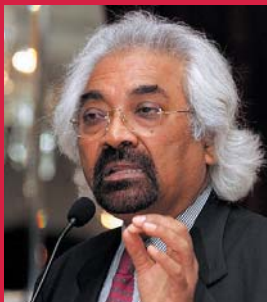


INTRODUCTION

The rise of AI & Robotics in the City

Sam Pitroda, Internationally respected telecom inventor, entrepreneur, development thinker
Nicolas Mialhe, Co-Founder and President The Future Society



Dr. Sam Pitroda is an internationally respected telecom inventor, entrepreneur, development thinker, and policy maker who has spent 50 years in information and communications technology (ICT) and related global and national developments. Credited with having

laid the foundation for India's telecommunications and technology revolution of the 1980s, Mr. Pitroda has been a leading campaigner to help bridge the global digital divide. Dr. Pitroda served as Advisor to the Prime Minister of India on Public Information Infrastructure and Innovation, with the rank of a Cabinet Minister. He served as the Chairman of the Smart Grid Task Force, as well as the committees to reform public broadcasting, modernize railways, deliver e-governance, and other developmental activities.



Nicolas co-founded "The Future Society" at Harvard Kennedy School in 2014 which specializes on questions of impact and governance of emerging technologies. Under it, he co-founded in 2015 the "AI Initiative" dedicated to the rise of Artificial Intelligence which is now leading a global participatory debate on

the governance of AI (<http://www.aicivicdebate.org>) among several activities. Nicolas has over fifteen years of professional experience working at the nexus of innovation, high technology, government, industry and civil society across Europe, America and Asia. He teaches at the Paris School of International Affairs, is a Senior Visiting Research Fellow with the Program on Science, Technology and Society at Harvard, and a Fellow with the Institute for Data Driven Design affiliated with the MIT Media Lab.

The world is experiencing a wave of extreme urbanization focusing some of the world's greatest challenges and opportunities onto cities. For millennia, humans have migrated to cities to connect because it promised creativity and mobility. In 1900, when the second industrial revolution of electricity and oil started to unfold, just 200 million people lived in cities, about one eighth of the world population at the time¹. Today, a century later, while we are entering what many experts call a "fourth industrial revolution" led by artificial intelligence (AI), robotics, gene-editing and neuro-technologies, more than 3.5 billion people live in cities. And the United Nations projections indicate the urban population will reach 5 billion by 2030 - 60 percent of the population- and 6.5 billion by 2050².

Cities are the main source of global economic growth and productivity, and they account for most resource consumption and greenhouse gas emissions. The ways in which developed, emerging and developing cities and countries collectively react to the combined tectonic shifts of urban explosion and the automation revolution will determine how well cities are prepared for sustained growth after the expansive urbanization wave passes. Managing urbanization on the one hand, and socio-technical change on the other, is thus central to usher the world onto a more sustainable development path.

In 2008, the number of mobile Internet users surpassed the number of fixed users, driven by the rapid spread of inexpensive mobile devices in the developing world. According to HIS Markit – a market research firm – there were over 4 billion smartphones in use worldwide in 2017, with 6 billion projected in 2020³. This is profoundly reorganizing our societies around mass mobile communication and distributed intelligence combining the power of machines and beings to the point of merger.

¹ Urban population in 1900: "Human Population: Urbanization" (Washington, DC: Population Reference Bureau, 2007)

² *World Population Prospects: the 2011 revision* (New York: United Nations, Department of Economic and Social Affairs, Population Division, March 2012), 1.

³ Arjun Kharpal, Smartphone market worth \$355 billion, with 6 billion devices in circulation by 2020: Report <https://www.cnbc.com/2017/01/17/6-billion-smartphones-will-be-in-circulation-in-2020-ihs-report.html>

The disruptive upsurge has already unleashed a massive wave of transformation which will continue to grow, scale and accelerate. Improvements and convergence in machine learning and neurosciences combined with the “Big Data” and “Internet of Things” revolutions, and powered by the ubiquity of high-performance scalable computing are now propelling us into a new age of Artificial Intelligence. Humans are fast becoming a minority on line and the rise of mind-brain interfaces spurred by advances in neuro-technologies is poised to accelerate the merging of humans and machines further down the century. By 2020, there should be some 50 billion networked objects. This year, the torrent of data generated online exceeded 16.3 zettabyte (1 zettabyte equaling one trillion gigabytes) and is expected to grow to 163 zettabyte by 2025!

As we will see in this edition of the *FACTS Reports*, the promise the AI revolution hold to deliver sustainable urban development is immense; so too are the risks. Through a rich and diverse series of article and interviews of leading practitioners, scholars and experts, we have worked to combine forward-looking analysis, case studies and reports from the field. Our objective has been to provide a panoramic view of how the fourth industrial revolution is and will play out in cities. According to our analysis, it may prove to be a *creative destruction* raising incomes, enhancing quality of life for all and generating previously unimagined jobs to replace those that get automated. Or it may turn out to be a *destructive creation* leading to mass unemployment, privacy abuses, discrimination and loss of control over key collective decision-making processes. This depends on the velocity and magnitude of the development and diffusion of AI and robotics technologies. But it also depends on how societies react individually and collectively.

And policy choices will matter greatly. Though they stand to be at the epicenter of the automation revolution and benefit from it largely as compared to rural areas, cities alone will not be able to deal with it. Thanks to cities’ dense data ecology, AI-powered software supporting businesses, governments and citizens will tap into the growing flows and stocks of reading to understand and predict our urban world. The latter has already started to morph into an “information infrastructure” fueling an “attention economy” with upsides, and downsides... Therefore, how we guide the integration of these historic forces will, to a great extent, determine the kind of world our children’s children will inhabit by the end of this century.

Since the digital market fueled by AI and data –the AI market is expected to grow to 40 billion dollars annually by 2020- exhibits oligopolistic characteristics, such digital transformation effort will need to avoid excessive power concentration, and rein-in potentially adverse competition dynamics to prevent a race to the bottom. In this new environment, isolated countries and cities will find it more and more difficult to be able to stand on their own. The catch-all and IT industry-dominated imaginary of “Smart Cities” has undeniably gathered increasing attention over the past ten years. It has also disillusioned many, and severely under delivered. Despite its re-

discovered enticing appeal, now that machine learning algorithms have demonstrated how Big Data can be harnessed, the smart city utopia still encompasses a large series of gaps, shortfalls and misguided assumptions and visions. In fact, precisely because the AI revolution relies so centrally on data, and demands that data be collected, stored, processed and circulated at scale to realize its potential, the automation wave will likely amplify the dangers of the smart city utopia.

More than ever, cities will have to manage the tension between a growing set of stakeholders to work out solutions; that too at a time when the boundaries between categories (human vs machine vs other lifeforms; private vs public; virtual vs real; firm vs market; consumer vs citizen vs user...) are blurring! This implies above all nurturing the creativity and knowledge of citizens, grassroots innovators, businesses and institutions. It also means inclusively orchestrating this knowledge into decisions through what Geoff Mulgan calls “a continuous process of argument, deliberation, decision and action in which government acts with the people, as well as for them”. And crucially, it requires plugging into the complex and multilayered series inter-city networks and associations (regional and thematic) to draw the most of collaborative dynamics, forge multifaceted alliances to ultimately invent, test, customize, share and replicate new solutions. If the vision of intelligent cities can be achieved, we may even be able to forge a bridge to help democratize globalization, one the key challenges of our times. Alexis de Tocqueville insisted that liberty is always municipal. And yet we know today that it cannot be exercised without global reach. We also know it cannot be exercised away from the new data and intelligence ecology. On the contrary liberty, as well as a number of other cornerstone values, need to be baked firmly in it.

“THOUGH THEY STAND TO BE AT THE EPICENTER OF THE AUTOMATION REVOLUTION AND BENEFIT FROM IT LARGELY, CITIES ALONE WILL NOT BE ABLE TO DEAL WITH IT!”