

Inclusive

ARTIFICIAL INTELLIGENCE

Open

BIG DATA

Secure

THE FUTURE OF WORK

**Making the Digital Economy & Society
Inclusive, Open and Secure**

**Innovator's Strategic Advisory Board
to People Centered Innovation to G7 Leaders**



DIGITAL TRANSFORMATION TEAM
Italian Government
teamdigitale.governo.it

<https://teamdigitale.governo.it/en/i7.html>



Making the Digital Economy & Society Inclusive, Open and Secure

Innovator's Strategic Advisory Board to People Centered Innovation to G7 Leaders

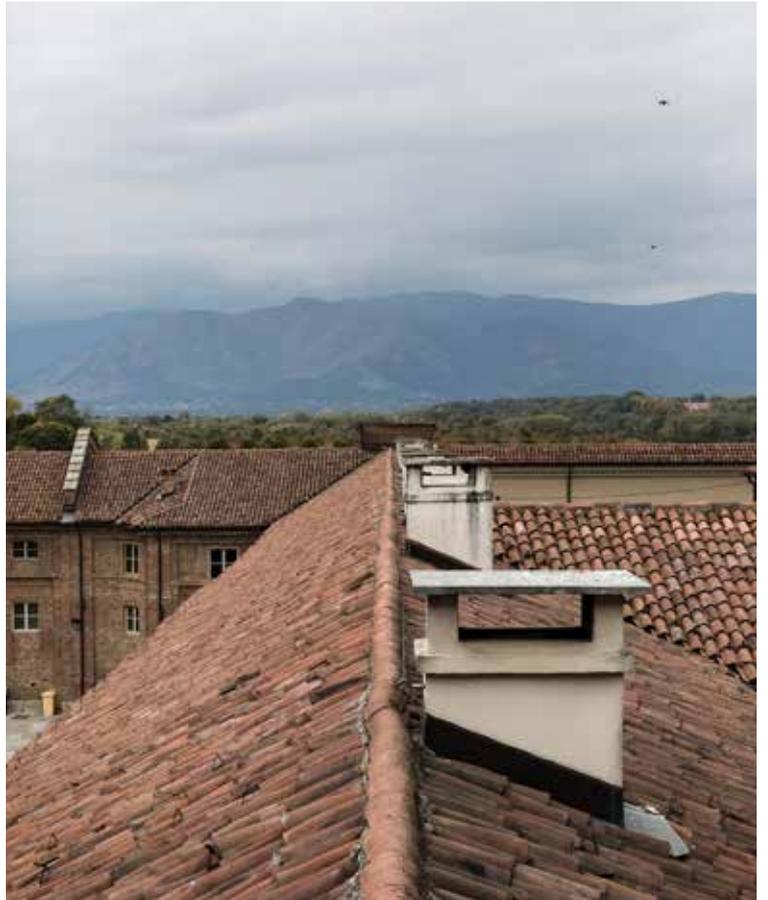
Artificial Intelligence (AI)

Big Data
From regulation to active management

The Future of Work
The changing nature of society



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A new civic contract?



An Introduction by Diego Piacentini

The advent of the digital society over the past decades has so far been a source of excitement but also sometimes been met with reluctance by Governments. Recently, machines have shown their capacity to outdo humans in many tasks, including some that we would have not expected to be replaceable for quite some time. With the perceived spectre of mass unemployment and a transition into a world surrounded by sensors, robots and seemingly unmanageable data, governments have started to be prone to fall into fears of doomsday scenarios. But indeed, the opportunity is for artificial intelligence applications to drastically change the world for the better.

The I7 could help connecting the dots between what Governments should consider and how to both channel and encourage the opportunities that artificial intelligence, machine learning, big data and the possibilities of automation are starting to avail.

It is a fact that competitiveness and attractivity for citizens, wherever they may find themselves, is aligned with a generally progressive stance towards technology. This evidence, so to speak, goes hand in hand with the notion that a new set of expectations falls on governments to upgrade their level of competence, processes and vigilance whilst augmenting their digitalization.



A possible metric of success from the current meetings will be how well policy and leadership form together a renewed civic contract. There is much to gain from adopting the right approach to ‘partnering with machines’ and the earlier this relationship is defined the better. In the decades to come, this renewed contract will enable a heightened sense of trust in the political and economic bureaucracies and institutions which have suffered an erosion of their popularity in many countries. It is also worth noting that however much speed is of essence to respond to the threats arising from the shaking of long lasting practices and traditions, there is wisdom in understanding that the transformation will happen both abruptly and slowly; accordingly, the rules should be in a continuous evolution. **Sharing knowledge and insights along with inspired experimentation with concrete targets remains the core of the conversation that the G7 countries need to continue.**





The development and maintenance of trust among citizens and businesses is critically important for the effective implementation of AI solutions. The corollary of trust is trustworthiness.

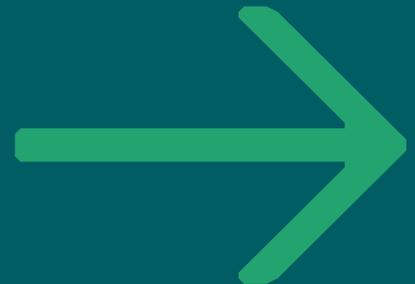
Diego Piacentini

As Ida Auken says, technology needs to be both embraced and tamed. G7 member states have a task in front of them that has now begun: to define how we can creatively stimulate and regulate digital society as big data allows ever more sophisticated uses of machine learning and AI. The question is how to keep the human

at the center of the debate and the core beneficiary of the changes ahead. Harmonisation and cooperation are needed to succeed in this defining anthropocene moment.

Thomas Ermacora, Futurist.

Chair's
Summary



G7 1-7 Focal Points

ITALY

Diego Piacentini

Italian Government Commissioner
for the Digital Agenda



CANADA

Mike P. Moffatt

Chief Innovation Fellow at Innovation, Science and Economic Development
Canada (ISED)



EU

Piero Venturi

Deputy Head of Unit in the Directorate General for Research and Innovation of the European Commission



FRANCE

Hugues de Franclieu

Head of Trade Policy and Export Unit – Directorate-General for Enterprise – Ministry for the Economy and Finance



GERMANY

Ulrich Oberndorfer

G7/G20 Sherpa Office Federal Chancellery, substitute for the appointed Focal Point: Gesa Miede-Nordmeyer, Head of the G7/G20 Sherpa Team at the German Chancellery



JAPAN

Yuko Harayama

Executive Member of Council for Science, Technology and Innovation, Cabinet Office.



UK

Mark Walport

Chief Executive Designate of UKRI (UK Research and Innovation)

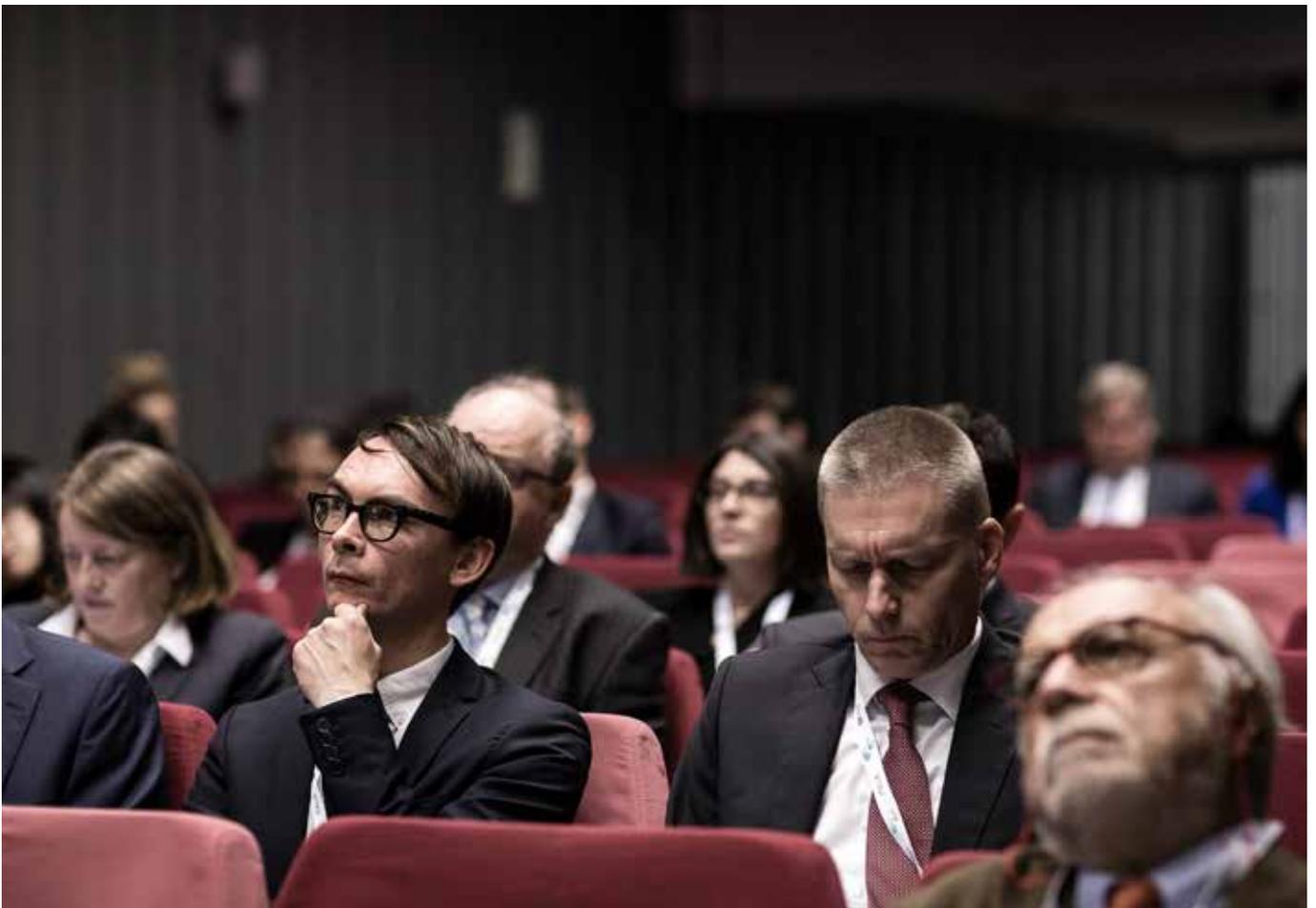


USA

Michael Kratsios

Deputy Assistant to the President and Deputy U.S. Chief Technology Officer, The White House





Innovators' Strategic Advisory Board on
People Centered Innovation to G7 Leaders

Innovators' Strategic Advisory Board on People Centered Innovation to G7 Leaders

Chair's Summary

Under the G7 Italian Presidency, G7 Leaders convened in Taormina, recognized in their Communique how the Next Production Revolution (NPR) is going to offer an extraordinary opportunity to increase competitiveness and to boost an innovation driven growth.

For the very first time, the G7 adopted in Taormina an Action Plan on Innovation Skills and Labor, whose main goals were to reassess the importance of putting people at the very heart of any technological advancement and to identify a set of Key Policy Priorities that would help in making innovation a source of well-being for our Countries and the whole mankind.

Governments need to understand the changing size, scope and shape of the digital economy if they are to maximize the opportunities available, and respond appropriately.

In addition to this, Leaders recognized the importance that a stricter dialogue among innovation key stakeholders would have in order not only to provide the G7 with the most appropriate endorsement to their policies, but with first-hand insights on innovation issues too. To this end, the G7 decided to set up the I-7, as a "Strategic Advisory Board to G7 Leaders on People-Centered Innovation", whose first meeting takes place today, September 25, under the supervision of the G7 Italian Presidency¹.

The I-7 contribution, under the form of this Chair's Summary, will support the discussion of the Ministerial Meetings of the Innovation Week that are taking place at the same time. We, the I-7, would also stand ready to support the incoming Canadian G7 Presidency. The I-7 also believe that the main stakeholders of the innovation will benefit as well.

The I-7 concentrated their work on three parallel sessions:

**01
Artificial Intelligence (AI)**

How can AI help governments make better decisions and deliver policies and services more effectively?

**02
Big Data
From regulation to active management**

How can a more proactive approach to Big Data lead to smarter countries?

**03
The Future of Work
The changing nature of society**

How could innovation help deal with upcoming social and demographic changes?

By becoming model users, Governments can tap the unprecedented opportunities offered by digital innovation to develop policies and create new services with a positive impact not only on their citizens' well-being and the job market but also on the innovation ecosystem as a whole. Technological innovation should give us hope, not despair. If history is a guide, the march of innovation should give every human more opportunity, not less, therefore we need to take concerted actions.

We summarize the discussion under the following 4 themes: training and education; technology; ethics and society; and jobs and income.

Training & Education : Key Points

- 01 **High Impact awareness, training and education programs about exponential trends in technology and other fields for the whole of society, including politicians, policy makers and business leaders, faith leaders, opinion leaders, teachers and professors, journalists and the media. The need to acquire fundamental and new skills and competences, such as creativity and the capacity for solving tough, complex problems, logical reasoning, or coding, become imperative for all sectors in an advanced economy. Encourage basic technology and data literacy education in primary and secondary schools.**
- 02 **Educational systems should support 'lifelong learning' and retraining of the workforce.**
- 03 **Alongside the above, education should also include the key human attributes of creativity, originality, reciprocity, responsiveness, empathy and adaptability.**

The Chair's Summary was welcomed by the G7 Ministers of ICT and Industry.

“We embrace multi-faceted and multi-stakeholder approaches and we welcome the meeting of the Strategic Advisory Board to G7 Leaders on People-Centered innovation (I-7), held in Torino on September 25th under the Italian Presidency. We take note of the Chair's Summary of the dialogue between the G7 governments and stakeholders in innovation.”

Technology : Key Points

- 01 **APIs are the nervous system of the 21st century. Silos that prevent data integration are greatly reducing the power of high-variety data to deliver deep insights. To overcome these, we encourage collaboration on common open APIs in sectors of shared importance and promote access to and exchange of data.**
- 02 **The development and maintenance of trust among citizens and businesses is critically important for the effective implementation of AI solutions. The corollary of trust is trustworthiness. All of those that participate in the development of such systems should recognize the importance of behaving in a trustworthy fashion. This includes consistent observance of best practices to maintain security and privacy. AI technology itself can be used to enhance security and privacy.**
- 03 **G7 countries should acknowledge the importance of innovative applications of AI or government work and the opportunities for collaborations between them.**
- 04 **Governments around the world are implementing machine learning and AI to develop and deliver services. We encourage sharing amongst G7 Countries of best practices and lessons learnt from these examples.**
- 05 **G7 Countries encourage research in key scientific, technological and societal fields to provide an environment conducive to the emergence of innovation and development of a digital economy. Advancement in security technology is a key priority.**

Ethics & Society : Key Points

- 01 **The transformational nature of Big Data will require continuous adaptation of all key actors involved – governmental bodies, businesses, citizens – in their multiple roles of data generators, data analysts, and end users, and a different conversation on the concepts of digital privacy, data ownerships, and digital security, and accountability in the sharing and use of the data.**
- 02 **Policy makers and providers of AI based services should consider how they can be delivered in the most inclusive fashion.**

Jobs & Income : Key Points

- 01 **The new technology platforms have created new working environments and the so called 'gig' economy. Governments need to consider how to recognize and encourage these new platforms and to consider the terms and conditions under which this new workforce operates.**
- 01 **It is important to monitor and measure what kinds of jobs are created, changed and lost. This will help businesses and policy makers to constantly update the attributes needed for modern workplaces.**
- 01 **In the era of increasing automation, we need to find better ways of measuring the 'gig' economy, non-paid labour, volunteering, to improve social inclusion and civic engagement.**





Big Data could lead to a reshaping of the power dynamic between governments, civil society and private actors.

Vittoria Colizza

Artificial Intelligence (AI)

Big Data
From regulation to active management

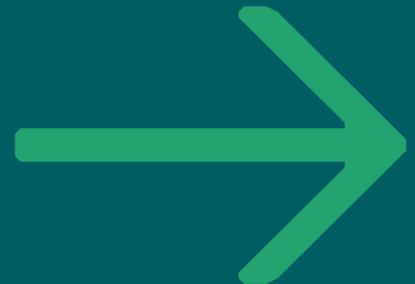
The Future of Work
The changing nature of society

Technology Grows Exponentially: its impact on society and work evolve from 'deceptive' to 'disruptive' faster than our, individual and collective, adaptation capacity. A deep and urgent redesign of educational systems and approaches, job creation policies, and of the relationship between government and business is needed, to create a shared and durable prosperity, reduce the risks of social disruption, and

grasp emerging opportunities. A clear understanding of exponential dynamics and their impact should become a required competence for political leaders, policymakers, decision makers, business leaders, educators, opinion leaders.

Eric Ezechieli
& Raffaella Rumiatì

Parallel Sessions



Artificial Intelligence (AI)

Big Data
From regulation to active management

The Future of Work
The changing nature of society

Inclusive
Open
Secure

01

Artificial Intelligence (AI)

How can AI help governments make better decisions and deliver policies and services more effectively?



AI represents one of the most intriguing and promising fields of innovation and has the potential to dramatically improve the way public and private services are delivered. AI could have plenty of applications in government. As an example - applicable to e-government in particular - the private sector is already delivering “chatbots” and using NLU (Natural Language Understanding) to automate and improve services for customers. But much more can be shaped by AI: from traffic management and self-driving cars to security and emergency management. Furthermore, AI technologies may not be governable by the existing regulatory frameworks, presenting a unique policy challenge compared to prior innovations. In this session, innovators will discuss and generate ideas about how governments can take advantage of AI.

02

Big Data

From regulation to active management

How can a more proactive approach to Big Data lead to smarter countries?



Big Data represents the “fuel” of tomorrow’s production and a critical feed on information to AI-based services. In this session, innovators will be asked to discuss how a more proactive approach to Big Data could help tackle social and productive challenges in new ways, magnifying the effects on people’s well-being and businesses’ competitiveness. Government Big Data is usually stored in silos, and we need to find leverage points to convince the gatekeepers of the silos to collaborate. For example, should governments build national Data Analytics Frameworks as a necessary step to building “Government as an API”? Furthermore, once again, Big Data may not be governable by the existing privacy regulatory frameworks, presenting a unique policy challenge.

03

The Future of Work

The changing nature of society

How could innovation help deal with upcoming social and demographic changes?



The present narrative is much too focused on the negative effects of technology on jobs and employment. As ever, innovation is destroying old jobs while creating new ones. In this session, innovators will highlight how new technologies are shaping the future world of labor, and identify those skills which will be more in demand, thus helping workers reap the benefits of change.



01

Artificial Intelligence (AI)

AI represents one of the most intriguing and promising fields of innovation and has the potential to dramatically improve the way public and private services are delivered. AI could have plenty of applications in government. As an example - applicable to e-government in particular - the private sector is already delivering “chatbots” and using NLU (Natural Language Understanding) to automate and improve services for customers. But much more can be shaped by AI: from traffic management and self-driving cars to security and emergency management. Furthermore, AI technologies may not be governable by the existing regulatory frameworks, presenting a unique policy challenge compared to prior innovations. In this session, innovators will discuss and generate ideas about how governments can take advantage of AI.

How can AI help governments make better decisions and deliver policies and services more effectively?

GROUP 1

The I7 AI innovation group recommends that a long term goal for AI systems is to create a virtuous relationship in the form of a highly tangible and personal interface between government and citizens. Governments should facilitate mutual learning and public education to engineer and deliver new, better and generally augmented services. It appears critical to align top down and bottom approaches to leverage a positive feedback loop in the adoption of AI in general public services. Governments should envision the profound personalisation and fair distribution opportunities that AI affords and as such work step by step through concrete experiments that produce a sustainable trust relationship and limits risk factors. This work is extremely valuable for global competitiveness and welfare development that the G7 member countries unite in their efforts to promote a human centered approach and share best practice in a cooperative manner as all stand to gain. This may also be seen as a preventative measure vis-a-vis non G7 states that could have different attitudes towards the uses of AI.

GROUP 2

The I7 Innovators group believe AI will become a foundational engine for governments, making them more accessible thanks to modern and ubiquitous interfaces, making their processes more efficient and accountable, automatizing the vast majority of their tasks and finally offering a profoundly better service for its citizens, more open, more efficient and more fair. This transition will be possible only thanks to a proper understanding and education of the possibilities and limitations of this technology, both inside the governments and in the citizens confidence and expectations.

GROUP 3

We envision a future where open, explainable and accessible AI provides efficient, personalized, accountable and scalable services to society in health, infrastructure, education, safety, science and research and generates equal opportunities for all people.



In any system where rare events and nuances are as important as the common cases (a democracy can probably be defined by this very assumption) AI systems should probably be primarily used as the suggestion engine of a final human process of validation, with the authority to overrun the machine decision in case of scarce precision or understanding.

While machines are now the watchdog of many human activities, in the future humans will be the watchdogs of AIs to make sure rare cases are managed with a more flexible and compassionate approach.

Thomas Ermacora
& Riccardo Sabatini



Key Points



Artificial
Intelligence
(AI)

INTERFACE

Current interfaces between governments and their citizens often create barriers, rather than build a trustworthy rapport. AI is a key asset for the design of highly-tangible, multimodal, and personable interfaces between citizens and their governments. The increase in AI-enabled public spaces and government-managed services in physical environments (e.g. smart city infrastructures) presents an opportunity for a successful, continuous and ubiquitous relationship. It is highly recommended to build awareness and be proactive in newly AI-enabled environments. We propose a framework to brief and evaluate design of services and relations between administrations and individuals. We recommend an iterative process focusing on improvement of human-machine interaction, including: (1) intuitive and adaptive interaction (does it do what it says on the tin?); (2) level of service to citizens (does it improve their day-to-day life?) (3) value to society (does it provide a mechanism for meaningful influence?)

FAIRNESS & EQUALITY

Governments should invest in AI as a tool to promote equality and fairness in society regardless of socioeconomic class, specifically to reduce cost of access to healthcare by optimizing allocation of medical resources and augmenting clinical knowledge, provide citizens with 24/7 access to government and public services, offer equal access to education and professional development opportunities and improve the reach and efficacy of the social welfare system. Governments should also extend international cooperation and leadership on the application of AI to ensure mutual benefit across countries.

EFFICIENCY & ACCOUNTABILITY

To improve efficiency and accountability, Governments need to track and measure their own working ubiquitously. This data needs to be collected anonymously to understand the current baseline and identify areas of improvements. It should not be used to lay blame. Governments need to setup ethic guidelines on using sensitive data and setting fair and explicit objectives. They need to educate their employees about AI's potential, limitations and pitfalls.

Based on that performance data, Governments need to identify which processes should be enhanced or automated by AI (e.g., low value-added repetitive tasks) and which processes need more human resources (e.g., senior care). Governments need to create a cross-government repository of best practices and pre-trained models that can be re-used to solve inefficiencies. They should pay special attention to the explainability of the models to provide better accountability to citizen.

CUSTOMIZATION

Artificial intelligence will allow governments to personalize taxations and subsidies, moving away from a model where citizens have to struggle to demonstrate their eligibility, to a model where the governments automatically accounts personal needs and entitlements. Early implementation include transportation tolls modulated to optimize congestions and pollution while accounting for corner cases, personalized lifetime educational curricula to improve learning impact and a personal and societal level, health care subsidies where AI can account for unfair high costs of treatments in families that cannot afford. All the personalization have to happen under the design principle of universal equality, without privileging any specific part of the population.



02

Big Data

From regulation to
active management

Big Data represents the “fuel” of tomorrow’s production and a critical feed on information to AI-based services. In this session, innovators will be asked to discuss how a more proactive approach to Big Data could help tackle social and productive challenges in new ways, magnifying the effects on people’s well-being and businesses’ competitiveness. Government Big Data is usually stored in silos, and we need to find leverage points to convince the gatekeepers of the silos to collaborate. For example, should governments build national Data Analytics Frameworks as a necessary step to building “Government as an API”? Furthermore, once again, Big Data may not be governable by the existing privacy regulatory frameworks, presenting a unique policy challenge.

How can a more proactive approach to Big Data lead to smarter countries?

FUTURE VISIONING

Govts, businesses, social sector making evidence-based data-driven decisions in multiple domains:

- 01 **To provide highly tailored and segment-specific services and products to individuals and communities**
- 02 **To optimize/improve infrastructures and systems**

VALUE PROPOSITIONS

Inclusiveness
Equity
Community-level resilience
Efficiency
Sustainability
Effectiveness
Quality
Time to market
Responsiveness- anticipation (timeliness)

RESHAPING OF PARTNERSHIPS, RELATIONSHIPS, COLLABORATIONS, COOPERATIONS, SYNERGIES

Redesigning the relationships between all key actors involved - governmental bodies, businesses, non-profits, individuals - in their data work (data generation, data collection, data access, data analysis, data use). Increase availability of interoperable qualified data for useful and responsible, ethical R&D, innovation/business, and social sector, and policy work.

VALUE PROPOSITIONS

Inclusiveness
Equity
Protection of rights (Individuals, privacy, IP ect)

INDIVIDUALS/CIVIC SOCIETY

Individuals actively engaged in the production, collection, and use of data and its outcome value. Individuals and civil society should have shared benefit when they share their data.

VALUE PROPOSITIONS

Empowerment: Value exchange is critical, Ownership of data belongs to data generators.
Inclusiveness
Equity
Mutually informed data transactions (clarity)
Better services
3 principles – respect for persons, beneficence (do no harm), justice (fairness)



Most importantly, the transformational nature of Big Data will require a discontinuous adaptation of all key actors involved – governmental bodies, businesses, citizens – in their multiple roles of data generators, data analysts, and end users. In the form of a novel socio-technological phenomenon that is already taking place, Big Data could lead to a reshaping of the power

dynamic between governments, civil society and private actors. Eventually, facing the complexity of Big Data to harness its power will call for a fundamental shift in mindsets of the actors involved.

Vittoria Colizza



Key Points



Big Data

- 01 **Continue to open data that is openable, by collectively prioritizing datasets of public benefit and general interest. Leveraging potential of legal frameworks that protect privacy, and change where necessary for accessing benefits**
- 02 **Data champions-promoter-leader (usually high ranking) (Data literacy as part of it) – in all sectors. Grounded in ethics. Maximizing benefits while being transparent and respecting privacy. Workshops to leaders about data, open data 101, data security, understanding problems and how data can help. Increasing data literacy among leaders – increasing will and understanding what to ask for. Specific mention of technologically (financially) disadvantaged groups – SMEs, Nonprofits, ect.**
- 03 **Interoperability – attaching data work to the needs of the data users will create standards (not developing standards before publishing or sharing data). Unique identifiers make data easier to use. Standardization (bottom-up, not top-down by committee)**
- 04 **Decision-makers have those knowledgeable about data close to them – showing them what it really means and what is possible – maximize benefits of data. Investing in data scientists**
- 05 **Including beneficiaries and civil society - developing data services with them, not for them. Engaged throughout process. Data engagement is not helped by legal language – needs to be simplified for civil society.**
- 06 **Data governance – ensure data collection and data use transparency. Create framework and methods for accountability in data usage. Security data and I.T.)**
- 07 **Privacy: Access rights; I.T. Security; Fair Information Practice Principles. Pro pose a novel framework for privacy, allowing different degrees of privacy that are user-specific, user-driven, and user-approved → Personalization of Privacy (Privacy 4.0)**



03

The Future of Work

The changing
nature of society

The present narrative is much too focused on the negative effects of technology on jobs and employment. As ever, innovation is destroying old jobs while creating new ones. In this session, innovators will highlight how new technologies are shaping the future world of labor, and identify those skills which will be more in demand, thus helping workers reap the benefits of change.

How could innovation help deal with upcoming social and demographic changes?

The panel has worked in two phases, applying a backcasting approach: -

ONE

The innovators were invited to share and converge on a Vision of the desirable future we want to create, in which AI, Big Data and technology enable a shared and durable prosperity in our society.

TWO

They then prioritized the key actions to bridge the gap between the Vision and the present reality. Ideas and actions focused mainly on learning, education, work, and other interdependent factors.

EDUCATION & LEARNING

- 01 **Building an adaptive, tailored education and learning approaches for an adaptive, tailored life: learn more about the learner and adapt to her need.**
- 02 **The education system needs to focus on skills and competences and not so much on careers, to help navigate uncertainty.**
- 03 **We educate for the world not as it was but as it is and, most importantly, as it will be.**
- 04 **From a society of workers to a working society: the technological revolution has the potential to transform us from consumers into creators, thus enhancing typically human qualities such as creativity, compassion and empathy**
- 05 **Innovation provides new opportunities for more people to experience the dignity of work. The more disadvantaged people will be embraced and included.**
- 06 **Fostering new business paradigms and Benefit Corporations which embed positive impact purpose and human development in their DNA.**
- 07 **Measure what matters: Data and AI help quantify social impact and contribution to a common good, for both individuals and businesses**



The challenge for government is to ensure that social protection systems adjust to this continually shifting environment (where equilibrium will be elusive), particularly in the face of resistance from gig economy platforms like Uber to have their 'users' labeled as employees and their claims that they cannot monitor 'over-working' and other issues, as well as moves to block workers from using the platform for collective action.

Making workers aware of their rights on these often unregulated platforms is difficult but increasingly important, in markets where trade unions are unlikely to enter and there are barriers to workers' collective action.

Helen Margetts



Key Points



The Future
of Work

- 01 **It is necessary to innovate the paradigm with which subjects are thought throughout school and university: teaching STEAM (A for Arts) and critical thinking, not just STEM (Science, Tech, Engineering, Math). Art and science need to be synthesized together, also by showing the value in learning and merging diverse fields. Governments should reorder teaching priorities taking this into account.**
- 02 **Governments should encourage social media competence development: open (don't block!) social media in schools. It is important to encourage pupils to use technology as part of education, entrepreneurship, design, attention- building, non-linear thinking.**
- 03 **To understand education and work better we need good data: this can be achieved by measuring generic skills (e.g.: every day problems, finding solutions by collecting data from different sources) of humans, offering feedback and training them (individualistic learning) in what they need to improve on so they can create a skills portfolio of sorts. Needs technological structure, could have AI helping, need something that can measure and evaluate someone's skills and tell them what skills they will need more for what they want to do.**
- 04 **Improve the offer of education so that it becomes accessible for all also by adopting innovative teaching methods possibly including VR, MOOC's or in general eLearning platforms, social networks and websites, implanted microchips.**
- 05 **Have government policy that promotes entrepreneurship and an educational policy that teaches entrepreneurship. This will change the whole culture of education, and remove the stigma around failure (=experience).**

Actions concerning infrastructures, ethics, policies

- 06 **An ethical framework for digital technology, data science, machine learning, artificial intelligence – developing similar structures as for medical research – that is the 'data' equivalent of the Nuffield Council for Bio-ethics.**
- 07 **Open up platforms – APIs (companies as API not just government), distributed ledger technologies – put pressure on them to release data (so that policy-makers can plan for future, as well as for social protection) – within an ethically secure framework. Legislate for transparency, as with Facebook and political advertising.**
- 07 **More fine grained ideas about employment/non employment – some kind of sliding scale, not binary (welfare systems often designed on the binary notion of employment).**





Neural Net

Artificial Intelligence Summaries

TECHNICAL DETAILS OF THE TRAINING

- 01 **Mixture of experts (MOE) with Attention Architecture**
- 02 **Training on Wikipedia + semi-supervised corpora of AI books**
- 03 **Human post editing to fix basic grammar nuances**
- 04 **Raw results reported after**
- 05 **Statement in bold report the incipit of the sampling**

We trained a deep neural network to generate short paragraphs of text from an incipit. The model is based on the Mixture-Of-Experts architecture (Shazeer et al. 2017) with Attention (Kaiser et al. 2017). This architecture represents the state of the art in deep learning applied to natural language processing as of 2017

The model contains over 1 Billion free parameters and it is trained on an HPC cluster (Eurotech S.p.a.) with a total of 16 GPUs (Graphical Processing Units). We used a customised version of the open source software Tensor2Tensor (<https://github.com/tensorflow/tensor2tensor>) to implement the model and we trained it for over 60 thousand iterations on a recent dump of the English Wikipedia. For each page we extracted the text and truncated the length to 2048 words. Then a selection of random pages were bundled in batches of 8192 words and fed to the neural network. Synchronous training was used. The model receives sentences and tries to predict the next word in the sentence. The model has no prior knowledge of the english language nor of any other concepts. It merely tries to learn to guess the next word in the sentence by observing millions of sentences.

We trained the model for over a week and it converged to a loss of about 0.6 on the Wikipedia corpus. At this point the model is already capable of producing original generic sentences in English. To further narrow down the learning space we extended the training over a selected list of 20 books coming from the broad search "artificial intelligence" done in Amazon as of September 2017. This corpora, we believe, reflects a good approximation of what a group of experts can achieve to learn for the task of answering the questions posed during the 17.

01

Artificial Intelligence (AI)

How can AI help governments make better decisions and deliver policies and services more effectively?

In the future artificial intelligence will replace human work — and may represent a potential long-term future in AIs. If worker roles can be perfectly changed without anymore human intervention, we'll be in the AI winter of madness, but nature does appear to require a digital lifesaving regime for a biological human being, and this may allow the prospect of human workers to continue exist indefinitely.

02

Big Data

From regulation to active management

How can a more proactive approach to Big Data lead to smarter countries?

Artificial intelligence can help government deliver policies and services more effectively than with human capabilities and abilities, that also encompass deterrence and analysis. The worst scenario is probably excessive or inappropriate programming, which is why the government have to work to create a perfect deterrent.

03

The Future of Work

The changing nature of society

How could innovation help deal with upcoming social and demographic changes?

Future workers will use artificial intelligence to power existing technologies, or to eliminate redundant pre-defined factors such as genetic bias¹ and simple algorithms. What we will call “general artificial intelligence”? We might propose “a superintelligence whose well organized function is not conceivable”. As well we might point out that a suitably engineered intelligence might look human even if it’s not very intelligent. These hypothetical “smart” intelligent beings that will be selected (or at least worthy) will already supersede² human intelligence.





Innovators G7 I-7 Delegates



ITALY

Vittoria Colizza

Senior Researcher at INSERM (French National Institute of Health and Medical Research)

Eric Ezechieli

Co-founder, Nativa

Riccardo Sabatini

Research Scientist, Human Longevity

Thomas Ermacora

Architect-Urbanist, Futurist & Technologist, Founder of Machines Room & Laudato Si Challenge Vatican Accelerator

Raffaella Rumiati

Professor and Director of the iNSuLa Laboratory at SISSA (Scuola Internazionale Superiore di Studi Avanzati)

CANADA

Leslie L. Cheung

Partnerships Development Director, Powered by Data

Melissa Sariffodeen

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Sharing knowledge and insights along with inspired experimentation with concrete targets remains the core of the conversation that the G7 countries need to continue.

Diego Piacentini



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