

Towards a sustainable future:

The changing role of science, business and politics in the 21st century

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“You can have a dialogue about solving future problems all you like,” said keynote speaker Dennis Meadows, author of *Limits to Growth*, at the Future Dialogue forum in Berlin on October 26th. “But if you don’t behave any differently when you go out of here, it won’t make any difference.”

This was Professor Meadows’s challenge to more than 500 business people, scientists, policymakers and experts who had convened to discuss how they could collaborate better in tackling some of the major global challenges of the 21st century: global warming, affordable healthcare and fast-growing urbanisation.

Future Dialogue was initiated by Peter Gruss, the president of the Max Planck Society for the Advancement of Science, and Peter Löscher, the president and CEO of Siemens, in order to improve co-operation between industry and science, starting with their own institutions. Economist Conferences moderated the event and wrote the background and summary papers.

The event gathered an impressive list of international speakers from across the spectrum to throw light on the constraints to effective co-operation. This summary focuses on climate change, which attracted the most attention and discussion at the event (see boxes for summaries of the healthcare and urbanisation sessions).

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Dennis Meadows

Five major themes emerged from the discussions

1. Urgent action is needed

The fall of the Berlin Wall, 20 years ago, marked the start of a new era of globalisation that has brought millions out of poverty and is gradually shifting global economic power from west to east. But this process has also accelerated the tension between growth and sustainability, as the emerging world industrialises and aims to achieve the same living standards as the developed world. “We have now reached an inflexion point,” said Professor Meadows, who first pointed to the challenges of sustainable growth in the 1970s. “The habits that gave us growth and progress in the past will not give us growth and progress in the future,” he argued. “We will see more change over the next 20 years than in the past 100.”

Most panellists at Future Dialogue agreed that the world is in a period of transition, requiring new approaches and initiatives now if the decline and devastation caused by global warming, population growth and resource depletion is to be avoided. Hans Joachim Schellnhuber, the director of the Potsdam Institute for Climate Impact Research, laid out the facts and summarised his findings: “The risk that we sink this planet is one in three...We have a very small window of opportunity, but if we fail to use this window, we will have consequences for thousands of years.”

Panellists also stressed, however, that the capacity exists to shift to something new and ultimately better. “It is not only the devastating consequences we are avoiding,” said Nicholas Stern, who launched a broad political debate over tackling global warming in 2006, when he published the Stern Review on the economics of climate change. “It will be an extraordinary transformation...towards a low-carbon economy that is more energy-secure, cleaner, quieter, safer and more bio-diverse.”

2. There are no silver bullets

There was widespread agreement at Future Dialogue that immediate action was necessary, but there was equal consensus that there is no single solution to any of today’s great challenges – no silver bullet, as Professor Schellnhuber put it. “The system needs to be reinvented and system innovation is the most difficult of all,” he said. “We have to innovate our industrial metabolism.” This requires working across an entire portfolio of activities. For climate change, Lord Stern stressed, “it’s not an

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Providing healthcare for a growing and ageing population

Healthcare costs are already too high to be sustainable in most parts of the world, and matters can only get worse, as the global population is growing and ageing. How can nations provide effective, accessible and affordable healthcare? The panellists focused on three main areas:

1. Learning to be frugal

In developing markets that are not burdened with the legacies of Western healthcare systems, new players have introduced very innovative ways to reduce costs and increase quality, partly by using technology cleverly and partly by developing innovative new approaches to healthcare administration. The developing world, forced to focus on maximising access and affordability, has a lot to teach the industrialised world about rethinking healthcare.

2. Focusing on prevention rather than treatment

Most healthcare systems focus on treatment rather than prevention. Shifting attention and resources to prevention would reduce overall costs and improve health. To achieve this, more attention should be placed on educating patients about good health maintenance, providing incentives for patients and doctors to focus on preventive measures, and making it worthwhile for researchers to focus on the science of prevention.

3. Maximising the value of an ageing society

Ageing is usually seen in terms of burdens on healthcare costs and pensions. But, as part of a much wider approach to reinvent today’s society to make it age-friendly, healthcare resources need to be refocused away from prolonging life at the sickly end and towards extending the healthy lifespan.

artificial horse race between discovering new technologies and energy efficiency and deploying existing technologies. It's all these things at the same time."

Given such a comprehensive approach, the key to maximum progress is finding the right balance between speed of implementation, to ensure that the short window of opportunity is used, and careful analysis of the efficacy and viability of specific initiatives.

Take biofuels, for example, which in recent years were touted as the perfect alternative to petroleum. Apart from the disruptive impact they had on global food prices, it soon became clear that many schemes would actually emit more CO₂ into the atmosphere than they could possibly save. "People hadn't taken the time to do that bit of analysis needed," said Jochem Marotzke, director of the Max Planck Institute for Meteorology in Hamburg. "It was seen as too much of a quick fix without having to go through more fundamental changes."

Professor Meadows made the point in his keynote address that making mistakes is an integral part of radical change. But mistakes are due not only to lack of thought about consequences, but also to lack of clarity about goals. Biofuels, like many policies and schemes now seen as green, were originally intended to solve other problems, such as overdependence on oil-producing nations. "We should not green-label these initiatives retrospectively," argued Hermann Requardt, board member and head of corporate technology at Siemens. "We need to lean back and ask if they are suited to the goal we now want to achieve and this is a low carbon footprint."

3. Science and technology are necessary but not sufficient on their own

"Sustainability is not about technology, it's about attitude," said Professor Meadows. This view is perhaps not surprising coming from the author of *Limits to Growth*, but his sentiment was echoed in different ways by participants throughout the day. Science and technology are crucial tools in tackling today's challenges. But they require the right policies and incentives if they are to make a real difference.

Mr Gruss argued that science helps us to understand where the real problems lie and provides industry with a stream of innovations required to solve them. But the transmission of ideas into solutions is sometimes inadequate and requires support. "Basic research delivers the technology platforms, the ideas and concepts, but these are often not at first accepted either by society or by industry," he said. "This is the innovation gap and it needs to be bridged by the public hand."

This gap also exists at the other end of the innovation spectrum, where fledgling technologies are translated into large-scale, commercial solutions. "The basic technology is there but we need demonstration projects to prove that the scaled version of it will really work," said Mr Löscher, arguing that the R&D process needs two other "Ds" to be effective: demonstration and diffusion. Lord Stern echoed his point: "We have existing technologies but we can't implement them fast enough without the right kind of public policies...The private sector won't invest in finding out if [technologies] will work on a large scale unless there is some investment by government to share the risk."

4. The market can change behaviour but market incentives are defined by politics

“If we convert the challenges into market opportunities, we will create dynamism in the scientific as well as in the industrial world,” argued Frieder Meyer-Krahmer, Germany’s state secretary for education and research, launching a debate about the capacity of market incentives to achieve fundamental change.

The advantage of markets is that they can help to reduce reliance on policymakers to make the most efficient choices. “In politics, there is a tendency to try and pick winners, which is actually sometimes the opposite of systematic progress,” said Lars Josefsson, CEO of Vattenfall, pointing to support systems for specific renewable energy technologies such as solar or wind. But he also saw the limitations of the free market. “There’s a nut there we haven’t cracked. How can we be technology neutral when in the infancy of new technologies you obviously need some form of public support?”

Participants agreed that, ultimately, market incentives are chosen by political leaders and society. “It is politics that is influencing the market – setting the framework,” said Joschka Fischer, a former German foreign minister and former leader of the Greens. “If, for example, you switch the framework of markets by pricing carbon at a global level ... you change the markets and this might have a tremendous effect in changing behaviours towards goods, services and the overall approach to the use of energy.”

To make market incentives work more effectively, policymakers need first and foremost to define clear goals and set long-term policy frameworks. “The key thing is that you have a long-term framework you can work towards,” argued Mr Löscher. “We have to deal with technology cycles of 10, 20 and 30 years.”

“The key thing is that you have a long-term framework.”

Peter Löscher

5. Political will is the weakest link in the chain, but the hardest to fix

“We know what the targets should be and we can see the areas of action,” said Lord Stern in his summary. “We can see the kinds of technology and we can see the economic instruments. What’s missing is political will.” In the run-up to the Copenhagen climate conference, this sounds like a relatively simple matter to fix – albeit one that requires global political leaders to act courageously.

But throughout the discussions at Future Dialogue, there was frequent reference to the underlying complexity of the governance required to tackle global challenges effectively. This is because painful short-term measures are required for solutions that only bring obvious benefits in the long run. The discrepancy between short- and long-term goals affects companies, individuals and institutions, which explains the call for political leadership to break out of destructive short-termism. “We need to find a government model and incentives for the economy and personal behaviour that aligns the two,” argued Professor Marotzke. “Otherwise we won’t make much progress.”

Mr Josefsson countered that politicians need to take the lead, supported by a business community that has the responsibility to be open, long-term and clear about the risks. He points to the EU’s introduction of the emissions trading system as an example of strong leadership. “It was brave, it was leadership, and the EU needs some applause for that,” he said.

Urbanisation and the city of tomorrow

More than one-half of the world's citizens already live in cities and the process of urbanisation is speeding up, as countries like China and India modernise rapidly. But what does this mean for the future? Will cities become the main sources of dynamism and sustainable living or dysfunctional centres of poverty and despair?

Panellists came to three areas of consensus:

1. Cities are not a collection of buildings but dynamic processes, attracting people looking for opportunity of all sorts. That dynamism can turn them into crucibles for innovation and efficiency, especially where there is good planning, integrated with the needs of city-dwellers, and good economic opportunities. But it can also turn them into disasters. And, indeed, for many of the millions of people who will become new urban-dwellers in the coming decades, slums are likely to be the dominant city model.
2. Technology is an enabler for making cities function more efficiently. Sustainable technologies can be integral to the planning of new cities or integrated into existing cities, but cities are shaped primarily by conscious policy and planning choices about the kind of society we want to live in. Technology needs to be integrated into that process, getting teams from different areas, such as water, energy or transport, to work together rather than operating in isolation.
3. There are plenty of visions for the rich city of tomorrow, but very few ideas for transforming slums into functioning cities that can provide jobs, housing, healthcare and education. Technologies, such as mobile phones or small-scale water treatment systems, can help to trigger virtuous economic circles in poor cities by empowering people, but tackling slum development at its roots will be the biggest urbanisation challenge in the future.

Engaging people in a debate that persuades them to accept short-term sacrifices requires more than rational debate about the scientific facts. "People don't understand the process of science, they don't understand risk," said Marcus du Sautoy, Charles Simonyi Professor for the Public Understanding of Science at Oxford University. "We need dialogue not polarisation...it's not just about explaining science, it is understanding what society is worried about."

Professor Schellnhuber suggested two ways to get people focusing on the long-term benefits of difficult change. "The fact that we are about to destroy the world where our children could have a decent life is the most powerful argument," he said. The second way is through the fascination of science and technology. Demonstration projects such as Desertec, which aims to generate up to 20% of Europe's electricity in the Sahara desert, could have a similarly galvanising effect on people as the Apollo moon mission in the 1960s. "People are interested in new solutions if they are fascinated," he said.

Think global, act local?

Building consensus nationally or regionally is difficult enough, but tackling major global issues like climate change requires an international coalition of interests. This coalition has emerged in a way that was inconceivable just five years ago, with the biggest transformation coming from fast-growing countries such as China and India, which are shifting their policy as they understood both the risks they face and the opportunities for growth in low-carbon markets in the future. The fledgling dialogue now needs to be focused on preparations for urgent and continued action. “The world needs to agree that we are going to handle the climate change problems,” said Mr Josefsson. “But the world has not agreed on that. If we had, we would have the focused R&D efforts and make progress we can’t even dream of today.”

Next steps

Sustainability, efficiency and responsibility were the three principles that panellists and participants converged on to describe a world committed to tackling climate change. In the ensuing discussions, the following specific needs were highlighted:

Politics

- Provide a clear, ambitious and long-term policy framework of targets and regulations
- Measure all initiatives by the clear goal of reducing the global carbon footprint
- Find new ways to co-finance demonstration projects designed to commercialise potentially important technologies
- Draw up a long-term, technology-neutral national framework of energy needs to depoliticise specific decisions, while securing stable energy prices and supply
- Engage voters with the attractive side of shifting to a low carbon economy
- Ensure that basic research receives adequate funding so it can develop breakthrough innovations

Business

- Provide clear support for difficult but necessary long-term initiatives to tackle global warming
- Work with the public sector to ensure sufficient financing of potentially viable technologies
- Work more closely with researchers to improve the connection between invention and innovation
- Be open to disruptive innovation even where it threatens existing businesses
- Be transparent about the risks and benefits of technologies

Science

- Remain analytical and open about the consequences and risks of new technologies
- Make sure performance incentives encourage scientists to spend time communicating with the public
- Improve incentives for young scientists to intensify their exchange with industry
- Focus on developing the gaps to utilising existing technologies effectively such as smart grids, large-scale energy storage and effective solar energy
- Fight to preserve a role for basic curiosity-driven research

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