

Dear colleagues,

I do appreciate the opportunity to celebrate with you the YSSP 40th Anniversary and it's a big honor to me to speak at the Symposium. Thank you very much.

I would like to stress briefly some rarely discussed aspects of the new technology wave (NTW) and the key challenges it produces for social science. Besides I will note some challenges that could be considered as the most important for certain types of countries including Russia.

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Nowadays we can observe a new worldwide wave of studies, projections and largescale government initiatives concerning the new technologies. Enthusiasm and expectations are really great. And it's difficult to say whether it's a dry shot or a real upcoming revolution.

The new technologies topic was discussed for many years. Enthusiasm used to be great but not all expectations came true. As an example one can remember former early reliance on controlled thermonuclear fusion or more recent nanotechnology expectations.

As a result people get accustomed to the news about technologies and their possible disruptive consequences. I personally can see a lot of sceptics among my colleagues in Russian Academy of Sciences or at the government authorities.

Nevertheless, as far as I can see, there are more and more signs that we stand just before the revolutionary changes in many spheres.

I believe that all of us are aware of basic technological trends but let me show you a brief picture of the key fast developing technologies.

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Obviously digital technologies are at the core and they consist of the whole array of more specific technologies. Many of them are the result of confluence of several technologies where ICT plays very important role.

The time is limited so I can just name the key digital technologies here. Most of them are already well known: the big data, advanced algorithms and artificial intelligence, advanced robotics and driverless vehicles, internet of things, collaborative consumption, augmented reality, the batch of uprising financial technologies. Apart from digital technologies, it's necessary to point out new materials, biotech and the batch of new energy technologies.

It's very important that almost all presented technologies can be really disruptive, producing revolutionary changes in many spheres in upcoming decade. What is the basis for such confidence?

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The short answer is that we have classic transformation of quantity into quality. More specifically the key triggers for digital leap are: 1) progress in electronics including speed, size, energy efficiency, costs; 2) progress in different types of algorithms and interfaces, 3) finally, the rise of smartphones as the consequence of previous progress and the cause for further revolutionary changes. What are the outcomes of further technological progress?

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The main outcome is productivity gain or even productivity leap though it's not so simple. Disruptive nature of many technologies and their extremely fast adoption lead to many challenges in different spheres. And the key challenge is the quick changing demand for different occupations. These effects are well known and widely discussed. But what is impressive is the scale of these changes. For example, driverless vehicles eliminate demand for drivers. But this is the most common job, each tenth person works as a driver.

What is interesting, the most of the new technology publications and initiatives are about “how to catch the wave”. This is a natural and a proper goal especially for the most advanced countries and companies. But I would like to concentrate on rarely mentioned issues. What does it all mean for the rest of the world?

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So what are the other less discussed effects of NTW? As far as I can see, the key macroeconomic effect is that many non-tradable services turn into tradable. This phenomenon should not be underestimated. We shall see a completely new map of world trade in services in a decade.

Besides we should mention new favorable conditions for world-scale monopolization in services. One or several types of services can easily be monopolized by one worldwide company because it’s getting easier to scale new service technologies and acquire possible competitors.

Finally, slowing growth or even decline of demand for commodities. The possible peak oil demand is being discussed. But what is rarely mentioned is that peak oil demand in 2030s means \$20 per barrel in 2020s. It will happen as a result of accelerated exploitation of the cheapest oil deposits.

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In 2015 we estimated the positive effects of new technologies adoption for Russian economy by economic spheres and industries. Pool of experts gave their estimates of direct changes in productivity, export or import shares, relative prices and other economic and social variables (like life expectancy, disease intensity and so forth). We used this direct estimates to get final integrated estimates using input-output tables. Later we added preliminary expert estimates of negative effects of net export decline of services for several sectors.

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Our estimates for Russian economy show that final integrated effect is close to zero, but uneven by sectors. For example, we expect substantial negative effects for education and healthcare, personal services, while positive effects for manufacturing and commercial services.

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The above mentioned effects will lead to substantial redistribution of value added among countries. Net gain will be received by the currently leading countries or more likely leading companies. Alternative is not very attractive: it means strong government regulation up to new strong barriers to trade in services. Redistribution will be strengthened by substantial net losses for current commodity exporters with the increasing risks of instability and conflicts. Even if losses of less developed countries could be covered by general productivity gain, we should expect increasing gap between the leading countries and the rest of the world. Among other effects it means additional migration challenge for developed countries.

Concluding, as it goes from the ICT&SDGs report (prepared by The Earth Institute and Ericsson company) ICT can be a crucial enabler in helping to achieve the SDGs, particularly in today’s low-income countries. But crucial side-effects should not be ignored. I can mention at least the following additional challenges. First, we need to search for international win-win solutions in regulation for trade in services. Second, it’s necessary to deeply consider all the risks of slumping commodities prices. Third, migration research should be accelerated.