Global Forum
Shaping the future 2018

THE INTERNATIONAL THINK-TANK
ON THE DIGITAL FUTURE

CITY OF COPENHAGEN

ITEMS INTERNATIONAL

THE DIGITAL TRANSFORMATION IN THE BROADER ECOSYSTEM

Designing New Practices for Innovation, Growth & Social Prosperity in a Secure Environment

Monday 5th & Tuesday 6th, November 2018
Copenhagen, Denmark
Radisson Blu Scandinavia Hotel

PROCEEDINGS

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Report written by
Items International

ACKNOWLEDGEMENTS

The 27th edition of Global Forum/ Shaping the Future took place on 5th & 6th November 2018 in Copenhagen, Denmark. The Global Forum 2018 marks the first Danish edition of the think-tank and return in Northern-Europe following the edition in Finland.

We would like to express our sincerest thanks to our Danish partners the city of Copenhagen, Danish Business Authority, Agency for Data Supply Efficiency and Danish Energy Agency.

We would like also to address our thanks to all those who have put so much time, effort and support in making the Forum another success.

The keynotes, expert panels and lively debates were truly inspiring and once more the Global Forum allowed great networking. A heartfelt thanks to all our distinguished experts, moderators, chairpersons and speakers for their participation, engagement and enthusiasm! Thank you for sharing your insight, knowledge and your experience with us and for making this event a success.

Thank you to our engaged participants for their inputs.

We would like to extend special thanks to the main sponsors of the Global Forum 2018 for their spirit of sharing and support (in alphabetical order):

AT&T, bIoTope, CMI, Dencrypt, ebay, FotoInMotion, GSMA, IBM, IDA – Tele, Sybogames, Tele Industrien, UMAN.

As well as the supporting sponsors, which are (in alphabetical order):

ActiveMedia, Cityzen Data, Courage, European Education New Society Association ENSA, Fondation Sophia Antipolis, GODAN, IKED, Medici, Morgan Lewis, Public Technology Institute PTI, Technology of Peace TOP^3, Worldcrunch.

The numerous and strong feedback we received confirm, once more that the event was a success and helped the creation of new initiatives, partnerships & visions.

We look forward to collaborate, exchange knowledge and new insights in the framework of the twenty-eighth Global Forum in Angers, France.

Sébastien Lévy
Vice-President of the Global Forum

Sylviane Toporkoff
President of the Global Forum

The Global Forum 2018 was realized with the active and efficient support of its sponsors and support partners

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Cecilia Bonefeld-Dahl, Director General, DIGITALEUROPE, Belgium

Mathias Gredal Nørvig, CEO SYBO, Denmark

Philip Malloch, Chairman of the Executive Board, ETNO - European Telecommunications Network Operators' Association

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Namir Anani, President & CEO, Information and Communications Technology Council (ICTC), Canada

Rebecca Arbogast, Senior Vice President for Global Public Policy, Comcast Corporation, USA

Jean-Pierre Bienaimé, Secretary General, 5G-IA - 5G Infrastructure Association

Larry Downes, Project Director, Georgetown Center for Business and Public Policy, USA

Trine Heidemann Jansen, Director of Telecoms, Danish Energy Agency, Denmark

Matthias Kurth, Executive Chairman, Cable Europe

Claudia Selli, Executive Director for the European Political and Legislative Affairs and Head of the Brussels' office of AT&T International External & Regulatory Affairs, Belgium

Tom Stroup, President, Satellite Industry Association, USA

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Sylviane Toporkoff President Global Forum/ Shaping the Future / Founder & Partner Items International, France

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Dan Shefet, Lawyer, Cabinet Shefet, France

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Fabio Perossini, Founder & Managing Director, Kpeople, United-Kingdom

Dan Shoemaker, Professor & Director, Graduate Program in Cybersecurity; Principal Investigator for the National Security Agency's Center of Academic Excellence at UDM University of Detroit Mercy, USA

Søren Sennels, CEO, Dencrypt, Denmark

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Alessandro Gropelli, Director of Communications, ETNO - European Telecommunications Network Operators' Association

Jonas Munk, Director, Head of AI & Robotics, TDC Group, Denmark

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Randy Yaloz, Attorney & Founding Partner, Euro Legal Counsel Group, France

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Torben Aaberg, Interregional Programme Manager, Center for Communications, Media and IT, Aalborg University Copenhagen, Denmark

Torsten A. Andersen, Deputy Director General, Danish Business Authority, Denmark

Luca Bolognini, Founding Partner & Lawyer, ICT Legal Consulting; President Italian Institute for Privacy and Data Valorisation, Italy

Per Eirik Heimdal, Head of Technology Department at the Nkom - Norwegian Communications Authority, Norway

Kristian Møller, Director General, Agency for Data Supply and Efficiency, Denmark

Brent Olson, Vice President – Global Public Policy, AT&T, USA

Alice Pezard, Attorney at Law & Arbitrator, France

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at the City Hall of Copenhagen

Jean-Claude Granry, Full Professor of the French Universities, Practitioner in Hospital, France

Benoit Pilet, Deputy for Human Resources, Working Conditions and International Relations, Destination Angers, France

Peter Steengaard Moerch, CEO of the City of Copenhagen Finance Administration, Denmark

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Chair & Moderator:

Sébastien Lévy, Vice president Global Forum/Shaping the Future; Partner Items International, France

Keynote Speakers:

Julia Glidden, General Manager Global Government Industry, IBM Global Business Services, USA

Nicola Hodson, Vice President Global Sales and Marketing for Digital Transformation, Microsoft, United-Kingdom

Juhan Lepassaar, Head of Cabinet of Andrus Ansip, Vice-President Digital Single Market, European Commission

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Alan Shark, Executive Director & CEO, Public Technology Institute (PTI), USA

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Maria Antosen, Head of Office, Office of Digitalization, City of Copenhagen, Denmark

Eyal Bloch, Head and Co-founder, TOP Global; Co-founder of the Jerusalem-based Institute, Education for Sustainable Development (ESD), Israel

Fridda Flensted-Jensen, Acting Chief of Innovation, City of Copenhagen, Denmark

Steven Lafosse Marin, Founder & CEO, UMAN, France

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Christian Graversen, CEO, Welfare Tech, Denmark

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Paul Wormeli, Innovation Strategist, Wormeli Consulting; Executive Director Emeritus, IJIS - Integrated Justice Information Systems Institute, USA

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John Jung, Co-founder & Chairman, Intelligent Community Forum (ICF), Canada

Eric Legale, Managing Director, Issy Média – City of Issy-Les-Moulineaux, France

Gerard Peets, Assistant Deputy Minister, Policy and Results, Infrastructure Canada – Government of Canada

Rasmus Reeh, Senior Advisor, Copenhagen Solutions Lab, the Smart City Office, City of Copenhagen, Denmark

Susie Ruston McAleer, Founder & Managing Director, 21C Consultancy, United-Kingdom

Alan Shark, Executive Director & CEO, Public Technology Institute (PTI), USA

Irène Toporkoff Co-founder & Managing Director, Worldcrunch, France

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Carla Langjahr, Senior Analyst, ARServices, USA

Samia Melhem, Global Lead, Digital development Infrastructure and PPP Global Practice, The World Bank Group

Philippe Scheimann, Co-founder & CTO, TOP Global, Israel

Knud Erik Skouby, Professor and Founding Director of Center for Communication, Media and Information Technologies, Aalborg University, Copenhagen, Denmark

Tom Togsverd, Partner, Indesmatech, Denmark

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Julie Améen, Head of Public Sector, CGI Sweden, Sweden

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Sylvie Albert, Professor, Department of Business and Administration, University of Winnipeg, Canada

Anders Peter Kierbye Johansen, Managing Director, Unity & Global R&D HR Director, Unity Technologies, Denmark

Samia Melhem, Global Lead, Digital development Infrastructure and PPP Global Practice, The World Bank Group

Camilla Rundberg, Founder, Evenodds, Sweden

Chetan Sharma, Founder & CEO, Datamation Group, India

Tamara Shoemaker, Director University of Detroit Mercy Center for Cyber Security & Intel Studies, USA

Irène Toporkoff Co-founder, Worldcrunch, France

ABOUT THE GLOBAL FORUM

The Global Forum/Shaping the Future is an annual, independent international event affecting the digital transformation. As a high-profile international Think Tank, bringing together senior government officials, policymakers and industry leaders from Europe, North and South America, the Pacific Rim and Africa, the academia, and the civil society – both from advanced and developing economies, its main purpose is to promote interaction and dialogue between the different stakeholders, to give impulses for the formulation of common visions, and to pool knowledge, expertise, research, policy analysis and networking capability.

The Global Forum/Shaping the Future is a not-for-profit initiative of ITEMS International. It is sponsored by organizations from all over the world, interested in sharing and influencing global IT-agendas, and enabling business and government leaders from all sectors of the ICT communities to meet and work with suppliers and service providers.

2018 The Digital Transformation in the Broader Ecosystem – Copenhagen, Denmark

2017 Digitalization – Intelligent Pathways – Winnipeg, Canada

2016 Digitalization – The Global Transformation – Eindhoven, Netherlands

2015 Digitalization - From Disruption to Sustainability – Oulu, Finland

2014 A Connected Age – Geneva, Switzerland

2013 Driving the Digital Future – Trieste, Italy

2012 Shaping a Connected Digital Future – Stockholm, Sweden

2011 Vision for the Digital Future – Brussels, Belgium

2010 ICT for an Empowered Society – Washington DC, USA

2009 ICT & The Future of Internet – Bucharest, Romania

2008 Collaborative Convergence – Athens, Greece

2007 Global Convergence 2.0 – Venice, Italy

2006 The Digital Convergence – Paris, France

2005 The Broad Convergence – Act II – Brussels, Belgium

2004 The Broad Convergence – Malmö, Sweden

2003 Connecting Businesses & Communities – Rome, Italy

2002 The Promise of Broadband Services – Washington DC, USA

2001 Expanding the Global e-Society – Newcastle, United Kingdom

2000 Towards a Global e-Society – Sophia-Antipolis, France

1999 New Satellite and Terrestrial Applications – Sophia-Antipolis, France

1998 Networked Communities – French Senate, Paris, France

1997 Smart Communities Forum – Economic Development in a Global Information Society – Sophia-Antipolis, France / Rome, Italy

1996 Smart Communities Forum - US Tour of cities and regions – New York / Washington / San Francisco / Silicon Valley, USA

1995 The Second Europe / Japan Forum on Communications – Kyoto, Japan

1994 Europe / Japan Forum on Cooperation and Competition in Communications – Paris, France

1993 Europe / United States Meetings on Cooperation and Competition in the Field of Communications – Rome, Italy

1992 Europe / United States Meetings on Cooperation and Competition in Telecommunications – Washington / New York, USA

THINK TANK SYNTHESIS REPORT

The 27th edition of Global Forum took place on Monday, 5th and Tuesday, 6th, November 2018 in Copenhagen, Denmark.

Once again, the Global Forum attracted high-level delegates from the world of politics, the business community, and academia for a two-day discussion on latest achievements and ongoing developments in the world of ICT. Influential leaders and prominent speakers from around the world came together to share their visions and concerns and to discuss the most recent developments and the most fundamental questions related to the topic of this year's Global Forum:

THE DIGITAL TRANSFORMATION IN THE BROADER ECOSYSTEM
Designing New Practices for Innovation, Growth & Social Prosperity in a Secure Environment

The following synthesis report highlights the key issues of each presentation and summarizes the discussions that took place during the sessions. All slides, speaker profiles, and other documentation are available for download on the website of ITEMS International http://globalforum.items-int.com.

Do not hesitate to contact ITEMS International if you wish to get in touch with one of the speakers.

The Global Forum's report is structured according to the actual sequence of presentations during the two conference days. The summaries of the presentations made during the Global Forum 2018 are listed in chronological order corresponding to their sequence in the final conference programme, as listed in the beginning of the present document.

Welcome Addresses

Day 1 – Morning – Plenary Session

SÉBASTIEN LÉVY, Vice President Global Forum/Shaping the Future; Partner Items International, France, opened the Global Forum 2018 edition in Copenhagen.

"Distinguished guests,
Dear friends and colleagues,
Mine damer og herrer [ladies and gentlemen],

Good morning everyone! It is an honour and an immense pleasure for me to welcome you this morning to our 27th edition of the Global Forum here in the heart of this beautiful city of Copenhagen.

I personally very much look forward to the discussions we will have during the next two days to define our vision of the Digital Transformation in the Broader Ecosystem. Considering the uncertain and worrying times we are in, the design of new practices for innovation, growth and social prosperity is the key of our common effort to ensure welfare, democracy and stability.

Within the coming two days, we will listen to a great number of excellent presentations. Experts from all around the world will exchange their view in a wide range of topics in this vast field.

The role of the Global Forum has always been to highlight current trends and provide a meeting point to present and exchange ideas in an exclusive frame. This is something of great value -- especially in times like these.

Before ending, I want to express my sincere gratitude to all those who have contributed in so many different ways to the success of the Global Forum. A special thank you to all our Danish Partners & sponsors. These organisations represent in an excellent way the spirit of cooperation and dialogue in which the Global Forum was born and which continues to make it an unique event.

Ladies and Gentlemen, the Global Forum 2018 is guaranteed to provide an exciting programme full of inspiring presentations and awesome speakers. I will finish by wishing you an enjoyable and fruitful time at the conference.

Thank you."

SYLVIANE TOPORKOFF, President Global Forum/Shaping the Future; Founder & Partner Items International, France, warmly welcomed the participants to the Global Forum 2018 and thanked everyone for coming to Copenhagen.
Sylviane then introduced and gave the floor to Mr. Rasmus Jarlov the Danish Minister of Industry, Business and Financial Affairs, followed by the French Ambassador in Denmark, Ms. Caroline Ferrari.

RASMUS JARLOV, Minister of Industry, Business and Financial Affairs, Denmark welcomed the distinguished Global Forum 2018 participants and speakers with a speech exposing Denmark strong points in Digital sector.

“Ladies and gentlemen. Dear colleagues. Distinguished guests from near and far. It is my pleasant duty today to bid you all a warm welcome to Global Forum 2018. And a warm welcome to Denmark.

Many of you have travelled long distances and have made a quite an effort to join us here today. So thank you very much for being here.

Also a special welcome to our speakers – I am sure your contributions will inspire the debates the coming two days.

Now, it is a great honor to host Global Forum 2018 in the city of Copenhagen.

And I would like to start out today by asking you the same question Steve Jobs said to Pepsi executive John Sculley to lure him to Apple:

“Do you want to sell sugar water for the rest of your life?
Or do you want to come with me and change the world?” *he said.*

Now, there’s no doubt that technology changes the world. Until now only to the better.

And in Denmark we consider digitalization a decisive factor for the further development of both the public and private sector in a broad variety of fields: From digital education, over digital infrastructure to data ethics.

When looking at a map of the world, you have to look closely to spot Denmark that is squished in between many great countries. But when things get digital, we are not a tiny country. In that perspective Denmark is a big digital playground.

And this makes us able to lead by example because we are the most digitalized country in Europe according to the EU’s digitalization index.

We are the proud owners of this title because:

- The Danish people have embraced digitization: More than 97 pct. Of the Danes communicate with authorities via digital channels and receive their pay checks, health data and tax payments digitally.
- Our companies are the most digital in Europe, not least due to their use of technologies to automate tasks as for example accounting, administration and operation. Additionally, Danish companies embrace e-commerce and digital technologies such as cloud and social media.
- Finally, we have a well-developed infrastructure and a public sector that has come far in digitalizing services for both companies and private citizens. For instance, the registration process for companies is fully digitalized, which means that the administrative burden of starting and running a business is minimized. And as mentioned, we have largely succeeded in shifting our citizens to digital channels, thanks to our user-friendly framework for eGovernment services.

Combined, these factors make Denmark a perfect country for testing new digital solutions.

And a good example of new Danish digital entrepreneurship is the wine app Vivino. The company was founded by two Danes who – in their own words – did not know the first thing about wine.

As this was somewhat of an inconvenience to them, they got the brilliant idea to tap into and make use of the experiences of other wine consumers.

Today, with data from millions of users, Vivino is the company most knowledgeable of wine in the world. And it is the app that many of us go to for assistance and guidance when we stand perplexed before the shelves in the supermarket, unable to make a qualified decision for the weekend.

Hence, with a large, digitalized consumer base in a small country, Vivino grew rapidly in just a short period of time. And it turned into a platform-driven enterprise like the ones that many of us dream of fostering many more of.

It is the vision and the clear goal of the Danish Government that Denmark will continue to be a digital frontrunner.

However, we are increasingly facing strong competition in the global arena. And we must acknowledge that we are losing ground. Asian countries, in particular, are gaining ground in the global competition on advancing new technologies.

And please allow me to underscore that we are NOT on a mission to limit their possibilities and their growth.

Instead our mission is to foster a successful climate for innovation in Denmark and in Europe that makes us able to come forward with solutions and thereby create growth and businesses in our country.
Meanwhile, Denmark has world-class universities, a high level of digital skills and innovative start-ups. But to my regret Danish companies are not frontrunners in terms of utilizing the new digital technologies.

For instance, Danish companies make less use of artificial intelligence and Big Data than those in comparable countries. Furthermore, they do not develop new business models to the same extent.

That is why the Danish Government launched 38 initiatives with the Strategy for Denmark's Digital Growth January this year.
With these initiatives we seek to enhance the digital competencies of small- and medium sized companies and to improve access to digital skills, resources and essential knowledge about the use of data.

The goal is clear: The industry and the educational sector should work together in order to motivate people for this line of work. And to unlock the potential in new technologies.

Digital technologies, however, do not just pose the questions of how we are to gain from it. Or what we can achieve with the right competencies. It also poses a series of fundamental, ethical questions:

- ***"How do we obtain sufficient transparency?"***
- ***"How do we avoid discrimination and bias in our decision-making based on data?"***
- ***"And how do we ensure that both businesses and regulators handle data responsibly?"***

As a temporary answer to these questions, the government has established an Expert Group on Data Ethics. Which in just a few days' time will present its recommendations on responsible handling of data in the private sector.

The group has examined what good data ethics is. How companies can work with data in a responsible way. And how sound ethical behavior may develop into a competitive advantage for companies.

The purpose is not to create further burdens or restrictions for the companies. I want to make that very clear.

Rather the purpose is to create incentives for businesses to go beyond the letter of the law. And to drive change because they see the competitive advantage in being ahead of the curve.
I personally believe, that data ethics holds a great potential of becoming a competitive advantage that businesses can use to distinguish themselves positively from their competitors on the global market.

And with efforts from both the public and the private sector, it should be possible to create a framework that will enable us to harness the value of the data economy. As well as ensuring that our citizens may trust in the new digital solutions.
Rest assured that the Danish government is committed to the agenda. And that we believe that it is essential to keep data ethics at the top of the global policy agenda.

I am pleased to see all of you committed to the agenda here as well today. We have participants from authorities, the private sector and the scientific community from all over the world here today.

If we are to reap all the benefits of the digital transformation, we need to find new solutions – and we need to find them together.
In the European setting, we are striving to create a true Digital Single Market. The ambition is to break down national silos to ensure that the leading digital companies of the future will be European.

Therefore the European Digital Single Market should be:
- Open to digital innovation.
- Have low entry barriers for innovative start-ups.
- And ensure clear legal requirements that reduce unnecessary burdens for businesses.

Take my case example, Vivino. The case shows how we have succeeded in making Denmark a digital playground.

But to my concern, the case also shows that the start-up felt Denmark became too small to grow their business even further and ended up moving their headquarters to Silicon Valley.

Luckily for us, Vivino continued its journey and eventually decided to move its development division back to Denmark, where they could acquire highly-skilled engineers at an affordable salary. This indicates that also in this regard, Denmark may still have a competitive edge.
But the take-away from the Vivino example – and the ambition for the Danish Government – is that we should be able to accommodate these new digital successes within the borders of Europe and the Digital Single Market.

At the same time, the Danish Government is convinced that the EU has a very important global role in terms of promoting a middle ground in the global digital economy representing a responsible and ethical approach.

That is why we support a European framework that ensures a high level of consumer and personal data protection. And we will work hard to ensure that data ethics become a competitive advantage for businesses.

In the coming days here at Global Forum you will, hopefully, acquire new relations, share experiences and learn from each other. You are in for two very interesting days, I can say.

"So do you want to sell whatever it is that you are selling for the rest of your life? Or do you want to join me and The Danish Government and change the world?"

Thank you for your attention."

CAROLINE FERRARI, Ambassador of France in Denmark also shared words to open the Global Forum 2018 and welcome the participants.

"I am very honored to address the Global forum today in Copenhagen.

I have this privilege because the Global forum was created and developed thanks to the commitment of **a French woman, Dr. Sylviane Toporkoff who I would like to pay a special tribute to**.

It was really a great idea in the early 90's to create an **independent think tank** and **an international network** with all relevant actors, governments, companies, NGOs, international organizations in order to discuss the challenges of digitalization.

Today, I am very pleased that Global forum has chosen **Copenhagen t**o host its 27th meeting. Copenhagen is not only a very nice city, it is also one of the smartest in the world! Denmark stands as a digital frontrunner in many fields including public services, opportunities for industries and big data investors. It really deserves to be acknowledged as a fist-class player in the digital world.

The timing of this meeting is also perfect. You are gathering just one week before the **Paris digital week** when 3 major events concerning the challenges of digitalization are organized:

1) **The Paris Peace Forum, organized for the first time in the context of the centennial of WWI,** on how to improve global governance in favor of peace and security, taking also into account new technologies
2) **The GovTech summit** with the support of the mayor of Paris, Anne Hidalgo, and of the European Commission, on how technology can help transform the central governments, regional administration and cities
3) And **the Internet Governance Forum** organized by the United Nations on the topic "internet of trust"

On this regard, I would like to invite you **to endorse the Call for trust and security in cyberspace**, which will be made public by the French President, Emmanuel Macron, on the 12th of November. The endorsement is open to all actors, public or private (paris.roadmap@diplomatie.gouv.fr). This call aims at promoting international cooperation between all the actors under the rule of law.

One last word in order to call your attention on the **publication this morning in the Danish newspaper Børsen of an editorial from French Minister for the Economy and Finance**, Bruno Le Maire, advocating for a European Digital Services Tax. An appropriate topic, if any, for a living discussion on fairness in the digital economy!

I wish you all some very fruitful exchanges in the coming days."

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Opening Session

Day 1 – Morning – Plenary Session

JØRGEN ABILD ANDERSEN, Founder & CEO Abild Andersen Consulting, **Denmark**, chair & moderator of the opening session of the Global Forum 2018 shared with the audience his introductory remarks.

"Before I give the floor to the first panelist speaker just a few introductory remarks from my side.
Everybody has a history. So do I.
I have been dealing with telecommunications and later on digital economy issues for more than 30 years.
In the beginning we used to joke about what were the three most important issues and challenges we faced in our work.
In the 80s all answered: "Tariffs, tariffs, tariffs."
In the 90s the answer was: "Broadband, broadband, broadband."
Later on it changed to "internet, internet, internet" and over the last decade increasingly the answer has changed to "digital economy, digital economy, digital economy".
Some even claimed that the digital economy was becoming THE economy.
Because it is widely recognized all over the world that a flourishing Digital Economy is a very powerful means to drive innovation, growth and social prosperity in society.
It is also recognized that to make the Digital Economy flourish you must apply a holistic approach.
All elements of the eco-system of the Digital Economy are important and must be addressed appropriately – be it

- *e-Infrastructure (broadband, spectrum, data etc.),*
- *e-Skills/e-Literacy,*
- *e-Security/e-Privacy and*
- *e-Content (apps, services etc.).*

Just to mention some of the most prominent elements.
Important discussions and initiatives addressing the challenges related to these elements are already taking place at national level all over the world as well as in international organizations such as ITU, OECD and not least EU.
But are the right things done or do we leave the steering of the development to giants like i.a. Google, Amazon and Facebook – not mentioning hostile intruders polluting the internet.
What should be our focus in the next years to come? What are the most prominent challenges and what should be done to address these challenges in order to ensure a flourishing Digital Economy leading to innovation, growth and social prosperity?
What are the three most important issues or challenges we are facing in our near future?
I hope that our panelists this morning will share their thoughts and ideas with us on this in their short speeches."

ELISABETH AARSÆTHER, Director General, NKOM - Norwegian Communications Authority, Norway, made an inspiring speech on the definition of a favourable climate for investment in 5G industry notably to not fail implementation of 5G in Europe. Ms. Aarsæther points out like Minister Jarlov, who opened the event, on the power of culture in the

investment climate. Danish & Norwegian people are quite similar but one of the crucial differences between the two is that Danish enjoy life & are more relax than Norwegian people. Elisabeth insists on the need to understand the Norwegian culture for successful investments, general idea when thinking about Norway are oil, high taxes, high prices and population ready to pay a lot. Oil is a past thing and the future for the country is salmon according to Elisabeth.
Japanese are the first Norway's customers for the salmon but are strict customers: no more than 24 hours between fishing and eating the salmon in Japan. Otherwise Japanese refuse to pay.
The key point about Norwegian investments is to manage the timing,
The second point is share economy. For instance for 5G infrastructures in Norway, the telecommunication actors as well as Norwegian government do not have the money to invest by themselves in 5G. Telecommunication actors as well as Norwegian government need to collaborate in order to ease the investment. Thus local & central governments make sure that investment climate is good. For instance all public buildings are accessible to welcome an antenna.
The third point for the future of investment that Elisabeth listed is the strength of trust. It is not possible in the digital economy to not have the trust of people & customers in their government & businesses. In Norway after having paying their taxes, the citizens received a letter or an email from the government informing them about the amount they paid and the amount they have paid for previous year. The government ask the citizens to check that this is OK for them, 50% of Norwegian do not do anything, they do not check as they have faith in their government, this rate is pretty high.
In 2017, every 1/4 and in 2016 1/3 of the taxes were reinvest back in infrastructure which is a very high rate compared to others countries.

Following the presentation of Ms. Aarsæther, the session chair Mr. Abild Andersen asked her a question to go further on trust & investments and more precisely on how governments can establish trust.
Elisabeth stated that this question is difficult and that without trust it is impossible to lead successful business. Net neutrality is necessary as it forbid companies to sell what is not their meaning data thus the customers remain confident in their companies. When investing in Northern Country being honest is crucial. A deal is a deal, it is crucial to stay true to its words for a successful contract

CECILIA BONEFELD-DAHL, **Director General, DIGITALEUROPE, Belgium** started her intervention by presenting briefly the activity of **DIGITALEUROPE** which is the main organization for IT, ICT and Digitalizing industries in Europe with 36 000 members. Cecilia remarks that often digitalization is presented as something which is coming, arriving rapidly whereas digitalization has already been here for a long time, the environment of the market has already changed because of it.

The main changes are about the perception of scalability and competition. There used to be talks about competitiveness or competitive rules within Denmark. The most successful companies in Denmark & Norway are all multinational companies that survived the economic crisis of 2008.
Since the economic crisis of 2008, there has been a rise of huge digital companies, without raising any worries or fear. Those companies are very successful, the top 5 digital companies grew by 449% in 10 years per year compared to others sectors with high growth rate like where we are more close to 17%.
Those changes explain the shift in the investment climate and its dynamic. If we take a look at Amazon, a giant which can been seen a liberating or threatening, thousands of Danish SMEs work with Amazon and have access to the global market at a low cost thanks to this

collaboration. This appears as a positive thing at first, those Danish SMEs have the opportunity to grow thanks to Amazon.
In fact this raises new questions about taxes, should those SMEs be taxed specifically and who will pay this taxes at the end? If a new tax is added, will those SMEs remain competitive?
There is also the question about security. How to be sure when trading globally that the security is guaranteed? Data, especially localization one, are more and more used to create new protectionism barriers based on the information collected. Data localization allows countries to force companies to produce locally by stating that the countries do not trust the companies to handle in a secure and safe way their population data and thus force them to produce locally to sell.
Can we really act in a global environment with global competition when we will have consolidation which already started and will only continue?
Porter said that this would be the scale of globalization; he foresaw technology but not digitalization of the whole society.
Instead of looking on how to protect ourselves, we should look at the new challenges and define the European approach, global approach to those issues. How can we make sure that country leader, WTO and others global forces gather & discuss together about the next big challenges: cybersecurity, taxation, global competition… Those questions need to be addressed but in a way where each stakeholders try to protect themselves, shutting the doors and saying no to digitalization.

To illustrate her speech Ms. Bonefeld-Dahl, talked about her experience as former president of the Danish IT Association when she tried to understand better the SMEs: how & why those SMEs do not grow, why do they left Denmark? Ms. Bonefeld-Dahl discovered that 2/3 of the most innovative SMEs, the Unicorns which represent the future, left the Nordics within the 2 first growth phases. Those innovative companies left because of several issues such as the capital, competences, absence of a true single market and thus no possibility for scalability. Despite the European Union and single market rules, it remain difficult for companies and even more for SME or start-ups to go on the markets of others European Country. Europe has been trying to create a real single & common market but this require also leaders that are really working & collaborating toward the objective to create a unique European market. Europe cannot afford that its SMEs & companies have so much difficulty to grow in Europe that they have to leave. This would shift the competition and the balance. Europe needs to find how to get an even playing field to grow but also for consolidation which is inevitable, will happen, already started and cannot be stopped.

According to Cecilia the biggest challenge, strength & opportunity for Europe is the value of cultures, either Europe kills itself with national countries favoring their own culture & benefits or Europe finds the strength to be a multicultural economic area with high moral & ethical standards. Europe needs to have a new mindset, instead of saying “we do not like this”, Europe should think “There is a challenge, what is our goal”. If the goal is to create big scalable, innovative companies that act and have ethical role & creating benefits for our society, for public sector; security for the citizens then this should be the target and found out what is needed to reach this target. If it is access to the data, we need to be careful but not too much. For instance if an access to data could help for the creation of an application which predicts citizens ‘sickness and thus allow citizens to take preventive actions or medicines, most would like this. Same for an app helping to reduce C02 emissions. AI & data can do a lot of thing. Most countries worldwide understood that and are running ahead with no rules; Europe should also rush in this sector but with a regulatory framework. Europe should not be wondering how regulate, deregulate or review regulations.
For instance as member of a AI ethics group Cecilia is engaged in replying notably to one of the key question of AI & bias, there are already discrimination rules, do those rules just need to be apply in AI, create new specific rules ?

To conclude Cecilia Bonefeld-Dahl insists on the fact that Europe has many successful sectors such as manufacturing and the question is to make the future and not prevent it by fear.

PHILIP MALLOCH, Chairman of the Executive Board, ETNO - European Telecommunications Network Operators' Association started by thanking the Global Forum organizers for being part for the second time of the event which is an incredible gathering. Philip Malloch continued by briefly presenting ETNO which represent 40 major investors, manufacturers and international telecommunication companies which represent 70% of the investments in Europe in this sector. The panel is discussing about the future, ~~where are we going?~~ Mr. Malloch identified 3 main challenges.

The biggest challenge is the scepticism in technology. How to make sure that the Europeans have access to new services, new technologies and new products in a trusted and secure environment. The lack of trust is a death sentence for any digital service or environment.

The second challenge is about the growing concerns regarding the European single market. The business community in Europe thought that it was for granted, but not! With the single market, businesses worked in a stable environment. But over the years, we have seen raising questions about the European single market value such as integration, cross-border work. ETNO members are big supporters of the European integration and of the single market. This is vital for Europe to be able to have big players in telecommunication, to grow and have access to a huge market and advantages of scale.

The third challenge is about the infrastructures. Investments in 5G are at the initial stage, they need to be nurtured, they are not to be taken for granted. For instance the Italian government decided to charge operators billions euros for the 5G licences. The operators need to think of new business models as they have to pay 7 billion Euros without having sold any 5G contract to their customers. As there is only one pocket for investments; the operators have to carefully think about those investments.

Finland is a good example, where the government recognized the value of 5G investments and its meaning for a country like Finland and thus organized good auctions for the 5G licences.
Europe was proud about the bold unified 5G infrastructure but for Philip, Europe is for the moment failing the first test. Europe has a lot to do to achieve a bright 5G future.

Philip Malloch added that he joined a gathering of CEOs of several sectors such as Energy, telecom, transport… with the Norwegian Prime Minister to talk about the importance to reach the United Nations Sustainable Development Goals – SDGs. One of the conclusions of the meeting is that Norway is at the forefront of many UN SDGs achievements but at the same time many things need to be done.

A recent IPCC - Intergovernmental Panel on Climate Change – report stressed the need for a public & private collaboration to tackle the global warming challenge. If the global warming question is not addressed, we can forget about the single market, 5G and so on because much more pressing issues will be ahead.

Following his speech, Mr. Malloch was asked by the session chair / moderator, Jorgen Abild Andersen, if auctions done smartly would be a reasonable way to allocate licences / frequencies to telco operators. Philip totally agreed on the fact that auctions are great way to allocate frequencies, well designed auctions are good to allocate frequencies and badly

designed auctions are excellent way to destroy a market.. There have been cases where operators needed 10 years to have a return on their investments for 3G frequencies.

NAOHIRO YAMANAKA, Advisor for Director General, Global Strategy Bureau, Ministry of Internal Affairs and Communications, Japan shared Japan's ICT Future Vision from the digital mindset perspective.

"Today, I would like to talk about the mindset necessary for the successful digital economy, frequently referred to as "digital mindset."
Changing our traditional mindset is very difficult, but I think this digital mindset shift is just as important as the policy side and the technology side of the digital economy.

This August, Japanese Government has set out its ICT future vision "TECH Strategy to grab the future," looking ahead to around 2030 and 2040.
This strategy consists of a couple of elements, but in terms of the digital mindset, principles for actions would be very important.
In our strategy, we use the term MOVE FAST to explain this digital mindset.
MOVE FAST makes an interesting acronym.

First of all, MOONSHOT.
When developing future vision, we tend to take a forecasting approach where we estimate the future based on the past trend and present conditions.
This kind of approach is very effective when looking ahead to just 5 years or so. But when looking ahead to 10 years or more, it is not because predicting the future is quite difficult in this technologically rapidly changing era.
In such era, taking a backcasting approach, or "moonshot approach," would be much more appropriate. In this approach, we start with the point where we want to be in the future and then try to adjust everything in the present according to the target we want to achieve.
Actually, in developing our Tech Strategy, we adopted the moonshot approach.

Secondly, OPPORTUNITY.
As you know, Japan have been facing a number of serious challenges such as a rapid depopulation, super-ageing society and so on. What is important here is to see these challenges not as a crisis, but as an opportunity.
And it would also be important to do away with the so-called zero-risk bias and to make the most of the emerging disruptive technologies based on the so-called "agile approach."

Thirdly, VALUE.
We have been placing value on the national GDP or population to evaluate the national wealth. But, this doesn't necessarily reflect each national's happiness properly. So, it would be necessary to shift our standard of value from quantity-based to quality-based indicator such as per capita GDP or Bhutan proposed "Gross National Happiness."

Fourth, ECONOMICS.
In terms of the supply side, it would be important to improve productivity by introducing new technologies. In terms of the demand side, incorporating domestic and overseas demand through digital businesses such as e-commerce would be important.

Fifth, FOCUS.
In order to pursue the sustainable development goals proposed by United Nations, it would be necessary to focus our limited resources to certain areas while stopping or scrapping what is unnecessary.
Sixth, AGGRESSIVE.

It is related with the element of Opportunity, but introducing new disruptive technologies aggressively in every field would be important. This concept is called XTECH (cross tech) approach.

Seventh, SUPERDIVERSITY.
It is also important to make our society diverse and inclusive. In such society, people can collaborate with each other as well as enjoy their diverse values and lifestyles. It is in such society that people also can come up with innovating and creating ideas when faced with novel challenges.

Finally, TRUST.
There has been a lot of public concern about black box algorithm by new technologies such as AI. So it is necessary to foster the public trust and confidence in new technologies from the ethical and security perspective.

So, these eight mindset elements "MOVE FAST" are the key factors to succeed in this digital economy.
To be honest, I myself is a person with zero-risk bias. But nothing will change without challenging. That is why I decided to deliver a speech here today. So I have one the digital mindset elements.
And all of you here, who have decided to participate in this important Global Forum, also have them. Therefore, I believe all of us can succeed in this digital economy.
Thank you very much. "

MATHIAS GREDAL NØRVIG, CEO Sybogames, Denmark

"How many of you play games on your phone?
So, to those of you who don't, that means you are not part of the global network of more than 2 billion people worldwide who are playing regularly. So why are you not?
Studies prove that surgeons who play games are making 1/3 less errors than those who don't, and that gamers in general are better decision-makers as they are used to multitasking and can act faster with limited information. It enhances people's ability to navigate and interpret information received. But besides that, games are contributing in all business areas and are leading the development of in-app-purchases. With free-to-play and subscription-based interactions the micro transactions and ad-spends are in the forefront of the mobile game industry. This offers the new generation an easy way to be part of the technological development and growth.

We are SYBO, a mobile game studio in the heart of Copenhagen. We are passionate creators and believers in shaping games for everyone. We are creators of the smash hit Subway Surfers which has been downloaded over 2 billion times and are still topping the lists of most downloaded game in several countries. Inspired by the future we have expanded beyond just gaming and together with our SYBO TV, animated series and merchandise we work hard on bringing next generation entertainment to you.

But, let us talk about the impact of mobile presence. You all know that the biggest taxi company doesn't own any vehicles, that the most valuable photography company is not selling any cameras, and that the largest accommodation provider doesn't own any real estate. But, Uber, Instagram and Airbnb all have one thing in common. They are natively mobile. I use them while traveling, and for leisure. They are always with me on the go. This makes them great, because this is where people spend money. People spend over $100 billion in apps as of 2018 and this trend will see an average annual growth of 22,5% coming

five years. This explains why companies which manage to integrate their business model on mobile devices are so successful and impactful.
It is about understanding what kind of company you are on the phone. It is about being where your customers are spending most of their time. So, the question is; how do you create value on your customer's mobile devices? As a modern company your platform becomes paramount in driving company growth as this is where your customers will interact with your offerings. It requires innovation to follow the digital transformation, but it is already happening now. Therefore, not investing in a smooth and user-friendly app, is like not having any underwear, it is uncomfortable and odd.

Games are natively mobile and can enforce great user experiences to make a difference. We talk about social prosperity. We talk about environmental footprint. How do we make a change? The power of games and the power of a platform can shape experiences which demands user's attention and reward their participation. Conclusively, this is a great opportunity for learning and creating awareness among our users with the ultimate goal to make the world a better place. We can use the influence of gaming to motivate people to recycle more, choose sustainable products, ask for better working conditions or simply be nicer to each other. We know that the information people consume will shape their understandings of the world and games are at the forefront in embracing content which will shape the mindset of tomorrow. Mobile gaming is leading the innovation towards more sustainable interactions and experiences. We believe the answer to future growth and prosperity comes from entertainment and we are excited to bring engaging content for future generations. "

JAKOB WILLER, Director, Telecom Industry Association, Denmark shared with the audience an insightful presentation.
"The opening is about vision and visions in digital transformation need to talk about the use of digital to care about people, environment, society, planet…. There are several challenges, UN – SDGs, the main question is how we can use technology to make the world better.

Over the last few years, our understanding of the tech sector's contribution to society has changed.
Our belief in technology as a unique tool for job creation and economic growth can no longer stand alone.
The tech sector causes disruption of markets – and the hunt for growth, scale and profit, is not always in the best interest of people and the society.
The massive collection and use of our personal data is a violation to our privacy.
Games, apps and social media – designed to promote addiction and maximize our use – does not contribute to society in a positive way.
Just a few years ago, we looked at the internet and social media as tools for liberation and democratization. And they were.
But today we understand that these technologies are also powerful tools for surveillance, oppression, interference in elections, and distortion of public perception.
In September this year, the Danish Telecommunication Industry Association participated in the Copenhagen Tech Festival with more than 16.000 participants from more than 40 countries.
The festival developed and formulated the so called Copenhagen Catalogue. This catalogue sets out new standards for tech development – with the aim to put humans before business and take action to solve the global challenges we are facing.

The Copenhagen Catalogue has inspired me
To find my answer to your question Jørgen.
The most important thing we should do in relation to tech development – is to care.

Care for people
Care for society
Care for the planet

We need this broader value based agenda for the tech development in Europe – and globally.
We need business leaders to take responsibility and act.
We need politicians to set the right visions and create incentives for investments in technology and low carbon solutions.
In other words – we need a Value based industry policy for tech development.
In Europe, we are lagging behind the US and Asia when it comes to investments and roll out of fiber and 5G.

EU politicians have very high ambitions regarding the roll out of infrastructure ensuring a gigabit society in 2025. But there is absolute no realism in these high ambitions.
We have decreasing revenues in telecoms. We have decreasing returns on investments.
We are heavily regulated and very high cost for the roll-out of 5G. Good for users but not operators.

However, we still urgently need to act. We need investments and we need connectivity.
We should do whatever we can to create a better environment for investments in infrastructure in Europe.
Europe needs to do better in:
Predictability and stability in regulation
Remove barriers
Reduce costs for roll out
Ensure possibilities for consolidation in the market
Harmonization across countries
Level playing field – same regulation for all
And most important – we need to stimulate demand. and support the development of solutions that protect data, gives better security and supports the digital transformation of industries and a sustainable development.

Europe will not be no. 1 with 5G and roll-out but we should have ambition to use technology and maintain trust as well as support productivity and sustainability."

Following the complete & clear presentation of Mr. Willer, he is asked by the moderator to share his view on the demand side & role. Mr. Willer replies that it is of course the demand which drive the investments & roll-out. Combination of ensuring an investment climate in Europe in as stable & predictable framework should be combined with an effort to stimulate demand & use. If we combine that to stimulate demand, then some of the current challenges would be in the path of resolution or to get better in Europe.

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Q&A

Before opening the panel to questions from the floor, Cecilia Bonefeld-Dahl wanted to revert to the presentation of Naohiro Yamanaka. Cecilia remarked that in Europe we talk about manufacturing 4.0, but Japan has a more holistic approach about digitalization and the Japanese government has a more proactive attitude based on the concept of "Society 5.0". Looking at the needed investments, Cecilia agreed on the fact that when there public sector investments are necessary. Public sector and public goals play a huge role in investments as

well as the need for a great climate in terms of investments, regulatory compliance…. For instance, for the sustainability goals, how to create a sustainable environment with data system, health sector, public healthcare. What are the goals from the public sector point of view? Public sector inputs are important for digitalization and investments.

The first question from the audience came from Nasr Hajji, Professor of University; Former Ministry of Posts, Telecommunications & Information Technologies & Congressman, Morocco. Following the visions keynotes, Mr. Hajji asked what will be the role of human being in digital society. Nasr Hajji pointed out the lack of thinking on ethics and philosophical points of view. What would be the place for humans in new digital society?
Philip Malloch replied that digital is time-liberating and allow people to have more time for social interactions. The development of digital in industry, technology and society create new interactions. Digital create change for children, change also our link with screens with gamification. Philip is confident in the evolution of human with digital environment.

For Mathias Gredal Nørvig from Sybogames, this question highlights the needs and reasons why we need the Global Forum to discuss and exchange points of view.
Digital can liberate time for people to be more compassionate and more social. It allows people to be more creative also. AI can also be creative, some studies show that people prefer drawings created by AI rather than human. Digital allows people to be creative with the free time and co-creation between AI & people. Digital world also helps people with handicap to be on the same level of people who are not handicapped. Digital world allows the creation of friendship and cooperation between people who without digital do not met.

Cecilia Bonefeld-Dahl's take on the question is that each time technology progresses, arise the question "Who we are?" 'What is our role?". Those are natural and relevant interrogations but the question for ethics point of view is how to preserve democracy? How to make sure that future generations have the right skills? Democracy needs an educated population to survive. With digitalization many jobs will disappear but according to several studies 2,5 jobs will be created for each jobs disappearing. The question is what are those new jobs? Where? Do those jobs are source of equal prosperity for all? The key question is to make sure that the population has the right skills to live in this digital society and have the understanding of their world.

The chair/moderator of the session reminded that eSkill & eLiteracy are crucial.

Naohiro Yamanaka reaffirmed Japan's vision on the need to have human centric approach with a balance between resolution of social issues and economy by integrating cyber & physical space.

Nitya Karmakar, Professor, Peter Faber Business School, Faculty of Law and Business, Australian Catholic University, Australia; wanted to share his view on this question. For him as an Australian, he does see that digital, robots are replacing humans for instance at the bank. For him, we are going too much to a society where everything is automatic and digital. There is no taking into account of people who are not digitally skilled or not e-Literated. We are making huge progress and developments in technology but need to have a balance with human presence and interactions. He pursued with a comment on videogames that are great and bring a lot but can be source of addictions.

Mathias Gredal Nørvig replied to this observation by remarking the role of parents for game addictions. He also advocated that when a task can be automated, it should be done. There are people who cannot/do not know how to use those automated services and it is the role of

people who know to help those who do not know. Digital is source of free time which should lead people to be more compassionate and helpful toward each other.

Elisabeth reverted on the role of politicians and need to educate them on digital issues. There is a lack of information and knowledge of what is at stakes in legislation and in public debates.

Final question was asked by Ambassador Mary-Ellen Miller from the Australian Embassy in Denmark who asked Mathias his view on gender equality in the game industry which has a poor reputation on this. She asked what can do the technology for gender equality which is one of the UN SDGs.

Mathias Gredal Nørvig answered that it is an important issue and that his company, Sybogames, is a frontrunner in this issue. The change can also be seen by the fact that videogame companies are trying more and more to include lead female characters. The gender challenge is not bigger in the game industry; it is rather a tech company issue.

To conclude the panel, Jorgen requested all panellists to list the 3 most important issues according to them.
For Jakob Willer, the 3 most important issues are; care for people, care for society and care for the planet; for Mathias: SDGs SDGs SDGs; For Elisabeth: Trust, trust, trust; For Philip: sustainable development, human centric element of society and sustainable European growth agenda.
The 3 most important issues for Cecilia are: empowerment of citizens to understand, participate and know how to navigate in the digital society and for Naohiro Yamanaka: Moon-shot, Opportunity and Trust.

Session 1

Day 1 – Morning – Plenary Session

Transformative Infrastructures to Support Digital Transformation

BRETT TARNUTZER, Head of Spectrum, GSM Association, chair of the session, opened the panel by reminding the topic of the session "Transformative Infrastructures to Support Digital Transformation" and summarized the session topic on how the various elements and actors of the communication sector can contribute to transforming society in the digital age. What could be there inputs to improve welfare, democracy and stability in the current turbulent time. Brett Tarnutzer proposes to focus on 3 elements to reply these questions: firstly connectivity, benefits & challenges, secondly regulations in term of spectrum, role of regulation on cost spectrum and third what does 4G bring and need to succeed.

Following his introduction, Brett introduced the session moderator **WLADIMIR BOCQUET, Director of Spectrum Management & Policy, Eutelsat, France.** Wladimir exposed the focus of the session which is how to facilitate digital transformation, what are the direction, ideas required for easing and supporting it.
Wladimir stated that connectivity is now key; there are a number of data and studies which noted the impact of connectivity on GDP and economy. However there is still 50% of the world population who is not connected or not well enough. The aim of the session is to highlight some directions that could help to raise connectivity.
For the satellite industry, connectivity is part of its DNA/mindset. By nature satellite connectivity refers to multiregional or pan connectivity. Satellite collaborates with others as there are several approaches, solutions and technologies to solve the connectivity issues.
Today one of the key words is 5G, the panel discussion is not only about mobile access but also about broadband as a whole to facilitate connectivity for all. One key point for broadband is spectrum which is crucial for several industries aside satellite such as mobile.
In 2019, there will be the WRC - World Radiocommunication Conference- crucial for the future of both 5G and satellite broadband connectivity. The conference will be centric to have a clear, transparent visibility on regulation, policy and framework to implement investments.
Several projects have been launched in the satellite industry which combine spectrum to complement 5G deployment coming from terrestrial mobile solutions
Wladimir reminded that the session 1 would regroup several solutions and visions but that they all share the same goal to build a global sustainable environment to invest, promote broadband and investments.

NAMIR ANANI, President & CEO, Information and Communications Technology Council (ICTC), Canada presented his view on how transformative technologies are going to impact the economy and society in the coming years.
Namir started by rapidly presenting his organization, ICTC- Information and Communications Technology Council-, which is a national center of expertise partly governmental and partly

private. ICTC does technology researches, policy advices and talent development in Canada.

He pursued by affirming that transformative technologies are the essence of any high performance economy especially in the current global competitive environment. When we talk about transformative technologies, we look at several of them not only 5G but also about AI, VR & AR, Blockchain, Additive manufacturing & robotics, 3D printing… 5G is at the heart of these developments.
For Canada, 5G is the next innovation engine for its economy. The global 5G value chain will generate $3.5 trillion in output supporting around $22 million jobs by 2035. This demonstrates that 5G is a true game changer. 5G will bring as much changes as the industrial revolution and causes shifts around the world.

The world is more and more urbanized, 55% of the worldwide population live in less than 5% of the surface of Earth and generate 70% of the global GDP. These zones are the one where there is an economic growth. Those zones being small and limited there are thinking about how to create smart economy, smart connectivity, smart buildings, smart transportation… in thosel limited & growing areas.
To enable the massive machine communication that will be empowered by IoT for smart city, 5G will be a critical component of this environment but there is a need also to make sure to allow citizens to communicate and have a better broadband. Taking into account this need, one can think that contrary to others technologies connectivity innovation, 5G will not be directed towards consumers but rather for IoT. For Namir, 5G is disruptive and will create a new business model directed to business applications. Growth will not come from the average consumers but from business applications.
Advance industrialization is taking place, we talk now about industry 4.0, society 4.0 and beyond.

When we talk about 5G, we talk about 20 Gbps - Gigabits per second, 20 times higher than 4G, submillisecond speed almost real-time. There are talks about if 5G will be High Speed Packet Access connection, 5G to the cloud… 5G will be the transformative aspect of autonomous vehicles same for immersive entertainments. The future will be interactivity where you could potentially change the storyline and see a different storyline than the person sitting beside you.
In global trade, 5G & blockchain will speed things up and totally delete papers. This will lead to billions of economy in Canada and others countries. 5G raises a lot of questions notably about spectrum auctions, what policy for that? Do we need to cap the sales as there will be a lot of investments necessary? Do you allow spectrum sharing? How do you allow several 5G operators to have access to the streets furniture or equipments? Machine to Machine communication especially for autonomous cars will require connection to traffic lights, bus stops and others. How to stimulate competition? The companies and operators that have backhaul fiber connectivity will be advantaged compared to those who do not.

5G is not one technology but several technologies embedded. In Europe, there is lot of discussions on 700 Mhz – megahertz as being a enablers for 5G, Canada aims at 600 Mhz as enablers.

Following the presentation, the moderator asked Namir to share his view on the role of 5G in new business models and industries which were not affected by previous innovation like 3G & 4G.

Namir answered by reaffirming that 5G is in fact several technologies embedded starting to 600 – 700 Mhz, 1 to 6 Ghz. For Namir, the difference between 5G and previous technologies is that 5G allows the creation of a new breed of industries. For instance for autonomous

vehicles 5G is indispensable, this industry cannot rely on 4G or edge technology due to several parameters such as distance, landscape and others. With 5G, autonomous cars can be implemented.

Namir Anani insisted on the fact that 5G and machine type communication would create a lot of data.
Namir concluded by stating that the telecommunication operators would change their business models from broadband to data capability.

REBECCA ARBOGAST, **Senior Vice President for Global Public Policy, Comcast Corporation, USA** started her presentation by briefly introducing her company, Comcast which is an American company created more than 50 years ago. The company started with its founder buying cable stations in rural areas to provide TV services. Today Comcast is the US largest internet provider and invests in content and notably by the purchase of NBC and channel Sky.

Rebecca Arbogast considers that it is important to ask ourselves what is our biggest hope and fear for internet every year because things evolve rapidly.
The presentation of Rebecca was about the digitalization transformation as well as its needs and components to work well for everybody. There are 3 key elements according to Ms Arbogast which are capacity, connectivity and finally trust.

For the capacity, the US presents a particular challenge in capacity demand which is greater that the global average. Cisco predicts a 24% growth of internet usages, thus enormous demand of the network.
The second issue is about pure capacity, how much traffic through the network? Videos do not require speed but massive volume. Comcast doubles its capacity every 18-24 months to keep up. Research & Development are working on next generation of cables to increase speed and capacity.
Concerning the connectivity, there is a need to make sure that the network can connect everyone. The deployment in USA represents a challenge due to the weak density of population which is an enemy to universal deployment. The USA has a weak density of 35 people per km compared to European countries which are more urbanized and have a stronger density. In USA, 84% of the population has access to broadband at a speed of 25 Mo; there are still investments and work to do to connect US to rural and tribal areas.
The question is also about who has access to internet, this is a complicated issue in US with a great disparity depending of age, race and education being the most crucial criteria. The studies about why people are not connected to the internet show that the main reason is that they do not want internet, this is increasing; the people not connected because of the cost are decreasing. A study from the US Census shows that two-thirds of non-adopting households would not consider subscribing to the Internet at home, even if it were for free.
Comcast launched an adoption program to promote digital literacy with 6 million households involved in the last 7 years.
From a global perspective, connectivity remains today a big issue notably in Africa.

The final need for digitalization transformation is trust which is essential. This is a growing concern all over the world as every day we learn about security breaches. There are also social media and elections trust questions..

To conclude Rebecca said that most of people and companies want to promote and be open to diversity and in favor of gender equality. For instance, more than 50% of Comcast executive directors are women and/or people from diversity, same for more than 50% of Comcast new employees.

To go further, Wladimir questioned Rebecca about the main remaining challenges so that everyone benefits of the digitalization transformation.

Rebecca acknowledged that to connect the remaining people to the internet it cost a lot of money and that there is a need to make sure that public funding goes to support connection for non-connected areas/people and not to already connected areas/people. Rebecca is not sure that 5G is the solutions to connect the world, she has more confidence on satellite for a global deployment.

JEAN-PIERRE BIENAIMÉ, **Secretary General, 5G-IA - 5G Infrastructure Association** took the floor to pursue the debate and expose his view on *5G enabling vertical industries digital transformation and towards a real disruptive ecosystem*.
Jean-Pierre Bienaimé started by talking about 5G PPP- Public Private Partnership composed of a private part represented by the European industries, manufacturers, operators, verticals, research institutes, academics, SMEs… and a public side represented by the European Commission and some public funding for 3 phases of projects i.e 20 projects in the first phase now completed with a focus on researches, 22 projects in the second phase now in course, focused on optimization and inclusion of verticals. The third phase will begin in 2019 with the validation of the platforms and pre-commercial trials. There are in plus Work Groups including trials Work Groups and vertical task force. M. Bienaimé pursed by reminding some principles of 5G architecture toward business needs and verticals. 5G system aims at providing flexible network architecture, enabling new business cases and models supporting vertical industries. Network slicing emerges as very promising as it spans over various technologies domains such as transport, administrative domains (including management), security will be also included. The support of verticals is enabled also by flexible function. Network slicing adheres to the technologies and business needs of various industries. Network slicing will satisfy the demand of vertical sectors which request dedicated telecom services by providing customized solutions.
Network slicing will be a key factor of 5G as it will be standardized in the coming months – end of 2019. It aims at building dedicated logical networks that exhibit functional customized architectures to the respective telco services and vertical applications such as enhance mobile broadband, vehicle-to-everything, ultra-reliable and low latency, massive machine type communication for IoT, smart factory, robotics control …

5G needs to stay in it European conception as developed in 5G-PPP meaning vertical driven, as a true differentiator, whereas previous “G” (2G, 3G..) were more human/consumers driven. 5G will be also human driven but more BtoB
The move is on to create a dynamic European 5G ecosystem as a platform for future innovations with the help of trials between the manufacturers, operators, verticals, smart cities…
Verticals expectations go beyond technical requirements; on top they want security & privacy, ultra-low latency, particularly important in second phase of 5G-PPP, standardization, and sustainable business models to drive their digital transformation.
Some examples of verticals’ needs for implementing their digital transformation that could be satisfied by 5G capabilities. For instance, 5G will be useful in the Security field (Public Protection, Disaster Relief, Critical Infrastructures); for Volkswagen 5G is critical for Dynamic Network Slicing and predicted QoS – Quality of Services; for Peugeot 5G connectivity is a must. In plus autonomous car will request hybrid architecture, sensors and femtocells networks for a perfect virtual knowledge of the road. For Bosch**:** « 5G may be disruptive for the manufacturing industry: **high reliability and low latency** are major requirements for new applications, such as mobile robots, factory automation, augmented reality and logistics”

5G-IA implemented a Vertical Task Force to make the engagements more effective. 5G-IA phase 2 project deals with a certain number of verticals as partners covering various domains of Smart Cities, Connected and Automated Mobility, Industry 4.0, Public Safety & Digital Divide, Consumer and Professional Services and Transport. 5G IA made partnerships with industry associations representing those verticals such as 5G AA –in automobile domain, 5G ACIA in industry, PSCE in Security.

5G-IA has emphases the support of pioneer bands of the European RSPG – Radio Spectrum Policy Group.
The key spectrum issues as underlined by the draft RSPG 3rd Opinion on 5G implementation issues are:
- The defragmentation of the 3.4-3.8 GHz frequency than remains too fragmented in Europe
- Ensure connectivity for vertical industries
- Technologies and architectures to support spectrum sharing regimes, e.g., light licensing, dynamic spectrum access
- Indoor coverage remains a key issue

Following the clear introduction of Jean-Pierre on 5G and vertical driven, Wladimir asked him his view on how the vertical will integrated in the 5G standardisation process as new operators or rely on mobile operators who deliver under the slicing function some capacities?
Jean-Pierre explained that on the telco side, the natural move would be to offer to the vertical the spectrum, telco capabilities, the connectivity capabilities. There are some thinking: for instance in Germany some dedicated spectrum, private spectrum could be given under some conditions; in France the French ARCEP is not against the spectrum opening.
This question is at the heart of the RSPG consultation
Precautions need to be taken in order to make sure the ecosystem is efficient. The number of bandwidth available per country will be also crucial in 5G deployment.

LARRY DOWNES, **Project Director, Georgetown Center for Business and Public Policy, USA** made an insightful presentation on What will 5G really do?
At the start of disruptive technology there are often marketing terminologies attached to it. When we talk about 5G there are applications attached to it in term of connectivity, IoT, smart, smart city, smart people, smart farm.
In fact, there are interesting technologies developments attached to 5G such as Software defined networks/networks function virtualization; Network slicing; Massive MIMO/densification / beamforming; Large channels/MM wave bands; Dual connectivity with LTE; Ultra reliable low latency; Multi-access edge computing; Carrier aggregation; Frequency-hopping “smart” antennae…

5G offers many promises and answers to current & future issues, we do not know how this will evolve as for all disruptive innovations and applications. 5G offers positive opportunities. For instance in US, as in many developed countries, there is a growing number of senior population who could no longer stay at their homes, 5G and many of the smart technologies have the capacity to improve the situation and help the aged population to stay longer at their home in a comfortable way.
In USA, there are 50,000 traffic deaths per year, autonomous vehicles and connected infrastructures will drastically reduce this number by eliminating the human factor & behaviors which is cause of a large number of those deaths.
5G could also help in term of waste of productivity due to traffic, reduce carbon footprint of vehicles. 5G offers great opportunity in the current context of sustainability issue.
There are industries which managed to not be disruptive by previous changes, but even these are about to be disrupted by 5G i.e Education, health care, manufacturing, energy will

be transformed in a similar way to what happened in entertainment, electronic, banking & finance at the start of Internet.
5G is synonymous to opportunities & disruptions, creative destruction.
5G also raises philosophical questions on the Existential nature of work, what it means to be employed, what it means to leave in one place and work somewhere else, what it means to be in a virtual community. Applications that will come from 5G will certainly play a big part in the next evolution of human society. Larry Downes thinks that 5G will greatly improve human condition.

Bouncing back on the presentation, Wladimir said that we all understand that 5G is not 4G+1 and will be completely disruptive in terms of the way to connect things, way to be connected between us and with different elements but how we will make it real ? Pre-commercial solutions and pre-commercialization are currently implemented; by 2020 there will be the 5G boom which is tomorrow in term of technology and standards. Wladimir asked Larry his view on how we will pass from dreams/expectations to reality?
For Larry, the move to reality will be the same as with previous disruptive innovations which occurred in the last 20 years, it will be in unpredictable, chaotic and surprising way. Some general categories of applications have a clear vision on 5G inclusion. Most of what will be made with 5G mobility, speed, capacity & latency is not yet known today. The predictions in this domain today will surely prove to be wrong. Of course it is difficult to hear for companies, investors.

TRINE HEIDEMANN JANSEN, **Director of Telecoms, Danish Energy Agency, Denmark** focused her speech on what will be driving the roll-out 5G infrastructure and the take-up of 5G services. Trine Heidemann Jansen explained that in 2018, all political parties within the Danish Parliament signed an agreement on the overall framework for the telecom sector; access to new technologies such as 5G was one of the four focus areas of the agreement. As a result of this political agreement, the Danish Energy Agency is currently working on **a** national action plan to support the roll-out of 5G in Denmark. This plan was drafted in close collaboration with the telecom sector and others relevant stakeholders. There are 4 focus areas that have been identified for the plan: spectrum for 5G; barriers for roll-out of 5G; regulatory issues; 5G use cases.
Concerning the 5G use cases, one of the questions is what kind of services will drive the take-off of 5G. The 3G adoption was rather slow until the introduction of the smartphone, the tablets and a great number of applications which drove the 3G take-off. For Ms. Heidemann Jansen the take-off of 5G will not be driven by the same current services as of today, there will not be probably a single 5G application that will achieve this.
Some stakeholders are working to identify the drivers of 5G within the vertical sectors such as health, energy & transport. The Danish Energy Agency is currently looking at uses cases that could support the roll-out and take-off of 5G. The Danish Energy Agency is looking among agriculture and of course among others sectors.

Wladimir thanks Trine Heidemann Jansen for brilliantly introducing the situation in Denmark on 5G and asked her, based on the uses cases that she already exanimated, which are the most beneficial uses cases from 5G implementation.
Ms. Heidemann Jansen replied that it is a difficult question, most IoT services can already run with the current 4G infrastructure so 5G will be revenant when uses will require higher speed, low latency and massive connectivity. There is a need to look beyond the current hype to understand the kind of services which need 5G features, agriculture & precision farming could be one example, same for logistics, health, energy, transports… Public sector could also look at domains where 5G could be an answer.

MATTHIAS KURTH, **Executive Chairman, Cable Europe** discussed about "5G: hype or reality?" Mr. Kurth started by exposing his background as former member of the regulatory field for 12 years in Germany & the industry side. He quoted Niels Bohr, famous Danish physicist: "Prediction is very difficult, especially about the future" to highlight that there have been a lot of prediction in digital industry over the last 30 years which proved to be wrong. This quote to say that it is particularly difficult to make predictions in the scientific & industry sectors such as the digital one.
5G is a new Ecosystem in which many politicians and governments have a strategic plan. The US President announced a strategic digitalisation action plan with a Memo from the President on October 25th, 2018; the EU Action Plan; Danish Plan and so on. Every countries deems crucial to be frontrunners in 5G deployment. It is widely understood that 5G is not just another mobile standard (like LTE, UMTS,GSM, etc.) but a whole new ecosystem with a lot of applications in IoT, autonomous driving, e-health, entertainment, digital farming and so on.

Pursuing his reflection, Matthias Kurth asked if there is a real gap between the expectations and the reality. There are indeed some developments such as standards developed by 3 GPP and ITU-R and it will be harmonised soon; additional spectrum for 5G will be available and spectrum auctions are under way in many areas; many pilots, researches and test cases are planned or realised worldwide. Those are positive points. However there are still some open questions such as how should the enormous investments, which are necessary be funded? especially for the small cell antennas and the fibre backup in the range above 3 GHz. How can telco companies upgrade the existing LTE networks in parallel with 5G roll-out? LTE will not be shut down, no sudden changes will be done, there will be a need for parallel developments. Will the demand justify the investments? In the long term yes but not in short term; for instance Germany which is not a frontrunner in fiber roll-out, there are 3 million building fiber-ready but only 30% moved to a fiber internet connection. Demand will move to 5G but timing and the balance will be crucial for infrastructure investments. There is also the question about regulations, how much regulations intrusion there will be, what level of influence and impact of those investments?

The key issue is how to obtain a sustainable business model for the 5G ecosystem. If supply and demand are to go hand in hand with industries (IoT, car manufacturers etc.) and will benefit from 5G, do they need to contribute to the investments at an early stage and form reliable partnerships with the telco sector? There are a lot of pilots and cooperation already underway but those are not binding long-lasting agreements for the next 10 or 20 years.
In the industry sector, there are different solutions possible for instance Siemens, Bosch and others are looking to have their own spectrum. The German regulator reserved 100 Mhz for industry solutions not telco solutions because digitalization plans should not be done in cooperation. Telco are of course not in favor of this approach because network slicing could be used for this. This gives a conflicting signal to the market, it is not completely clear who pays for the new and shining world of IoT and smart devices everywhere? Who will pay-fund in the end, telcos or industries themselves? Reverting his experience when GSM rolled-out, Matthias Kurth explained that there was a lot for profits on the telco side but it was also profitable for R&D; there were a lot of subsidies, the market was rapidly penetrated and there were a lot incentives for investments, there is few chances to have the same structure for 5G.

The discussions around the conditions of spectrum auctions done by the German Network Agency should be finalized end of 2018 and are an example of conflicting signals:
There should be high coverage obligations for successful bidders not 98% but 100% coverage of 5G even in rural areas. This is not realistic. Such roll-out cannot be fund for those areas. The current drafts aim at 98% coverage but some politicians judged this as not enough whereas we know that the last 2% are always the most expensive one.

The German Network Agency expect high auction results, in Italy the auction reached 7 billion, the last auction in Germany reached around 4 billion but the country is more populated and offers more spectrums and so expects a higher financial result.
The German Network Agency and a lot of governments in Europe want investments and new market entrants and the market is already mature with 160% - 180% mobile market penetration. They want to ease the emerging of new entrants with national roaming agreement and less roll-out obligations for new entrants. This is a conflicting signal because it will devalue the value of existing network operators' bids as they will be obliged to give open access to service providers & new entrants. Decisions are still pending, but it's clear that not everything is helpful for timely 5G.

To conclude on a positive note, Matthias Kurth talked about the very good European cable infrastructure; cable has HFC networks available in more than 50% of Europe households with fibre close to the home. This infrastructure is gigabit ready and can be upgraded to 1 gigabit and up to 10 Gigabit with Docsis 3.0 and 3.1 possible to make it symmetrical (downstream and upstream).

Cable is an ideal backup for 5G, no need to roll-out fiber everywhere, the cable can be used for small antenna and small cells.

To pursue the presentation of Matthias Kurth, the moderator Wladimir Bocquet asked him his view on the role of cable industry in 5G, will cable be limited to 5G back-up or others role in terms of implementation & deployment to ensure a successful 5G roll-out.

Matthias replied that the mobile aspect of cable is not seen as prominent, cable industry is still usually pitched as delivering TV and signals and delivering high-quality broadband but not as a back-up for mobile. Cable resources are still cable TV and fixed broadband. However the market is changing, there are more and more convergence also via merging and acquisition such as Vodafone acquiring cable networks in Spain, Germany and now there are talks about the acquisition of Liberty's networks all over Europe. Fixed and mobile are growing more and more closer, we used to have 2 sides and now fixes & mobiles think together and make a double usages of their infrastructures, use fixed cable for broadband but also for 5G back-up for instance and those synergies are facilitated when there is a common entity.

CLAUDIA SELLI, **Executive Director for the European Political and Legislative Affairs and Head of the Brussels' office of AT&T International External & Regulatory Affairs, Belgium** shared her perspectives about 5G.
Claudia Selli started by reminding the audience that the digital ecosystem is an ecosystem made of all interconnected networks with mobile network at its core. Without those networks, the digital ecosystem would not work properly and part of the ecosystem would be weakened.

The successful policies that encourage investments should not create inequalities in those ecosystems; the policies must ensure to allow the market to choose the winners & losers. The market is rapidly changing with a move toward convergence, several examples such as AT&T, Disney or Comcast. Industry is changing in an unusable business type, same for politic which is changing a lot and creating new challenges to global investors due to the political instability which make more difficult plans for investments. The Mobile Economy 2018 reports as the industry is looking to 5G to meet the demand of the digital world, there is a need for pro-investment policies and modernized regulatory frameworks. Policies & regulatory frameworks should encourage innovations and investments and not create burdens or hindered innovations for companies particularly in the current move of 5G & IoT.

The global race toward 5G is in course, the entire industry has been planning, creating consortiums as well as testing and now moving from labs to reality.

AT&T has announced that it would be covering 12 markets by the end of 2018, the first 3 markets are Dallas, Waco and Atlanta. To support the massive data created by 5G, AT&T is virtualising its network, creating and moving toward market networks. AT&T has already virtualised 55% of its infrastructures and aims at 75% by 2020. This increases the efficiency and improves consumers' experience. All this, have been possible thanks to the adapted regulatory framework implemented by the US government and the fact that the US government, FCC **–** Federal Communications Commission and NTIA - National Telecommunications and Information Administration have supported and understood the demands and needs of the industry such as allowing and having more spectrums availabilities which are the core of the industry. The possibility to timely and cost-effectively implement additional infrastructures including small cells for example is also a real plus. The US model should be replicated at the international level as politicians are looking at policies easing the investments and deployments in 5G & IoT.

AT&T already connected 44 million devices in 2018, 30 million more in the second quarter of 2018 and 21 million connected cars. There are some challenges in some countries such as in the framework of IoT because policy makers are grasping and trying to address the security issue. One of those challenges is for instance the possibility to use extra-territorial number in others countries, some of the EU member state understood that and now allows this and others are more reluctant and think about the security issues around this. AT&T estimates that ultimately, IoT providers should be left by themselves to understand the type of numbering and technology to use in order to allow more investments.

The policy has been implemented in the US more than 20 years ago. It allowed innovations to happen and trigger a lot of investments. AT&T has invested 145 billion dollar between 2014 and 2017; the industry as a whole has invested 1.3 trillion since 1996. The US example is really the model that should be replicated in order to trigger investments and an efficient and quick 5G deployment. Policy makers should be educated about the industry challenges and the importance to create multi-stakeholders initiatives to accompany technologies deployment.

Following the introduction of Claudia on the US and European approach, Wladimir asked Claudia her position on what can Europe take from the US example to foster the rollout of 5G technologies?
Claudia explained there are several examples such as spectrum the length of licence only 20 years in Europe whereas 30 years in USA which is of course more reassuring and encourage investments. Operators are more inclined to invest and make long term plans when you have certainty on it. There is no harmonization in Europe which is of course key in spectrum policies. The multi-stakeholders approach would work well in Europe. There is a tendency in Europe to be prescriptive about regulatory framework. This is challenging for the industries as rules impose to the industry how and what to do instead of letting the industry to have the freedom. It is more efficient to set the objectives, when you set the goals you protect the consumer and let freedom to the industry thus more could be achieved.

TOM STROUP, **President, Satellite Industry Association, USA** made an interesting talk on the role of the satellites industry in connectivity. Satellites provide numerous services and few people are aware of many of those services, there are 220 Million Satellite TV Subscribers aka 20% of worldwide TV subscribers; 32.7 Million Satellite Radio Subscribers comparable to Apple Music and with 8% growth from 2016; 2 Million U.S. Satellite Broadband Subscribers with 5% growth from 2016. The company SES provides services

video distribution via satellites to over 1 billion subscribers. The fastest growing segment of the satellite industry is mobility and broadband services. Connectivity is important when traveling notably by airplane; the connectivity is the third most important criteria for the choice of an air company after costs and schedule. America Airlines identified that consumers are willing to change airlines based on the quality of the connectivity service available. This market represents $1B in-flight market, according to London School of Economics and should represent $30B revenue and $15B in cost-savings for airlines by 2035.

Satellites can also provide services to bridge the Digital Divide. In the USA, fixed broadband availability is still lagging behind compared to Europe. On the other hand, satellite companies ViaSat 2 and HughesNet Gen 5 both provide continental USA broadband coverage thanks to satellites. The broadband provided complies with the FCC – Federal Communications Commission broadband definition of a minimum of 25 Mbps download and 3 Mbps upload.
For Tom Stroup it is time to change the discussion from "who has broadband services" to "who has access to broadband services". This raises questions in terms of policy issues. Given the capability and new investments of these new satellites, basically ultimately everyone in the USA has access to broadband services.
The satellite industry is investing billions of dollars in innovation; ViaSat 2 and HughesNet Gen 5 provide services via spot beaming High-throughput satellite technologies and billions more are invested in constellations focusing on global low latency broadband connectivity and potential capacity approaching 25,000 Gbps. The satellite industry is heavily investing in capacity.
Satellite industry plans to deploy some 30 Tbps satellite in 2018 – 2022, there are 48 commercial GEO satellites reported under contract, in various R&D or construction phases and more satellite orders are anticipated to be announced with a similar deployment timeframe.
The role of SIA is to explain to regulators that the satellite industry will play a major role for broadband deployment and ultimately 5G services. The US regulators acknowledge the role of satellite to bridge the digital divide and ensure that the whole US and world will have access to 5G. The satellite industry has also a role to play in spectrum discussions in order to make sure that all consumers will have access to 5G services.

Following the presentation of the US perspectives on the satellite industry role for 5G & broadband deployment, Wladimir asked Tom his views on the collaborations between the satellite and mobile industries in the future in order to achieve a full coverage of broadband & 5G deployment.

Tom replied that the most apparent collaboration would be the ability to provide backhaul services for terrestrial networks but it goes beyond this. There are currently areas where there is no broadband fixed connectivity in the USA and satellite & mobile industries have to collaborate together in order to ensure that all areas are equally covered in term of broadband and 5G in the future. The satellites play a big role in this as the satellites provide a coverage to the territory not covered. The collaboration of mobile & satellite industries is ensured to achieve this whole broadband coverage.

YOSHIO TANAKA, **Professor, Tokyo University of Science, Graduate School of Innovation Studies, Japan** made an insightful presentation entitled "Things and System, *New Ecosystem by the Digital Technology*."
The Things and Systems Association was established in 2014 based on an economic organization proposal. Its purpose was to not only change the conventional industrial structure, in which Japan globally supplied parts and components while focusing on manufacturing "hardware" and did not maintain close relationships with customers, but to

create ecosystems that consider services through open innovation. “Things and systems” aim to develop products, services, and systems through industry-academia-government collaboration, while considering “making things” and “making systems” as a pair of axles. The objective is to create customer value, in addition to the previous goal of creating the world’s highest quality products. Many talented people influence the “making systems” concept, and their innovation arises from diverse ideas. Therefore, one significant goal involves promoting the necessity to implement open innovation across industries.
Innovations that IT and network-based ecosystems can use to function can be collectively obtained by industry, academia, and government evolving into a new industrial structure. This will lead to the promotion of things and systems, open innovation 2.0, and the creation of new business Models and industry structure.

Wladimir reverted on the presentation of Mr. Tanaka and asked if the Japanese model could be expanded to others countries and eventual collaborations with others regions.
Yoshio Tanaka replied that he already spoke with Taiwan, Korea and European Union about this model and both were very interested by the Japanese model.

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Q&A

Following those interesting and relevant presentations the session moderator opened the floor to questions & remarks from the audience.

The first question came from Hugo Kerschot, Founder & Managing Director, Is- Practice, Belgium who among others activities recently advised the Belgium Ministry of ICTs on smart city issues. One of the issues in Brussels concerned the fact that for the moment the introduction of 5G is impossible because of the Belgium regulation on radiation of mobile antennas limited to 6 V/m (Volts per meter) compared to the WHO (World Health Organization) recommendation which is 22 volts. This low voltage makes technically impossible to deploy 5G. There is more and more reflexion on the environment, human aspect of ICT and technology. Mr. Kerschot asked what is the reply of the telecom industry to those questions arising in the society. There are several studies and suspicion that mobile increase health risk notable brain tumour and Hugo pursed by saying that it is hard when advising public authorities to find objective scientific studies and information about this potential risks. What will do the telecom industry to take into account those questions especially the environment one which has a growing importance? For instance the green party in Belgium doubled its score. How to manage those social & societal questions?

Matthias Kurth replied that Germany resisted doing this limitation despite the strong push to limit the level of radiations of mobile antennas. He said also that there are regions in Switzerland and Australia where the level admitted is even lower than Brussels. He insisted on the gap between the emission level possible and mobile / broadband / 5G coverage obligations of rural areas. Mathias pursued saying that there are thousands of studies on the impact of antenna and as often as it concerned emission of diesel, waves, etc… there are always scientific studies saying something is safe and others saying the contrary, it is impossible to have a single point of view admitted to everyone. There is a need for a political will to keep the level of emission at a realistic level because most of the time the decided target levels of emission are rarely met only 5% comply when controls are done.

Dan Shefet, Lawyer, Cabinet Shefet, France reverted on the question from the moderator Wladimir Bocquet about what Europe should learn from USA. Dan Shefet talked about net neutrality which is for him the key issue when talking about 5G. The 5G licenses &

infrastructures are very expensive. The US administration under Obama and Trump failed to create a federal level of net neutrality but the FCC makes that there is no longer net neutrality in USA. In Europe there are regulations to ensure net neutrality and Dan Shefet asked if for the AT&T & Comcast speakers, net neutrality is an issue and render difficult the development of infrastructures given the necessary investments
Rebecca Arbogast replied that the neutrality question has been discussed very differently in Europe and in the USA. In the USA, the question of net neutrality is looked as whether or not broadband is seen as a common carrier under Title II of the Communications Act of 1934.
In the USA, all ASP - Applications Service Providers called for a federal legislation to impose net neutrality rules.

Claudia Selli explained that AT&T supported the 2012 FCC regulatory framework around net neutrality with no blocking, no tracking, no stopping, no slowing down of services. AT&T has been opposed to the reclassification of Title II and in favor for the US Congress to pass the Internet Bill of Rights which would bring harmonization as for the moment there are new legislations rules appearing depending of the States and thus creating uncertainty.
In Europe, there are common rules adopted that have been agreed with telecommunications actors with the Connected Continent regulation rules. The question is the impact of those rules on 5G deployment.

Larry Downes takes on the question. He replied that 5G has a lot of aspects such as network slicing, ultra-low latency. Depending on how the net neutrality regulations are implemented, 5G can be severally impacted. In the USA, due to the net neutrality regulations and interpretations, there are 5G applications which will not be allowed as violating rules about prioritization

Sylviane Toporkoff President Global Forum/ Shaping the Future asked the final question of the panel on what would be the “killer-application” for 5G, gaming, healthcare…
Namir Anani replied that there are a lot of applications for 5G. The applications of the future cannot be developed by just relying on the market and telecom operators. The economy needs to be stimulated so that innovations on the economic & social senses emerge.

For Jean-Pierre Bienaimé, despite early deployments and first launches it is important to push the standardization as well researches phases before the real launch of 5G in 2020 which will be source of many ruptures with verticals. There will surely be several killer applications per sector such as remote surgery for health sector; autonomous cars…

The session chair Brett Tarnutzer wrapped the session by stating that there surely will not be a single killer application, 5G is a new ecosystem with development across the board, there are network virtualization, network slicing to support different vertical industries from smart cities to smart farms…; there is a crucial need for capacity to meet the needs from the new services and the role for multiples players in broader ecosystem such as cable, fixed, mobile satellite… Those actors need to find a way to collaborate.
In terms of investments & regulations, there is an acknowledgment for a need for investments but the political instability creates challenges for the investments. Governments are well-placed to set goals but the industry needs freedom.
In terms of human aspects, there are still coverage issues but also a user gap with factors like costs; relevant content and digital literacy explains internet different level of usages…
Brett Tarnutzer reminded also the need for trust as 5G impact all people and sectors.

Afternoon Opening Keynote Session

Day 1 – Afternoon – Plenary Session

The chair & moderator **SYLVIANE TOPORKOFF, President Global Forum / Shaping the Future; Founder & Partner Items International, France** opened the keynote session and its focus on how communities are informed.
Despite the efforts of the social network to fight against the spread of false information, the latter have generated even more audience and sharing in its pages than last year.
If the Internet is teeming with resources, it is also a perfect vector for fake news. Google News, Facebook or Twitter have indirectly contributed to the spread of this misleading information. Faced with this phenomenon, the giants of the Web have all set up devices to penalize the media conveying these lies, focus on new strategies in order to regain credibility for their respective users.

JANNE ELVELID, Public Policy Manager Nordics, Facebook, Sweden made a brilliant and clear speech about how Facebook deals with fake news and how as a platform Facebook mitigates the bad and amplifies the good which is a way to address the fake news challenges.

Fake news is not a new phenomenon but with the technology speed and scale make Fake news more prominent
Facebook estimates to have a big role to play to threat this issue. It is an ongoing work to find solutions.
There are talk that Facebook is making money from fake news and false advertisement. This is not true. In fact fake news cost money due to the investments in systems and people to do to address the issue. In plus, fake news damages Facebook image and reputation. So, fake news and disinformation are true costs for the company. Over the last 2 years, Facebook made several investments which are visible on the company's learning report.

Fake news is a complex and sensitive issue. There is not only one type of fake news. It can take different forms, different intentions, and different actors doing this.
There is no single solution. Facebook will not be able to solve this alone, solutions will come from collaboration with others i.e. civil society, governments, media, industry etc…All need to take actions on this.
We need to work and collaborate across industries to help solve this problem and find industry solutions: technology companies, media companies, educational organizations and our own community can come together to help curb the spread of misinformation and false news.

We're working to help build an informed community. We know people want to see accurate information on Facebook. People tell us they don't like stories that are misleading, sensational or spammy. False news and hoaxes are harmful to our community and make the world less informed and it erodes trust. Recent disinformation campaigns have shown how quickly disinformation can spread widely across social media platforms and influence citizens and decision-makers. At times of crisis, this can divert the attention of responders, affect the

sense-making and decision-making process and generate false perceptions and expectations of citizens.

At Facebook, Janne said “we take our responsibility seriously. We've been working on this problem for a long time and will continue to focus on our strategy, it is an ongoing work:

- doing everything we can to reduce the spread of false news to as close to zero as possible, building new products to curb the spread of false news and show less stories.
- Fake news is often spread by fake accounts, so the challenge is to identify and remove them ASAP. Facebook works with tech and people in measure to identify what might be false or misleading, what types of signal indicates that information can be received from the platform. Facebook
- Helping people make more informed decisions. Inform and empower them, so they can tell what is true/wrong and make the right decisions by themselves. Facebook launch initiatives on the platform such as articles context available. It also implemented “related articles to articles judged as wrong by the facts checkers so that users have access to different perspectives on an issue. Facebook launched educational tools on the platform before elections where it explains to the users how to spot false news and disinformation. Facebook launched initiatives on transparency where it tries to relaunch a feature to tackle “dark adds” which are not shown on a Facebook page. Facebook journalism prospects try to promote qualitative journalistic content and support them.

In Facebook transparent report, we can see that the first quarter of 2018, 5.6 millions of fake news have been deleted, 98% of those were taken down by AI; 1,5% following users reports. Facebook also blocked the creation of fake accounts from the start.

Some of our projects

Facebook Journalism Project: We are committed to collaborating with news organizations to develop products together, providing tools and services for journalists and helping people get better information so they can make smart choices about what they read. We are convening key experts and organizations already doing important work in this area, such as the Walter Cronkite School of Journalism and Mass Communication at Arizona State University, and have been listening and learning to help decide what new research to conduct and projects to fund. Working with the News Literacy Project, we are producing a series of public service announcements (PSAs) to help inform people on Facebook about this important issue.

News Integrity Initiative: We've joined a group of over 25 funders and participants — including tech industry leaders, academic institutions, non-profits and third party organizations — to launch the News Integrity Initiative, a global consortium focused on helping people make informed judgments about the news they read and share online. Founding funders of this $14-million fund include Facebook, the Craig Newmark Philanthropic Fund, the Ford Foundation, the Democracy Fund, the John S. and James L. Knight Foundation, the Tow Foundation, AppNexus, Mozilla and Betaworks. The initiative's mission is to advance news literacy, to increase trust in journalism around the world and to better inform the public conversation. The initiative, which is administered by the CUNY Graduate School of Journalism, will fund applied research and projects, and convene meetings with industry experts.

DAN SHEFET, **Lawyer, Cabinet Shefet, France**
Dan Shefet drafted for the French senate the first law on fake news. It did not passed and he in a way he was happy about this!!!

Dan in order to demonstrate his views on the subject of fake news began by calling one of his Danish friend lawyer Tom Togsverd to join and offered him the opportunity to put himself in the shoes of a new Facebook employee based in Bangalore.

Tom, this is your first day in Facebook and you are based in Bengalore and you have to make decisions.

First example: Six months ago there was a social debate in France and of course a strike place de la République in Paris. According to the organizers the number of people involve was 300 000 members, the police counted 100 000 and the government 50 000. Tom, everyone understood the political issues, how many you will report, which one is trust?
Tom answer: it is hard, usually the safe rule will be the government official data.

Another example: We had this case. A politician 3 months after the last election in France is accused on cheating on his taxes. The ministries of finance made it clear in front of the parliament and the politician was sent in prison.
Tom what to do, how to report, Maybe is true, maybe is not true and you are supposed to put it on line, so I can read it. Tom answered he will make an investigation. Dan asked how can you do that? You do not have an idea about all. Circulation of facts can be manipulated. So, you have to give an opinion. This is not black and white. Could be fake, could be not fake!!!

The third and most insidious example is this one: the bigger news is not fake in itself but it is an extrapolation of facts.
The most dangerous today for democracy. Not the fake facts but the influence from facts.

Janne added: that there is no doubt, we have to keep on learning. By the past we will put a warning. But the warnings had the opposite effect because people said to themselves, oh, that is for me!! Then we removed the warnings. So, instead we put it is not approved.
You are right, it is hard, you touch the bone. In fact, news needs to be approved. We have processes made by the IOCN.

Opinions, controversial news, who can say is true or not true.

The last example: In Eastern Europe sometimes ago, the President was running for reelection. It happens that he knew from school the chairman of the commission pricing energy. He also knew another friend with strong interests in energy's companies. Putting all together somebody put on Facebook that obviously the price of high energy shows that the president is corrupted because he has interests in it. This is an opinion. What you say?

Janne answered this is an opinion and there is a freedom of speech.

Another challenge:
One of the major digital policy challenges we are facing today is that of corporate consolidation: never has so much information, science and technology been controlled by so few!

Modern information and technology control started with the conquest of the Internet and, to a very large extent, the same players now expand their domination into areas like artificial intelligence, education, transport and medicine.

Their knowledge based and control exceeds those of most democratically-elected governments.
In the area of culture and intellectual property rights, the European Parliament recently approved the Commission's draft adaptation of European copyright law to increased digital distribution. One of the new obligations will be that of mandatory upload filters (i.e. a system which will allow pro-active monitoring of copyright protected works). This is thought mainly to protect the music and video industry while the instauration of a "snippet tax" is intended to compensate the newspaper industry.

These initiatives demonstrate that regulation is now critical.

Had the Net not been concentrated in the hands of a few overwhelmingly dominant players, "natural market mechanisms" would have "done the job" and proper remuneration of creative worlds could have been achieved through negotiation.
Unfortunately the modern platform economy no longer allows the "market place" to perform its functions and regulation is vital.
It is striking how the original visions of a decentralized "New World" have turned into the exact opposite.

The time has come to seriously revisit the utopian and celebratory dreams of the 90s as famously embodied in John Perry Barlow's 1996 Declaration of Independence.
The below adaptation of the original Declaration is intended to encourage a debate on the respective roles of tech companies and regulators ensuring that the necessary checks and balances be put in place. Further consolidation may gravely put at risk our societal values and human rights.

The absence of regulation has left the field open to societies that absolutely control everything. And their power is huge ! If they want to undermine a person's reputation, nothing more simple. From a society? same. These companies also know how to manipulate us. They know how we will react.

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Q&A

A question raised: what has Facebook learned from those initiatives?

Janne replied that this is indeed challenging. There is a balance to find between freedom of speech and fake news that can be hurtful. Defining fake news is complicated as some political speech in one country can be seen as fake news for the others countries.

To the Question: can one lead a search engine influence the selection of information, Dan Shefet answered that we must ensure that the information we carry, that is published or referenced on its site; do not undermine our core values. From the moment a content can harm our human rights, including our democracy, and that such a risk is reported to a dominant society, it derives from this power an obligation of verification, rectification, transparency.

Dan Shefet answered also to the question what can the European legislator by saying that in addition to regulation by competition law, the immunity granted to these companies (even if this immunity is "relative" in Europe and not "absolute" as in the United States) should be better regulated, but also that the decisions of justice allowing to engage this responsibility are made more quickly and that the sanctions are exemplary. However, it is not only the states that must act, but all of us. We need to be able to take our clicks and go elsewhere,

turn to European alternatives that already exist to these companies and that allow, in addition, enhanced protection of our privacy.

To the question: how to apply common rules to reconcile the sensitivities of more than 2 billion users worldwide?
Janne Evelid answered that people are using Facebook to challenge their ideas and raise awareness on important issues, but the company will continue to remove content that violates its community's standards."
Facebook's goal with false news is not to prevent anyone from saying something wrong - but to prevent false news and misinformation from spreading through the company's services.
This debate for the fight of fake news is certainly one of the most challenging.

Randy Yaloz, Founding Partner & Attorney at Law, E.L.C. Group, France raised the point that we do not talk about fake news from Wikipedia which often comes up when looking information. As a lawyer in IP, Randy talk about the fact that some Wiki content, cannot be taken down as being 2rd part contributions. You can have false information for many years on Wiki and this hurts reputation. Wikipedia being one of the major sources of info it is problematic that there can be false info remaining for years. Randy asked the opinion of the speakers on that. Dan replied that regulation on internet can destroy companies and life. He told the story of a mathematician who wrote false information for a test. Everyone thought it was true and he became a famous mathematician. His mathematician peers did not understand this. What is on Wikipedia must be questioned. It is a big problem. We need to see how GDPP rule will play out for European members' states.

Another question came from Sherif Aziz, Advisor Strategic Planning Public Establishment for Industrial Estates (PEIE), Sultanate of Oman. He talked about India or others Asian countries vision on fake news. India suffers from fake news at the micro, local and national levels. This plays a role for shifting opinions, trends. Democracy has mutated into an electronical process facilitated by social media.
Janne explained that there have been cases where Facebook has been used to hurt democracy in several countries, all over the world. Using Facebook to promote violence is against their roles and Facebook deletes those groups. For Janne, fake news and inciting violence are not the same issues. In India, WhatsApp is having a great success, but being crypted, content moderation is not possible.
Dan added that there is a difference between hate speech and fake news as both are different concepts. The problem is that most hate speeches come from US groups and the 1st amendment make that it is a crime to criminalize hate groups. It makes clashes between US, EU, India regulation over content published by Facebook as it is a US company

Session 2

Day 1 – Afternoon – Plenary Session

Safety & Security in an Interconnected Society

STEVEN LAFOSSE MARIN, Founder & CEO, UMAN, France opened the session as its chair & moderator by presenting UMAN, a startup building a digital platform to contribute on Development and Humanitarian sectors that he co-founded. UMAN works with Donors, Trust fund, NGOs and beneficiaries to shorten the time needed to provide funding, from the call proposals to the delivery. For the start-up, Trust is fundamental to contribute to sustainable aids.

In our global interconnected society, Safety and Security risks are more and more part of the leaders and C-levels agendas.

We recently heard about the Social media Leak affecting 50 million Profiles and the intention to make a big cybersecurity acquisition to regain trust.

How to protect data, people, democracy, trust in companies, we are all concerned about this subject.

Steven Introduced the first speaker **FABIO PEROSSINI based in United-Kingdom, Founder & Managing Director of Kpeople** asking him to provide an overview of an interesting European project named Storm Project and how the STORM approach could be implemented to provide coverage for the full disaster facing cycle for Cultural Heritage?

Fabio delivered a very interesting overview of the Storm Project -**S**afeguarding **C**ultural **H**eritage through **T**echnical and **O**rganisational **R**esources **M**anagement- which benefits from safety and crisis management reflexes regarding full disasters to protect our cultural heritage, From the Prevention to Detection and Response

This is not specially a project on cybersecurity, but it is dedicated to safety not for people but for cultural heritage.
Our main goal is to improve resilience of cultural heritage starting from prevention to detection and response.
To do that we have working now for 2 and ½ years. We have achieved some very important results and committed to achieve further in the next 6 months.
Working in the context of resilience, we have understood that is very important to work in collaboration between all the actors that could be involved in safety. And this is a very difficult challenge as we are talking about people with very different competencies and also with a glossary completely different. So talking with restorers, engineers and firefighters, we are talking with 3 different languages and this is a challenge.
So, for instance, in our project, we start creating a framework of references in order to have the people to communicate with each others.
Then it is important to stay on the field to understand what is going on day by day and what could happen. You cannot do this job staying at your desk and waiting and designing solutions without having a prior view of what are the possibilities.

At the end, it is not possible to avoid disasters, but we can limit and block damages as soon as possible.
We achieved a predictive model. We are now able to understand from some statistical data how is the possibility to have a disaster in some place.
This is unfortunately not value for earthquakes, but we have a couple of teams , one in Turkey and one in Greece working on earthquakes and I can tell you that they are able to understand how a building is going to collapse in terms of earthquake. And this is very interesting because we can be prepared of this kind of collapse. It is important to monitor the situation and this is very different if you talk with a firefighter, an architect or an engineer.
So, first of all when we are talking about monitoring, we are talking about real time data monitoring. So, we are considering IOT, something that would work everywhere, every time on a resilient communication and this comes back to the 3G, 4G, 5G discussion. It is very important to create a collaborative environment that should count on security. So, Cybersecurity is mandatory. We are talking about sensible data. For ex. The value of some cultural heritage is very sensible because during the disaster there is a high risk that culture goods could be stolen by people going around.
It is very important to have people prepared to face the disaster. This is also valid for cybersecurity.

To answer to the question of policy improvement:
The policy around the world in Europe as others parts of the world are not updated. So, there is no fund for preparedness. Nobody is dealing with that. So, we started with a data collection. We collected the existing data. They have not been digitalize. This is not a project to digitalize the data. They were kept and considered for their importance. We defined priorities and vulnerabilities of cultural heritage. To do that we assess a preparedness. So, all the tools and procedures need prepare when asset. There were a lot of activities in pre-disaster in order to have simulation and people frame ready, each person knowing exactly what to do in case of disaster.
There is a platform behind this that follows. You can see a tablet and when going on field, people have this tablet that clearly gives information about priorities and how to proceed to save the cultural items. It seems easy. But I can tell you that this is really a key point.
I just release few days ago a document in which the process describes is very similar.
We did not called this project the social value of culture because this project was to face physical emergencies and also the tangible goods aspects. It could be in the next one.
We are not intended to stop.
We are very proud to say that we involved a lot of projects. We are talking about 7.3 million euros project, 20 partners from 7 countries. So, we have a wide range of competencies in place and thanks to the European commission we could do a great job.
At the end the key word is process driven experience.

Steven asked Fabio: Do you think that this innovative approach could be accepted for governance models?
Fabio answered that this is not easy although some governments show some flexibility. But the investment to be done is huge and the results are not so much visible on a political point of view. You cannot win the reelection with this.

The second speaker was ensured by **DAN SHOEMAKER, Professor and Director of the Graduate Program in Cybersecurity and Principal Investigator for the National Security Agency's Center of Academic Excellence at University of Detroit Mercy** who made a relevant speech to share some global Cyber Security approaches through the spectrum of cultural diversity, especially in US and UK.

Dan started by stating that the standard definition of trust is the most important. Everyone has his own definition of what Trust means. If Dan made a survey on the audience of the Global Forum on the sense of this word he would surely have one different definition per person.
The subtitle of Dan's speech is *"Or Why I Sleep Like a Baby",* he explained that babies wake up every two hours like a sign of anxiety or fear.

By the year 2021, cybercrime will cost the world six TRILLION dollars annually compared to 1 TRILLION dollars in 2012. This shows that things are not improving.
The human attack surface will total Six BILLION people making infrastructures even more vulnerable with the raising number of devices connected. The fastest way to bring a country to its knees is by attacking its infrastructures. Everyone is aware of that. The biggest threats do not come from countries but from groups of persons with genius level digital skills.
When thinking about cybercrime, we only think about issues connected to computers but that is the least of the problem, this definition of cybercrime only directly addresses one third of the problem, for the last 10 years the statistics shows that computer/ hacking / all electronic causes of cybercrime are only caused by this factor at 29%; The main causes are the causes related to human factors such as insider threats 35% and causes related to physical factors such as theft, someone losing his laptop outside of the company 36%.

We need to have a common concept of what is trust, the fact that there is not only one, make it impossible to set standards. We all have our expertise, we all have things we do very well but the problem is that we do not do everything well. Cybersecurity is a blend of folks, skills and abilities in a single systematic solution which must incorporate all those elements otherwise it is ineffective. It would be like guarding a mouse hole while it comes in and out from another hole is waste of time and money. It must be a complete and fully integrated solution or no need to invest in it.
Hackers are trying to get by the defenses so when talking about cybersecurity, the problems are gap in your defense. If you do not have a comprehensive defense, hackers will find gaps on it explaining the spectacular figures of loss due to cybercrime.
We need a single model explaining to people what needs to be done and how. The US Government built a roadmap defining cybersecurity. The US National Initiative for Cybersecurity Education (NICE) framework (NIST 800-181) defines a complete set of roles for the cybersecurity workforce with 7 areas: Security Provision; Operate & Maintain; Protect & Defend; Investigate; Collect & Operate; Analyses; Oversee and Govern.
The British also have their own roadmap defining cybersecurity which is practically the same as the US one.

Following Dan's presentation, the moderator Steven Lafosse Marin asked him if the roadmap defining cybersecurity is already an accepted standard & method in the US.
Dan replied that the US government is leading on this with national agencies. Academics & industries in general are catching up on the concept. But this is big broad scale policies with nothing to do with machines room, there has been attempts to give this to the people but this only adresses one third of the cybersecurity issues.
Steven asked another question about how to cover the ICT supply chain risks. Dan explained that everyone buys software without knowing what there is in it. If one wants to bring a country to its knees, what one could do is to infiltrate the supply chain at the bottom level where you could temper with the software which production is outsourced in India, then in Vietnam. As a CEO it would be important to have a secure supply chain, knowing what you buy from who and without outsourcing.

The floor was then taken by **SØREN SENNELS, Chief Operating Officer of Dencrypt, Denmark** who made an insightful speech to share his vision regarding encryption and why it is key for Safety and Security?

Søren Sennels started by briefly presenting Dynamic Encryption, the technology proposed by Dencrypt which proposes to bring security to the application level. We cannot assume that communication infrastructures are secure. When sending an email on the internet, you cannot be assured that nobody reads it, when doing a voice call not sure to not be intercepted, same with SMS.

Dencrypt works with Advanced encryption solutions and actively wants to deploy End-to-end encryption to mitigate the security flows of some of the networks. Dencrypt has its own Dynamic Encryption Principle and voice application app allowing secure mobile voice calls & messaging over the mobile network. This application works on iPhone and is Common Criteria certified and accredited for classified information. It allows using a classic smartphone to make classified voicealls.

With its Dynamic Encryption principle, Dencrypt do not pretend to invent some fancy mathematical solution but do encryption in another way. Usually when doing encryption today, you keep the same encryption system but change the key all the time. In fact today, 95% of all data is encrypted using the same US standard Advanced Encryption Standard (AES).

With Dynamic Encryption, you change cryptosystem for each new data transmission extending the principle to changing the key to also change the cryptosystem. This brings a lot of benefits. Some companies; organizations are worried about the length that the Advanced Encryption Standard will be secure. Data are secured today using AES but what about in the future. Dynamic Encryption allows extending crypto life time; moving target defense; prevents crypt analysis attacks and enhanced protection.

The problem is that mobile infrastructures cannot be assumed secure. Today's mobile systems are a result of an evaluation. Even with a 4G modem phone which has decent security, the device also contains a 3G & 2G modems. The 2G modem is a weak component allowing possibility to intercept calls. Of course 2G was not designed with todays' security implications in mind nor to provide access for a plethora of 3rd party content providers who use the network as a business.
The mobile core network elements contains still the SS7 - Signaling System 7 a system coming from 1975 but this is still used in 2G & 3G networks and 4G has be woven on the diameter but even the diameter has many weaknesses of the SS7 network.
Cybercriminals are lazy people so they attack weak spots such as SS7.

Using the SS7 protocols allows a wide range of attacks: location tracking; intercepts of call & SMS; denial of service; spam; fraud... Many examples of this such as in the TV show "60 minutes" in 2016, we saw a man hacking the phone and intercepting a call between a BBC journalist & an Australian Senator. In May 2017, the O2 network in Germany was hacked using this SS7.

The European Union with ENISA - European Union Agency for Network and Information Security- has shown concerns about this in a report published in March 2018. One if the report conclusion is about the future perspectives for 5G: *"...., there is a certain risk of repeating history."*

5G was heavily discussed in previous sessions but there has been not enough talk about security and if we do not have the same situation as previous generations.

The moderators of the session asked Soren to have his views on the reasons why it is so hard for operators to secure their network.

Soren replied that without a secure network, we cannot guarantee that data transferred via the network are secure. If you do not have the trust that data are transmitted in a way assuring security & privacy you cannot have trust in the network. It is fundamental for 5G networks and thus disrupts their businesses.
Digitalization continues to grow with more and more things digitalized and thus vulnerable to cyber attacks.

Steven then introduced Eikazu Niwano
Eikazu, ecosystems are more and more important, we heard huge figures with trillions of futures IoT and mobile sensors, interconnected to big data platforms using Artificial intelligence works.

EIKAZU NIWANO, Research Professor in Secure Platform Laboratories, NTT Corporation, Japan shared his valuable insights on *"Trusted Ecosystems based on Secure ID Components".*

This year, The Telecommunication Technology Commitee (TTC) has given Mr. Eikazu Niwano "The Information Communication Technology Award (The MIC Minister's Award, *Ministry of Internal Affairs and Communications)" for his "Contribution to R & D, standardization and practical realization on advanced IC card system"*
That is for his almost 20 years activities. This is very prestigious award in ICT sector in Japan as last year the father of Internet in Japan has received the award.

Eikazu started with mentioning the importance of trust for ecosystem environments by applying tamper resistant module.

As background, recently the security concern about IoT device has been pointed out much. For example, a few years ago there was a report that the car was hijacked experimentally and the steering wheel was operated illegally from the outside. And also there are many reports that cyber-attacks are done through hijacked low end IoT devices such as surveillance camera.
Such situation can be applied into the public infrastructure, and it is often said this will cause serious situation as you see.

So it is not so much, but gradually adoption of tamper resistant module has started in for example GSMA, OneM2M, and CSA. to protect services. And recently it is strongly pointed out that it is important to guarantee the authenticity of device to avoid such problem.

On the other hand, because security concern can be existed in supply chain of products over country, then the importance of security certification of device is also important issue and it has been referred by ENISA etc.

Then, to solve those problems, trust management for device components become important
Traditionally and historically TCG, Trusted Computing Group, has studied it based on a kind of tamper resistant module called TPM (Trusted Platform Module).

GlobalPlatform which is an international standardization organization of secure components has proposed "Device Trust Architecture". It generalizes the framework of Root of Trust, Chain of Trust in device and remote device attestation based on Secure Components, such as Secure Elements like embedded SIM chips and Trusted Execution Environment.

The framework reflects dynamic issue of variety of device manufacturers and types of models of device components in ecosystem environments.

However furthermore there is another kind of dynamic issue, it is, increasing connected system and system of systems (SoS) in distributed environments.

In those environments, there are huge numbers of ID components over man, things and software objects.
So management and guarantee of the trust of system and system of systems will become important in addition to device trust issue as next.

To conclude, the trust for complicatedly combined, composed and structured ID components in system or system of systems of ecosystem environments will have to be well managed over secure components.
And then the study of security by design, assurance, certification, evaluation methodologies for them have to be done, towards constructing "trusted ecosystem based on secure ID components".

Following his presentation, the moderator, Steven Lafosse Marin asked Eikazu Niwano his view on the promising markets for using secure components with IoT / Cyber Security.
Eikazu replied that the Standardization organization GlobalPlatform says it will be medical, automotive and utility. He thinks that if it is related to the risk of human life or some finance, the demand for secure components will increase as it is usually says.

Steven Lafosse Marin asked also if it is the time for secure components to be required quickly with IoT / Cyber Security.
For Mr. Niwano, it has taken much time to migrate the plastic card to smart card, because if we are not aware of critical incident, we do not launch the use of strong security tool to avoid any cost.
The convenience of the IoT service is first and then next IoT security issue, finally the solution utilizing the chip is needed. To accelerate the usage it is necessary to analyze the use cases and to cooperate with organizations with standardization bodies related to effective fields.
In any way, it might take time, but Eikazu is sure it will be required as well as the case of smart card including SIM card.

Finally the moderator asked what is important in realizing a trust using secure components.
Mr. Niwano replied that regulation and certification schemes are important. Then, collaboration between standardization bodies and government, municipality and certification bodies will be more important from now on.

JESPER ZERLANG, **CEO of LogPoint, Denmark**, 6th speaker of the session made a presentation on *"Securing the Digital Transformation".*
Steven introduced Jesper saying that Demark is one of the most digital counties in the world. A country well into the Digital transformation journey.
This is a key driver for the development of the public sector and for the growth and competitiveness of private businesses.
However, being digital a digital nation, also means an increased exposure to cybersecurity risk.
LogPoint is a cybersecurity company, dedicated to securing the Digital transformation journey and converting the increasing amounts of data in digital society into actionable intelligence.

What are the biggest challenge we face in securing the Digital Transformation journey? And how do we employ technology to address these challenges?

Jesper Zerlang replied that the ever-evolving Cybersecurity threat are jeopardizing the Digital Transformation journey; economic growth, social and political stability. While technology provides part of the answer, the biggest challenge is the shortage of qualified Cybersecurity specialists: the real cybersecurity threats have to be addressed by humans.

As the amounts of data are rising exponentially on the digital transformation journey, technology is needed to effectively mitigate the workforce gap. Advanced analytics tools aided by Machine Learning and Artificial Intelligence is the answer to address the challenge.
SIEM - Security Information Event Management, UEBA and IR are key technologies to help organizations and their cybersecurity professionals cut through the noise and deal with the cybersecurity challenge. These technologies help to identify threats in real-time, eliminate false positives, narrow the scope for human intervention and effectively address actual threats.

The Threat is real, CEO's rank Cyber Threats in top-5 on par with Geopolitical Uncertainty and Terrorism. In 2017, 20% of CEO's were extremely concerned over Cyber Threats. In 2018 it doubled to 40% first being the Over-regulation.
Digital technology dramatically improves the economics and capabilities of every business
Every company should continuously reinvent its business with efficient use of data at the core. The mission of digital innovators is to harness data to continually improve customer outcomes and improve operational excellence.
At the core of the Digital Transformation is keeping your data safe, managing data efficiently, making sure data is in compliance and enabling the exploitation of data efficiently.

The Digital Transformation is based on Data with an explosion of the amounts of data created that you cannot imagine unless you are a statistician. Data and analytic capabilities really transform entire industries.
The explosion in data is impressive as 90% of the data were created over the last two years. To have a better vision of this it means that the volume of data created up until 2005 is created today in 10 minutes.

SIEM - Security Information Event Management is the answer to protect your data, as it provides real-time analysis of data generated by applications and network hardware.
SIEM is a core business platform and a key tool for the IT security department. SIEM is to Security what an ERP (Enterprise Resource Planning) system is for finance department or CRM (Customer Relationship Management) system to a sales department.
In 2 years, every company will have a SIEM. Unfortunately, Europe is a bit lagging behind the USA in this field. For instance, when Jesper's company LogPoint calls a US customer, the question is "what type of security system you have" and explains them the strong points of LogPoint; in Europe the company has to explain to the companies why they need a system then present itself. This shows the different level of approach in this field.

Data are like billions of digital fingerprints as they are numerous and impossible for the human to analyse and find relevant information. This explains why we need to rely on machine learning & AI for this task and render the data readable and exploitable for humans.

Advanced Analytics enabling Cybersecurity through a coherent collection of data meaning that the machine handles data from all sources (email, figures, tables…) structured as well as unstructured and process to a normalization of data, normalizes data to a common taxonomy. Then Advanced Analytics stores both normalized and raw data and analyzes and visualizes data across all sources in one dashboard.

The digital transformation is needed but it needs to be secured. In the digital transformation, you need to protect your brand, increase availabilty and gain new business insights and to do this you need data which could be used also for much more. In the same time, companies need to secure IPs. Lots of companies, academics and others entities do not enough to protect their IPs which is crucial as it is easy to steal and manipulate data. Jesper is always surprised by the way big companies mismanaged risks in the cyber world.

Today we need between 1.5 and 2 million skilled people that know everything about cyber. This is why AI & machine learning is going so fast as we have not been able to educate and train talents to understand what cyber is. For a lot of people cyber remains a big black hole. For Jesper every country should train its population to be a cyber warrior just like Israel when young people do their mandatory military service. The Israel vision on cyber explains why Tel-Aviv is second after Silicon Valley in term of security start-ups nurtured with 800 cybersecurity business.
Jesper thinks that every country in Europe should offer a sort of military service to train their population to be cyber warriors and thus learn how to hack & defend your country.

Following Jesper's speech, the moderator asked him the impact of IoT and 5G on the amount of data that will be created.
Jesper replied that we have to support this, the role of machine in this will be prominent. Attackers are already using machine learning to guess passwords. We should be open to do and willing to share issues & compromises. If we do not share and know, the hackers have no borders and will attack worldwide. We are in a global village and need to collaborate or it will be complicated to struggle against cybercriminals. As human we are slow compared to the cyber who is evolving at a much faster pace.

SARAH-XIOAHUA ZHAO, **Partner, Baker Hostetler, China & USA** assured the last presentation with a speech on *"China Cybersecurity and Data Protection Rules".*
Steven introduced Sarah:
Sarah, you are partner at Baker Hostetler, an American law firm founded in 1916, you have a substantial experience on Cyber regulations topics in China.
* How the Chinese cybersecurity regulatory is evolving?

Sarah Zhao started by saying that she agreed with the previous speakers, that data is gold. The data security business is booming. Three years ago Baker Hostetler had only a few lawyers dedicated to data security & privacy. Currently, there is a group of about 50 attorneys in 14 offices with a revenue of over 30 million dollars a year.
Data security is also the most internationally oriented sector since the Internet technology has bread down the borders among different countries.
Sarah made an introduction to Cybersecurity Law of China. She stated that before June 1st 2017 when China Cybersecurity Law took effect, China had not have comprehensive rules governing cybersecurity or privacy. However, there were more than Thus all stakeholders were wondering the rules; there were more than 100 Chinese rules, policies, laws, local rules touching different aspect of the area.

In 2015, Chinese government started to draft the cybersecurity law. The first Draft was issued for public comments but raised a lot of controversies. The government revised the Draft and released the second Draft 2 months later for public comments. Again, the public reacted to it with a lot of critics. The third version has finally become the formal law on June 1st 2017.
It is the first comprehensive cybersecurity and data privacy law in China. The law focus on two major issues (1) national security through Internet (2) data security and data privacy. The

Cybersecurity Law mandatorily requires the network service providers in China not only to participate in the protection of the national cybersecurity, but also to protect the privacy of collected personal information. The law is broad and ambitious. Following the law, a series of the implementation rules and guidelines have been issued to provide additional detailed explanations, standards and compliance requirements.

About 10 implementations rules and guidelines, or the draft of the rules have been issued after the Cybersecurity law was issued, focusing on different aspects. For example, the rules on security technology, on assessment on cross-border personal information, on new technology used for online news media, and the guideline on personal information security specifications. The newest one may be the draft of the rule on Blockchain. The deadline for public comment was last week on Nov. 2.

Following the establishment of those rules, the Chinese government started its enforcement actions. For example, In August 2017, the Chinese government launched investigations on about 10 major Internet service providers including Baidu, WeChat (Tencent), Jindong, Taobao for violation of personal information privacy. The penalty on the violations ranged from 50,000 yuan to 500,000 yuan. The government requested them to add the data security and data privacy aspects into their website, stating their obligations to their customers. In January 2018, the Intermediate People's court of Nanjing has accepted a case against Baidu brought by Consumers Protection Association for installing two apps on cell phones without customers' prior consent for getting customers' location and contact information.

The broad definition of the rules, the absence of roadmap to follow, and the government's vigorous enforcement actions have provided the evidence for domestic & foreign companies to be cautious. There are cybersecurity and privacy compliance obligations for companies to follow. The requirements include having users' true identities, storing data servers locally in China and providing "technical support" (wiretap access) to the Chinese government during investigations involving national security. Failure to do so may trigger not only monetary fines, but also the termination of one's business license, or even certain criminal penalties.

Data security and privacy issue is also a key issue for mergers and acquisitions in China. There is a need to conduct a due diligence on data breach and data protection. During a due diligence, many questions should be asked. Here are some examples: (1) Has the targeted company had a government investigation inquiry regarding its data security and data privacy? (2) Has the company received a litigation claim regarding its data security or privacy? (3) Are there any customers' complains regarding privacy existed? (4) Is the company in a sensitive industry, like infrastructure or credit cards? (5) Does the company have an appropriately written information security program? (6) Does the company have an appropriate incident response plan? (7) Has the company conducted and recorded the internal security assessments? (8) Does the company have a vender management program in place? (9) Does the company have a system in place to identify privacy or security problems? (10) Does the company have the personnel who focuses on data security and data privacy issues? ...

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Sarah Zhao started by stating as previous speakers that data is gold. The data security business is booming, 3 years ago Baker Hostetler had only 3 lawyers dedicated to data security & privacy now a group of 14 persons do this made a revenue of 30 million dollars.
Data security is also the most international domains as there are no borders.

Sarah made an introduction to Cybersecurity Law of China by explaining that before the law of June 1st 2017, China did not have privacy or cybersecurity rules. Thus all stakeholders were wondering the rules; there were more than 100 rules policies, laws, local rules governing this area.
In 2017, China government started to draft cybersecurity rules. The first draft was made public and raised a lot of controversies; the government revised the rules and released a second draft 2 months later which was again welcomed with a lot of critics. The third draft and final version was released and effective on 1st July 2017. The law has a broad reach and ambition and covers almost all areas. There was no roadmap for local & foreign companies to follow.
The government issued the implementation rules and regulations for the different areas and perspectives.
The rules implemented were around 10 rules or draft rules covering the implementation.
For instance rules for assessment of the security for cross-border exchanges of data, when those exchanges could occur before government approval, when do you need to notify the government… The rules also defined what is personal information and guidelines to follow to ensure security.
The most recent rule refers to blockchain that are currently being drafted.

Following the establishment of those rules, the China government implemented enforcement actions. One example after 2 months implementation of the rule on August 2017, the Chinese government launches investigations on 10 majors internet service providers including Baidu or Tencent and half of those investigated companies did not comply with the law and were fined from 10 000 to 500 000 Yuan. All companies were sentenced to review their privacy policy, online statement regarding the use & collection of data, security permission.
Sarah used as a second example a lawsuit filed by a consumer protection association against on January 2018 over the fact that Baidu installed 2 applications on their new cellphone before the purchase from the customers. Those applications were used to gathers personal information like GPS & contacts without customers' approval beforehand.

The broad definition of the rules and absence of roadmap to follow, the government enforces the law so companies domestic & foreign need to be cautious.

There are several cybersecurity and privacy compliance obligations for companies notably the fact that personal information collected in China need to be stored on a server located within the Chinese territory. There are few exceptions for this. Companies need to inform their users about the collection of data, reasons & usages.

The main objectives of the Chinese Cybersecurity Law are national security and data privacy. In case of non-compliance to those rules, there are monetary and criminal penalties.

The cybersecurity is also a key issue for mergers and acquisitions in China, there is a need to conduct a due diligence on data breach and data protection.

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Q&A

Following the panelists' speeches, the micro was opened to questions & interactions with the audience.

The first question came from Jakob Willer, Director, Telecom Industry Association, Denmark who asked Sarah Zhao if she could provide an example of violation of data protection rule and generally to the panel if the panelists consider cybersecurity to be a barrier for the development of digitalization. Jakob thinks that the biggest problem would be the difficulties to recruit 1 or 2 millions of cybersecurity experts. Most companies will soon need an expert in this field and there are already 4 million vacant posts for cybersecurity experts.

Sarah Zhao replied that the Chinese rules are still very young so there are so far no severe punishment for a company/organization which did not comply with the rules.
Two years ago, a Chinese hotel chain has been hacked allowing the hacker to obtain 500 000 customers personal data and credit card numbers.
Another example concerned another hotel chain in which one personal obtained customers personal data and credit card numbers and reselled them via internet in exchange of bitcoins.

Jesper Zerlang reverted about the point whether cybersecurity would be a barrier to digital transformation. He replied that it would not be the case; cybersecurity is not an IT issue but rather a core strategic issue with top management. This fact is being taken into account according to Jesper as more CEOs and involved and aware of the cybersecurity issue. The companies are reluctant to invest in this field as for now it did not happen anything to the companies. Most companies react when they have already been targeted of cybersecurity issues. Being strategic, the cybersecurity agenda should be at the top of the digital transformation strategy for Jesper.
The people skills gap is really an issue and explains why companies are tempted to outsource cyber to far countries like Bangalore but it requests to implement a certified and right evaluation process to be sure that the software is legitimate.

The second observation-question came from Tamara Shoemaker, Director for Center for Cyber Security & Intel Studies - University of Detroit Mercy, USA who talked about the skill gap. There is a need for a call for change as at the University level, it is too late to reorient people to the cyber domain. Tamara explained that she is involved in a program called "Cyber-patriots" which reaches children between kindergarten and 5th grade. Children today are good users of the internet as they grow with it being part of their daily lives but they do not know that they give away a lot of things. The aim is to make the children aware of the security & privacy issues and that they adopt the right reflexes toward cyber and internet. Cybersecurity should also incur a real cultural change.

The final question came from Chetan Sharma, Founder & CEO, Datamation Group India who asked suggestions from panelists about the behaviors that should adopt users/consumers toward the fact to be under constant surveillance from some huge digital players such as Google or Facebook.
How to ensure security of open learning system and open information exchange platforms?

Jesper Zerlang replied that for the consumers/users to be safer, the best tool would be through education and behavioral changes because it is possible for consumers/users to go against major digital companies. Politicians could play a big part for this, Europe is leading in this field with GDPR - General Data Protection Regulation and its 4% annual revenue fine for non-compliance. The USA is also strong on this point with a lot of fines inflicted since the financial crisis of 2008 and personal responsibility of board. Same for UK with extension of GDPR with possibility to fine the members of board directly in case of data compromised. .

Dan Shoemaker stated that the security issue will surely be regulated at the international level because the US governments cannot act taking into account what is at stakes for both

the business and government sides. The US government tries to keep things as they are because politicians do not have the mindset to see the changes.

Session 3

Day 1 – Afternoon – Parallel Session

Role of Artificial Intelligence & Data

JEREMY MILLARD, Senior Consultant, Danish Technological Institute, Denmark was the chair and moderator and opened the session by reminding the audience that Artificial Intelligence and Data are huge and complex subjects. He insisted on the role of the Global Forum to help people to keep updated and abreast of the news and impacts of those key topics. Contrarily to speeches that occurred during the previous sessions, Jeremy Millard would take a more balanced approach focusing on both the positive as well as more negative aspects of Artificial Intelligence.

Artificial Intelligence and Data promise many benefits notably for public services, new services, health, education, transport,etc… The combination of AI and biosensors will ensure that in 10-15 years the poor and most-marginalized persons will have health care at least to the same level that the richest do today. This shows how fast things are evolving. Personalized healthcare using biometrics and AI will revolutionize health.
However there are also problems. For Jeremy, regulators, policy makers and consumers accept what is going on without a clear understanding of what it is. One interesting thing is that Google's motto when it started was "Do no evil", but the company subsequently dropped this few years later and instead focused upon making money as much as possible.
Joseph E. Stiglitz who used to be chief economist at the World Bank said that when most companies today not only in digital sector think about increasing their profits the choice is whether to make better products or services or to exploit the consumers. Often the way forward is exploiting the consumers.
Today there are increased services and applications that we like but they are not free, we do not give money but our data. Allowing companies to monitor the consumers, their habits, consumption habits, opinions, our contacts and friends…
This is a real challenge, the companies do this not because they are evil but because they want to make profits.
For instance, YouTube has an algorithm that defines what would be the best videos for you to watch after the one you are currently looking at. The algorithm does this not based on the quality of the videos but on the search of sensationalism because sensationalism makes users more likely to watch the videos and thus increase the audience for the ads and the revenue coming from the ads. One can wonder whether it is the fault of the consumers that the algorithm and AI tends to direct us toward sensationalism, or whether the regulators should insist that companies which design the algorithms also minimize societal harm as well as make money
Jeremy reminded that we do not have regulations saying that algorithms must do "good" and it would be difficult because we would need to agree on the definition of good first. The best way forward may be what is currently discussed, making algorithms transparent allowing anybody to see the potential biases and problems. Companies using or creating algorithms are against this because if their algorithms is fully transparent, they will lose competitivity. An analogy here might be open source software.

Over the last 5 years there have been many discussions about the loss of jobs that could happen because of AI. For Jeremy, there have also been many surveys showing that job creation is also huge thanks to AI and Data. It is in the interest of all companies whether in digital/tech or not that unemployment does not explode otherwise consumers would not have sufficient income to purchase the companies' products and services.
The WEF - World Economic Forum - pointed out with a report in September 2018 that globally in the next 10-15 years, there will be at least 50 million net new job created. Many of these new jobs will be in areas that we do not yet know.
There will be job losses that need to be taken care of, but this is normal when new technologies arise. Jeremy Millard does not think that this is necessarily bad news.
The question is how as a society, regulators, policy makers and experts, we can make sure that good outcomes arise from AI and Data. This is the basic issue.

The key issue for Jeremy is to define what technology does well and what people do well? Technology is good for applying precise rules and standards in routine ways, to very large data sets and looking for, patterns. People, on the other hand, are much better at exercising compassion, empathy, caring, teaching,- having personal relationships, being creative and the ability to link innovatively across different sectors and aspects of life - In Denmark this is called "warm hands", and many public services reply strongly – on - "warm hands". When we combine the qualities of both people and technology, the impact is much better than each acting independently.
A study in Denmark from July-August 2018 showed that in the health sector having human interventions on top of data analytics give a better result than only relying on data. Better results are obtained when a doctor looks both at a patient's data as well as meets the patient than only with the patient's data. There are things that data cannot say/share.
The Danish Ministry of Higher Education & Sciences invested 500 000 Euro into looking at Danish values in the 4th Industrial Revolution technology landscape, including AI. Such Danish values are of course open to discussion but they cover open and democratic society and transparency notably. The question is again how to make sure that those technologies do good for society.

ANNE CARBLANC, **Head of Digital Economy Policy Division, OECD Directorate for Science, Technology and Innovation** made a sparkling speech on clear on OECD views on Artificial Intelligence.

Anne. Carblanc stated that the thorough introduction of Jeremy Milliard, reminded her about the topic of climate change as we know that there is an issue but we have not yet been able to resolve it.
For Anne Carblanc, Artificial Intelligence can do a lot of good but we have to fight against short-termism which is a disease that many policy makers are faced with. The same issue confronts business that wishes to make rapid profits.

Anne then briefly presented the activities undertaken at the OECD - Organisation for Economic Co-operation and Development- that are relevant many areas of the digital economyand, policy, including Artificial Intelligence. The OECD started working in this area in 2016 with the organization of 2 conferences, with the outcome of the second showing that AI is transforming the economic and social sectors at a much higher speed and more deeply than previously anticipated. Transformation is so fast that policy makers also need to move fast.
Following these conferences, the OECD worked on an analytical report which tried to provide a general overview of the state of research of various applications, of policy issues, of the measurement of AI and is now developing principles for AI that could provide policy guidance for governments.

Given there is no agreement on a single definition of AI, the OECD is working an AI definition that could be broad enough to encompass current AI application intelligence and future applications. For the OECD, AI can be understood as equipping systems with cognitive functions that allow them to function appropriately and with foresight in their environment. “With foresight” is meant that AI can perceive and learn from its environment in order to learn to adapt to dynamic environments. AI is implemented in various sectors such as the sciences, agriculture, health and transportation.

The economic impact of AI is important because AI algorithms detect patterns in enormous volumes of data, they can improve the accuracy and efficiency of predictions and lower costs. The main benefits of AI are productivity gains; lower costs; safety and also capacity to help address complex challenges because of the ability of AI to analyse and detect interactions beyond human possibilities.

The OECD started to measure AI using patterns, databases, scientific publications but also investments in AI startups and the finding is that investments in AI nearly doubled in 2017 to reach 15 billion USD with a projection of 24 billion for 2018. Most of the private investments are in the USA, China, EU (United-Kingdom leading), Israel, Canada and Japan.

Policy issues related to AI impact every social and economic sphere, from access to the technology, to computing resources, to data; to usage and education and skills issues; to innovation and regulatory experimentation; market openness; trust and society; and jobs.
In relation to jobs issue, Anne pointed out that AI already equals or exceeds human capabilities in many domains and that AI can replace individual tasks not whole jobs previously done by humans.
The OECD, predicts that the impact of AI on jobs is that 14% of jobs in OECD countries are at a high risk of automation, whilst another 32% of the workforce is likely to see substantial changes in their jobs. According to Anne, AI creates jobs but we do not yet have an idea of the number, and is amazed to see reports and studies that purport to be able to accurately predict the number of jobs that will be created with AI. The OECD prefers to take a cautious approach on this. Anne concluded with the fact that policy makers need to be active for jobs and AI by investing in education, skills, social protection and dialogue as not everybody will be able to proceed smoothly through the AI transition. There will be people left on the sidelines who require help and support. Policy makers need to create incentives for the creation of new jobs.

The OECD started to work on policy principles for AI with a multi-stakeholder group consisting of governments, industry, academia and civil society. The first meetings were in September and November 2017, followed by two more in January and February 2018.
Garry Kasparov, former world chess champion has been heralded as the first human-being to lose his job due to AI.
The OECD’s policy principles aim to foster trust in and adoption of AI. The draft principles are that AI needs to be Inclusive and support sustainable growth and well-being; human-centered values; awareness, disclosure and understanding; robustness and safety; risk management; and responsibility.
The principles for policy making are stewardship and a whole of society dialogue; research and innovation; access to infrastructures and resources; capacity building; governance and ethical oversight; and international cooperation
The principles could be incorporated in a Recommendation of the OECD Council.

In 2019, the OECD will launch its AI Policy Observatory for governments as a center for evidence collection, debate and guidance for on how to ensure the beneficial use of AI (including a government foresight function). The Observatory will engage a broad spectrum

of actors from different stakeholder groups to help address the legal, ethical, cultural and technical facets of AI.

Following the presentation of Anne Carblanc, the chair and moderator of the session, Jeremy Millard, asked her why in the current 4th Industrial Revolution with a lot of changes and impacts, is there so much focus on AI and Data compared to VR, AR and other technologies.
Jeremy asked if it is because AI & Data are underlying elements for supporting the 4th Industrial Revolution.

Anne replied that there is an ecosystem of digital technologies in which AI and Data are part that will lead the 4th Industrial Revolution, and that also includes blockchain and the Internet of Things.
It is the combination of those digital technologies which will lead the digital transformation.
The specific focus on AI and Data, both at the OECD as well as around the world more generally, can be explained by the recent breakthroughs and applications currently implemented in citizens' daily life. Another reason explaining this focus is the fact that AI and Data raise important ethical and security questions especially with general AI. There is also the question of the competitive race between countriesin the field of AI and Data including access to data.

WALID EL ABED, Founder & CEO, Global Data Excellence, Switzerland made a brilliant speech on "*DEMS AI: The Data Excellence Management System to Serve and Guide A Society of Excellence Governed by Value".*

Walid El Abed started by explaining that we are currently living in a quantum leap with an increasing speed of the value creation ecosystem.
The onset of the information age has irrevocably changed the way business activities are conducted, evaluated, and managed. A paradigm…
This is possible thanks to Data, the idea is to have a system enabling dialogue with natural language.

DATA AS AN ENABLER OF CORPORATE VALUE

The accuracy and speed of execution in many corporate processes rely on the quality of the data at hand. Traditional Master Data Management efforts have failed to deliver accurate data, and a better approach is required. Ensuring accurate data is hard work and requires resources. The key in raising data quality is in expending those resources where they have the highest impact: on data with high value.
Valuating data requires an understanding of the relationship between that data and the corporate value drivers: key value indicators, organization, and business requirements. When we link data with those entities, the value of data can be determined and prioritized.
DEMS is a system that enables dialogue between human and machine. It is possible to optimize the interactions between humans and computers.
DEMS is .at the crossroads of the worlds that uses computer science, linguistics, semantics, didactics, semiology and the automatic processing of natural languages
DEMS is a new generation system to handle the paradox and empower sustainable value creation.. This software has optimized the artificial intelligence for the digital enterprise and people and is capable of answering the vital questions that organizations' executives and managers have to solve in order to perform their mission in the best way.
This does not mean that we can fear job loss.. Value creation requires resources and thus represents a cost but with DEMS you can make value creation sustainable.

ALESSANDRO GROPELLI, **Director of Communications, ETNO - European Telecommunications Network Operators' Association** made an insightful presentation focusing on what the telecom operators will do with AI.
For Alessandro Gropelli, this topic should matter to all, both as professionals in the digital sector but also as users. Indeed ultimately the smartphones that all possess rely on ETNO's network. ETNO is based in Brussels where European regulators try to sort out whether they want a policy or regulatory approach to AI.

Concerning the broader landscape about telcos and AI, the USA are leaders in term of venture capital, algorithms and big data which are all important for AI.
China is transforming into a superpower in the AI field with several strengths, such as its huge population providing a huge users and data base, as well as a lot of public investment with 30 billion of government funding. China's lax laws compared to EU are also key points for the country's progress in AI field.
The EU has also some strength for the development of AI, but when looking at the global debate ranging from operators to academic debates the EU seems a little lost because the geopolitical discussion is framed as a fight between the AI superpowers of USA and China. The EU is not part of these discussion.
A lot of EU member states are pushing for an advanced approach such as France and the United-Kingdom. EU is perceived as a leader on ethics and regulations issues.

When it comes to AI, how do we look at it? Where do we expect AI to change the telecom business? Those are some key questions to evaluate impacts of AI on the telecom sector.
AI will play a great role in network planning but also for the whole services area such as digital assistants or smart speakers. Several telecom operators have launched smart speakers with AI integrated such as Orange and Telefonica.
When it comes to platforms, telecoms are starting to explore the role of AI on platform ecosystems.

For Mr. Gropelli, when looking at AI, you also need to look at 5G. For ETNO, 5G is the way to bring together fixed and mobile networks and make them intelligent notably by bringing proximity data centers. AI will play a big role in the 5G network that requires a myriad of decisions one after the other to allocate the right type of connectivity to each user based on the type of demand tailored to the user. AI clearly has a crucial part to play in this as no human or current computer system could carry out this task.

Alessandro Gropelli also presented his vision on the policies currently being discussed in Brussels, concerning whether to regulate or not. The two positions can be summarized by two persons; on one hand the former Nokia former director who now leads the EU high-level expert group and who said in an interview "Please do not regulate yet, we still need to understand what all this is about, let's not make this mistake". On the other end of the spectrum, is an academic paper of Paul Nemitz called *"Constitutional Democracy and Technology in the Age of Artificial Intelligence"*. Paul Nemitz is the person who is engaged mostly at the working level on the General Data Protection Regulation at the European Commission.
The 3 policy areas that ETNO identifies as the most critical are, first data privacy and, second cybersecurity, where - AI is seen as a huge opportunity to tackle many of the regulators- 'worries when it comes to keeping networks secure. The third area is competition and what do we do about the current concentration of data, where data is money and what are the consequences of AI.

Alessandro Gropelli concluded with the fact that there might be a battle for citizens' homes, which can already be seen with smart speakers. What is the role of telecom operators in this? Are telecom operators adding positive competition? As telco operators, they are already

entrenched in many European homes and are trusted. The telecom operators are trying to see what their place could be in this market and how they can implement AI in a more trusted and secure way.

Following the clear presentation of Alessandro Gropelli, the moderator of the session Jeremy Millard, asked him when the regulation will be implemented and ETNO view on this.

Alessandro replied that for ETNO the debate is wether we should create a new framework for AI. There are already several regulations in place with rules that could be applied to AI such as rules of data protection, ePrivacy, GDPR, etc… The question is to look at rules already existing and their applications and implications for AI. This is what the EU already has done for communications and AI. According to Alessandro, the EU has recognized that there is a problem in being excessively strict when it comes to data regulations because in the end this does not allow EU companies to develop some solutions and services that are being developed by non-EU competitors leaving EU users become to be recipients of technologies and services developed according to non-EU rules. For ETNO, we need to evaluate the implications of rules already existing on AI to evaluate if there is any need to establish new and specific rules for AI.

JONAS MUNK, Director, Head of AI & Robotics, TDC Group, Denmark addressed the question of telecom perspectives on AI.
For Jonas Munk, AI has tremendous potential from the telco perspective, notably in term of the service delivered to telco customers, AI could play a great role in managing the numerous contacts with customers, and in financial management, AI could play a key role for financial forecasts. AI could also be implemented for improving other operations such as network planning and commercial activities…
In the telco industry, there is a need for the big players to rethink their business models and AI is seen as a way to help to achieve this transformation. TDC see AI not as a means to replace persons but to improve customer' experiences. For TDC, AI is a way to ensure a successful digital transformation for a company which is over a century old and that has acquired several companies in its history, thereby increasing its legacy work systems etc... TDC cannot transform itself overnight and needs to be smart to ensure an efficient digital transformation in which AI can be a useful tool to achieve this transformation.
For TDC, AI can generate more efficient operations, organizations and processes. There are many persons who are interested in being assisted by AI for instance for decision support.
TDC will invest in AI especially in data science, practices and methodologies in order to create new type of services for TDC employees and customers.
Jonas Munk's job is to understand and exchange with his colleagues to identify the areas in which employees are interested in being assisted. Thanks to AI many manual tasks will be automated by AI and thus empower the employees.
The telco industry and customers are demanding smart services from TDC and want the company to be more proactive and resolve issues without customers needing to contact it. Employees also want AI deployment that gives them more time to use their personal skills without being obliged to take care of tasks that can be automated.
Society must also benefit from AI deployment.

Mr. Munk sees AI as a handicraft possessing many capabilities trough data science, mathematics and statistics. TDC's work in the AI domain has adopted key principles such as ethics, legislative, security and transparency.

AI should be seen as a tool to empower humans and not as a threat.

Following his speech, Mr. Munk was asked by Jeremy Millard what will be the main benefits of AI in the future both for the telco and for society more generally.

Jonas started by explaining that TDC has a set of ethics rules in terms of what TDC want to do and compliance with the law. TDC does not work in the area of decision making algorithms even though, from a legislative point of view, TDC could do so. For the moment, TDC is focused on transforming itself with AI and empowering its employees.

CHRISTIANE VEJLØ, Chairperson of the Danish Expert Group on Data Ethics; CEO & Senior Digital Trends Analyst, Elektronista, Denmark made an interesting speech presenting the *"Danish Government Initiative on Data Ethics"*.

The Danish Expert Group on Data Ethics was set up in March 2018 based on a decision by the Danish Disruption Council. The Expert Group's task was to discuss how companies could handle the ethical challenges linked to the use of data and the new digital business models that are constantly evolving, and to propose recommendations that could contribute to the responsible and sustainable use of data in the business community. The recommendations had to contribute to ensuring a strong framework for companies so that Denmark maintains a competitive and digital private sector which is ready for future challenges.

Members of the Expert Group represent relevant skills in data ethics, technology use and company management.

The Expert Group has prioritized an active societal debate on the responsible and sustainable use of data. Questions about what constitutes good data ethics and what kind of world we want are best answered by first having a societal debate. To this end, the Expert Group held a number of open meetings, known as conversation salons, at e.g. the People's Political Festival, to gather knowledge and input from interested citizens, companies, researchers and other external experts in the area. Data ethics was also one of the main topics at the Techfestival in Copenhagen at the start of September 2018. Finally, the Expert Group's Chair has been active in the public debate on data ethics, including holding meetings with and giving presentations to a number of interest groups, and has even been on research trips to India and America to discuss data ethics with a wide range of experts.

To provide full transparency of the process, the Expert Group launched a website – dataetikdk.dk – with continuous updates on the progress of the work in the Expert Group as well as a dedicated e-mail address - dataetik@erst.dk – by which the public has been able to add their input.

The Expert Group has worked according to the following principles:
Involvement: the Expert Group wants to work actively with and get input from a wide number of stakeholders. Involvement is through open conversation salons, an open mailbox and the Chair reaching out to companies and organisations.
Transparency: It's important that the Expert Group's work is easy to understand and that it is easy to contribute to, find information about and talk to the group about data ethics. This is why the public is invited to get involved and why many aspects of the group's work are documented on the group's blog at dataetikdk.dk and on social media.
Diversity: The composition of the Expert Group and other experts, influencers and participants should be diverse to ensure that different voices and perspectives are represented and heard.
Challenge: It is essential for the Expert Group to challenge perspectives, norms and habitual thinking in all phases of their work, so that their output is strong and innovative, and so that everyone who has taken part in the process has learned something new.

We currently find ourselves at a point in history where technology and data volumes have developed to such an extent that they provide us with almost endless opportunities, both in our society and in the business community. But right now, we also need to watch our step if we are to ensure that our technological progress achieves the common goals we set ourselves as a society and as citizens. Losing focus here could have serious consequences, which could easily overwhelm us.

Data, data analysis, business intelligence, big data, advanced analytics, deep learning and artificial intelligence could potentially deliver major benefits for individual citizens, consumers, organizations, companies and society as a whole. Digital technologies and data use could lead to a significant shift both in the way citizens, consumers and companies interact, and in the way in which companies recruit, work, collaborate and compete.

Using digital solutions and data presents a number of ethical dilemmas. If data is to be exploited to its full potential, it is essential that we, as a society, trust that our data is being used responsibly.

Denmark has high level of digitization readiness and we are good at exploiting new opportunities. Denmark is also a nation that builds on values such as trust, democracy, responsibility and self-determination. Denmark is therefore well-placed to become a digital frontrunner, which is why we also have a particular responsibility to make an impact on European and international developments. Denmark has a strong foundation from which we can spearhead the work with data ethics.
Data ethics is defined as an active decision and action to ensure that knowledge obtained through data is not used against the legitimate interests of an individual or group. With data ethics, organisations work actively to address data ethics issues in design, innovation and business processes. When we talk about data ethics in relation to companies, responsibility lies beyond what is stated in data protection legislation (e.g. GDPR). Data ethics is about doing the right thing, even when no one is watching. As a basis for the implementation of data ethics in practice, the Expert Group has identified a number of overarching values to inform their work.

This means that the values below must act as the foundation for the design of data driven systems; the following values are to be the foundation of new policy and possible legislation, and that the values must be integrated into daily activity around data and use of data driven systems.

Autonomy: People's self-determination must be prioritized in all data processes. It is the individual person who should have the ultimate control over what their data is used for and in which contexts.
Dignity: Human dignity must be respected in all data processes, i.e. data should not be used to exploit knowledge against the user's long-term interests. This includes, for example, use of the latest new technology and encryption methods to protect privacy data from leaks and misuse, and organizational processes any data analysis and correlation that protect people from discrimination and misuse of their data.
Responsibility: It is a company's “due diligence” in relation to data collection and processing. Responsibility and co-responsibility must therefore exist in all links of the data processing chain. This includes co-responsibility from business partners and third-party processing and any future data storage.
Equality and Fairness: Strive for a fair balance in data processing. When using machine learning and algorithms for processing data, active work is being done to prevent undesired bias in data (such as when manually sorting and tidying data), as well as to work towards designs that avoid categorization that discriminates between e.g. population groups. In

regard to this, the rationale and criteria for methods that reduce bias and discrimination will always be explicit and open to revision
Progressiveness: Advanced data use can help bring significant progress to our society. To achieve this progress, technical and organizational solutions need to be created to support ethically-responsible data processing.
Diversity: Diversity (demographic and professional) in teams working with data systems is essential. Diversity helps ensure a mix of skills, beyond the purely technical, for identifying and tackling the social and ethical consequences of data processing, and to ensure that a representative section of the needs, values and interests of population groups in society is taken into account right from the start when data systems are designed.

As a digital pioneer, Denmark has an excellent opportunity to help impact European and international developments towards a more responsible use of technology and data. Values such as trust, democracy and self-determination permeate Danish society. By taking the lead internationally, Denmark can ensure that these Danish values help shape the long-term international solutions in the area.
The Expert Group believes that large parts of the Danish business community would support the data ethics agenda and be able to utilize data ethics as a competitive advantage in global markets. The long-term goal is to promote a Danish approach to data ethics in an international context.
A strong business community doesn't happen by itself. By focusing on kick-starting new data ethical business models, business support can be provided to a new and budding industry. This will help make data ethics a competitive parameter by giving Danish companies the opportunity to develop data ethical business models, which will allow consumers and businesses to opt for data ethical alternatives. This avoids the formation of data monopolies and situations where consumers and companies have no choice.

Data use in the business community is developing rapidly. This is why it is essential to maintain an ongoing focus on the connection between advanced data use and trust in the fact that companies are processing data responsibly, to create opportunities for innovation and growth. It requires a long-term anchoring of relevant initiatives and knowledge-building.
If sustainable data use is to be a competitive parameter for Danish companies, there must be a sustained focus on converting the business community, including developing new business models that are data ethical.

RANDY YALOZ, Attorney & Founding Partner, Euro Legal Counsel Group, France made an enlightening speech on the legal implications of AI and Data.

Randy Yaloz has been involved for more than 20 years in litigation about IP, privacy and breach of privacy. We are now in a system where everybody can put their private data into the public domain. We trust people and companies to have access to those data and sometimes see information that we were not expected to find on the internet.
The European Union has implemented some protection of data but it is not the same when on the individual level you want to defend those rights. Individuals do not know all the information that is available about them and how those data have been used. It is complicated to have a complete overview of the information available on the internet on each person even though there are private organizations specializing on those kinds of task but this costs cost money.

Mr. Yaloz explained that when talking about data protection, one must take into account the traceability, feeding, reporting and tracking aspects of personal data on the internet. Many technologies are available to help in this. How can we personalize the use of data and

provide an individualized personal data footprint. In the same way that we can give each individual a number, we should be able to give a personal footprint and have traceability in place in an ethical manner.

We need to have traceability, feeding, reporting and tracking of personal data so that companies can be held accountable. Once there is accountability, the individual will have control and ethical principles can be applied . If at any moment, individuals can trace the use of their data and that the company has a legal obligation to allow this, this will be the moment when companies will be transparent.
Policy makers must tackle this subject; they should encourage companies to be more transparent by themselves regarding the data and the use they make of it by offering their customers real traceability of their data and use.
For Randy Yaloz, ensuring real traceability is the only way to force companies to adopt ethical principles regarding personal data use. We need to empower individuals in the data environment and to do that there is a need to combine ethics and traceability creating accountability.

Once information is on the internet, even if it is wrong, and despite any judicial decision to delete the information, an individual's reputation and image are nevertheless damaged.

EUNIKA MERCIER-LAURENT, Global Innovation Strategies, Vice-chairman IFIP TC12 (AI)
made an enlightened speech entitled "*Artificial Intelligence overview and impacts*"

After almost two decades of absence in the media world, artificial Intelligence is now generating much hype over its current capabilities. The origin of this "renaissance" is the increasing power of computers, the evolution of artificial neural networks (known since the 1940s) and the motivation to sell more and more quickly. The main trends are deep learning, intelligent assistants using voice interfaces, robots, drones, IOT and autonomous cars with embedded AI.
Deep learning explores client navigation data, often gathered by pushing various offers via email and from advertisements to generate "client experience".
"Intelligent" assistants are supposed to understand the client's request expressed in natural language, which is not always the case, because the majority of them use just pattern recognition instead of natural language processing, known since the 1970s.
Robots, drones, IoT and autonomous systems are now ubiquitous. Since perceptron1, robots have evolved into useful, less useful and dangerous ones, as military robots and mini-drones equipped with face recognition and explosives. And we still have other complex problems to solve, as for example climate change, preventing serious diseases and terrorism.

The initial motivation of the AI founders was to build an intelligent machine able to act as a human but even more intelligently. Over the last 60 years, many AI techniques have been developed, applied and improved. They are useful, not only for knowledge derived from data, text and images, but also for knowledge transfer to computers, knowledge modeling such as graphs, semantic networks, ontologies and processing using various reasoning methods such as analogy, rules and multi-agents systems (robots and games).
Lots of AI based decision support systems (DSS) have been developed, among them process control in blast furnaces and for race cars, talent management, the security of the Olympic games, scheduling, planning, optimizing and many others. AI is now embedded in autonomous systems, in drones used for monitoring, measuring, inspection and failure

[1] built by Minsky, Papert and Rosenblat, 1960

control. AI is also embedded in industry 4.0, for example the monitoring board of the Schneider Future Factory and Safran cobots conceived for collaboration with humans.

However some warnings and risks have to be considered, such as using only one technique for all kinds of problem solving that may lead to wrong results and deception; bugs in autonomous systems, missing data and disappearing know-how. Weak mastering of ML programs that are programmed to do something beneficial cannot prevent developing a destructive method for achieving its own goals.
AI applications generate multiple impacts. While many focus on economic impact only, we need to consider at least 72 with a special focus on environmental and cognitive issues.

While today many people are excited by big data for electronic commerce, smart cities, banking and health, today complex problem solving such as optimizing, eco-design, AI for climate change, prevention of serious diseases by combining data and knowledge, industrial and medical diagnosis etc.., requires more than only deep learning. Among the last trends we find cyber-physical systems combining knowledge discovery from collected data with knowledge based DSS.
In the 4th generation of AI multisource heterogeneous unstructured data (speech, video, text, sensors) not qualified data are analyzed using deep learning, the results are combined with expert knowledge to form robust AI systems that can be used for knowledge based services.
Facing various and difficult challenges requires knowing the whole AI spectrum in order to select the best approach and techniques. Environmental impacts and climate change can be easily faced by right AI and alternative thinking. Smart software (and hardware) conceived using eco-design approaches have the potential to reduce human impact on the environment and and contribute to planetary protection.

However, some questions need answers: what future do we want? Do we still wish to build a super-robot to replace humans? What regulation is needed to avoid a bad AI? How to control it? There are already some initiatives on good AI and on AI ethics.
The main challenge is still to understand our brain capacities before trying to enhance or replacing humans.

Following the presentation of Eunika Mercier, Jeremy Millard made a comment about the fact that the role and risks of pre-industrial revolution technologies tend to be similar to AI's challenges today in the 4th Industrial Revolution.

Eunika replied yes, that AI is there to help humans, we need to combine the best from human and the best from AI, as technologies did in the past.

Session 4

Day 1 – Afternoon – Parallel Session

21st Century Regulatory Framework

This panel has been part of the Global Forum for the last 27 years since the inception of the conference. The Panel was orchestrated and moderated by Andy Lipman, a partner of the International law firm Morgan Lewis, headquartered in Washington DC. The panel was highly successful and explored the rapidly changing scope of global regulation of the telecom, media and technology industries.

As its name evidences, the panel was both Global in nature and a timely Forum for the ventilating of valuable insights on the overall topic of evolving regulation.

The Panel was opened by **ANDREW LIPMAN,** who has chaired this panel 25 of the past 27 years. Mr Lipman took occasion to trace the historical arc of regulation since the First Global Forum, where the desirability of competitive telecom providers was debated as opposed to maintaining a natural monopolist. We have, of course, seen vast progress through competition. Mr Lipman pointed out a few areas where competitive providers were still disadvantaged. He discussed further the appropriate guide path to completion. He finally discussed the different Regulatory schemes that apply today in many countries to social media providers compared to telecom providers and where he thought regulation of these entities was heading in both the US and EU.

Mr. Lipman turned the panel over to the chairman of the panel, **MANI MANIMOHAN**, **Senior Director of Policy for GSMA**. GSMA has been a longtime Global Forum supporter. His presentation was on Digital Transformation and Rethinking the Rule Book.

Mr. Mani Manimohan made some introductive remarks:
Today governments, firms and others industries talk about digital transformation and that it depend on the high quality of infrastructures that we need.
He then highlights some Key trends and drivers of digital transformation.

The first one is that today we have 5B people connected to the mobile network and the global interoperable network, the number will raise to 25B by 2025 and that's is a massive increase. So, connectivity becomes massive and 5G technology will aloud to achieve that massive level of connectivity.

The second one is that 143B euros is the total annual revenue for the European mobile networks operators and by the next 8 years this number will remain flat 144B euros. This means a tension between investment and Competition. How to encourage higher investments in the digital infrastructure that we need when the returns to private sector are lower and there is a disconnection between returns and the volume.

In terms of policy making there are implications. Here in Europe, the question at a concrete level is should we need 3 or 4 operators, 3 or 4 mobile networks in the market. We know that

in Denmark the tension concerned the merge between 2 mobile operators and subsequently the operators pulled out on the merger.

The second tension is the digital divide. The digital divide has a number of dimensions. It requests a policy framework and thinking to handle this problem.

There is one specific issue related to infrastructure that is availability to extend mobile networks coverage to area that are uneconomic to cover to find returns. And again that is a question for policy makers. If we have an incremental investment to be done, should we invest in new technology 4G, 5G... to improve the quality of the network first or should we extend the network.

The next tension is about data. Today we have 16 Trillion Giga that have been collected, stored and processed in the internet. By 2025 the number will be 10 times more 160T. The massive connectivity of things and enterprises will be the driver of this change. We move from an era of collection of personal data generating insight to companies and enterprises making use of data.
And then we are really at the very beginning of the next way which is the machine learning way.

The real opportunity to make use of massive connectivity is larger amount of data, better tools. We are really at the beginning of this. Venture capital funding into AI has almost doubled over just 1 year from 6B to 12 B.
The number of smart speakers has tripled.

This data economy has its own challenges related to those topics:
One about network effects. Ranges of policy makers intervene between invention and innovation keeping from being socially valuable and welfare enhancing.
The question around conglomerate effects: would platform companies make use of data to minimize entry from other places in the market.
And of course the question about the use of data which is far besides privacy and security.
It's really a policy tension between misdata for AI and the misuse of data.
What I mean is you should move away from ex-ante regulation to much more ex-post regime approach to regulating market.

I conclude by drawing some principles.
First principle: we need to shift away from structure presumption about all affects us. and decide to have prescription around input factors, production factors and move to the more outcome on performance based system.

Second, we should favor under specification a regulatory intervention rather than over specifying this. This is not particularly related to coverage obligations and not in term of intervention related to how companies can manage their network.

Third, the regulated framework objective itself should shift from short times price effect to focus much more on long term innovation. By that what I mean is that governments should embrace connectivity investments alongside the objective to promote competitive market.

Finally, we should adopt kind of equal system mindset when it comes to collaborative approach to regulation, whether it is collaboration between countries to setting privacy framework, it is collaboration within local authorities in setting up regulation and also collaboration between different departments if you want to really deliver the agenda.

Andrew Lipman raised a question: you highlighted data as a strategic asset to companies in the digital economy. What are the key policy considerations around this new type?

Mani Manimohan answered that he sees 3 aspects related to this.
One is network affect. When you build up a network, it becomes more valuable. We did a study last year looking at the data value chain. I have a conclusion with that: due to vertical integration of the data that companies integrates. The operation from collecting on data to analyze and the fact that you have to collect large number of data because you don't really know which data sets you can communicate, there is really a tendency to build up scale and that scale is an advantage to the companies.

This leads to what people call the winner takes effect. And that is really useful as there are interesting innovation in building that scale. Concerning the policy the question is would that scale becomes so high that it will be difficult to any other player to enter into the market. Many of the companies that collect the data would not make these data available. And that because the data is an important asset. I am not asking for that access to data should be made available. We need to find another way and combine data assets.
If you look at AI and machine learning, the value comes not from volume but by variety. We need to combine altogether data sets in order to create insights.
We need to rethink this question. How to create data trading, data commerce or data lakes to allow different players to come together and create insights and one regulated tool to do this.

The next panelist was **BRENT OLSON**, **Vice-President of AT&T, USA** a longtime fixture of this panel. Brent talked thematically about how regulation is not keeping pace with the pace of technological change and the ensuing implications. He focused primarily on the US, but the message resonates as well for the EU. Among other things, he shared excellent insights on the key issues of out time: network neutrality, tech platforms, content distribution and unequal playing fields for increasingly substitutable competitors.

For Brent Olson, we are currently at an interesting reflection point between communication and media. The internet is progressing today for at least half of the world, the technology enabling the internet is constantly changing and there are constant technological evolutions/revolutions.
The way & tools we used to use to communicate or consume media is radically different from the way we used to do it 20, 10, 5 or even last year. People and especially young generations are used to this phenomenon and expect it as they have grown with it.

Despite all those changes in the industry, regulation has not gone to the same transformations. For instance in the USA, the current regulatory structure for communication and media is based on an early 20th century conception of the communication or even earlier 19th century as the regulation is based on the railroad regulation.
Under the scheme, regulation is based on technology; technologies exist in silos and thus create technology specific markets; broadcast technology, broadcast regulation; telephone technology, telephone regulation… These technologies were relatively stable for a long period of time and because of the relative inflexibility associated with these technologies along with the economy of scale. Those markets were largely contained and concentrated and the regulation reflected those attributes. In the USA, this led to a policy entitled "Title II of the Communication Act" which spells out the rules & legal guidelines for telecom network.
"Title III" refers to rules for broadcast and wireless technologies and "Title VI" to rules for cable television.
Today, technology is changing rapidly, players are changing constantly and some appear out of nowhere. The markets are fast evolving, economy of scale scope still exists but with the internet, the entry barrier is lower and it enables the possibility to create new markets.

For AT&T, at the time of the first Communications Act of 1934, AT&T was a simple telephone company, the telephone market was largely local and self-contained. Today AT&T is truly a modern media company marrying connectivity and entertainment, AT&T has activities in connectivity business, consumer entertainment, distribution business… AT&T is a global company serving global customers and now also a media business company with Time Warner acquisition.
Today consumers have multiple choices in term of communication and entertainment to choice from. Companies have to worry about less demand for your products but also gyro demand.

There are currently in the USA an offensive reaction from regulative cities to this industry transformation, there are some regulators, policy makers and stakeholders which are exploring new frameworks. For instance the FCC - Federal Communications Commission implemented new rules trying to opening up local zoning ordonnances for 5G deployment; the FTC – Federal Trade Commission has gone under a serie of hearings looking at whether the completion and trust laws are adapted to the 21st century and different technologies; the US Congress has started to explore a new unified regime for privacy.
In parallel of those stakeholders looking for a new framework, there are others stakeholders trying to make sure that the old silos structure or create new silos based on the old silos. This situation in the USA can be symbolized by the debate around net neutrality.
There has been case where state regulatory agencies tried to gain or retain regulatory authority as a traditional service they regulated disappeared or was replaced by new technologies.
The tug and pull between new and old frameworks puts the industry and even consumers in a situation where decisions are made and reverse and made again such as for the net neutrality debate, over the last 20 years there has been 3 or 4 different frameworks for this issue.
This instable, uncertain and unpredictable framework represents a real cost for the industry, for example there is a clear gap in customer protection, privacy rules have not been updated to adjust to internet and data. There are benefits online for protection of data but rules must propose a balance between customer & industry so that innovation can continue to flourish.
Brent Olson thinks that the new privacy framework is critical and this is why AT&T and others push for this change at the US Congress and others to adopt new legislation.
Another issue would be that the unstable framework is an issue for investments as broadband requires significant & regular stream of investments. AT&T is the largest capital spender in the USA. Those investments bring new innovations and the wrong regulatory framework can greatly interfere with this dynamic.
Certain actors are regulated based on the functions they are providing and not based on market analyses and thus implicitly favor some business models over others. Given the inherent market dynamism this fact can be reinforced by regulatory asymmetry.

Before establishing a new regulatory framework, there are fundamental questions that need to be asked and answered.
The first question would be do we want technology neutrality? With the convergent communication and media which all use varied internet protocol network bet it wireless, fiber or fixed, the core technology does not change. The burden on the infrastructure increase.
Another question that need to be answer is about if we want a single regulator or several governing economic issue as well as other issues such as privacy. In the USA, this question is reflected by the FTC & FCC that both estimate that there are the legitimate regulator over the other. In plus of those 2 agencies, should the Federal Government be the primary regulator? What would be the role of States when technology does not abide to States and National boundaries? If the Federal Government points toward one regulatory direction, should the States be in measure to go to another or be obliged to comply with the Federal government direction?

Do we want an ex ante regulation or a framework against bad actors which would be more an ex post framework or a framework which govern all decisions in the industry regardless of their impacts on the market more an ex ante regulation.
Do we want evidences based or data driven decision making based on market?
How do we deal with the changing landscape of issues, many issues today are more social than economic, how can we regulate those social issues, what are the tools for this?
How can we ensure that the industry is meeting with the critical public interest objectives? Should there be universal service, public safety, accessibility …
Should we make sure to have a flexible regulatory framework to accommodate future changes or focus on maintaining the status quo.

Brent Olson concluded on this by saying that there are just some questions and more remain, he thinks that we still not have the answers to all those questions.

Mr. Olson elaborated also on the fact that the "Title II" regulation is an issue for a company like AT&T as this regulation was adapted for heavily regulated market. The regulation process takes too much time to be build which is a determent for dynamic investments & markets.

Following Brent Olson was **KRISTIAN MOLLER, Deputy Director of the Danish Agency for Data Supply and Efficiency.** He shared with us his local Danish experiences on the challenges and opportunities for the public sector to keep up with the fast pace in digital transformation and technology development. That's not an easy task and he shared with us the specific challenges. The presentation focused on Denmark, but had significant global implications.

The Danish Agency for Data Supply and Efficiency is probably one of the first agency of this sort created worldwide, the aim of the agency is to render public data available as a platform along digital infrastructures in order to facilitate value creation thanks to those data.

Kristian Møller said that given the fast pace in digital transformation and technology development, it is not easy for the regulation framework to keep up with this fast pace. Given the rhythm, one cannot implement a classic regulation per silos but rather a regulation sector to sector. Technologies & digital transformation are cross-sectors so it should be the same for regulations. For Mr. Møller, regulation within the digital transformation is less about regulating what can & cannot be done but more about the mission & responsibilities.

Regulation when done appropriately can contribute to add value to the society and private sector by defining the playing field, facilitating transparent & competitive economy. The public sector can support the value creation by providing public data and a digital infrastructure platform for private sector innovations. In Denmark, the public sector through the Danish Agency for Data Supply and Efficiency gives open and free access to fundamental public data through a web-based digital infrastructure. Those public data are about the Danish population, businesses, real property addresses, geography… those data are used to provide modern public services and made available to private sector so that it can create new products & services adapted to the Danish market & specificities.

The role of the Danish Agency for Data Supply and Efficiency is to provide the foundation for a political decision based on reliable and interoperable data and to ensure that those data create value across the public & private sectors. This is a success as the agency lead studies that proved that the economic value of geodata more than doubled in a few years. This increase came mostly from the private sector which used the public data to develop new products & services. This concern more static data, the challenge for Kristian Møller is to facilitate value creation from new more dynamic data and technologies through a common

approach and principles of standards and governance. It is difficult to valorize real time data which comes from diverse sources such as sensors, IoT network, smart cities … There are sectors boundaries to overcome in order to facilitate value creation and not stand in the way of the market.

Given uncertainties about the future technologies and what their roles could be for the public sector, it make sense that the private & public sectors collaborate for defining the most appropriate regulation framework in order to facilitate value creation. There is a need to define what data should the public sector provide to the market, what is the appropriate playing field and safeguards to be implemented.

Following the clear presentation of Kristian Møller, Andrew Lipman the moderator of the session asked him how the public sector prepares itself for future technologies.
Kristian Møller replied that the public sector is moving more into a sort of pilot sandboxing. The public sector must find a way to regulate things & data evolving in real time such as autonomous vehicle. Denmark put up an infrastructure of pilot in Aarhus in order to find how to facilitate innovation products; there is a digital platform where companies can test any products. Based on this research infrastructure, Denmark will decide the appropriate regulation to implement.

Andrew Lipman then asked what are the use cases in taking advantages of better positioning.
For Kristian Møller, there are many, in order to have truly smart cities in which there are autonomous vehicles with a fluid traffic flow, then there is a need to have tracks of where everything is. In Agriculture positioning would also have a great impact, currently there are general rules governing the whole agriculture sector without taking into account specificities; with positioning the agriculture regulation and could be differentiated depending of geographical situation.

Andrew Lipman questioned also Kristian Møller about the Memorandum of Understanding that Denmark signed with the World Economic Forum. The Danish Agency for Data Supply and Efficiency played a great role in this and Andrew Lipman wanted to have more details on the elements of this cooperation.
Mr. Møller replied Denmark has now a Tech Ambassador, it is the world first one, his Embassy is not geographically constraint and he works in the Silicon Valley. Denmark signed an agreement with the center of the 4th industrial revolution, the World Economic Forum, and in their work in Internet of Things and connected devices.

The next speaker was also a local Denmark tech expert, **TORBEN AABERG, Professor and Interregional Program Manager at the Center for Communications at Aalborg University in Copenhagen**. In his talk, he introduced the audience to the Baltic Region as a digital front runner. He gave two excellent examples of how this so called macro region can inspire the development of a digital single market through a strongly committed transactional collaboration and a bottoms up approach to complement the formalized process at both the national and EU level.

Torben Aaberg took as an example the Baltic Sea Region which is the crossroad of Scandinavia, Finland, the 3 Baltic States, Russia but also north of Germany & Poland. This was called by the EU, the first macro-region now, there are others macro-regions in Europe. These countries are generally seen as front-runners in many aspects of the digital economy. According to the European Desi Index and analyses from digital think tank, the Baltic Sea Region countries have in common developed infrastructures, advanced public services, highly skilled citizens and companies which are quick to embrace new technologies. Those countries are also close in term of cultural history, most are small open economies with a

tradition of cross border trade, trustful public-private dialogue and strong informal networks. These elements make that this region of Europe was the perfect candidate to be the first digital integrated market and to inspire the European Digital Single Market.
These countries share digital potentials but also challenges as the rest of Europe, these challenges may lead to a fragmentation and gaps but due to the similarity of those countries, they are willing and able to learn from each other systematically and develop common solutions and approaches.
Torben Aaberg illustrated this with the example of Digino project which gathered 24 ministries and ICTs associations from the 9 countries from the Baltic Sea macro-region (Denmark, Estonia, Latvia, Finland, Germany, Lithuania, Poland, Russia, and Sweden) jointly explore and test transformative aspects of the collaboration. It is a pilot project cofounded by the European Union and the Baltic Sea macro-region, these partners jointly developed crossborder showcases. The partners test digitalization toolkit for SMEs and discuss digital implication within the region and the world. The findings are seen by the European Commission as inspiring for implementation of new EU regulations.

Mr. Aaberg shared also a second example about 8 Nordic & Baltic Ministers for Digitalization who signed an agreement under the umbrella of the Nordic Council of Ministers. The ministers meet on a regular basis in order to coordinate their digital strategies and policies, they exchange also on the current topic in the digital field such as 5G, AI… Across their different political cultures, the ministers share a strong commitment to join forces.

Torben Aaberg concluded on the fact that both examples on a practical and policy levels are convincing examples of initiatives with the ambitions and the ability to break-down barriers and silos between countries that could be replicated at the European level.

Following the speech of Torben Aaberg, Andrew Lipman asked him whether if in a globalized tech world, it is necessary to encourage governments to learn from their neighbors and encourage public-private sector collaborations or let the countries decide by themselves.

Torben Aaberg answered that countries could decide and found by themselves to some extend the right framework but policy makers have the tendency to still think in silos. Countries are still attracted to protectionism where the countries prefer to develop their own solutions from scratch rather to adapt something developed by neighbors.

For Torben Aaberg countries can learn from each other, all countries have complementary strongholds and different success stories that can be shared.

Andrew Lipman then asked Mr. Aaberg why European digital policy makers would pay attention to bottom-up macro-original approach.
Torben Aaberg replied that the European Digital Single Market has been created for crossborder integration between markets. To reach this objective there is a need to think differently, there is no one size fits all for this. A bottom-up regional approach can serve as a complement because it is based on identified concrete business cases where public service can play a role.
The macro-original approach should not replace but serve as a complement to support policy discussions and influence policy makers.

The last question form Andrew Lipman to Mr. Aaberg was why we should focus our attention on the Baltic region and what lessons could we learn for this region when there are other dynamic regions in digitalization such as South-East Asia and China.
Mr. Aaberg replied that there are indeed good examples throughout the world that could teach lessons to others countries but the Baltic region regroups countries that trust each other so much that they are ready to test new ways of tomorrow's collaboration. The Baltic

region can test both digital and political solutions at small scale as regards to crossborder transportability. The outcomes of these experiences could be inspiring all over the world even in the more advanced regions according to Torben.

Then Andrew Lipman gave the floor to **ALICE PEZARD, a well-known Paris lawyer**. Ms. Pezard is also a long time veteran of this regulatory panel and, as usual, gave a novel and provocative talk. She discussed, from primarily a legal perspective, rethinking the Regulatory Framework from some of the more challenging policy issues facing us: GDPR privacy rules, AI, robots and blockchain. These are precisely the issues regulators are struggling with. Among the others macro social implications, who was responsible for AI failures, like those involving autonomous driving and robots.
For Alice Pezard the question is to know if we have to rethink the entire legal framework due to innovation. She thinks that for now we have a legal framework which copes well with the current situation to some extent. GDPR, privacy, crypto money, blockchain … that are all recent innovations that have a legal framework. It is not a question of establishing laws but of implementation of the existing one.
Ms. Pezard thinks that there are already laws which are adapted to the situation, policy makers & regulators have created adapted laws. Ms. Pezard used her experience as a French practitioner, to illustrate her point. In France for Initial coin offering, we know that there is the threat of black money but France implemented a law in November 2018, the implementation will be difficult but it gives the framework of laws to respect.
Last year France implemented a law for platforms & blockchain and France hopes the European Commission will enforces a similar law all over Europe.
Alice Pezard shared that France is not very innovative for integration but remains innovative in term of regulation.
Europe implemented the GDPR followed by a US regulation which is close to the EU text.

The crossborder issues are almost taken care of. GDPR is a great example as privacy issue is the same regardless of the countries, the first regulation came from Europe in 2017 with GDPR, USA implemented a similar regulation and even China is thinking about implementing this good privacy regulation.

The problem now is that it is more complicated to find solutions to some key points of innovation such as AI, robots, algorithms and predictions. For Alice Pezard, the creation of a suitable policy framework is complicated for those 4 points. There are a lot of questions but no solutions. It remains others questions about massive data and quantum computing arriving**.**

To conclude Alice Pezard shared 4 essential questions without answers:

- Cloud is international, but legal questions remain such as what is the cloud legal framework in Africa? It is impossible to stop & secure data in Africa, or there are data exchanges between Africa and Europe & US.
- Who is liable when an autonomous or connected car has an accident and kills someone? So far there is no clear answer, even the US Supreme Court does not have a clear answer, the US Supreme Court said that there is a collective responsibility from the engineers but this is not a satisfactory answer because it is an anonymous reply. The judges said that there are insurances but insurances are only there to compensate not to take responsibility.
- Do robots have a legal personality? In Europe, the tendency is that robots have a legal personality like humans. It is complicated to anticipate for this point.
- Who is responsible for predictions and for all decisions derived from those predictions by politicians? The predictions are now policy makers.

Those questions required some thinking but Alice Pezard fears that the regulations may cause stagnation and stop the scientists & innovation because of the lack of legal and ethics framework. All those points are discussed but it is complicated to put together as those questions rise philosophic, academic and politic issues.

Andrew Lipman asked Alice Pezard if she thought that with the new technologies we would be coming back to an era of collective liability.
Alice Pezard replied that it is an important question as for the last century we were in a system of individual liability; we are now more in a system of mutualized liability rather that collective liability.

Andrew Lipman gave then the floor to **PER EIRIK HEIMDAL, Head of the Technology Department of the Norwegian Communications Authority** who made a very informative speech;
Per Eirik Heimdal shared with us the scope of activities of the Norway Communications Authority, especially as it pertains to an extremely timely issue: radiation from electric communications. This issue was very prominently in the US. Per Eirk Heimdal very well differentiated the myth from the reality based on his agency's diligent work.

For Mr. Heimdal, we have to make sure that all uses of electronic communications are safe. NKOM measures the level of radiation from the tower broadcasting cell phones and takes actions in case of non-compliance. NKOM works in close collaboration with phone operators, in most case discussions are enough to solve issues.

Per Eirik Heimdal thinks it is important to inform the people about the radiation measurement results, it is important that NKOM make sure that the results are safe and inform the people about this. The radiation measurement reports are public so that the people are aware of the situation in order to help people to feel safe.
This open & public disclosure policy helps to build trust which allows introducing and implementing more easily new technologies. This is important as we are now in period of 5G roll-out which requires the setup of more transmitters due to the fact that with 5G we need higher frequencies which means lower ranges, so more transmitters needed to cover the area.
The aim with 5G is to have the lowest latency which also explains the need to install more and closer transmitters per area covered.

NKOM is managing the frequencies in Norway and thus NKOM plans the use and allocates licenses and ensures the supervision meaning that NKOM measure radiation levels, find sources of interference and noises that can alter or block the performances of the infrastructures. By doing this job of supervision, NKOM secures the functionality.
NKOM sometimes received complaints from specific antenna positions in this case NKOM investigate. A great part of NKOM job is to handle cases by cases to document them and make public the reports describing radiation. Those reports are snapshot of the radiation levels with date and venue of the radiation measurements.

In 2012, NKOM discussed with a regional radiation protection agency about how the radiation levels will develop overtime and long-term measurements radiation. The statement was that with the increase of wireless societies, will the exposure to radiation increase for the humans? NKOM leaded a pilot in the city of Kristiansand in 2013 with 60 measurement points over 5 years now allowing to gather a lot of data measures in the same way at the same place & time.
During those 5 years pilot, Per Eirik Heimdal explained Norway was one of the first countries to shut down FM broadcasting transmitters and introduced digital audio broadcasting. These

changes gave a good opportunity to see what happens when an old technology is shut down and replaced by a new one.
The same situation occurred with the takeover of 4G mobile network over 3G. When 4G transmitters went live in Kristiansand, NKOM measured a significant drop of 3G and the total radiation level of mobile networks decreased. The reasons of this drop were the 3G network decreased and that 4G technologies are more efficient than 3G and can transfer more data per energy than 3G could.
With 5G, there is a need to have transmitters closer to people but Per Eirik Heimdal thinks that with the proper installations, there will be no reasons that the total level of radiation will increase with the 5G roll-out as long as the installations are done in a good way.

In recognition of the global nature of the panel, Andrew Lipman moved on to **LUCA BOLOGNINI, founding partner and lawyer for ICT Legal Consulting and President of the Italian Institute for Privacy and Data Valorization, Italy**. He made an inspiring speech focusing on the negative aspect of the GDPR and what could be improved.
For Luca Bolognini, the convergence of European data protection regulatory framework without a clear framework cannot work. For instance in Italy, there are several entities involved in personal data regulations.
It is important to understand what works and does not works in data protection in order to be in measure to address new challenges like AI, IoT, big data…

For Luca Bolognini, the first issue of GDPR is that it is too general. The European Union decided to have a general data protection regulation and left too much room for the member states of the European Union to specify and set their own regulations. GDPR only provided a general framework allowing each country to create its own rules for the same question. Non-European companies have to comply with various rules on data protection depending of the countries which is complicated and not in favor of businesses.

The second issue that Mr. Bolognini identified was about the ex-ante approach of GDPR, a lot of prior information obligations and prior consent obligations. Prior information consents and obligations are not the right solutions in a data-driven economy and data-driven society. There are a number of principles in GDPR which are inconsistent with new businesses and development of new services. For instance big data is in itself incompatible with the data minimization and purpose limitation principles. Data mining and AI are also in themselves incompatible with the principle of limitation of retention of data.
Mr. Bolognini understands that non-European countries underline that these principles are not consistent with the progresses and evolutions of business.

The Third issue refers to the fact that personal data is compared to money. This cannot be said in Europe as with GDPR Europe has a fundamental rule that personal data is not marketable, sellable. Personal data protection is a fundamental right in Europe. This rule is inconsistent with the general evolution of businesses.

GDPR is not designed for non-human accountability; the principle of accountability can only be applied to humans and organizations of humans such as board of directors… What about objects' liability and the accountability of public laws & regulations. When there will be billions of objects processing, exchanging and creating data which will have physical effects on individuals, who will be accountable? The GDPR does not regulate this point.

Mr. Bolognini has some answers to those issues, for example for the ex-ante approach which is not fitting for the real world, Luca Bolognini proposed to think about new regulations that are more in line with the one of the food and drug which imposes labels. When the users get profiled content, we could have the "ingredients" explaining why you have this content and the data used to target you.

For the data as money point, Luca Bolognini thinks that European regulators should change their paradigm and accept that data can be money and thus recognize a new fundamental right that could be the right to monetize personal data.

Andrew Lipman asked if a more sectoral regulation for personal data protection is needed.
Luca Bolognini replied that for him the solution cannot come from others general regulations like the ePrivacy regulation that was presented in 2017. The consumer rights data protection regulation could be helpful or others sectoral laws or national and international regulations could help. The consumer privacy act was just an example of sectoral data protection.
Politicians could have the solution and should propose something else, AI imposes to rethink fundamentally human rights, new set of human laws. The danger is that at the political level, the new laws will be set by algorithms.

TORSTEN ANDERSEN, Deputy Director General of the Danish Business Authority spoke very knowledgeably about agile regulation and Danish initiatives in this area. Specifically, he addressed how we enable new business models and ensure that business regulation remains up to date. He focused especially on two initiatives from the Danish digital growth strategy.

Denmark launched a new one-stop-shop website for new business models on November 4th 2018 which break down the silos. This website allows for new business models to have more information and clarification of questions about regulation across ministries; it check of legislation in neighboring countries and have a clear understanding of the Regulatory test and experimentation.

Denmark also implemented new principles for agile & digital governance ensuring that the way legislation support companies' ability to test, develop and apply new digital technologies and business models, in order to create value for businesses and society.

Keynote Opening Session Day 2

Day 2 – Morning– Plenary Session

JULIA GLIDDEN, **General Manager Global Government Industry, IBM Global Business Services, USA** made a brilliant & relevant keynote on *"How can the private sector support the SDGs - UN Sustainable Development Goals ?"*

Imagine a world where helping to deliver hyper-local sustainable development is as easy shopping online…. The world has changed, technology has changed us all!
With the current 4th Industrial Revolution, there is an exponential pace of change unprecedented in history of human kind.

The technology has changed us all and the UN – United Nation is no exception. So far – we've only digitized the status quo but new tech like Blockchain is disrupting the disrupters – Government itself is at risk of disintermediation as AI and Blockchain replace many traditional roles: authentication, identity, eligibility, proof of ownership…when what we really need to do to achieve the SDGS is fundamentally rethink the role, and the relationships, of Government**…**
For sustainable development to be achieved, it is crucial to harmonize three core elements: **economic growth, social inclusion** and **environmental protection**. These elements are interconnected and all are crucial for the well-being of individuals and societies.
To do this– we need to rethink the role of government and the way it interacts with civil society and private sector in managing the country's public affairs and responding to people's needs and to make this a reality we need:

- Political Will: Supportive international and national policies to enable governments to collaborate with private sector and others as development partners
- Leadership: To drive good practice around process, transparency and action, to manage human relationships, build trust to deliver impact and added value
- Technology: To systematically convene the different social sectors around key issues

The private sector can help government create an infrastructure to catalyse innovative partnership action at local and national levels.

Emerging technologies make a paradigm shift possible but are still operating in ad hoc silos. A large proportion of the Sustainable Development Goals can be implemented, supported and monitored using digital technology, not all of them, but digital technology will help enable the SDGs. We already have the potential to infuse this powerful enabling technology into legacy systems
However for true success – we need to rethink the role of government and the way it interacts with civil society and private sector in managing the country's public affairs and responding to people's needs

To pull the SDGs together we need a new model of social innovation - a model which leverages private sector infrastructure to create a global innovation ecosystem that delivers hyper-locally yet scales globally. We need infrastructure to catalyse partnership innovation at the local & national level which delivers a more open and collaborative model of innovation in which Government brings together stakeholders to use emerging tech and harness the

potential and synergies among different governance actors deliver positive change and prosperity for all

The answer lies in platform thinking If Amazon and Airbnb can connect people around the world to co-create services, together we all can too.
We believe that the citizen will generate an increasing volume of unstructured personal digital data, which will require structure, through insights and requests.
So we are establishing a platform that uses AI and machine learning to connect innovators and in-country community, governments or stakeholders that need them to achieve the SDGs. This platform empowers people to own their digital data, create an innovation ecosystem that delivers hyperlocally yet scales globally to accelerate progress towards SDG's. It is an infrastructure that catalyses partnership innovation at the local & national level.
If Amazon and AirBnB can connect people around the world to personalised services, the UN can too!

New Public-Private partnerships are already leveraging platform thinking driving a paradigm shift from profit to social innovation.
Example: Angaza – Pay-as-you-go Solar Energy – SDG 7 Affordable and Clean Energy which uses platform thinking to facilitate sale of solar powered devices to end users in developing world (currently East/South Africa and India) and brings together manufacturers and distributors of devices and builds their technical solar capabilities, and provides platform to share data and manage a new business model. Angaza lays foundation for creation of prosperous grid-free societies without vast investment and resources associated with traditional power infra (leapfrog). Considering the vast resources needed to build up such a grid, solutions such as the PAYG platform play an important role in powering the circular economy (leave no-one behind). Users pay for usage, not the product itself -meaning a user can obtain a solar powered reading light. The effect of this model is substantial in underdeveloped areas where access to a reading light can mean the difference between a university degree and a stagnant life in poverty

Another example: World Computing Grid: OpenZika – SDG 3 Good Health and Well-Being. On February 2016, WHO declared the Zika virus to be a global public health emergency due to its rapid spread and new concerns about its link to a rise in neurological conditions. The pregnant women who contract the virus have given birth to infants with a condition called microcephaly, which results in brain development issues typically leading to severe mental deficiencies. The virus is rapidly spreading in new geographic areas such as the Americas, where people have not been previously exposed to the disease and therefore have little immunity to it. Currently, there is no vaccine to provide immunity to the disease and no antiviral drug for curing Zika.
The OpenZika project on World Community Grid aims to find an anti-Zika drug by identifying which of millions of chemical compounds might be effective at stopping the effects
The Research has been accelerated and delivered at scale thanks to platform thinking -
World Community Grid enables anyone with a computer, smartphone or tablet to donate their unused computing power to advance the cutting-edge research. Over 650,000 individuals and 460 organizations helping to find effective treatments for zika and other illnesses such as cancer and HIV/AIDS

Another example: Cartagena, Colombia – SDG 6 Clean Water and Sanitation. Prior to 1995, water/wastewater service and its providers were unreliable >70 percent of households had water connections, >55 percent had sewage service. The population with lower incomes either had no water or experienced water pressure so low that their service was practically non-existent. The pre-existing system operated with substantial financial losses and had insufficient funding for maintenance or improvement of the system.

The Political pressure from the citizens of Cartagena led to the Government looking for a partner to help them repair and operate the system. In 1994 the municipal council created a mixed enterprise which combined public works department resources with an international Spanish water firm – in an operation called AGUACAR.
Despite initial suspicion of AGUACAR, significant changes in service were quickly apparent - leaks significantly reduced, increasing the water pressure to existing customers. The services extended to those not connected to the system by bringing in other private entities and establishing a system of water truck deliveries.
The financing came in part from a restructuring of the tariff system, to incorporate cross-subsidies, where more affluent customers helped subsidize the water rates to lower income families.
By 2005, water supply coverage increased to 99 percent of the population and sewage coverage rose to 75 percent.

Those examples are only the start, not only can PPPS deliver services to help existing challenges, they can predict and mitigate crisis before they happen. IBM has also identified ways to use advanced machine learning, optimization and statistics to predict potential migration crises. These models can track the number of arrivals, refugees' intended destinations and routes, and the factors pushing or pulling them to those pathways. Their predictive analytics rely on aggregating data from weather, news, social media, country statistics, and migrant registration on a scale out of reach of human analysts. This model offers the UN the opportunity to plan for emergency flows before they happen, and allocate resource more smartly. It could help efforts to tackle human trafficking and migrant smuggling. Better information on migrants' age and origin would help efforts to find employment and education. Shared Data can also help hold governments and civil society more accountable for their response, and correct negative public perceptions of migrant numbers and impact.

JUHAN LEPASSAAR, Head of Cabinet of Andrus Ansip, Vice-President Digital Single Market, European Commission made an inspired speech on "*Breaking down barriers and creating a Digital Single Market"*

Juhan Lepassaar developed the fact that Europe before the DSM – Digital Single Market was full of barriers and poor on online access. Europe was a patchwork of rules around EU-28, hindering access to goods and services as well as competition for Europe as a whole.

The DSM – Digital Single Market vision from May 2015, aims to update single market to online environment; add 'digital' to EU's four basic freedoms; make it easy for people/business to access and exercise online activities in fair competition.

The DSM achievement is that it is becoming a reality. Europe's people and companies feel already the difference on the ground. Building a DSM has created more than 35 new digital rights/freedoms, including those deriving from GDPR, net neutrality, end of roaming surcharges and unjustified geo-blocking, cross-border portability of online services.

For the future, the DSM will focus on new-growth areas based on data as source of innovation and growth. Initiatives on free flow of data, HPC, AI, digital skills, digitising industry, e-government, e-health - all underpinned by a safe and secure environment to guarantee trust in the online world.
The DSM will aim at building on key areas for EU's digital future - big data (also analytics), EU's leading role in robotics, the IoT, 5G and beyond.

AI is one of the most promising area in ICT and can benefit a wide range of sectors such as healthcare, agriculture, self-driving vehicles for safer transport.
The continued development and strengthening of the EU single market will help us to address these challenges - and others of which we are not yet aware.

NICOLA HODSON, **Vice President Global Sales and Marketing for Digital Transformation, Microsoft, United-Kingdom** exposed with great skills the digital transformation of Microsoft and its impact after 18 months implementation.

Nicola Hodson explained that Microsoft had only 3 CEOs in its 40 years existence and each one of them had the ability to adapt the company to the evolution of the world. This can be verified with the PC, cloud, mobile… Now we are going toward intelligent cloud and Intelligent Edge. Intelligent cloud refers to ubiquitous computing, enabled by the public cloud and artificial intelligence (AI) technology.
Intelligent Edge is a continually expanding set of connected systems and devices that gather and analyze data—close to the users, the data, or both. Users get real-time insights and experiences, delivered by highly responsive and contextually aware apps.

Companies, Industries and governments as well are designing services for that Intelligent Edge. Those services are being created with AI, cognitive conversational service to real provide the best services to the customers/users.

Going with those changes, Microsoft realized that it needed to change fundamentally as a company in order to be in measure to bring the best of itself to its customers. Microsoft made massive investments in its agile infrastructure to bring these services to life.
Microsoft‘s mission is to empower every person & organization to achieve more meaning that anyone anywhere with the right tool can be what he/she wants to be. This mission has an impact on Microsoft’s product choices and people.
Satya Nadella, Microsoft CEO said “Every person, organization, and even society reaches a point at which they owe it to themselves to hit refresh…” This is easy to say but no so easy to do of course.
Microsoft has 26 000 employees in global sales & marketing department, and before transforming the service, Microsoft decided to gather customers & employees feedback which revealed to be pretty humbling.

Digital is changing the landscape for companies, 84% of CEOs expect digital selling to increase profit margins; 30% of businesses are monetising their information assets; Digital companies generate $100M more in operating income each year; By 2020, the scale up of digital business strategies will drive 60% of IT spend and 60% of CEOs plan to build IT and digital.

Ms. Hodson continued with the exposition of Microsoft vision on the digital transformation and meaning for its customers. For Nicola Hodson, digital transformation is synonymous of empowering employees, meaning helping the employees to use the digital tools to be more productive. The digital transformation is also about engaging customers in new ways, optimize operations and bring new products to the market faster.
To cope with those objectives, Microsoft completely transformed it global sales & marketing department around the sizes, objectives, activities – industries of its customers.
Ms. Hodson explained that Microsoft reshaped its sales team by adding technical sale people so that there are technical specialists who can support the customers.
Microsoft invested a lot in helping its customers to be successful, Microsoft was not just selling products but made also sure that the customers obtained the best of the products and thus better satisfy and empower their own customers.

Microsoft digital transformation was wide and concerned several aspects:

- **Engineering:** FROM “Packaged software” TO “Cloud Services & Devices”
- **Sales Motion**: FROM “Manual, Transactional Selling” TO “Viral Find/Try/Buy/Use, Customer Self-Service, Data-Driven Sales & Marketing
- **Support:** FROM “Add On for Cloud Services” TO “Integrated support offerings that deliver more customer value”
- **Partners:** FROM “Partner ecosystem slow to change” TO “Help new Cloud Partners scale; focus on IP”
- **Seller Focus:** FROM “Selling Licenses” TO “Customer Success, Usage & Consumption”
- **Readiness:** FROM “3-year cycle of product releases” TO “Continuous cycle of innovation”
- **Compensation:** FROM “Perform (Revenue)” TO “Perform and Transform (Consumption)”

Following its digital transformation, Microsoft changed the role of most of its leaders globally and had to help them understand what their new role was, how they could collaborate… This stage revealed that Microsoft needed to change the habits & behaviors of the employees. To do this, Microsoft launched an initiative called “Empowering Digital Success” which is a real cultural change. This initiative aimed at making Microsoft sales team the most trusted cloud sales force on the planet. By achieving that, Microsoft answers its customers’ expectations objectives.

Microsoft’s customers experience the same ethical dilemma in terms of AI implementation in a fair and inclusive way, Microsoft had to make sure that its staff could be in measure to discuss those questions with their customers. To do that, Microsoft had to think of a way to onboard all employees and give them specific trainings. It is a complicated task as Microsoft wanted that its employees learn every week; reeducate its managers to give employees time to learn. Microsoft also had to create new certifications available online as well as to its customers and partners so that they could learn at the same time as Microsoft employee do.

Microsoft spent a lot of time re-educating all its managers with a focus with front-line managers in order to help them to coach rather than inspect their people. This requires a deep and real behaviour change.

ADAM PEAKE, Civil Society Engagement Senior Manager, ICANN - Internet Corporation for Assigned Names and Numbers started his speech by presenting ICANN and its mission which is to ensure the stable and secure operation of the Internet’s unique identifier systems: numbers, names and protocols. Anything connected to the Internet – computers, mobile phones, and other devices – has a unique number called an IP - Internet Protocol-address. Every address has a unique number and names associated to it in order to be sure to reach the website, computer and other devices intended. There are billions of addresses and ICANN is in charge of the addresses assignment.
ICANN role is also to mediate between the computers that “talk”/exchange in numbers which is not practical or memorable for humans thus ICANN takes those numbers and transformed them in semantic names which are more memorable. ICANN collaborates with various technical partners to make sure the Internet works. ICANN collaborates also with partners from the policy sphere such as WIPO - World Intellectual Property Organization on copyright, UNESCO and others.

ICANN Ecosystem is composed of 3 components: the Global Multistakeholders Community of volunteers which is a volunteer-based community, open collection of global stakeholders that work together through a bottom-up process to give advices, make policy

recommendations, conduct reviews, and propose implementation solutions for common problems within ICANN's mission and scope.

The Global Multistakeholders Community of volunteers has a crucial role as it is the initiator of the policies and actions of ICANN. All things developed by the community goes to the board of directors who are representatives from the global community, the board decides if the policy should or not be implemented and then the board instructs the ICANN Organization aka ICANN staff to do the implementation.
The ICANN community through its Supporting Organizations (SOs) and influenced by its Advisory Committees (ACs) develops and refines policy recommendations. The Supporting Organizations tend to be on the industry side whereas the advisory Committees is more close to governments.

Adam Peake exposed the challenges that ICANN has to overcome, as many there are criticisms over the fact that there is no trust, ICANN is not accountable and transparent, questions about the different actors involve in ICANN, who is the leader, challenges of different regimes and regulations.

Adam Peake insisted also on ICANN Multistakeholders approach which can be global, inclusive, accountable and transparent. Adam shared that the multistakeholders approach is the way to bridge the lack of trust and accountability by involving all stakeholders.

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Q&A

Following the keynote speeches, the floor was given to the audience for direct questions & interactions.

Jakob Willer, Director, Telecom Industry Association, Denmark bounced back to the keynote of Juhan Lepassaar, on the fact that Europe displays a clear vision of the digital, what Europe wants to do etc.… but for Jakob we need a description of how Europe will stimulate investments. Jakob pursued by describing Europe which is lagging behind USA & Asia, There are in Europe more than 100 mobile operators compared to 3 in India and China; 4 in USA… for Jakob there is a need for consolidation in Europe. Jakob estimated that Europe is the most unattractive place to invest in telecom due to an excess of regulations & rules. Ambition & reality is far too unbalanced in Europe, Jakob urged the Commission & politics in Europe to create an industry policy in the telecom sector to attract investments as Europe is lagging behind and need strong actions.

Juhan Lepassaar from the European Commission pointed out that Europe is attractive in terms of investments as Europe is a rich market with rich returns. In term of connectivity, Europe is a high competitive area which means that customers have access to low prices not possible in USA or India. When comparing, Juhan insisted on the need to look at the whole picture.
Juhan agreed with Jakob on the need of investments in Europe, and hope that the new code agreed by the European Commission will give opportunities for the telecom operators to tap into investments**..**

Tom Togsverd from the Danish ICT Industry asked a question to Juhan Lepassaar about the single market. Tom explained that Denmark has a war rule in the digitalization law enforcing that some public data must be stored in Denmark exclusively. Tom asked if we could still talk about single market if all European countries enforced like Denmark this type of "war rule".

Juhan Lepassaar noted that the single market in Europe needed to go digital and ensure free flows of data as much as possible. This is why the Commission fought hard to make sure that there are few limited exception in digital regulations essentially for public security & safety. The exclusions are limited and must be motivated.

Session 5

Day 2 – Morning– Parallel Session

S5: Understanding the Value of Innovation

This session was chaired & moderated with great skills & expertise by **ALAN SHARK, Executive Director & CEO, PTI - Public Technology Institute, USA**. The session focused on how to best respond to change and enhance prosperity for people and organizations through innovation. Technologies like Artificial Intelligence, Blockchain, Big Data and Internet of Things are evolving quickly. Governments and private companies are – among other things – drawn by an attractive digital growth environment, where new and value-creating solutions are developed and where new digital start-ups can emerge and succeed. This session featured 9 presentations with the speakers bringing their expertise from among government and the private sector.
While the slide decks provide the best information, the session can be summarized as follows:

- **UMAN** (Universal Mutualised Aid & Networks: We learned from a first-hand example how H & D (Humanitarian and Development Sector) how technology and innovation is playing a key role in delivery of aid, rethinking distribution and process, utilizing digital services, and producing new business models. Finally, technology is being used to speed up the process for donor identification and efficiencies.
- **FotoinMotion**: We learned that FotoInMotion is an innovative format that transforms a single photograph into a dynamic, high-quality video for storytelling and branding. It also utilizes a 3D immersive tool with AI object recognition and semi-automated functionalities and can serve as a valuable medium for both government and private companies.
- **Technology of Peace**: This fascinating presentation showed real-life self-help programs in poverty-stricken Africa by turning trash into “treasure” as but one example. Other examples showed how their GreenWall project can produce Food Security and Health through innovative ways to use seemingly spoiled food or repurpose food for different purposes.
- **The City of Copenhagen**: The City’s Office of Innovation shared a few of their most innovative initiatives which include:
    - Becoming a cashless government
    - To support residents with cognitive and physical difficulties in being able to function in a society that is increasingly digitized
    - Field-work modernization
    - Streamlining and improving relationships with the vendor community
    - Applying modern management techniques to innovative practices in government
- **Innovation both defined and Applied**: There was much discussion on what innovation is and is not and why it is important to understand the differences. There was a focus on how innovation can make government more trustworthy, efficient as well as effective.

JOACHIM ALMDAL, Co-founder & Head of Business Development, Greentech Challenge, Denmark focused his talk on boosting innovation

GTC is an accelerator program that trains and develops sustainable businesses and innovations and put them in touch with heavy investors. It is financed by the European Union (EU), Nordic Countries, Scandinavia
My mission is to make green business good business.
We do this by connecting green tech startups with capital and professional consulting through a 4-day growth programme - which work remarkably well. A year after the first programme 73% of the participants raise capital within 12 months of participating in a Challenge, their monthly revenue triples on average and they raise an average of EUR 500.000 Join our next challenge through www.greentechchallenge.eu
The team sizes have grown 67% on average. The start-ups 3X their monthly revenue.
GTC has run programmes in cooperation with Microsoft, Accenture, PwC, KPMG, E.On, QVARTZ Consulting and many others.
In 2017 we are running accelerators in Berlin, Lisbon, Helsinki, Copenhagen and London.
We have worked with almost 100 green startups and have a database of even more.
We make green business good business through intense growth sprints focused towards raising capital
We help start-up that have

- a positive impact on the environment and society and help reduce emission and pollution
- technology, or a business model, that can scale to positively impact a large amount of people or area of the globe
- traction in form of sales or customers who are willing to purchase at certain technological milestones

MARIA ANTOSEN, **Head of Office, Office of Digitalization, City of Copenhagen, Denmark** made an enlightening presentation about the transformation of Copenhagen into a digital city over the past years.
Copenhagen is Denmark's capital city and is in constant growth, Copenhagen is a city in growth and one of the best places in the world to live according to several studies led all around the world due to its economic & social climate.
In September 2017, Copenhagen's population passed 610,000 and that figure will keep rising with in 2027, a population expected to be about 700,000. This increase in population means: more income and more growth but it also puts a pressure on the costs of service and service capacity for the city. To overcome and managed efficiently those issues Copenhagen has decided to rely on the power & opportunities offered by digital.

The Digital innovation in the City of Copenhagen consists on a strong financing with 450 mill. DKK each year alloocated for the development and implementation of digital projects. The investments of the city in new techs are varied ranging from RPA (Robotic Process Automation), machine learning, chat / voice… Robotic Process Automation is one of the fastest ways to drive digital transformation and innovation within organisations.

The city grants also a great importance for the scaleability of the various projects & initiatives implemented with a focus on the possibility for the citizens & enablers to take part in the scaleability of the initiatives.

EYAL BLOCH, Head and Co-founder, TOP Global; Co-founder of the Jerusalem-based Institute, Education for Sustainable Development (ESD), Israel

Eyal presented the program to explain why he created the NGOTechnology Of Peace .

TOP is designed and developed as a growing Upcycle platform with a lively network of people, NGOs and businesses helping each other in sustainable development. Sustainable development means Self development, Social development, Spiritual development and Simple

It is a program for sustainable development . The goal is innovation with the people and not for the people with an impact on Self development, social development and spiritual development.
There are 17 goals to achieve a sustainable development
No poverty, Zero Hunger, Good health and well-being, quality in education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, , reduce inequalities, sustainable cities and communities, responsible consumption and production, , climate action, life below water, life on land, peace, justice & strong institutions, partnerships for the goal.

TOP aims to share the proper conditions and tools to create a community for people, businesses and organizations, where they participate in an ecosystem of share knowledge, tools, resources, energy and inspiration, and cooperate to build and grow well beyond their individual capacities

Eyal Bloch gave some examples as a conclusion

Here is a very short sample of the activities of TOP Kenya Founding Organizations:
RODI (Resource Oriented Development Initiative): works with schools and prisons. Prisoners grow their own food, and become permaculture specialists
YARD: works with young girls at risk / prostitutes and teaches them to work in cosmetic salons/hairdressers.
SHOPHAR: a former headmaster, whose school and water purification system was visited by the President of Kenya and presented ESD at the UN in 2016.
ELIMU TV: broadcasts educational content to children who can't afford to go to school
SCOPE: a network of 18 NGOs introducing permaculture in schools
KWEN: a network of 4000 women entrepreneurs using table banking and micro financing.

FRIDDA FLENSTED-JENSEN, Acting Chief of Innovation, City of Copenhagen, Denmark
Rethinking Copenhagen

7 mayors, 7 Departments, 45.000 Employees
Copenhagen is regularly placed in the top 10 of smartest cities in the world alongside Amsterdam, Barcelona, London, New York, Paris, Stockholm, Vienna, Dubai and others. How smart is Denmark's capital city?

Back in 2014 Copenhagen won the prestigious World Smart cities award for its Copenhagen Connecting project. Its city planners use technology in a way that adds real value to citizens in terms of services and quality of life.

Copenhagen solutions lab is the city's incubator for smart city projects and initiatives.
The aim of the lab is to work alongside the city, companies and citizens in order to test out new technologies and ideas in real-life settings. As there can be no better way to test solutions than with citizens – this allows for real-life learning and a great understanding of how people actually use the technology that is put in front of them. Many cities throughout the world are now implementing such solutions labs in their cities, but Copenhagen was definitely one of the first to realise that this business model would be a great way to test and integrate technology across the city.
At the time of writing CPH solutions lab has open invitations to collaborate on projects including: smart parking, blockchain applications in the energy sector and is part of a call for tender to create a Europe wide internet of everything platform for open innovation. Working locally and with other cities across Europe and the world is a key factor in the strategy of the city that allows it to be at the forefront of technological change and development.

One of Copenhagen's flagship projects is their City Data Exchange, this innovative platform is being specifically developed for Copenhagen by Hitachi. The aim is to create a platform that enables the buying, selling and sharing of data between citizens, public institutions and private organisations. This will be the first data exchange to deliver both private and public data all in one place – it is a cornerstone of Copenhagen's ambitious plan to be carbon neutral by 2025.

MICHAEL STANKOSKY , Research Professor, George Washington University, USA

Delivered a great presentation on Technology Convergence

The nature of Innovation is: the following

- Technology innovation is not linear
- Technology is accelerating at an exponential pace because of the intersection of all of the different disciplines

What is Technology Convergence?

- Cohabitation of technologies in a single device, sharing resources and interacting, creating new technology and convenience
- Integration of a number of disparate technologies or functions into a single integrated system
- Technology convergence pushes alliances between once isolated industries such as broadcasting, computing, and electronics

The drivers of Technology Convergence are:

- Information technology and digitization
- Globalization
- Sophistication of services
- Pressures for increased functionality
- Drive to find solutions to the complexity to our industrial systems
- Increased process orientation
- Sustainability

- Prof. Stankosky then gave some Examples of Technology Convergence: Big technologies that now underlie the next big crop of convergent breakthroughs
  - Artificial Intelligence (AI)
  - Blockchain
  - Internet of Things (IoT)
  - Nanotechnology
- Services coming out of convergence
  - Video on demand: Think streaming services.
  - Mobile-to-mobile: This has no need for fixed location capabilities.
  - Location-based services: Being able to determine where the nearest ATM is located.
  - Fixed-mobile convergence: Services that are irrespective of their location.
  - Integrated products and bundles: These “super solutions” keep your services for multiple solutions with just one provider.
  - IP Multimedia Subsystem: This integrated telecommunications network enables the use of Internet Protocols to communicate.
  - Session Initiation Protocol (SIP): This is a call setup protocol that can be operated over the Internet.
  - Internet Protocol Television (IPTV): The delivery of television over the Internet.
  - Voice over IP (VoIP): Phone service over the Internet, made possible by SIP.
  - Voice call continuity (VCC): This service determine how a voice call is delivered, enabling it to be delivered over both IP and CS networks.
  - Digital video broadcasting: The standards developed for transmitting digital television

Pioneers and Leaders of Converging Technology

- Apple
- Adobe
- Netflix
- Amazon Prime
- IBM
- Microsoft
- Google

The Benefits of Convergent Technology

- Time-saving and cost-saving devices
- Improving human performance
- Allowing and encouraging new ways to communicate
- Moving away from being passive consumer to active user (e.g. in media, the audience can become more active than passive)
- Encouragement of new product acceptance, as some of the functions are already well-known
- Less siloed information with digital data
- Bigger effectiveness of a single piece of technology
- One set of infrastructure which is cheaper to operate
- Ability to address different price points with essentially the same technology
- Watching media on a wide range of devices
- Broader availability (e.g. in certain fields like film production, what was once all professional-level equipment is now in the hands of everyone)

The Challenges of Convergent Technology

- Some converged devices are less reliable than the devices that perform a single task; they have lower quality

- With each added capability, the original device function is decreased
- Potential data security issues arise
- Possible waste of investments in separate technologies that was already made
- Increased expense in the combination of services and products and the need for a faster network
- Unknown regulatory issues
- Antitrust issues

To conclude

What Is the Future of Converging Technology
- Quantum Computing
- Truly Integrated health research/care
- Whatever you can imagine

DANIEL VAN LERBERGUE, Co-founder & Director, InnoGage, United-Kingdom

Daniel made a presentation on FotoInMotion

Why FotoInMotion? Why now?
More than 1 trillion photos are taken every year.
FotoInMotion is a tool to surface quality photographs from the endless stream of digital content

FotoInMotion is a 3D immersive tool with AI object recognition and semi-automated functionalities

FotoInMotion targets 3 creative industries
Photojournalism with NOOR
Fashion with Marni
Festival with TBNFF
Each pilot runs through the entirety of the project in order to build a tool that is relevant across the creative industry sector

There are Multiple uses for FotoInMotion
Social Media
Electronic Billboards
Art Galleries
Journalism Websites

Mobile app will allow the full-feature set from image & audio capture to immersive semi-automatized video output
Desktop tool ideal for transforming existing archive images into immersive videos

STEVEN LAFOSSE MARIN , Founder & CEO, UMAN, France made a presentation on Digital social innovation/ technology for Good, Development& humanitarian aid. You have his in-extenso speech below:

“Thanks Alan and Good-morning everyone,
I’m honoured to be part of this panel and share with you our start-up’s observations and vision to innovate together.
Our startup name is UMAN and it means Universal Mutualised Aid Networks.

My name is Steven LAFOSSE MARIN, I'm the Co-founder of UMAN and one of the cofounders Nicolas MEN is also in the audience. We are available if you want to find out more after my presentation or you can connect to our website uman.global
We are at the Global Forum during these two wonderful days to share our vision on how new technologies and ecosystems can support humanitarian and development (H&D) sectors, with Donors through their Trust Funds, with regional or local based NGOs, various stakeholders and beneficiaries. If you are one of them, Trust Fund or NGOs, don't hesitate to contact us.
We have built our vision during one year. It has been fed by interviews and analyses with all categories of key actors.
I would like to share outstanding figures that everyone here in this room has to know.
Today, climate change, inequalities and persistent large-scale conflicts are the most serious issues that human beings are facing today.
We have 68 million displaced people in 2018. It 2 million more compared to 2016, and 18 million more compared to the Second World War period.
Among this 68 million, a significant part comes from the effect of the climate change. It will increase more and more due to the demographic and climate changes.
In 2017, 330 disasters have been recorded. It's the highest number since the last 15 years.
According to experts, in 2050 we will have 4 times more displaced people, and now, 800 million people lives under the extreme poverty line with less than 1,90$ per day.

Do-you know that we have 12K start-ups sin the fintech area. And according to you, how many start-ups are there operating in the H&D sector? Around 200 start-ups'.
We believe that more innovations could be new drivers of changes to tackle this global challenge.
There are different types of innovations: Technology, process, services, distribution& new business models.
What is the main driver of innovation for private sector? It is more revenue & more profit.
And what about the H&D sector? For us, the value of innovation is in the improvement of people lives, with new technologies.
Now let see some vibrant innovation examples in the H&D sector.
On the technology area, the World Food Program built an Ethereum blockchain to distribute aid vouchers to Syrian refugees living in the Azraq camp in Jordan, with biometric identification. Yesterday with the SYBO game application, their CEO Mathias Gredal Norvig shared us how we can also benefit of empathy to care more about people.
For the Services, Mojaaloop, implemented by Bill and Melinda gates foundation, will help people send digital payment to regardless of what kind of account or service they use.
And for the Distribution, UNICEF is testing aid delivery in Malawi with drones.
I will take the opportunity to invite all people who are interested in these topics to discuss with us after the session. Thanks.

<u>Alan question and Steven answer:</u>
Innovation is also a question of timing. Why do you think UMAN has to do it now?
Needs are amplified, and solutions requires involvement of all of us. It has been highlighted by the Davos 2018 forum and key leaders, the Pope François appeal, and also today in Copenhagen during our Global Forum, and it will continue for example with the Paris Peace Forum next week, as Madam the Ambassador of Denmark, Caroline Ferrari said yesterday.
Even if there is an on-going and huge work since 2000 with the Millennium Development Goals (MDGs) through the impulsion of Mister Kofi Annan, and now with Sustainable Development Goals (SDGs), **demography andclimate will continue to change, and will increase poverty and displaced people.**
We see with some innovation examples that:
*Emerging technologies in the private sector, with also an increase technologies penetration rate& adoption for beneficiaries contribute to help more people

* The workshare and synergies between several different channels and aid fragmentation will maximise efficiency and capacity building

Our analysis and research confirmed the need of innovation to build new ecosystems and platforms that UMAN are currently designing.

And in conclusion, we feel also the responsibility as leaders to invest our time, skills and resources to build a better tomorrow for our children and that is why we created our startup UMAN."

Session 6

Day 2 – Morning– Parallel Session

Digitalization in Healthcare

The session was chaired and moderated by INGRID ANDERSON, CEO, Corporate Wellbeing, Oman & Senior Advisor, IKED, Sweden

MARIANE CIMINO CEO, Hoa-Ora, France presentation focused on Health and well-being: an holistic approach
WHO principles : Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity. The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief,economic or social condition.
Some disturbing facts however such as:
Environment i.e Air pollution and climate change, Water supply, Deforestation, Soil degradation, Overpopulation…
Education : 72 million children around the world remain unschooled
Nutrition :Poor nutrition affects a 1/3 of the human race
And also **The challenges of urbanisation** : ¼ of the world's urban population lives in slums, 0.3 billions expected decline in the global rural population (2014-2050), 90% of the global increase in urbanisation will be in Africa and Asia

There are Some innovations in a patient journey : Telemedicine, Health IoT, IA for diagnosis (eg Dermatology), Robot in medical operations, personalized medecine.
Some innovations also in social area such as Social relationships, e_learning, e_nutrition, solutions for mobility, remote sport coaching

Also Some innovations in house construction : 3D house printing, Digital calculation for house insulation, urban agriculture, smart Lightening

Conclusion : There is a need for an holistic approach
• Transdisciplinarity
• Partnerships
• Coordination for the benefit of the patient/citizen/person

JEAN-CLAUDE GRANRY, Full Professor of the French Universities, Practitioner in Hospital, France presentation was about Healthcare simulation
*The term « medical simulation » means the use of **a device**, such as a mannequin, a task trainer, virtual and augmented reality, or **a standardized patient**, to **emulate a real** device, patient, or patient care situation or environment**to teach**therapeutic and diagnostic **procedures**, processes, medical concepts, and **decisionmaking** to one or a **team** of healthcareprofessionals.*
It is the mix of Manikin procedural simulation, Manikin TB simulation, Human simulation PsimPSt et PE (standartization of patient) and Digital simulation

- Pr. Granry gave some examples :

- Central venouscatheter*(Barsuk JH 2009)*
- Tracheal intubation *(Mayo PH 2004)*
- Pleural drainage *(Wayne DB 2008)*
- Endoscopy *(Blum MG 2004)*
- Laparoscopicsurgery *(Andreatta PB 2006)*
- ECMO Simulation Eye tracking
- *Simroid "simulator humanoid*

There are Breakingbad news and simulation when

- Cancer announcement
- Announcement of a death
- Announcement of a disability

Patients look to us for knowledge, guidance, reassurance, hope, meaning, and compassion

Telehealth and simulation is an important field: such as Teleconsultation, teleexpertis, Training in virtual contact doctor-patient, Training in healthconnectedobjects
For ex. we know that Simulation based education improves quality of of care during cardiac arrest team responses ; the management of simulated emergency helps for better teamwork, better performance.
Medecine is reaching a turning point : experts believe that in just a few year, artificial intelligence will greatly help doctors make diagnostic decisions and plan treatments. In addition, patients are expected to benefit from increasingly personalized approaches and better care.

The Core standards are

1. Mission and governance
2. Organization and management
3. Facilities, application, & technology
4. Evaluation & improvement
5. Integrity
6. Expanding the field

CHRISTIAN GRAVERSEN, CEO, Welfare Tech, Denmark

Denmark is the largest cluster for health and care technology.
It build bridges between private companies and public organisations

What is the concept of welfare technology?
Telemedecine, Robots and automation, services, Intelligent aids, IT digitalization and data, Virtual reality and artificial intelligence are Technologies and digital solutions that enhance the quality of life and efficiency in society.

Today, There is an increased pressure on health services due to the demographic development but also the fact that there are more deseases, fewer hands and increased requirements for documentation and globalization.

In the Danish context, the population is ready for technology, there is already a private/public cooperation, an innovative sector and we are testing new technologies.
Denmark is first ranking in 2018 in Europe as a digital economy.
The Danish Digital Health strategy 2018-2022 has 5 main objectives based on 27 initiatives
1.Patient Reported Outcomes
2.Integrated Care

3. Population Health and Prevention
4 ; Data security and confidence
5. The National Health-IT Atchitecture

Mr. Graversen then describes some caeses
IntelligentLife

- IntelligentLife - app and censor system
- Targeted at elderly or people suffering from dementia
- Automatic and manual alarming through censors or items such as bracelets
- The app is a communication network for citizens, family and specialists

Benefits for the citizen : Creates security, Greater freedom, Less loneliness, Rehabilitative features and more quality with caregivers, Extends the possibility for citizens to stay in their own homes for longer and finally this gives Better quality of life, greater joy and more dignity

LARA SRIVASTAVA, Head New Initiatives, ITU - International Telecommunication Union

Transforming Healthcare in the era of AI

There is an enormous potential of leveraging IoT and M2M connectivity to gather data from a plethora of sources (things, sensors, phones, medical devices)
There is also an Exponential increase in data – and data complexity going beyond traditional data processing software. 3Vs: Data Volume, Variety, Velocity (+veracity, +value).
And also we have the Ability to draw inferences and recognize patterns in large volumes of data, with resultant algorithms able to make predictions

Even today, we normally rely on what we can **explicitly understand**: relatively simple relationships that can be identified and validated (e.g. through clinical trials)
But the field of biology is a complex and complicated matter: there are dozens and hundreds of **interacting variables** to consider, including those that are easily observable and those that are not so AI and ML have the potential to grasp these complex underlying biological relationships, using **algorithms for validation** rather than clinical trials

Whether we are talking about artificial intelligence, or machine learning, or deep learning, one thing is clear: if the data being used is flawed, then the insights and information extracted will be flawed
For AI and machine learning to continue to advance, the data driving the algorithms and decisions needs to be of high-quality and unbiased
In health care, this represents a particularly critical challenge

The development and commercialization of useful AI for healthcare will require **significant incentives** to flourish
Current IPR regimes are not full equipped to tackle the value of collected data **vs.** patterns discovered by that data, **vs.** validation of those patterns…
Blackbox medicine is dynamic, constantly changing – but patents are relatively static and don't tend to protect new uses effectively

Predictive analytics made possible by AI and ML hold **tremendous potential** for health care

However, typically, such decision-making cannot be explicitly understood, and sometimes cannot even be explicitly stated.
The **WHY or HOW** a conclusion is reached is not clear by the very nature of the process itself
This means there is already an **inherent opacity** to the process (before any is added externally)

In Conclusion **Lara Srivastava** raises a number of issues
How can we ensure AI systems for health reflect core values of *equality, justice ,diversity, human dignity, human rights?*
Who will benefit from advances in AI for health?
Will AI perpetuate/magnify historical biases or will AI teach us to better understand them ?
Should data become the doctor?

PAUL WORMELI, Innovation Strategist, Wormeli Consulting; Executive Director Emeritus, IJIS - Integrated Justice Information Systems Institute, USA

The rising influence of Social Determinats of Health
There are FIVE CRUCIAL SECTORS DETERMINANTS OF HEALTH : this is
A NEW OLD IDEA: Economic stability, Education, Health and Healthcare, Neighborhood and built environment, Social and Community context.

The Issues in social determinants are the following

- Economic Stability : Employment, Food Insecurity; Housing Instability, Poverty
- Social and Community Context : Civic Participation, Discrimination, Incarceration, Social Cohesion
- Education : Early Childhood Education and Development, Enrollment in Higher Education, High School Graduation, Language and Literacy
- Health and Health Care: Access to Health Care, Access to Primary Care, Health Literacy
- Neighborhood and Built Environment : Access to Foods that Support Healthy Eating Patterns ; Crime and Violence, Environmental Conditions, Quality of Housing, Access to transportation

What we know ?

- Social Determinants are the basis for health outcomes and setting health disparities.
- Health is determined by where we live, work, learn and play
- Health outcomes can be improved when there is a focus on the population rather than the individual—the public health focus
- Investments in social determinants can reap benefits in improved health outcomes

The Wrong pockets problem is that Investments from one part of the government are not reimbursed by the benefits that accrue to another part of government, discouraging cross-agency investment and perpetuating silos

There are Advancements in Health Care:

- Focus on social determinants results in shift from individuals to populations
- Treatment from individual clinician to team-based
- Value-based models of health care
- Expanded research to create evidence-based delivery policies
- Patient engagement continues to rise
- Interoperability of IT systems in health care vs. other domains

Where are the opportunities, Where we must go??? We should

- Shape resource allocation policies on evidence of improving wellness across places
- Develop new models of collaboration across domains (health, social services, education, justice, etc.)
- Establish cross-domain IT interoperability and standards to share data that generates evidence
- Expand research to support evidence-based practices of collaboration and interoperability

Session 7

Day 2 – Morning– Parallel Session

Smart and Intelligent Cities, Regions & Communities

SYLVIE ALBERT, Professor, Department of Business and Economics, University of Winnipeg, Canada made an enlighten speech "*Smart, Intelligent, Livable, Sustainable Cities*", it is available below in-extenso.

"Challenges that cities face now and going forward,

- 2.5B more population in our urban centres,
- congestion,
- environmental strain,
- cost and livability of housing,
- the economic sustainability of building infrastructure further into suburbs, and for today's needs
- changes in jobs as a result of the digital economy,
- homelessness,
- crime, and
- loneliness.

On the other side, there are opportunities to fix problems using technologies (AI, robotics, data, 3D printing, sensors, etc.) which is a smart approach to problem solving and using strategies to change siloes culture; to improve planning, engagement, partnerships, innovation; and re-engineer, which is an intelligent approach.

Smart cities are about efficiency. We use technologies to monitor and manage energy, water, traffic, transportation, service needs, in short, to improve the management and distribution of goods and services using sensors, data, robotics, and so forth.
Intelligent cities are about effectiveness. We need to better use people and organizations to change the way that we do things to fix longer standing and longer term problems as well as create more livable and sustainable cities.

Several of the participants in this room contributed to a new book: Cities: Smart but Visionary? With the intent to provide some examples on how we re-engineer and innovate around ways to become more effective as cities. We can all have a role in helping cities eliminate some of the silos and agree to work on common themes together.

Under the theme of **building a culture of engagement and conservation**, we could have multidisciplinary groups talk about how we move people in cities to make significant improvements in:

- Wasting less water and energy; Issy (France) is deeply involved in smart grids, the World Bank has several project examples in water leakage management and other innovations, and there are many examples of citizen-empowerment such as in Tucson (USA)

- Re-use and divert from waste sites; Edmonton (Canada) re-purposing up to 90% of waste
- Co-build better residential areas; New York (USA) residents crowdsource to build their own parks
- Sharing economy, capitalizing on idle capacity: computer memory, cars, home rentals, home equipment such as lawn mowers
- Mobility choices; Copenhagen (Denmark) pedestrian and human focus over cars

Under the theme of **planning and designing cities of the future**, we could engage people into thinking about how we improve:

- Controlling and decreasing traffic;
- Smart housing;
- Social & affordable housing; Denmark is an excellent example, using coop and co-ownership models to provide affordable housing to over 30% of Danes;
- Condensed living;
- Green buildings;
- Food security;
- Networked & supportive community environments;
- Senior integration;
- Pedestrian and people-focused neighbourhoods;
- Healthy choices;
- Homelessness;

Under a **jobs & development cluster**, we would encourage problem solving around:

- Strategies for 'at-risk' jobs; Singapore skills upgrading program is an examples and other options are offered in a McKinsey report on job transitions
- Development of new industry clusters and networks; Barcelona (Spain) and Fabrication City concept
- Changes to education to meet new needs, soft skills, and dissemination;
- Support of flex work and a telecommuting environment; Calgary (Canada) and Washington DC (USA) have flexwork and a telecommuting focus
- Measurement of innovation; the European Union benchmarks and regularly measures innovation in organizations
- Development of entrepreneurship eco-systems; Toronto and Waterloo (Canada) and Israel pay close attention to support innovation
- New healthy office environments;
- Green and sustainable development;
- Inclusive growth;

Cities need people like us to get involved in developing a more inclusive network of stakeholders to tackle broader challenges. The Smart Cities Challenge launched by the Government of Canada encouraged cities to think about what cities could do as a broader system to move the yardstick. This led to more depth discussions and divided the responsibilities amongst a wider group of stakeholders which will increase its chance of meeting targets. This is kind of action is what we need to encourage in all of our cities. "

Summary of **Gerard Peets**, Assistant Deputy Minister, Policy and Results, Infrastructure Canada – Government of Canada

The transformation to "smart cities" is happening to everyone, whether they are ready to embrace it or not – large cities and small, remote communities. It is driven by advances in

data and connected technology that will continue. Our goal as leaders and policy makers is to do all we can to ensure that the transformation happens in a way that helps people in meaningful ways, is more than “technology for technology’s sake”, and above all, does not play out at odds with the interests of community residents.

Canada’s Smart Cities Challenge is built on the principle of realizing positive change at the community level. It starts by encouraging communities to understand and define their need. What is the issue that needs addressing, that, when fixed, will make a difference for residents.

To do this, it is essential that people in the community be involved and engaged. Our Smart Cities Challenge required contestants to show how they engaged people meaningfully and were influenced by what community residents told them. This not only ensures that the idea reflects a true need, but the process creates buy-in and commitment throughout the community.

With these foundational pieces in place, a community is ready to embark on complex projects to put data and technology to use in ambitious and transformative ways. They have direction and purpose in the form of clearly defined desired outcomes.

We at Infrastructure Canada are looking forward to selecting the winners of our Smart Cities Challenge in Spring, 2019. We hope that partners and communities from around the world take advantage of the partnership opportunities that this process will present.

Session 8

Day 2 – Morning– Parallel Session

Digitization Transforming Economy & Society

The session was introduced by the **moderator**, **CHRISTOPHE AUBRY DE MARAUMONT**, **senior consultant at IS-Practice**. For this session 'Digitization transforming Economy and Society", the panelists and the moderator had chosen to focus on concrete examples and use cases to show some of the core transformations that they are witnessing every day. They also decided to try to identify some of the key challenges that still need to be tackled in order to achieve the full potential of the digitization's transformative power on the economy and society.

The panel of the session was composed of:

- **Mr. Christophe Aubry de Maraumont (IS-Practice):** Moderator – IoT and interoperability
- **Mr. Tom Togsverd (Indesmatech):** Industry 4.0: Danish business cases and focus on SMEs
- **Mr. Knud Skouby (Aalborg University):** Blockchain
- **Ms. Carla Langjahr (ARServices):** Industry 4.0 for the commercial & defense industrial base
- **Ms. Samia Melhem (World Bank Group):** Role of government and impacts of IR 4.0 on developing countries
- **Dr. Azmizan Abdul Rashid (Urbanice Malaysia):** Impact of Industry 4.0 on a developing country: Malaysia
- **Mr. Philippe Scheimann (TOPGlobal):** Sustainable development and digital transformation, example of the coffee e-farming in Kenya

It is to be noted that, regretfully, **Mr. André Laperriere**, Executive director of GODAN, was unable to attend the session and thus to provide his presentation on "E-farming and digital agriculture". His presentation has however been available on the Global Forum 2018 website.

IoT and interoperability by Christophe Aubry de Maraumont, IS-Practice

After the rapid introduction, the moderator provided the audience with a first testimony focusing on the bIoTope project, an EU funded projects aiming at creating an open ecosystem for new IoT solutions. He invited the audience and panelists to: *"Imagine a smart car arriving in a new city that instantly connects to various data sets allowing the driver to identify available parking slots with or without charging possibilities, allowing the car to calculate the best itinerary avoiding waste collection trucks, school areas during peak hours, or planned city road works. Imagine, an automated irrigation of public parks that can be used as a city cooling system when facing a heatwave."*

This example demonstrated partly the considerable benefits and opportunities for society and economy offered by Internet-of-Things (IoT) solutions, namely:

- Cost reduction for societies
- Increasing services for citizens
- New business opportunities and solutions leading to sustainable economic growth

He further pointed out one of the key obstacles to reap these benefits that IoT has to offer: the lack of interoperability due to the existing vertical siloes generated by proprietary solutions (Apple vs Samsung vs Amazon vs Google). These siloes represent a critical obstacle to the full potential of IoT today, that notably inhibit co-creation of products and services. To overcome this critical obstacle the European Commission is funding several Research and Innovation projects to address the issue of interoperability, amongst these, the bIoTope project.

bIoTope is been implemented by a consortium of 24 partners amongst those you have BMW, the Open Group, Fraunhofer, AALTO, Deakin University, cities of Brussels, Lyon, Helsinki.Its objective is to lay the foundation for creating open innovation ecosystems that foster the rapid development of new IoT solutions with minimal investment and based on common standards.

Christophe Aubry de Maraumont explained how bIoTope is achieving this goal by providing open building blocks for IoT components and systems development. These building blocks are based on the OMI & ODF standards that enable ad hoc information flows between IoT objects, users, services, business or government systems. In addition, bIoTope uses the Everything-as-a-Service paradigm to deliver essential capabilities for System-of-System platforms that allow for tailored approach to specific application domains. In a nutshell, bIoTope is providing an architecture and methodology for integrators and SME's to provide IoT turnkey solutions in a variety of application areas, such as the ones used to introduce this first testimony.

bIoTope is demonstrating that by using the common standards of O-MI/O-DF, it is possible to overcome the interoperability issue and create an open ecosystem that enables the full potential benefits of IoT.

What is your key message for the audience?
In Interoperability and open ecosystems have much more to offer to economy and society than a siloed

Industry 4.0: Danish business cases and focus on SMEs, by TOM TODGSVERD, Indesmatech

The second testimony was provided by **Mr. Tom Togsverd**, partner at Indesmatech. His presentation focused on four (4) Danish business use cases demonstrating the impact of Industry 4.0 on the targeted companies.

Mr. Togsverd started by providing a quick overview of the Industry 4.0 characteristics, among those: the presence of sensors in devices, products and processes that connects them together, the use of BigData and AI in cloud or edge solutions for new analytical tools and processes, the sharing of data between customers and suppliers, the emergence of new production paradigms and business models.

The first panelists then continued his presentation by going through the 4 business cases, starting with the case of A. P. Moller Maersk, the Danish and biggest shipping company in the world. A. P. Moller Maersk has been initiating its digitization for quite some time and is a good example of the digital transformation of the economy. The company is notably has notably optimized the scheduling, routing and navigation of its fleet through new digital solutions, it is able to track and trace the containers, has introduced automated logistics in harbors and is using joint blockchain platform for customers and suppliers. Finally, the company is working on making the new generation of autonomous ships.

He then presented his second Industry 4.0 example: Vestas wind power. The renowned wind power company is notably using Big Data for site location, sensors for the monitoring of the windmills but also predictive maintenance systems and production forecasts, ultrasound testing and drone inspections to improve its production and efficiency.

The third business case was the one of Grundfos and their smart pumps that is at the core of their "Pump-as-a-Service" and "Water-as-a-Service" solutions. Grundfos has notably developed on the web design tools, electronic power steering, a regulation interface for plumbers, Big Data analysis services for user data, and a system of remotely controlled operations.

The fourth use case was the one of Elos Medtech Pinol. The Danish SME has notably a 3D scanning of mouths technology that allows them to couple digitally design implants with an automated factory. The automated factory enables the automated picking, testing and packing of their products.

Mr. Togsverd concluded his presentation by stating that one third of Danish companies today use IoT or e-commerce, insisting on the role models of the large and medium sized companies. He insisted on the gigantic unused potential in SME's that exposes them to the risk of being outcompeted and call the governments to fuel SME investments and more globally all parties to get involved in addressing the competence gap by notably attracting skilled workers and candidates and by offering in-service trainings.

What is your key message for the audience?

The message is two folded. First, Industry 4.0 is important and there is a need to understand the different layers. Second, society should do more to push and convince SMEs to do more (through e.g. tax, consultancy services, etc.) and more demonstrators to show what can be done through the adoption new business models and technologies to inspire SMEs

Blockchain by KNUD ERIK SKOUBYK, Aalborg University

The third testimony was provided by **Prof. Knud Erik Skouby**, professor and founding director of the center for Communication Media and Information technologies of Aalborg University, in Copenhagen. His presentation focused on the role of blockchain technologies as transforming society and economy through answering three key questions: Why haven't we heard more about it? What is blockchain? And why should we talk more about it?

1. *Why didn't we hear more about it?*

Prof. Skouby started his presentation by underlining his surprise not having heard the name 'blockchain' mentioned more during the forum and provided an explanation for this. From his perspective, "Blockchain" was hyped by the cryptocurrency phenomenon as the blockchain

technology was at the very center of this trend. The rapid slow down and decrease of interest for this trend as well as the plummeting of the cryptocurrencies'' value - like for bitcoin now down to one third of the value at its highest –cause the consideration and interest for the blockchain technology to follow the bitcoin down the hill.

2. *What is blockchain?*

However, it was still considered as a solid technological foundation. Looking back at the history of the cryptocurrency, Prof. Skouby explained that the people in the Silicon Valley came up with the idea that we need a new system after the collapse of the financial system in 2008, a new system outside of the old banking system. This new system could be trusted through the use of a software system, namely the "blockchain". Blockchain is this decentralized system with a distributed database which constantly updates and where you can see who owns what, who has done what. It is a network of replicated databases that synchronizes with the internet and is visible to anybody who is within the network. Another advantage of the blockchain is that there is no central administrator as in traditional systems or as in banks.

However, it became rapidly clear that it was a very heavy system. Not only because of the downfall of bitcoin, but also because, in its original version, it was only able to handle 7 transactions a second within the system. If you compare this to other system handling currency, and where it was considered to be implemented, such as VISA for example, the old systems were handling at least 2.000 transactions a second (not an exact figure as highlighted by Knud Skouby, but a minimum). There is thus quite a distance to cover before it could be used efficiently. Another negative aspect is that it consumes an enormous amount of energy: the way it is designed, consuming a lot of computing power, requires a lot of cooling, making the blockchain technology a heavy energy consumer with all the environmental impact it can have.

3. *Why should we talk more about it?*

Prof. Skouby stressed that it was, nevertheless, still a response to an old problem of the internet: how to stay anonymous while ensuring visibility for business purposes? By providing a solution for digital transactions in a protected block, that is updated every minute or so, added to the other blocks (the "block – chain") and with the entire chain being updated continuously, the technology allows to have a system where there is no approving mechanism – just essentially a network which governs itself – that provides for both the anonymity and the required visibility for business making.

Prof. Skouby then underlined that Blockchain is now re-emerging with the focus on the broader potential. Many new usage areas are emerging such as house buying and selling markets that could be automated using smart contacts, insurance transactions that would be made transparent and authenticated so we can know who submitted the claim and who the money goes to, making more efficient, safe and secure exchange of information in the healthcare system, finance sector etc. The biggest potential area, from Prof. Skouby's point of view, lays in the Internet-of-Things: it is good to have all these standardized things communicating with each other, but how do you make sure that you don't have some third-party person or machine going into the network without your consent? This is closely linked to smart cities and transport for example, where you need some sort of authentication to avoid something goes wrong, through a smart, easy and automated way to handle this authentication.

What is your key message for the audience?

Blockchain is not "bitcoins" and it is much more important than "bitcoins". It is part of the global answer.

Industry 4.0 for the commercial & defense industrial base by CARLA LANGIAHR, ARServices

The fourth testimony was given by **Ms. Carla Langjahr**. She has worked in and represented Department of Commerce and Defense in an advisor and consultant role. Her presentation focuses on the digitization of the global economy through the compared perspective of the commercial and defense industrial bases.

Ms. Langjahr started by highlighting that the federal government and cautious and that is not always a bad thing because they want to get it right the first time. When it comes to innovative technology especially, that deliberate process can be a challenge.

She continued by explaining that "Industry 4.0 is connecting the physical world to the digital and back to the physical. IoT is connecting the internet to things but what makes industry 4.0 different is that it aggregates the data and allows for better decision making and productive analytics". Ms. Langjahr used the example of an airplane factory in the 1940s: every manufacturing process, assembling, inspection is done manually for form, fit and function. If you have a landing gear on an airplane, if there is any modification to that, it would be done on the factory floor. And that change would not be propagated throughout the system. In a smart factory, she continued, you have deployment of sensors for real time automation, inspection, monitoring and decision making. Any modification in the design would then be propagated throughout the system. In a perfect world those lessons learned would be applied to Air force, Navy and Army. In the real world, these are siloed ecosystems that can be a challenge to overcome.

Ms. Langjahr further provides examples of applications for Industry 4.0, which are in various progress. The first application she mentioned was transportation which uses the IoT solutions for tolls. The data coming from these tolls can be further used to develop improved transportation infrastructure based on the demand if you look at the volumes. Other applications can be found in the agriculture, farming or irrigation systems for example.

When it comes to the defense and military, the existing siloes that exist between the closed ecosystems for land, sea and air – Army, Navy, Air Force – limits the possibilities. For example, for the Air Force to make a F16 airplane wing – just the wing – it is more than 10.000 documents, none of that being digital, that need to be respected. This means that when you are in the part business, you actually have to find a part that was made in 1940s looking through 10.000 pages of documents. The Navy has the Virginia class submarine, which has about 50.000 documents for the design. This situation is sometimes referred to as the Wild West: everyone is doing their own thing. In that context, the benefits of a global supply chain with the seamless supply of goods and services would thus be a good thing. Or would it?

The digital transformation of the supply chain indeed has risks and it has warning signs primarily from a Defense perspective. She illustrated this with the example of Facebook where you have your personal data or your shopping habits, with only a risk for yourself in comparison to the military, where you want to avoid saboteurs in the supply chain and the risks that pose for the security of everyone. On top of the issue of saboteurs, you need to be sure that the right material is used: if there is a bad code in your data, it would be distributed throughout the supply chain and you have to find it. For example, if somebody changes the material source and that airplane can't withstand that material, that's a problem. There is thus a need to verify the supply chain.

Within the Defense industrial base, Industry 4.0 is primarily implemented through additive manufacturing and 3D printing. In order to make a forty-years-old part for a forty-years-old

weapon system, you need to create a digital twin of that part, i.e. a software representation of a physical asset. The digital thread follows the design of that digital twin from concept to execution. For instance, a part for the Army has different performance parameters than for the Navy. With the digital twin and the digital thread, you can modify that part based on your performance specs. To achieve this, you need an infrastructure, a common language – common semantics – when Army, Navy and Air Force all use different language. All this also need to be secure as well as propagated throughout the system.

She then invited the audience to imagine that they are trying to find the parts for a 40 years old airplane and you have to create this digital twin. A car has lifespan of 10 years, so any incremental innovation that's done in the last 10 years can be applied to the manufacturing of that car. Appliances have a lifespan of around 7 years. Your phone, 2 months, 6 months? Any incremental innovation in that manufacturing process can actually be implemented to the next generation. But in this case, we are looking for older parts that have a lifespan of around 30 years.

Ms. Langjahr finished her presentation by highlighting the importance of cyberthreats that are more prominently present in manufacturing and engineering than in any other industry. This is why there so much concern about it. Blockchain could be a potential solution as it allows for independent and secure interactions. The US government do realize that this is a problem and released a vulnerability report on security in the supply chain. It not only has to do with Intellectual Property but also, and mostly, with integrity and security of your data.

What is your key message for the audience?
With new technologies, integrity, security & privacy need to go hand in hand. When the new technologies involve data, try a more deliberate approach: once the data is out there, you can't take it back.

Role of government and impacts of IR 4.0 on developing countries by SAMIA MELHEM, the World Bank Group

Following the presentation on the Industry 4.0 in the commerce and defense industrial base, **Ms. Samia Melhem**, Global lead for the Digital Development Community of practice at the World Bank Group, presented the role of government and the impact of Industry 4.0 on developing countries.

Ms. Melhem started her presentation by stating that so far, everything that has been discussed during the session concerned developed countries. She explained that her presentation would focus on low income countries and medium economies and the digital transformation of government over the last 5 years. Attention will be given to the challenges governments face when they have to reform the enabling environment, for digital economy. She will then discuss the "big unfinished agenda" and what we can all do to contribute to mobilize all the players of that ecosystem to improve it.

Ms. Melhem recalled that more than half of the world is still not connected, at a time where the internet is used to access labor markets (jobs) and information that could save lives. The situation today is that more and more countries are really slipping behind while others, where governments and private sector are mobilizing and investing in technology, are a big leap ahead. Denmark for example, where this conference is hold, is number one in the UN e-government index and we have with us representatives of the top ten: Japan, Korea, UK, Australian, France, smaller countries like Estonia and DK but bigger ones as well.

What are these governments doing right that the others can emulate?

The number one thing is that these governments actually complete the large technology projects on which they embark. Ms. Melhem underline that completing projects is a must even though the technology may not be perfect or becomes obsolete if you want to be successful in your digital transformation. She compared this situation with people getting their car license: *"You don't refuse to train people to drive a car because the car model will change in 3 years. You teach them to drive the car, and then they will get better and drive the next car model.*" The same approach needs to be applied for digitization.

The second element explaining the success of the governments in the top ten is the investments. Ms. Melhem recalled that when we look at the investments in digital transformation, half of them are failures. As an example, in 2015, Africa spent over $3 billion on electoral systems according to our research whereas the data collected could not be re-used towards provision of basic services. And you have many other stories of big enterprise resource planning systems for Smart cities, for taxation, for human resource, for digital health, all have big failures. The most difficult thing is to have governments work with the suppliers, with the experts, to put the system in place and actually start populating it with data that will at some point be used for e.g. Big Data analytics, Artificial Intelligence, etc.

Ms. Melhem continued: "*Today we are talking about big data and markets where we don't even have data or the data that we have is either still on paper, incomplete, incorrect, or if it exists – it is the worst – not shared. One of my big advocacies is sharing reusing and creating these safe, secure digital platforms that governments can use to provide services to its people, at least for the same country while respecting people's privacy".*

Importance of promoting the Digital economy

Digital economy now is a big mandate and the World Bank is requested to assist big digital economy projects, explained Ms. Melhem. There are many such projects around the world: a digital economy project in Vietnam, many in Africa, etc. Digital economy represents today around 15% of the world GDP and it estimated that in the next 3 to 5 years, it is going to increase to 25%, one fourth of our global economy. The digital is already creating new jobs but we need to ensure that the people who will be the most affected by the digital transformation, who all have skills and want to work, who have dignity in work, that they are re-trained to the digital. Many successes can already be seen in countries such as Côte d'Ivoire, Kenya, Rwanda, where government have embarked on large digitization projects. These countries have put in place important capacity building programmes that are not training a hundred or a thousand, but over 10.000 of civil servants at a time, teaching them how to use the mobile instruments or tablets so that they can enter the data, can take biometrics, can populate the public databases.

Ms. Melhem stressed that the potential of new technologies is almost without limit and one of things that we are witnessing is the accelerated rhythm of change over the last 5 years. This pace is also something that public institutions have problems following. This accelerated pace is notably due to rapid adoption, the high connectivity - everyone now has a cellphone, even very poor people, and the access to knowledge, to online content - everybody has access to everything. This is creating a huge shift around the world: citizens all around the world, and especially in developing countries, are becoming more demanding. They wonder why they can record a new status on Facebook that they got married or they had a child within seconds on one hand, and on the other they need to spend money and time to get a birth registration for their kids lining up in different government offices to register the new born.

The new usages, the huge adoption of social media and other types of services is today pushing governments to try to please their citizens by creating new services. In doing so,

they have to deal with big changes in processes – the famous business process re-engineering that many books were written about, but also the legislation in order to create trust in digital transactions so that people can do digital signatures, and other digital transactions are accepted, are legal and are ratified in case there are disputes for example.

The digital economy that is envisaged in the projects developed by the World Bank Group today rests on several pillars:

1. The digital infrastructure (platforms and services): having the right digital and mobile infrastructure, with the right speed, the right reliability, resilience in the face of disasters (e.g. 5G) is a pre-requisite.
2. Digital payment is also essential: governments tend to not think about it, but having ways to automate and legitimize digital payments whether you are paying a fine, a parking ticket, taxes or if you are doing a transaction with an agency is crucial
3. The digital entrepreneurs are the ones driving the transformation and are essential to it
4. Usage: transactions, registration, digital health, digital education

In addition, there is a need to better accompany governments so "they don't simply re-invent the wheel". Ms. Melhem underlined that there are so many private platforms (Alibaba, Amazon, etc.) today and asked why there is no such thing for governments, where they could search for already developed systems and tools instead of creating new similar systems. In order to have such innovations, there is a need for a lot of social entrepreneurs and for companies to sit together and work with governments under new models, such as PPP.
In the new generation type of projects of the World Bank, they are pushing for several things to be assembled together:

- steering committees around government
- participation of private sector
- participation of academia and civil society.

The World Bank Group calls this new approach of partnership with private sector "Maximizing finance for development". Ms. Melhem concluded by stating that "*no organization in the world – whether it's the World Bank or the UN or governments or private sector – has enough funding on its own to help all our countries to realize their ambitions with the digital*". The MFD approach is needed to help all governments realize their ambitions to leapfrog using disruptive technologies, while leaving no one behind (inclusion).

What is your key message for the audience?
Business leaders need to find ways to provide advice to governments, work together even if you are competitors. The result will be much better if you work together to help governments to mobilize their resources, show them results. Cooperation, capacity building and knowledge sharing is key.

Impact of Industry 4.0 on a developing country: Malaysia By AZMIZAN ABDUL RACHID , Urbanice Malaysia

The second to last testimony was given by **Dr. Azmizam Abdul Rashid**, Director of Knowledge Management and Advisory at URBANICE MALAYSIA. His presentation will focus on the case of Malaysia and how digitization is impacting this developing country in Asia, through Malaysia's aspiration to align in terms of digitalization, how the country can transform into a digital economy. The presentation will also focus on the readiness of Malaysian cities

for Industry 4.0 as the government wants to see Industry 4.0 not only for manufacturing but also for its cities.

Industry 4.0 and sustainable cities

Dr. Azmizam first recalled the importance of re-situating the discussion about Industry 4.0 in the broader context of the UN Sustainable Development Goals but also the UN habitat recent new agenda, that focuses on how cities can become more sustainable through Industry 4.0.

Is Malaysia ready for Industry 4.0?

The panelist continued by explaining that on a global level, Malaysia has been enjoying a fairly strong and competitive position in both manufacturing and the use of technology. Manufacturing is an important economy sector for the country and represents 22% of the GDP over the last 5 years. It is expected to remain strong and continue to grow. This situation puts Malaysia in a good position to benefits from the future of Industry 4.0

What role for the government of Malaysia?

The government of Malaysia is supporting the emergence of Industry 4.0 in the country through its "Embracing Industry 4.0 in Malaysia" strategy. The strategy is composed of broad variety of initiative all supporting this emergence of Industry 4.0. Among those, we can notably find the National Industry 4.0 Policy Framework, the Study on Future of Manufacturing, the Industry 4.0 task force etc.This strategy should contribute to enhance the digital free zones, enhance the capacity and building the analytical capacities, create a digital transformation blueprint, etc.

Industry 4.0 in Malaysia

The overall objective is to be able to adopt the technology seamlessly and make it accessible to Malaysian SMEs. The National Policy on Industry 4.0, launched by the Prime Minister at the end of October 2018, is focusing on three pillars: "A.C.T". : Attract stakeholders, Create the right ecosystem & Transform Malaysia's industry capabilities.

Towards the 4th Industrial Revolution in Malaysia

Dr. Azmizam underlined that in order to achieve this, Malaysia first needs to:

- Upskill and reskill the younger generation
- Involve SMEs
- Achieve significant evolution in innovation
- Provide focused funding support
- Develop a good digital infrastructure

What does Industry 4.0 mean for cities?

Malaysia needs to both develop affordable housing and affordable living: this means that there is a need for developing close and good public transport, easy access to public amenities, to work, shops. In order to achieve this concept of "affordable living", the new technologies offered by Industry 4.0 is a must. This is why Malaysia is translating the Industry 4.0 into City 4.0, in order to create a good living environment within the cities. It is important that the inhabitants and the communities are closely involved, and that they take part in this transformation: this will allow Malaysia to ensure that "Cities 4.0" designs remain human-centered and technology gives more autonomy to people.

Dr. Azmizan concluded his presentation by indicating that through this strategy, Malaysia aims at becoming the one of the first destinations for high-tech industry by 2025 and to be ranked among the top 30 nations in the Global Innovation Index.

What is your key message for the audience?
Young generations need to scale up their digital skills and address innovation.

Sustainable development and digital transformation, example of the coffee e-farming in Kenya by PHILIPPE SCHEIMAN, TOPGlobal

The last testimony was delivered by **Mr. Philippe Scheimann**, co-founder of TOPGlobal, on sustainable development and digital transformation through the example of the coffee e-farming in Kenya.

The coffee industry today

Mr Scheimann started his presentation by highlighting that the coffee and tea farming today in Kenya occupy most agricultural lands, leaving very little space for food production. Through TOP (Technology of Peace) they have been empowering people over the past years through teaching them how to grow the food on walls (see TOP documentary on green-walls) to tackle this issue.

TOPGlobal is currently working on another issue within the coffee industry in Kenya: empowering the coffee farmers by increase their share of the coffee business.
Mr. Scheimann recalled that the average price for a coffee that you can buy in a shop in different parts of the world. He notably stressed that, Copenhagen for example, is the most expensive city in the world for a cup coffee: $6,24 for a cup of coffee in Copenhagen.

Mr Scheimann then recalled the important effort you need to do in order to produce coffee: 5-6 years to grow the tree, picking the fruit by hand which is a quite intensive work. In the end, the small scale farmers (that constitutes 60% of the coffee growers) get less than $1 per kilo of coffee. If you compare that with the 7 grams of coffee, you need to make an expresso. This means that you can make a little over 142 cups of coffee with 1 kg. And if you sell each cup for $2 a coffee, then the vendor makes about $300 per kilo. Quite a huge value but with very little of this going to farmer.

Everyone is crazy about coffee, everyone has an idea about it as explained the panelist. He continued by saying that this was especially the case in the US, where by the end of the year $1 billion will have been invested in coffee related start-ups. This doesn't mean that this $1 billion will go to the coffee planters, but to people who will invent new things like Starbucks or new drinks. It a very good industry for some people, you have all the coffee planters who do all of the hard work and get less than $1 per kilo – and people in Kenya don't even drink coffee, and you can sell it on wall street for sometimes up to $7, even $10 for a coffee. That's the situation today.

What can we do?

TOPGlobal is talking about changing the whole system by connecting the dots. In the middle, there is the coffee roasters and there is a young man, Alfred, from Kenya. An engineer who went to study the slow food movement in Italy, coming from a very poor family and supported by an NGO through university and got him a scholarship for Italy. Four years ago, he came back to Kenya and developed some made in Kenya roasting machines, so people can roast the coffee on their own.

TOPGlobal is helping with setting-up this ecosystem that brings value to the process. In this ecosystem, you have the farmers, working hard to have the coffee plants grow. You also have the cooperatives, foreign purchasers. You have "Rodi Kenya NGO" who is doing organic agriculture. And you have Alfred and his roasting machine that cost $200 against similar machines on Alibaba that cost $5.000. With the help from Rodi Kenya, some farmers were able to turn 200 trees giving 300 kg to 7.000 kg within 3 years. Do people prefer a coffee with chemicals or an organic coffee? The answer is quite obvious. The issue is that currently, the organic coffee is only sold in one place: the factory.

In the new ecosystem, TOPGlobal and their partners are cutting the middle men, empowering the coffee producers.

A good example is what is actually happening in Denmark, where the biggest cooperative COOP, have set up an installation in Kenya for processing coffee to cut off all the intermediaries.

Similarly, the new ecosystem is based on a platform where you have vendors and sellers – could be some large foreign purchasers like Carrefour for example – that are connected to the farmers through their phones. But the objective is to make this a sustainable system: this means bringing value to all the parts. With the collaboration between TOP and Data Global excellence, we are setting up the rules for each actor, what kind of value they should get. In the end, the purpose is to introduce some traceability to allow people to choose a coffee that is environmentally, socially and economically responsible.

What is your key message for the audience?
We are all responsible to do something: you all drink coffee but where does it come from? Our platform will help you in becoming more responsible and everyone is invited to join us on the journey.

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Q&A

The discussion with the audience focused on three main messages:

1. We should not only focus on the technology but also on “human beings” and notably make sure that the younger generations can be involved
2. There is a need to re-think the system and to make it more transparent. This leads to the broader question of philosophy and technology and how to conciliate both. “Data-philosophers” need to re-think the system together with data analysts and other technology experts to achieve the deeper cultural shift required for the emergence of a more transparent system with a redefinition of values.
3. The great thing with Industry 4.0 is the data sharing. The whole approach and emergence of the data sharing is a question of maturity: the full value chain must take this into account and become mature enough to be able to better define ownership and value for data.

Session 9

Day 2 – Afternoon – Parallel Session

Women in Digital Services

Introduction
Moderated by: Julie Ameen, Head of Public Sector, CGI Sweden

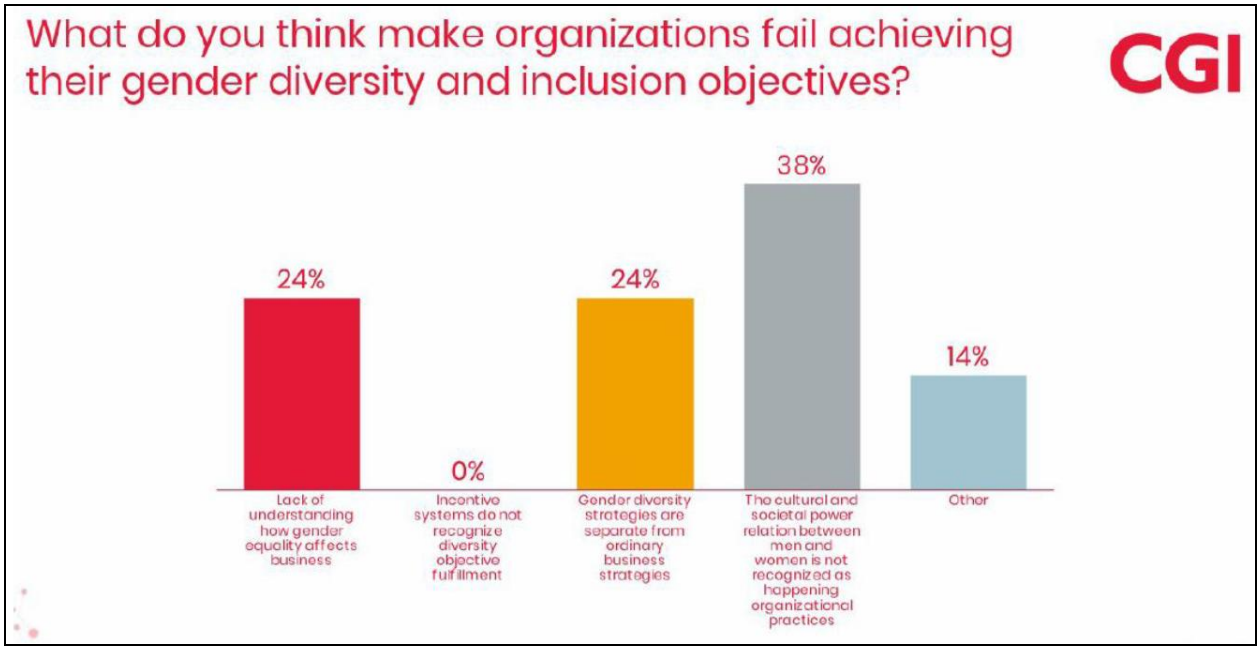
Anders Peter Kierbye Johansen, Global R&D HR Director & Managing Director, Unity Technologies Denmark

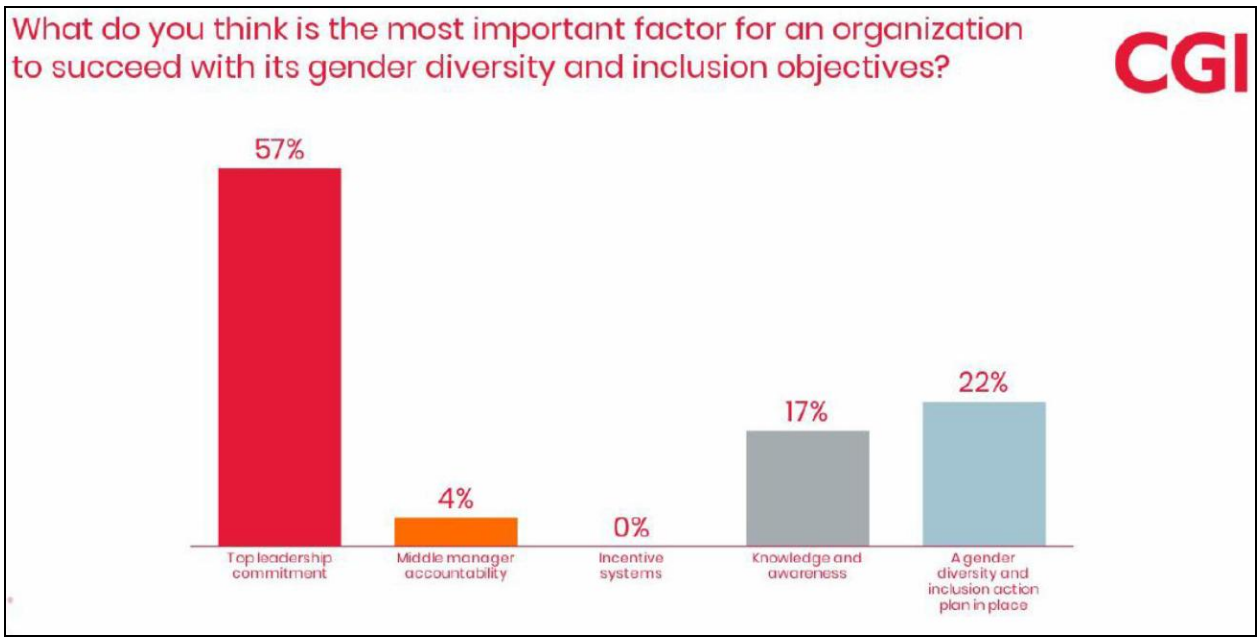
- **Our Mission drive our company** We believe the world is a better place with more content creators
- **Our values organize our behaviors** A key principle in our company is that “Every Perspective Matters”
- **Getting more perspective into digital services** First, we need to “fix the Destination”

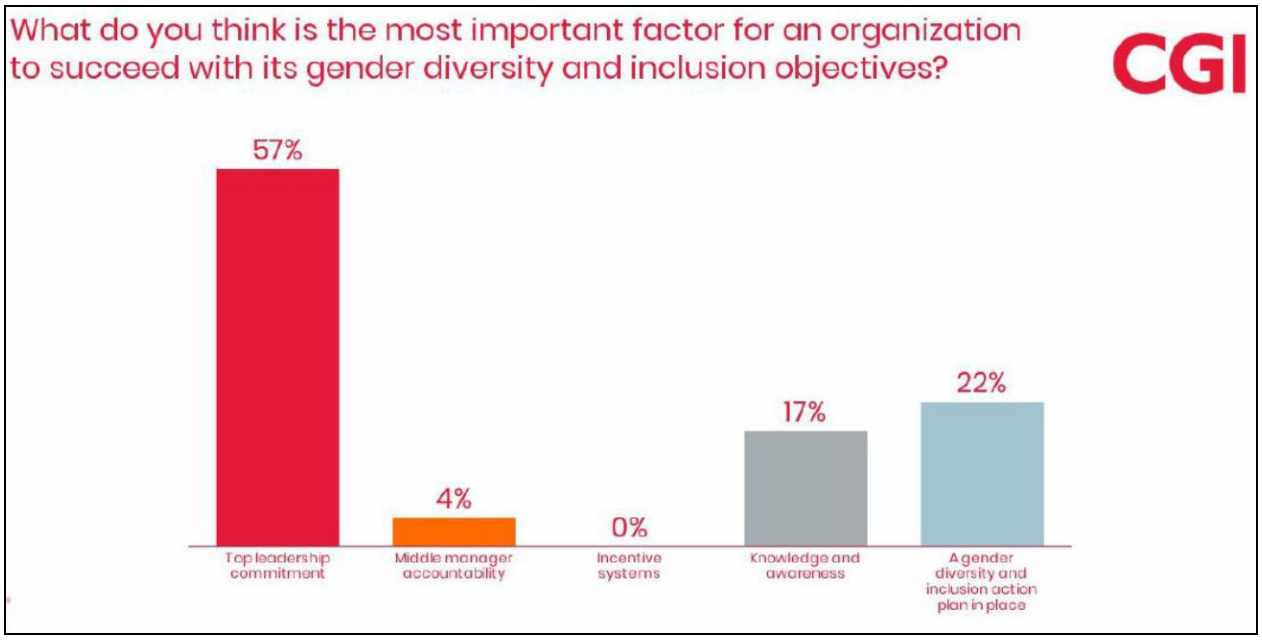
Developing Strategy for Corporate Diversity
CAMILLA RUNBERG , Researcher at KTH, Royal Institute of Technology Entrepreneur and founder of evenodds

Diversity is counting numbers and inclusion is making the numbers count. My input on the 6th of November was to point out the implications for leaders when the organization makes gender equality strategic priority, which many companies do these days. To achieve gender equality leaders from top down need to allocate time and recourses for employees to train and reflect on how social everyday interactions at work construct men and women, and

hence limit their full professional potential. Once they start detecting how gender behavioral patterns are done at their companies they have the awareness and option to start relating and communicating with each other in a more gender inclusive way. Which, I would argue with support from research from different countries, benefit businesses financially by means of more engaged employees, creativity release and brand reputation.



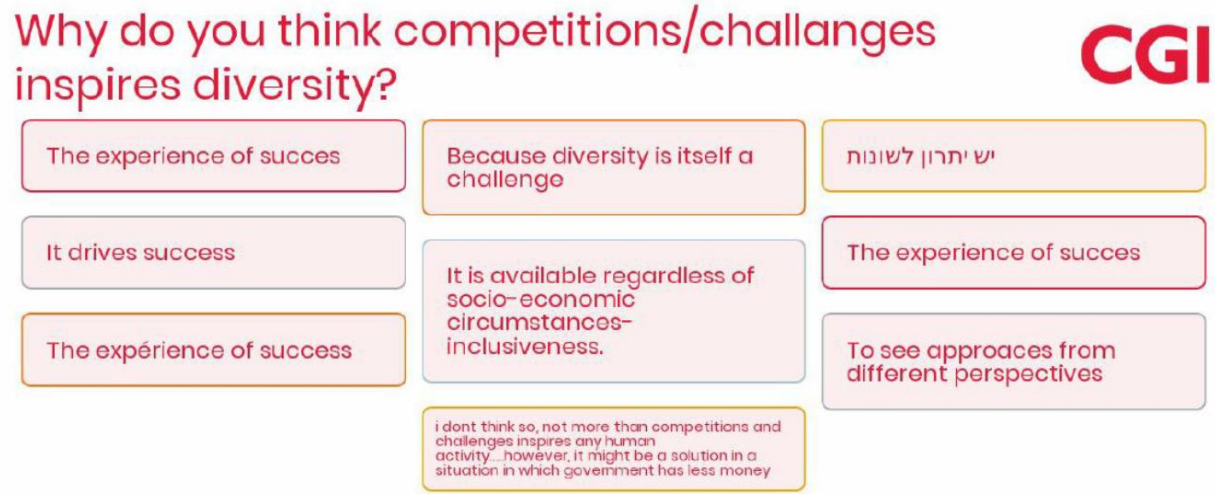


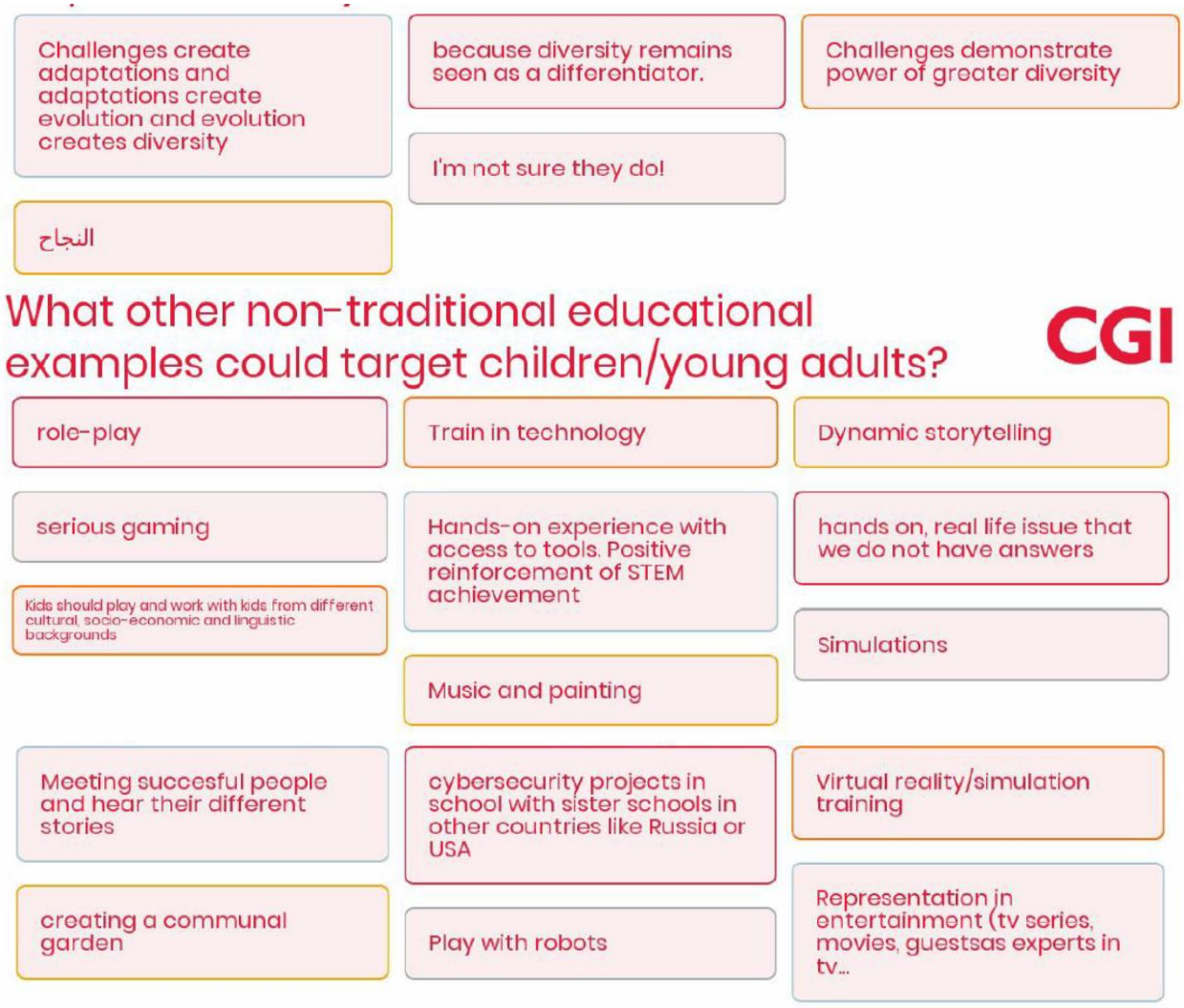


Attracting Diversity in STEM

TAMARA SHOEMAKER , Director for Center for Cyber Security & Intel Studies - University of Detroit Mercy USA

Michigan, U.S.A. has established an educational system that grants indelible rights for ALL education stakeholders to succeed. In support of these efforts the Michigan Department of Education has funded programs that help to increase the diversity in STEM education. One example of that is the international CyberPatriot program, which uses an after-school competition to attract a larger range of student participants. Key to this program's success are the cybersecurity professionals that mentor the teams and help the students see themselves in this amazing career and educational pathway. For more information about the AFA's CyberPatriot, CyberTitan, or CyberCenturion programs please go to: www.uscyberpatriot.org





Emerging Skills in the Digital Economy (diversity angle)

SYLVIE ALBERT , Dean of the Faculty of Business and Economics, University of Winnipeg Canada

- Leadership skills of the future favor women
- Examples of emerging skills programs
    - The modernization example: RBC (Canada): National target of 100% work-integrated learning to ensure every undergraduate student has the opportunity for an apprenticeship, internship, coop placement or other meaningful experiential placement
    - The development example: OECD report on Innovation and Research: Develop a culture of life-long learners and implementers (individual responsibility) and Enhance collaboration with industry, governments & educational institutions (network development for shared responsibility)
    - The build new example: Competition in education:
        - Guild for Data Analysts in Finland – training next gen
        - Genspace and BioCurious – private sector allowing learners to create cool experiments
        - Twitter U – revamping engineering skills
        - Udemy – an online marketplace for learning

Mainstreaming marginalized women for the Digital Economy

CHETAM SHARMA , Founder & CEO, Datamation Group India

- Socio-economically-culturally-educationally marginalized women have the resilience to leap frog in the Digital Economy as Consumers, Workers, Teachers and even Developers. More than 100+ successful case studies conclusively demonstrate the Impact of Digital Economy spanning social media networking, e & m-Commerce, embedded ICT tools, e-learning, e-health & host of applications.

Retaining Diverse Population in STEM

SAMIA MELHEM , Chair, eDevelopment Group Information & Communication Technologies Sector Unit, World Bank Group USA

- For the World Bank Group, gender is a strategic priority, cutting across all priorities. Specifically, the WBG aims to contribute to gender equality and women's empowerment by putting a stronger focus on achieving meaningful results towards closing gender gaps in two priority areas: Women's Economic Empowerment and Gender and Conflict.
- Skilling Up. Digital jobs is the future. Therefore, equipping children and youth with skills needed to succeed in an increasingly digitalized economy is of significant importance. Enrolling and interesting young girls, and their parents, in these programs is critical to our objectives of full participation and gender inclusion.
- Beyond access and into use. Looking at US data, internet access is definitely associated with an increase in employment for married women.
- Second, internet access is correlated to an increased awareness of sexual education programs, reducing the rate of teenage pregnancy. There is also established research in this area
- "Based on field research conducted by the GSMA in 2015, it is estimated that the gender gap in mobile ownership is there - 21% in Jordan, while this gap is only 2% in countries like Egypt or Turkey. Access to mobile phones and mobile services can empower women by making them feel safer and more connected. For example, mobile services can provide access to health information, financial services or employment opportunities – often for the first time, especially for women. According to the GSMA, mobile connectivity is spreading quickly around the world, however, it is not spreading equally: especially in low- and middle-income countries, women have less access to technology than men. Unequal access to mobile technology threatens to exacerbate the inequalities women often experience already in these countries.
- In the most recent update, the GSMA Mobile Gender Gap Report 2018 finds that even women who own mobile phones have a significant gap in usage, particularly for transformational services, such as mobile Internet. While ownership gaps in low- and middle-income countries are on average 10%, the mobile Internet usage gap is on average 26%. The main barriers to mobile ownerships are high costs followed by lack of local context and low digital literacy as well as low overall literacy, which tend to affect women disproportionately."

In addition, the following source makes a good point, one that I observed relevant in many countries: gender gaps need to be matched with two additional types of divide:

- Urban/rural divide and
- Age divide

https://webfoundation.org/2016/10/digging-into-data-on-the-gender-digital-divide/

Older, rural women are the weakest social group.

The ITU data quoted by this source also point out to additional facts such as on-line bullying and sexual harassment

https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf

Women Entrepreneurs

IRENE TOPORKOFF , Founder & Managing Director, Worldcrunch, France

- Globally, 163 million women have started a business since 2014
- Women are 5% more likely to produce innovative ventures, compared with men
- Women constitute 52% of the total European population but only 30% of start-up entrepreneurs
- Women-founded companies in Europe receive just 11% of the VC capital spent on the continent
- Since 2013, the average male entrepreneur has raised more than 4 times more money than the average female entrepreneur.
- Startups without a male co-founder has raised only 2,2% of all venture capital raised worldwide.

Day 2 – Afternoon –

Global Forum 2018 hosted the 3rd annual Global Startup Competition (GI$CO)

Last year's Global Forum included the 3rd annual Global Startup Competitionor GI$CO, which featured small & medium size and startup businesses from all over the world that presented a 2 minute 'pitch' of their innovative ideas. Each presentation included a 5 minute Q&A from our distinguished judges (which included some Global Forum speakers and leaders and entrepreneurs representing Silicon Valley- and other US regions, the EU- and other innovation hubs).

2018 GI$CO first place winners was a tie:

- Julia Sohajda, Co-Founder of Safeskin
- Sarah Iranpour, Founder of Person Clinic

2018 GI$CO runner up winner:

- Jose Quesada, Founder of Deep Learning Retreat
- Norbert Cseh, Founder of Tahnky

2018 GI$CO winners: Julia Sohajda(Safeskin)&Sarah Iranpour (Person Clinic) with Laszlo Horvath

Laszlo Horvath, Founder of ActiveMedia and GI$CO remarked that "Never in our history have received a tie for first place, and those were two women owned businesses. This complements the 2018 Global Forum agenda of featuring women in innovation and digitization for the future"

2018 GI$CO winners were awarded significant assistance and resources to take their to the next level, such as: Guaranteed pitches to Angel networks & other investors, 1 week at incubation competition camp (China), opportunity to participate at CES, 5 hours of consulting with Silicon Valley mentor team Virtualincubator.us and one weekend in Silicon Valley (Friday – Sunday) including lodging and company visits (like Google, Apple, Tesla).

The Global Startup CompetitionGI$CO is an opportunity to connect promising fledgling businesses and concepts with investors, facilitators, IP/patent specialists and angel networks, VCs, strategic investment arms of holding companies and technology firms.