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DIRK MESSNER ON THE DYNAMICS OF GLOBAL CHANGE AND THE SIGNIFICANCE OF INTERNATIONAL SCIENCE AND TECHNOLOGY COOPERATION IN THE POST-WESTERN WORLD

Theory Talks

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DIRK MESSNER ON THE DYNAMICS OF GLOBAL CHANGE AND THE SIGNIFICANCE OF INTERNATIONAL SCIENCE AND TECHNOLOGY COOPERATION IN THE POST-WESTERN WORLD

This is the fifth in a series of Talks *dedicated to the technopolitics of International Relations, linked to the forthcoming double volume 'The Global Politics of Science and Technology' edited by Maximilian Mayer, Mariana Carpes, and Ruth Knoblich*

In recent years, the analysis of new emerging powers and shifting global order has become central to the study of international relations. While International Relations, aiming to evolve into a truly global discipline, is only just about to start opening up towards Non-Western perspectives, global power shifts have already led to a restructuring of global governance architecture in large fields of political reality and practice. Dirk Messner illustrates how far global power shifts have to lead to new patterns of international cooperation using international science and technology cooperation as a case in point. He argues that investment in joint knowledge creation and knowledge exchange is vital for managing the earth system. Messner also points to the multitude of tasks related to socio-technical systems which the political sphere is currently facing, particularly with regard to the challenge of managing the climate system.

What is the most important challenge facing global politics that should be the central debate in the discipline of International Relations?

The biggest challenge of the next decades which we have to come to terms with is governing the big global commons. When I say global commons I do have in mind the atmosphere, the climate system, and other parts of the earth system, but also international financial markets and global infrastructures, such as the Internet – stability of these and other global commons is a public good much required. We need to stabilize the global commons and then manage them in a cooperative manner.

Three dynamics of global change make it specifically challenging to manage these global commons. The first wave of global change is the globalization wave; the economic globalization, cross-border dynamics, global value chains. It becomes evident that in many areas and especially when it comes to the global commons, regulation exceeds the capacity of individual nation states. The international community is required to institutionalize multilateralism and efficient global governance mechanisms in order to properly address issues arising from global dynamics. The second big global change is the shift from a Western to a post-Western world order. Global power shifts remaking the international system impede governing global commons. The third wave of global change is related to climate change, which adds a new dimension of global

dynamics; human beings now have to learn how to steer, to stabilize, and how to govern the earth system as such. We are not only a species living on this planet, depending from resources and ecosystems of the earth systems. With the acceleration of economic globalization during the 1990s and the emergence of new, non-Western economic drivers of change, like China, humankind now significantly impacts the physical structures of the earth system. This trend is new. For the first 4,6 billion years of the existence of the earth system it was driven by the laws of physics, the dynamics of biology and bio-chemical processes. Homo sapiens appeared 220.000 years ago, and the impact of our species on the earth system has been marginal until the industrial revolution started 250 years ago. During the last decades human mankind became a major driver of change at a planetary scale.

How did you arrive in your current thinking about these issues?

I have always been interested in international relations, international policy dimensions, and the global economy. I started at the Free University of Berlin at the beginning of the 80's towards the mid-80's, studying Political Science and Economics. One among those professors who have been particularly important to me is Elmar Altvater. He was the supervisor of my diploma as well as of my Ph.D., and he sent me abroad. This resulted being a pivotal experience to me. I studied the last year of my first degree in Seoul, in South Korea. It was the period, the 80's, when the four Asian Tiger states emerged following Japan's example: South Korea, Taiwan, Hongkong, and Singapur. I had the chance to visit these countries, study there and learn a lot about Asia. I was fascinated by the dynamics of emerging economies and what this implied for the international arena. Somewhat later, the Latin American continent became the center of my interest. I did research in Nicaragua, Uruguay, Chile and some other Latin American countries, trying to understand liberalization-movements, how weaker actors come under pressure in Western-dominated global settings, but also how some countries managed it to become dynamic parts of the global economy (like the "Asian tigers" or Chile) and why others failed. I learnt that it is crucial to understand dynamics of global change in order to being able to build solid and inclusive economic structures and legitimate political systems at national levels. There has always been a political impulse that pulled me into certain fields I decided to work in.

What is your advice for students who would like to get into the field of global change research or international cooperation?

My first advice is: visit and work in different countries and different cultural and political settings. It is one thing to learn from scholars or books, but having studied and having lived in different contexts and countries is absolutely a key experience. This is the way to understand global dynamics, to get a feeling for differences and similarities. My second advice stems from my experience and conviction that we need much more interdisciplinary research than we currently have. We talk a lot about interdisciplinarity, however, we do not have career paths that systematically build interdisciplinary teams.

Looking particularly at global environmental changes and the future of the earth system, at the end of the day, social scientists and natural scientists need to learn how to work together and to understand each other. The future of the oceans, for example, is not a question that can be understood by ocean biologists only. They are the people studying how these elements of the earth system are actually working, the dynamics and drivers - focusing on physical, chemical, and biochemical processes. But when we look at the oceans towards 2100 from the perspective of global change, the most important drivers are now us human beings, our economies, our consumption patterns, our greenhouse gas emissions and their impacts on the oceans. And this

implies that to understand dynamics of global change, we need to analyze the interactions, interdependences and feedback loops between three systems: the ecological system(s); social systems (our economies and societies) driven by humans; the technical systems and infrastructures. Therefore natural scientists, social scientists, and engineers need to interact very closely. In the German Advisory Council on Global Change we call this approach: Transformation Research. Currently, we do not possess the appropriate university structures to adequately address this sort of problems. This is an immense institutional challenge. If I were a young scholar I would move into this direction, crossing disciplinary boundaries as much as possible.

What is the role of science and technologies in the dynamics of global change?

There are multiple important dimensions, but I would like to focus on some of them by moving through the aforementioned waves of global change. Technology is driving economic globalization, the first wave of global change. So we need to understand the dynamics of new technologies, especially the impact of ICTs, in order to understand the dynamics of economic globalization. The World Wide Web and social communication media are restructuring industrialization processes and global value chains. ICT infrastructure is also displaying a big potential for less developed regions. In Africa, for example, we saw many African countries jumping from the old telephone technologies to smartphones within less than a decade, because the old, maintenance and capital intensive communications infrastructure was no longer needed. Many African people now have access to smartphones, thus to communication- and information networks, and begin to reshape prize constellations and the global economy. Because of its restructuring effects, the impact of ICTs is relevant in all areas of the global economy. The global trend towards urbanization is similarly related to ICTs. Currently, we approach the global economy via data on national economies. But this might be about to change, as global mega-cities develop into global knowledge and financial hubs, building their own networks. In 2040, 80 percent of the global production, global GDP, global consumption, global exchange might be concentrated in 70 to 80 global cities or city regions.

Technology is also linked to the second wave of global change – the tectonic global power shift – in the way that investment in technology and knowledge in emerging economies are growing rapidly. We are not only facing economic and political power shifts, but also a remaking of the global science and research system itself. From my perspective, international cooperation in the field of science and technology research between "old powers" and "new powers", between Western countries and non-Western countries is extremely important for two reasons: First, we need to pool know-how in order to solve core global challenges and to develop patterns for managing the global commons. Interaction and cooperation in the field of science and technology is especially important for the creation of knowledge that is "better" in any way. For instance, in the field of adaptation policies to the impacts of climate change, most of the knowledge on how societies and local communities actually work or respond under these conditions exists in non-Western societies. The generation of knowledge is context dependent. We need to interact with colleagues from the respective countries for mutual learning and common knowledge improvement. My second argument is that, as an effect of the global power shift, traditional development cooperation is losing legitimacy. Many of these societies, from China to Peru, from Kenya to Vietnam, are no longer interested in our usual business, in our "aid-packages", our money, our experts or our concepts. What they are more interested in is true and reciprocal knowledge exchange and joint knowledge creation. Therefore, investments in respective forms and institutions of knowledge exchange and creation will be a central pillar of/for future oriented development cooperation or international cooperation and beneficial for

all partners involved. Joint knowledge creation is a precondition for joint action and legitimate global governance initiatives.

The role of technologies with regard to the implications of climate change is crucial and multifaceted. In the German Advisory Council on Global Change we put forth suggestions concerning the transformation towards a low-carbon global economy. We are relatively optimistic in a technological sense. This statement is partly based on the Global Energy Assessment (GEA) research, which has been driven by Nebojsa Nakicenovic, one of our colleagues, who is working on energy modeling. The perspective there is that we know which kind of technologies we need for the transformation into a low-carbon or even zero-carbon economy. We can even calculate the investment costs and structures of different countries and regions. But we do know relatively little about the transformation processes of entire societies, economies and, eventually, the international system towards low-carbon systems. The transformation towards a low-carbon society is a "great transformation". In the entire history of mankind there might be only two examples for such a profound change: the industrial revolution 250 years ago and the Neolithic revolution 10.000 years ago, which induced the practices of agriculture. Today, we thus witness the third great transformation: the decoupling from fossil resources, from high-carbon to zero-carbon. To achieve the 2° Celsius goal, a complete decarbonization of the basic infrastructures of the global economy (the energy systems, the urban infrastructures and systems, the land use systems) is required – within a very limited period of time, until 2070. Comprehensive knowledge is key to achieve this. Let me emphasize once more the significance of international cooperation in the field of science and technology research, particularly in the IPCC context. I am sure that politicians from China, India, or Brazil only accept what the IPCC is presenting as objective knowledge, as the stand of the art knowledge, because their national scientists are deeply involved. If this were a classical western-based knowledge project it would have resulted in a lack of legitimacy. In the case of global climate policy, it is obvious that investment in joint knowledge creation is also about creating legitimacy for joint action.

What are the main obstacles of the low-carbon transformation?

The first two great transformations have been evolutionary processes. No one "planned" the industrial revolution, not to mention the Neolithic revolution. These have been evolutionary dynamics. The sustainability transformation instead needs to be a governed process right from the beginning. In our institute, we looked at different transformation dynamics, not only the really big ones, the Neolithic, industrial, and the current sustainability transformation. We also examined structural adjustment programs in Latin America and Africa, the collapse of communism at the end of the 80s, the abolition of slavery, and similar other key transformations of human societies. Based on this historical perspective, we have identified four main drivers of transformation: The first one is crisis, this is the most important one. Confronted with strong crises, society and probably also individuals react and change direction. The second important driver is very often technology and scientific (r)evolution. The third driver is vision: If you are confronted with a problem but you do not know where to go to, transformation becomes very difficult. The European Union is the product of a fresh vision among elites after World War II; the United Nations is a result of the disasters of the first half of the 20th century. Advancing a vision is an essential means to move or to transform in a goal-oriented manner. Sustainability, of course, is also a vision. The fourth and last driver of transformation is "knowledge": you know that you have a certain problem constellation, and though the crisis is still not there, you react based on your knowledge in a preventive way.

For the low-carbon transformation, the fourth driver currently is absolutely key. We are able to address problems which would otherwise become much worse in the future, although the climate crisis is latent still – in contrast to, for example, the financial crisis, which is more visible in its effects. The impacts of a global warming of 4 or 5 degrees are still not visible. This makes for a huge difference. In fact, humans are not very good at acting and transforming significantly based on knowledge only. In combination with visible, tangible crises, knowledge is a strong driver of change, but without crisis, it is merely sufficient. Transformations based on knowledge and preventive action only are rare. The ozone hole is one positive example; solving the problem was possible because it required less complex technological change, affecting few industries only. Human beings are risk-averse in a sense, we are conservative, we do not like to change rapidly; we are path-dependent. John Maynard Keynes once said: "It is easy to develop new concepts and ideas. The difficult thing is to forget the old ones". Therefore, scientific tools are needed in order to sketch out future scenarios. Based on scientific knowledge, we need to convince our societies, our political decision-makers that it is necessary and possible to transform societies and economies towards sustainability – in order to avoid disruptive change in the earth system. Pushing towards sustainability at a point where the crisis has not yet materialized implies a specific and new role for science in managing global dynamics. Organizing a deep transformation towards sustainability avoiding significant crises driven by Earth system changes would be a cultural learning process – a civilizational shift.

What are the effects of growing multipolarity for global governance processes?

To start optimistically, I would argue that in contrast to historical situations in which this kind of tectonic power shifts led to conflicts or even wars, the current situation is different. The world is highly interconnected and economic interdependencies are stronger than ever. Charles Kupchan is differentiating between "war", "cold peace" and "warm peace". I think that a big "war" is not very probable, and "cold peace" is what we are in actually. "Warm peace" would be cooperative global governance: we identify our problems, have a joint problem analysis, and subsequently start acting cooperatively on them. But this does not describe the contemporary situation. While there are no severe global conflicts, we do not solve many of the global interdependency problems.

There are many barriers to global cooperation and I would like to mention two or three of those. The first one consists of power conflicts and power struggles. Hopefully realists such as John Mearsheimer are not right in claiming that "a peaceful rise of China is not possible". But the fundamental point remains that the re-organization and shuffling of power resources is rendering cooperation extremely difficult. The second point is that all the important global actors currently have severe domestic challenges to manage. The European countries are coping with the European dept crisis. Similarly, the United States is concerned with financial turbulences and rising social inequalities. China has to keep its annual growth rate of about 8 to 12 per cent and meanwhile stabilize its rapid modernization process. In India, there is still a large group of people suffering from poverty. So, managing that and trying to be a responsible global actor at the same time is not easy at all. In brief, all actors that we would like to see taking on a more responsible role on the global level are overcommitted domestically.

There is consensus among different disciplines on what cooperation is actually about. At the Centre for Global Cooperation Research we did a study on *The Behavioural Dimensions of International Cooperation (2013)* based on insights of very different disciplines – evolutionary biology, social anthropology, cognitive sciences, psychology, political sciences, behavioral economics – to find out what the basic mechanisms are which help human beings to cooperate at any scale towards global corporation in a world of nine billion people. Finally, we identified seven

factors promoting cooperation: trust, communication, joint we-identities, reputation, fairness, enforcement – and reciprocity, which is the most fundamental prerequisite. These factors form an enable environment for cooperation and they are manmade. In contexts, actor constellations, systems, in which these basic mechanisms of cooperation are strong, they help to embed power dynamics, to solve social dilemma problems and to manage interdependencies. In contrast, contexts, actor constellations, and systems in which theses basic mechanisms of cooperation are weak, will be driven mainly by power dynamics and struggles. By looking at these factors one immediately understands why the G20 context is so difficult. We have been able to create and to well establish these factors in our old settings; in the European Union, the Western world, the transatlantic community. But now we are sitting together with new actors rather unknown. The G7/G8 world – the OECD driven and the western driven global economy and global politics – has moved towards G20 since it was acknowledged that one cannot manage any global turbulence without emerging economies. The G20 was created or rather called to meet in 2008, a few days after the bankruptcy of Lehman Brothers when many feared the collapse of the world's financial markets. Most western economies were highly indebted, whereas the emerging economies, especially China, were holding large currency reserves. From a behavioral perspective we have to invest in these basic factors of cooperation in the G 20 context in order to create the essential preconditions of joint action to solve the big global problems. This represents a long-term project, and unfortunately many of these global problems are highly challenging from the time perspective: a tension derives from the gap between time pressure in many of these areas and the time it probably needs to build up these basic mechanisms of cooperation. In fact, the major feeling is that international cooperation is even weaker now than a decade ago. I usually visualize the current situation of the G20 as a round table with 20 seats but no one is sitting there. Charles Kupchan's "No one's world" or Ian Bremmer's "The G0 world" deal with the same problem: international cooperation, global governance is currently so difficult, although all these interdependency problems rendered the problem of managing the global commons fully obvious. If you talk to our Foreign Ministers or Finance Ministers or Chancellors and Presidents, they of course all know exactly what is out there in terms of globalization impacts. But organizing the necessary global consensus and the governance and cooperation structures is tremendously difficult.

How far is the discipline of development research affected by global change?

This is a complex question, to which I do not have a definite answer. The whole field of development research is currently about to get redefined. In the past, the concept of development was clear: On the one side, there was the developed world, the OECD-world, consisting of 35-40 countries and on the other side, the "underdeveloped" part of the world, all other countries. Understanding the differences between developed and developing, along with thinking about the basic drivers of modernization and wealth creation in less developed countries was at the core of development research for a long period. How can poor countries become rich and as developed as OECD countries already are?

Today, it is highly questionable if even the broader categories of "development research" still serve to analyze the new realities. Do we currently still need "development economists", and how would they differ from classical "economists" doing research in those European countries suffering most from the debt crisis, high unemployment and weak institutions? Situations in many OECD countries nowadays look like what one would expect from a still developing or emerging economy, and the other way around. So, what distinguishes development research? This is an important question. Studying non-OECD countries, do we still need development research based governance theories or democratization theories – thus, theories that are systematically different from those we apply in our research on OECD countries? The discipline

of development research is under immense pressure. This debate is linked to the second wave of global change we talked about: the post-western world order, emerging economies catching up, convergence trends in the global economy.

If you look at the role of international technology transfer, the same scenario arises: the North-South, donor-recipient categories have dissolved. Technology transfer has lost its distinct direction, and it is much more reciprocal and diffuse than it used to be. There are several studies currently pointing to the fact that investment rates in R&D and in technology creation are growing fast in several regions around the globe, whereas in many OECD-countries, investment is stagnating, or even decreasing. The whole map of knowledge, if you like to say so, is about to undergo deep changes. This implies that the common assumption that knowledge is based in OECD countries and transferred to the South via development cooperation is just not working any longer. We need new patterns of cooperation between different countries in this area. And we need research on global development dynamics which will be different from classical development research which has been based on the assumption of a systemic North-South divide for a long time.

How do institutions such as the World Bank react to the emerging and redefined agenda of development?

The current reorientation of the World Bank as a Knowledge Bank originates from the assumption that knowledge is just as important as money for global development. The second point is that more and more of their partners in non-OECD countries, classical developing and emerging economies, are more and more interested in the knowledge pools of the World Bank and less in their experts. And: dynamic developing countries and emerging economies are even more interested in investments in their own knowledge systems and joint knowledge creation with the World Bank. The old North-South knowledge transfer model is eroding. You might say that there currently are two contradictory global trends: on the one hand via social media and the Internet, knowledge is being widely distributed – broader than ever before and actually, theoretically accessible at any point in the world –, on the other hand the proliferation of knowledge is accompanied with access restriction and control, and the growing privatization of knowledge. Aiming to play a constructive role in collaborative knowledge generation, the World Bank invests a lot in building up freely accessible data bases and open research tools, including the provision of governance or development indicators of any kind. However, this is a difficult process that is developing slowly.

The World Bank is currently undergoing several basic re-orientations. The structures inside of the World Bank are about to become less hierarchical and more horizontal. Originally, the World Bank has been a much more western dominated organization as the Bretton Woods institutions were formed by the United States and its allies. If you look into the governance structures of the World Bank today, it is still largely dominated by OECD countries, but you can notice that this is changing. It is a global organization but 90 % of people working there have been studying at Anglo-Saxon universities. Actors especially from emerging economies have been criticizing that for long, claiming that the World Bank as a global organization should have to be represented by a global citizenship. Although this had slowly started to change already, all the knowledge and all the qualification procedures still remained very western dominated. So they asked the World Bank to diversify its partner structures, to reach out and cooperate with research institutions from around the world. This is what the World Bank is trying to do at the moment, which is really a break with its culture. Because even though the World Bank is a global organization, it has always been a very inward-looking organization. The World Bank was strong, with fantastic

professionals and researchers inside, but without cooperating tools. Now they are trying to broaden their cooperation structures and to learn from and together with other institutions.

What are the opportunities and difficulties of big data analysis for global development?

Access to any kind of data is important for any kind of knowledge creation. It has been very limited for many developing countries over a very long time. So, thinking about how to assure access to serious data is significant. This would be my first point. My second point is that, when it comes to big data and the question of managing large amounts of indicators on, for example, cross-country or cross-sector modeling, I think the new technologies are opening up new research possibilities and opportunities. Big data provides the opportunity to identify patterns. Looking for similar dynamics in very different systems is a very interesting exercise, because you get deeper insights into the basic dynamics of systems. This is what I have learned from my colleague Nakicenovic, whom I have mentioned before, and who is working on the Global Energy Assessment, or from Juergen Kurths, from the Potsdam Institute for Climate Impact Research, who is studying basic structures and dynamics of very different complex systems like air traffic networks, global infrastructures and social media networks. Managing big data allows you to see patterns which cannot be seen if you only work with case studies. However, to understand the dynamics of countries and sectors, new actor constellations or communities, you need to go into detail and in this specific moment, big data is only the starting point, the background: you also need qualified, serious, very often qualitative data on the ground. Big data and qualified, specific data: they complement each other.

For sure, an important aspect of big data is that for the most part, it is gathered and stored by private businesses. We started this interview talking about global commons and we actually just defined a global commons: data on development should be a global commons, and we need standards and rules of managing those. Private actors could play a role, but within a set of rules defined by societies and policies, and not the private business sector.

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related links:

- Profile at German Development Institute

- Messner, Dirk / Guarín, Alejandro / Haun, Daniel (eds.) (2013): *The Behavioural Dimensions of International Cooperation*, Global Cooperation Research Papers 1, Centre for Global Cooperation Research (pdf)

- Read Jing Gu, John Humphrey, and Dirk Messner's (2007) *Global Governance and Developing Countries: The Implications of the Rise of China* here (pdf)

- Messner, Dirk (2007): The European Union: Protagonist in a Multilateral World Order or Peripheral Power in the »Asia-Pacific« Century? (pdf)