and other new things instead of responding to or restraining the external factors. So, the question to both of you is: where do you think Russian universities—not some abstract ones or 5–100 leaders—will draw strength from? Even if the government makes some effort and raises the size of funding, where will they take strength, ideas and any real trends from? Who will drive production of new things inside those universities? We've got the same staff today, and 15 years from now today's newcomers will become part of a new crowd that has spent its whole life in the university. They will get bogged down, too, in this environment that provides unique opportunities for socialization. Who will drive innovations in universities? What will make them do it? Thank you.

**Peskov.** May I start from the second one? I think regulatory regime is at least as important a prerequisite as funding. I strongly believe that the only possible format for leading universities is being part of such regime, similar to the Skolkovo Foundation, priority development areas (PDAs) and special economic zones (SEZs). Well, SEZs are mostly failing, Skolkovo works a bit better, and PDAs are more or less effective. However, under a regime like that, universities become corporations with a different fundamental management model and a managing company that assumes a number of functions. Universities in Russia have lately been created following this logic, we just haven't realized it yet. This logic underlies the two most recent universities, which boast the highest levels of expenditure per student, Skoltech and Innopolis. Innopolis is integrated into a SEZ, and Skoltech is regulated by the law on the Skolkovo Foundation. The same model is being customized today for the town of Yuzhny, which is going to be made a PDA. The same logic guides Far Eastern Federal University, which integrates its activities into the PDA regime of Russky Island. Such a regime is indispensable to "unpack" proactive attitudes, and it plays at least as important role as subsidies.

Who could be the driving force of changes? Well, it is clearly impossible to do in the brownfield and too expensive to do in the greenfield. So, my answer will be as follows: we've got the brownfield, in which greenfields should be sandwiched between the upper layer of managing companies and supervisory boards as change drivers and the lower layer and inclusions of individual model structures operating under the new logic, as well a system of benchmarks to encourage students and professors to move towards those model structures.

There are four sources of change, in my opinion. The government is the first and the most powerful of them: in particular, it will have to reshuffle rectors and form elite councils in a different way. The second source is naturally the alumni network. For instance, the association of PhysTech alumni is a very powerful driver of change that has a much greater impact on the university than the faculty members that

have the vote. The third source is advanced tech companies that will align themselves with the universities willing to try their luck and become PDAs. Finally, a critical source is school children and students enrolling in universities. Why? Because you have nowhere to adopt changes in technology and thinking but from these school and university students. Neither businesses nor alumni or the government can provide you with innovative thinking patterns. To my view, universities of the future are places where people and artificial intelligence learn together and learn from each other. Say, I need to inculcate the logic of working with AI within my small structure. We announce an open competition, and the only winner is a tenth-grader. So we hire him as a project manager and vest him with very important authority to change our digital systems to fit into the digitized future. He gives lessons and workshops, provides recommendations to our current contractors and elaborates the strategy of working with information systems. I haven't found this competence anywhere else in the country, only in this tenth-grader.

**Arzhanova.** But where do we find enough people to provide if not all…

**Peskov.** Easy: just buy all the prize winners of our National Technology Initiative Olympiad, they are all top-quality brainiacs. As soon as we scale this system from junior to world skills using our Quantorium tech schools, for instance, this cohort of population will hopefully increase. However, what Sirius Educational Center does is also a good way of supplying such human resources.

Now, as for the first question: what will people seek? I guess it will be a ratio of 80% and 20%. Twenty percent will seek capitalization on their talent. I think obtaining competencies in university makes no sense because over half of the necessary competencies will definitely develop in environments where they are applied as well. So, saying that university teaches competencies sounds really strange.

**Arzhanova.** The university provides this environment as such.

**Peskov.** Well, I doubt it. It has been long since it actually did. It is not the university where super professionals grow today. When you see those 12–13-year-olds that have already capitalized on themselves, where do you think they obtained knowledge above the university level from? They got it from online environments. As economy will advance, the role and weight of online environments will increase essentially in contrast to those of schools and universities.

**Arzhanova.** Won't it mean that young people will master some professional competencies perfectly but will still be unable to communicate with one another?

**Peskov.** They will have no problem communicating with one another and even swearing. Try living within a MMORPG online environment. This is a massive educational process today. Try playing Raid, look how competencies develop in there.

**Arzhanova.** I mean human communication.

**Peskov.** Well, that's exactly what it is. People form teams, identify the key areas of competence, agree to coordinate their activities, and undertake complex, socially mediated actions to achieve a common goal. There are all elements of a highest-level learning process there. I think that talent capitalization will remain the key function of those capable of setting goals for themselves, while those behaving as instructed by parents will go to university. I think degrees don't matter for 20%. We annually produce a few thousand graduates who have gone through the WorldSkills system. Do you think any employer has ever asked any of them which trade school they graduated from? The type of diploma does not matter to anyone anymore, and this is the reality of Russia in 2017. What employers want to know is whether you are a WorldSkills champion or not. Champions sell like hotcakes, no matter what. That's where the issue of uniformity is raised. If a first-year student wins the EU championship, why would she need all the other years at the trade school? You could appoint her as the director of this trade school, or as the chief educator, right now. She can do what the whole system can't, and she didn't learn it in a trade school.

**Kuzminov.** What will people seek in university in ten years? I guess it will be a success if 20% actually choose to capitalize on their talents. It means that a system for talent identification and development should be available at the pre-university stage to allow people to capitalize on their talents. The remaining 80%, if they all go to university, will still seek either brand, which is equivalent to social capital, or a set of high-paying competencies—with a tilt towards the scramble for brands, which has already manifested itself. The reason is simple: even today, we cannot predict the set of competencies that will become a market trend, and tomorrow looks even more uncertain. We can see this trend in leading universities and those of the cohort that follows. Even buying a degree is a particular case of the scramble for brands, brand standing not for a specific university but for the whole national system of higher education. That's how the dimension of credibility works. And people, indeed, behave rationally: an average employer who doesn't hire a WorldSkills champion draws on their own experience, which tells them that university graduates are normally better at grasping what you need from them, they normally learn faster, etc.

Could there be a different system of signals to replace the emasculated diploma of higher education? Yes, there could be, and we are

trying to create it right now. It will involve professional certificates and being listed on an open or proprietary database of people who have passed professional examinations of a certain level. However, because relevant industrial associations are invariably weaker than the university system in both institutional and economic aspects, I believe the trend is unlikely to change by 2025. Like Dmitry, I don't like this trend either, and I regret the need to say all these things.

As for manual labor, this is just a figure of speech. What I meant was procedure-based occupations. Yet, you still need a creative mind to execute procedures because you must know when to stop, you can't be a robot.

Now, as for what concerns the drivers and who can drive change inside university. Only 15% of HSE teaching faculty had publications in leading English-language journals seven years ago, whereas now the proportion has risen to 2/3. Some faculty members have left and been replaced by others, including our alumni and alumni of other universities, while others have changed since they saw strong incentives. I mean, we can't treat brownfield staff as dead-end employees, this is wrong and insulting. Strong stimuli, both positive and negative, must be provided to inspire voluntary change. Instead of growing greenfield inside brownfield, we should give everyone—every chair, every single staff member, every lab—a chance to change by demonstrating strong and hopefully persistent incentives. Two thirds of income at the HSE are paid for following those incentives. You follow them, and you change your behavior, and you join international teams, and you achieve results that are recognized by the global research community, not just by your department. Salary bonus criteria get stricter every few years. Such bonuses make up 2/3 of your salary, but they are permanent and non-subjective, you plan your efforts to get them. Incentive mechanisms don't run smooth in Russia yet. A faculty member whom we want to develop as a researcher should be given a five-, better ten-year perspective to understand the rules of the game and what exactly they should do to get access to a specific amount of funding. However, we keep changing the rules from year to year and awarding grants for 1–2–3 years only—the discussion of 3–5-year grants has barely begun in the Russian Science Foundation. This is ridiculous. Fundamental science doesn't work like that—even applied science can't.

How strong an additional impulse can be given by the spread of PDA regime and other preferential statuses? It would be great if an impulse was given to faculty, not administrators. If we launch the processes I was talking about, our next stage will be giving leading universities the status of "most-favored nations" in the economic world. The government will not lose anything in this scenario, but it's very likely to gain a lot. Thank you.

**Arzhanova.** Thank you. We now have 10–15 minutes to take some questions from the audience and respond to them.

**Sergey Malinovsky**, *Deputy Head of the Laboratory for University Development, Institute of Education, NRU HSE.* What will the university owe in 2030 or 2020, and whom to? You have offered a metaphor of university as a space of optional knowledge, optional student experience and optional communication. In this respect, my question is rather for Dmitry Peskov: to what extent is this space optional yet entitled to existence in your vision, in your university models? Each of the models you offered features a function of maximization. It seems like university dissolves in some corporate interests. However, student roles are what actually matters: to what extent will students in this new model be entitled to anything optional? Or will it be like in that joke about the rabbit that makes love without knowing it is bred for meat? I mean, to what extent may students—and not only students—engage in any optional activities? The flip side to this question is, can we think of the new functions and goals to assign to university? And shouldn't we somehow crack down on university owners to redirect their efforts into solving specific public problems? Because the suggested classification of university types is based on the functions assumed—these do this and those do that—but what problems they solve remains somehow left out.

**Peskov.** The question about the boundary between the obligatory and the optional is a good one, but you have answered it with your own metaphor about the rabbit. University's freedom of choice is limited by an array of functions, which, however, is so wide as to allow universities to create new worlds. This way, this is an obligation, but an obligation of a creator who undertakes to create at least a masterpiece, preferably a project, and ideally a setting as a result of university activities. Should purely optional universities exist? I strongly believe that any wealthy society can afford them. The question is, whether they will appear within the 20 years to come and whether we can place undershaped talents into optional communication environments. I don't know.

**Arzhanova.** Optional communication may involve other, less favorable areas. Maybe we should be talking about risk minimization here? In the end, not all the communities are creative and developing.

**Peskov.** Of course, you are right. Making allowance for these circumstances is what strengthens the boundaries of obligation in terms of functions and objectives that the government expects university to achieve. However, I don't see goal as a wall. Goals guide us, and *serendipity* is the key word in terms of organization of university interaction space. Serendipity management is what our universities lack and

what we have been investing in lately. It is literacy in serendipity construction and management that generates innovations. Innovations cannot be produced to satisfy an order.

**Arzhanova.** To me, it sounds very much like anarchy, controlled anarchy.

**Peskov.** The future is born out of chaos, not order—there is no doubt about it.

**Kuzminov.** In fact, the question about university's new functions and goals has to do with new, or rather additional university owners. This is an interesting question, but there are both a good answer and a bad one to it. The good answer is, students and alumni—the so-called "progressive" students employed in university-associated businesses and social projects—must be owners to a greater extent. Such an expansion of the circle of university owners would be an obvious advantage.

Another positive cohort of new owners embraces international researchers working in related fields. In theory, university must be governed by people at the forefront of science this university engages in—naturally, not all of them work in Russia. To the extent so as not to interfere with national geopolitical interests—as there are national security interests and other boring and unpleasant things—we must expand the circle of university owners, i. e. decision makers who treat university as their home, by attracting such global experts collaborating with university researchers. They must care. We have actually embarked upon this journey in HSE, Tomsk University and ITMO, inviting a number of foreign colleagues to engage in university development.

The bad answer is businesses that sponsor universities. Why are they bad owners? Because businesses often understand the universities they support in a very single-sided way or fail to understand them at all. In the end, a university owner is supposed to set goals and assess the processes using the power of its opinion. An owner must love the university.

Businesses accountable for supporting universities refuse adamantly from taking any part in governance, seeing invested funds as trust-based endowments. They will express their opinion but will never insist out of fear of being reputed as amateurs. That's how the HSE Board of Trustees operates.

**Peskov.** That is, money must be cleared of business influence. I agree with this approach.

**Igor Chirikov**, *Director of the Centre of Sociology of Higher Education, Institute of Education, NRU HSE.* Thank you so much for both variants, both are pretty viable and promising, no matter what. My

question is this: you discussed universities as very autonomous players, but they often lack autonomy, especially in the case of state universities, loved most of all by their founders. So, what will be the role of the Ministry of Education and Science in 2035 and how do you imagine the ministry or whatever will replace it in the future? What is the regulator's role in both versions of future university? What should it be like, what functions should it fulfill, and what will its relationship with university be like?

**Kuzminov.** I think its role will be considerably less important than today. The more independent and competent universities grow, the less external regulation and management they need. I can imagine more or less clearly what functions should be delegated to university associations. I think that government and public regulation must give way to purely public regulation—this is the case in most countries, and no one has died from it. The ministry should design strategies and elaborate some general regulations to prevent misuse of university potential. I hope it will never be responsible for determining the majors to teach. If you have to tell a university what to teach, that will be a bad university.

The government rarely has a clear vision of what exactly the education system should provide in terms of majors and occupations. The current situation, where student enrollment targets for engineers, technologists and teachers invariably exceed effective demand year after year, is an embarrassing signal that the existing mechanism does not work. As a result, candidates do not believe in job prospects in these majors, many strong secondary graduates refuse these careers, and government-funded spots are filled with weak, unmotivated students.

The government has effective leverages in the market of higher education in the form of grants for high-performing students in "trending" majors. A number of governors already use this mechanism by granting long-term subsidies for top-priority majors, which include investments in research teams and equipment. In this case, students will come themselves. But prescribing exactly how many students should be enrolled in each major is "accountant's romanticism".

**Peskov.** In an ideal spherical world that develops a digital economy, the ministry would be replaced by a service. Every time there is an intermediary that could be replaced by programmed or human self-regulation, it should be replaced. I agree that some functions will go. When we talk about 2035, we actually mean a much earlier date. This is typical of human ways of thinking: we can't think 20 years from now, so we think for the next half a decade but keep saying it will happen in 20 years—just to avoid the responsibility. I would say it would be wise for Russia to align the goals of education with the economic goals as much as possible. In this regard, the model "education + science" is not quite effective. Let's take a look at the experience of oth-

er countries, which have shown the best performance in creating relatively predesigned new industries and developing economic efficiency. First of all, I would mention the British model and their set of functions, featuring the Department for Business, Innovation and Skills (BIS). The link is made here with a very simple logic in mind: there are pervasive skills, which generate breakthroughs and innovations that later form new industries and growing businesses that the country needs. I would separate this function from the special function of regulating the optional. Following the logic of Yaroslav, regulation of the optional can perfectly exist separately from regulating the efficient. We should discriminate between these two functions. I'm not sure how exactly it could be done, but I'm sure the ministry of 2035 will be a service, not a regulator.

**Arzhanova.** Thank you. Our time is almost up. I guess we didn't succeed in painting the picture of 2030 or 2060 so as to actually see what university will look like and where we will come. Well, that was quite unrealistic. However, we have seen different versions of trajectories that higher education in Russia and all over the world can move along, whether straight or branching away. I'm absolutely sure that we haven't touched upon some crucial and very interesting aspects, like what those branch points could be like, what lies behind refusing selected and objective lines of development, whom these deviations are contingent on, as well as rollbacks and inability to move forward. That is a separate subject for discussion that may be continued. So, now I've got one short question to both discussants: how interesting and useful did you find today's format? I think this discussion could also be interesting and useful for a much broader audience, and maybe it makes sense to continue it in another format.

**Peskov.** I would certainly continue, maybe after modifying the audience and format a little bit. For example, I believe it would be very useful to initiate a similar dialogue with the financial expert of the rector school. Promising students and prospective rectors could also participate in a discussion of this type. However, it's not the same questions that the conversation should be built around but the same sore points of people accountable for doing their work within the existing system. In the end, our worldviews are not comprehensive, being largely inflicted by the elite status within the education system or outside of it.

**Kuzminov.** I think it was an interesting discussion, and I have picked up some ideas from what Dmitry was talking about. I guess the discussion would have won if we had spoken more briefly, but this is all too subjective. I agree that it does make sense to further discuss the subject with more participants and for a broader audience.