

Global Agenda

World Economic Forum Annual Meeting 2016 Mastering the Fourth Industrial Revolution

Davos-Klosters, Switzerland 20-23 January



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The Humane Age

To address the key global challenges confronting the world effectively and sustainably, mastering the Fourth Industrial Revolution – the wave of technological advances that are changing the way we live, work, stay alive and interact with each other and machines – is essential.

Why any company, organization or individual must get a handle on the rapid advances in technology and not let the opportunities created by the Fourth Industrial Revolution slip by was made clear from the first session of the Annual Meeting 2016. Just one week after President Barack Obama asked him to take charge of “mission control” for America’s new “moonshot” to cure cancer, Vice-President Joe Biden appeared at the Congress Centre in Davos to facilitate a discussion of what the initiative’s priorities should be with leading scientists, doctors and technologists. He put across plainly the need for warp speed. “Our goal is to make a decade worth of advances in five years,” he said. “We are not looking for incremental changes; we are looking for quantum leaps.”

The key outcome of the gathering: get a handle on the data. The treasure trove of information on cancer cases,

research and treatments across a wide range of fields including genetics, engineering and health insurance, has to be tapped. Applying a big-data approach should yield ways to ramp up progress in fighting the disease by speeding up research and improving access to new treatments. But to glean valuable insights from the vast amounts of data will require agreeing on common standards for collection, interpretation and access.

“We can do more if this information is widely shared,” Biden said. José Baselga, Physician-in-Chief and Chief Medical Officer at the Memorial Sloan-Kettering Cancer Center, noted that not enough work has been done to analyse data on cancer cell mutations. “In the computer science revolution, medicine has been left behind,” he said.

Big data focus

Participants across sessions pinpointed the big-data aspect of the Fourth Industrial Revolution as a common and urgent priority. The proliferation of mobile devices, online sensors and other means of collecting information digitally has made it possible to obtain detailed, accurate and real-time data on everything from purchases to patient care. Digital platforms, including sharing-economy apps such as Uber and supply-and-demand matching services such as Airbnb, allow for instant interaction, information exchange and closer and broader collaboration, be it to develop a rapid test for people with a fever or connect a driver with a car to a passenger who needs to get somewhere fast.



“I believe the auto industry will change more in the next five to 10 years than it has in the last 50.”

Mary Barra

Chief Executive Officers and Chairman of General Motors, USA; Co-Chair of the Annual Meeting 2016

In the session on internet fragmentation, US Secretary of Commerce Penny Pritzker warned of the dangers of digital Balkanization. Preserving the free flow of data online, she said, is not just about large companies but is also about small and medium-sized businesses. “They are very much threatened. Entrepreneurship and innovation are a big part of what the internet enables. It is imperative that we keep the internet flowing since it undergirds business.”

Natarajan Chandrasekaran, Chief Executive Officer and Managing Director of Tata consultancy Services, put it more starkly. “The future of the human race is tied to the future of the internet,” he said. If the international community is not able to sort out governance issues including standards for data protection, we will miss a huge opportunity. “The more we delay, the more we are going to lose.”

The dark side

Fourth Industrial Revolution technologies and the many ways they can interact with each other and enhance human performance can be used to achieve solutions from the mundane to the marvellous. We can create robots that pick only ripe blackberries and ones that will interact with an autistic child. We can use genetics to clone a sheep and to cure Huntington’s disease. We can use apps to find the nearest café and to locate a survivor of an earthquake or reunite a refugee family.

But there is the dark side. Terrorists have employed the same messaging apps that permit free and easy communication to coordinate attacks. The internet is a source of both knowledge for good and information of use to those who mean ill. And of course, there is the old argument that technology kills jobs and increases inequality.

“The central question is whether technology can be harnessed for systems change,” said Annual Meeting Co-Chair Sharan Burrow, General Secretary of the International Trade Union Confederation (ITUC). “Can we get to a zero-carbon, zero-poverty world?” Not with current business

models and approaches to public and private governance, Burrow argued. Technology has to be shared equitably to create opportunities and not foster greed, she stressed.

A bigger opportunity

However, blaming technology for such problems as the rise of inequality or unemployment would be a mistake, said Erik Brynjolfsson, Director of the Initiative on the Digital Economy at the Massachusetts Institute of Technology (MIT) Sloan School of Management. “The biggest misconception is the idea that technology will come for our jobs. The bigger opportunity is to use technology to enhance performance and augment human activity.” He concluded: “Technology can be used to destroy and create jobs. There is no economic law that everyone is going to benefit equally. You have to put the policies in place.”

Leaders must wake up, Marc R. Benioff, Chairman and Chief Executive Officer of US technology company Salesforce, declared. “We are in a leadership crisis. We are seeing technological shifts and changes on a scale we have never seen on this planet. These require severe and extreme leadership. Countries that are having a problem are those with the weakest leadership.” Henry T. Greely, a Stanford University law professor, said: “All of us need to begin to understand and grapple with how we want to shape these technologies.”

Goal is to stay human

The norms, rules and regulations, and even the thinking about the moral and ethical challenges that are needed to shape the world of the Fourth Industrial Revolution have to be done quickly, without succumbing to hype or helplessness. The overarching goal has to be stay human – or rather, as Greely put it, “to become more humane”. Justine Cassell, Associate Dean at Carnegie Mellon University’s School of Computer Science, said: “It is through comparison with robots that we will know what it is to be human.”

For Meeting Co-Chair Amira Yahyaoui, Founder and Chair of citizens action group Al Bawsala, the question of what makes us human is not irrelevant. “We are at a crossroads,” she said. “We should not just stay human; we should become better humans.”

“To maintain sustainable economic development, we need to shift our focus from speed to quality.”



Li Yuanchao
Vice-President of the
People's Republic of
China



AI reality check: no need to download your brain just yet

The arrival of supercomputers that can play poker (bluffing included), velvet-voiced digital personal assistants that answer questions and give directions, driverless cars and even robot sex partners has stirred excitement about artificial intelligence (AI). Add to the hype recent warnings from such science and technology icons as Stephen Hawking and Elon Musk of the consequences of giving machines moral responsibilities and the danger that human-made automatons could go out of control and turn on their creators. Science fiction contains many macabre predictions – could a person's knowledge, memory and personality be downloaded, one's very being preserved in a system of circuits?

Let's not rush too far ahead of reality. It is true that 2015 was a big year for AI. For the first time, drivers could take their hands off the steering wheel and have a computer do the work. Major progress was made in getting machines to do the boring parts of white-collar work such as legal document searches, to read facial expressions and emotions, and even to negotiate a deal with other machines. Last year, it could be argued, AI went from curiosity to conventional – or at least something more visible in daily life.

"We are starting to see these technologies move out of the data centres and into the world," said Matthew Grob, Executive Vice-President and Chief Technology Officer at US wireless technologies company Qualcomm. Zhang Yaqin, President of Baidu, the Chinese search engine company, agreed: "AI is really going mainstream."

AI has not yet taken over our lives. Some of the exciting products and services are not yet as intelligent as we may imagine. Siri, Apple's Speech Interpretation and Recognition Interface program, which serves as a mobile personal assistant and knowledge curator, is a far cry from J.A.R.V.I.S., the seemingly omnipotent intelligent computer in the *Iron Man* films. Siri voices prepared answers to a prepared set of questions. "If Siri really understood your questions and listened in on person-to-person

conversations, then it could be the ideal personal assistant," said Stuart Russell, a Professor of Computer Science at the University of California, Berkeley.

Autonomous cars undergoing trials may have been spotted on the streets of San Francisco but are not yet ready for market. A driver cannot leave everything to AI and still has to take over when the computer in a vehicle gets confused because of its inability to distinguish people in proximity from objects, or is in a situation where it has to deal with the unexpected and make a split-second decision that could entail an ethical choice. Government approval for driverless cars to be commercialized is still years away.

Robots may be common in modern factories and automatons that learn are becoming more sophisticated. But robots that can do something simple – such as pick up drinks or pick berries from a bush – are still not a reality. For computers, it turns out, "manipulation is a lot harder than driving a car down a freeway," said Andrew Moore, Dean of the School of Computer Science at Carnegie Mellon University. "To be as dexterous as a human being, a robot has to have complex hands. It's very expensive to develop that technology."

While algorithms and hardware capability are improving rapidly, "we don't have anything to worry about machines taking over in the near future," Grob said. Yet it is hard to overhype AI's impact. "It will change our lives, mostly for the better," he predicted.

Russell said: "Everything we have that is good in our lives is the result of our intelligence. So if AI can amplify our intelligence, then we could be talking about a golden age of humanity."



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01: Jim Yong Kim, President, World Bank, Washington DC; Daniel Kablan Duncan, Prime Minister of Côte d'Ivoire; Sharan Burrow, General Secretary, International Trade Union Confederation (ITUC), Brussels; Paul Polman, Chief Executive Officer, Unilever, United Kingdom; Laurent Fabius, Minister of Foreign Affairs and International Development of France; Erna Solberg, Prime Minister of Norway; Ban Ki-moon, Secretary-General, United Nations, New York

Professor and Director, Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea

06: Mary Barra, Chief Executive Officer, General Motors Company, USA

07: Gary D. Cohn, President and Chief Operating Officer, Goldman Sachs, USA

08: Adam Posen, President, Peterson Institute for International Economics, USA; Douglas W. Elmendorf, Dean, Harvard Kennedy School, Harvard University, USA

09: Participants at a roundtable discussion

10: Forum Debate: The Privatization of Science

02: David Cameron, Prime Minister of the United Kingdom

03: Luis Alberto Moreno, President, Inter-American Development Bank, Washington DC

04: H.M. Mathilde, Queen of the Belgians; Tejpreet Singh Chopra, President and Chief Executive Officer, Bharat Light and Power, India

05: Hilde Schwab, Chairperson and Co-Founder, Schwab Foundation for Social Entrepreneurship, Switzerland; Lee Sang-Yup, Distinguished



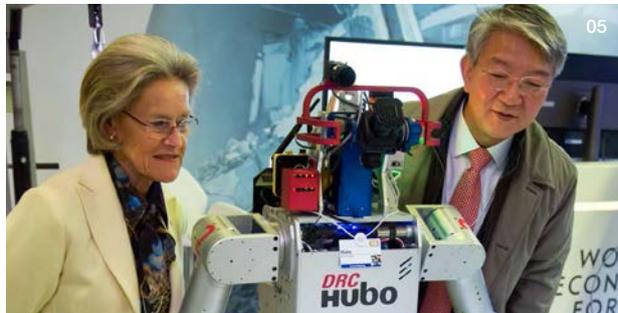
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01: L. Markus Karlsson, Business Editor, France 24, France; Rowsch N. Shaways, Deputy Prime Minister of Iraq; Elif Shafak, Author, Turkey; Sir Mohammad Jaafar, Chairman and Chief Executive Officer, Kuwaiti Dairy Company, Kuwait; Justin Welby, Archbishop of Canterbury, United Kingdom; Jean-Paul Laborde, Assistant Secretary-General and Executive Director of the Counter-Terrorism Committee Executive Directorate (United Nations)

02: Participants at a virtual reality session

03: Andrew R. Sorkin, Columnist, New York Times, USA; Paul Kagame, President of the Republic of Rwanda; Satya Nadella, Chief Executive Officer, Microsoft Corporation, USA; Sheryl Sandberg, Chief Operating Officer and Member of the Board, Facebook, USA; Anand Mahindra, Chairman and Managing

Director, Mahindra & Mahindra, India; Zachary Bookman, Chief Executive Officer, OpenGov

04: Mario Draghi, President, European Central Bank, Frankfurt; Lionel Barber, Editor, Financial Times, United Kingdom

05: Susumu Tonegawa, Picower Professor of Biology and Neuroscience, Massachusetts Institute of Technology (MIT), USA

06: Irene B. Rosenfeld, Chairman and Chief Executive Officer, Mondelez Global, USA

07: Manuel Valls, Prime Minister of France

08: Christine Lagarde, Managing Director, International Monetary Fund (IMF), Washington DC

