Global Forum

Shaping the future 2014

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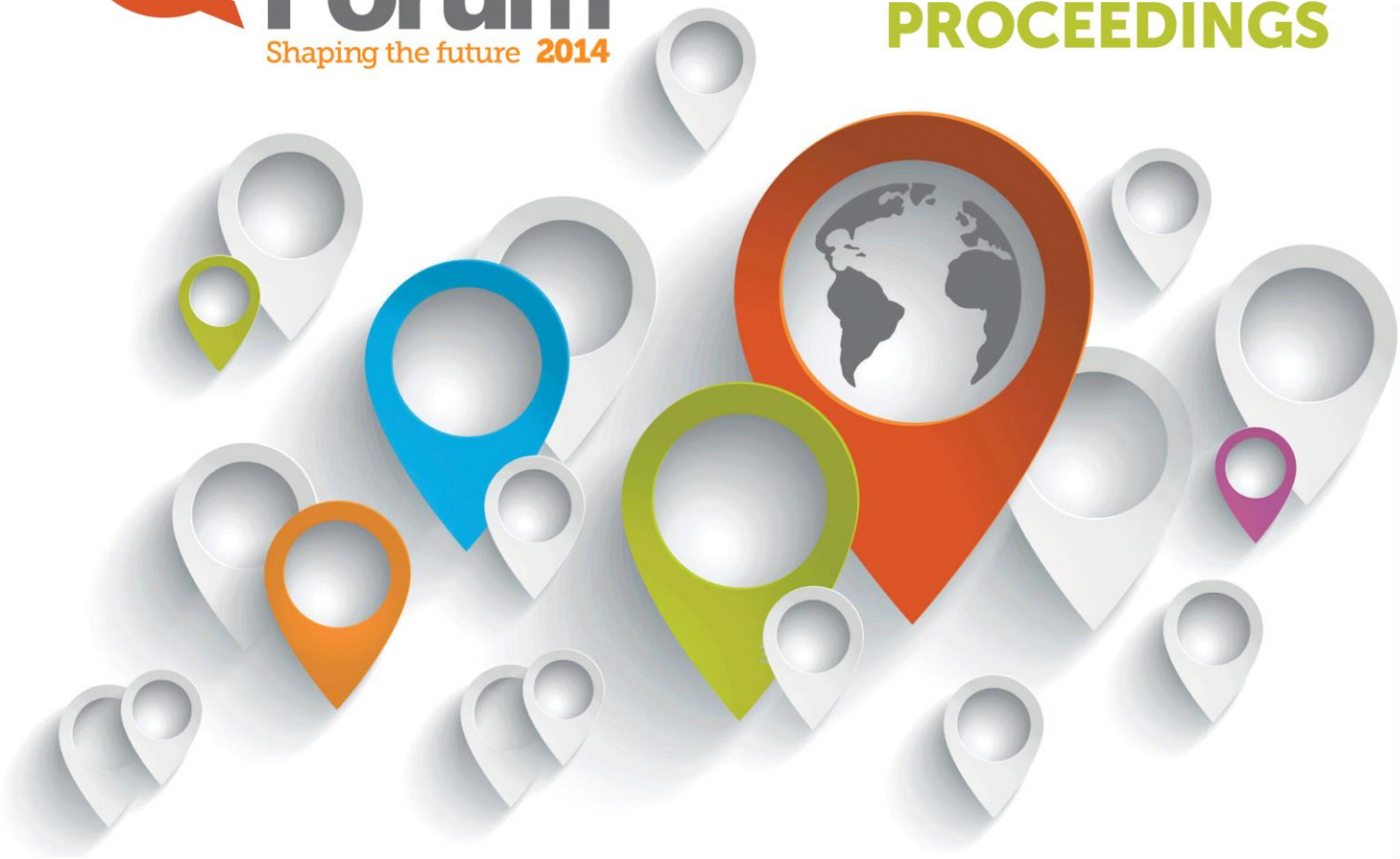

A CONNECTED AGE

OPPORTUNITIES & DISRUPTIONS IN A TIME OF TRANSFORMATION

Monday 17th & Tuesday 18th November 2014
Geneva, Switzerland
CICG - International Conference Center of Geneva

THE INTERNATIONAL THINK-TANK ON THE DIGITAL FUTURE

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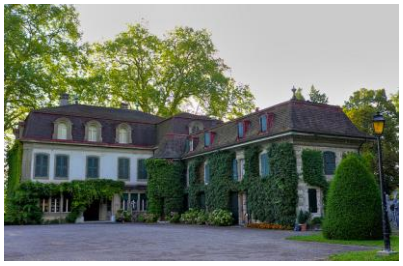

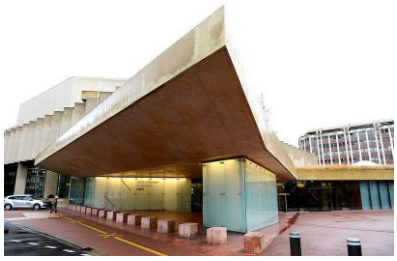

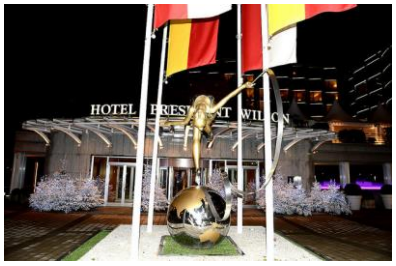

Report written by
Susanne Siebald, Communications Consultant

ACKNOWLEDGEMENTS

During the past two decades, the Global Forum has become an internationally recognized Think Tank for exchange and networking among governments at national, regional & local levels, private & public organizations, research & development experts and we would like to take this time to thank all the persons and organizations who helped us making the Global Forum 2014 another success.

The 23rd edition of the Global Forum took place on Monday, 17th and Tuesday 18th, November 2014, in Geneva, Switzerland, and we would like to express our sincerest thanks to the Republic and State of Geneva.

The Global Forum is the result of preparations in which the partners, sponsors, panel chairs, moderators and the speakers of the sessions have all been active participants. Without their commitment and dedication it would not have been possible.

We would also like to thank our distinguished experts – moderators, panel chairs and speakers, who have taken time out of their extremely busy schedules to share their knowledge and expertise with us.

Last but certainly not least, we would like to extend a special thanks to

The main sponsors of the Global Forum 2014 for their spirit of sharing, support and generosity:

> AT&T, GPI Group, Geneva Financial Center, Airbus Defence & Space, Latham & Watkins, Qualcomm, SIG Services industriels de Genève, govdelivery, InfoCert, Alcatel-Lucent, PayPal, DPI Digital Policy Institute, the Public Establishment For Industrial Estates and FUPOL.

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Thank you all for accompanying us on this adventure since so many years now and we look forward to seeing all of you again soon in Oulu, Finland, for the Global Forum 2015.

Sébastien Lévy
Vice-President of the Global Forum

Sylviane Toporkoff
President of the Global Forum

The Global Forum 2014 was realized with the active and efficient support of its sponsors and support partners

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PROGRAMME

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Sébastien Lévy, Vice President Global Forum / Shaping the Future & Partner Items International; Administrator Silicon Sentier, France

Sylviane Toporkoff, President, Global Forum / Shaping the Future, Founder & Partner Items International; Professor at the Institute of European Studies, University of Paris, France

Keynote Speakers:

Anja Wyden Guelpa, State Chancellor of Geneva, Switzerland

Hamadoun I. Touré, Secretary-General ITU - International Telecommunication Union

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Moderator:
Anna Gomez, Partner Wiley and Rein, USA

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Roberto Viola, Deputy Director-General, DG CONNECT, European Commission

Gary Shapiro, President & CEO, Consumer Electronics Association, USA

Jørgen Abild Andersen, Director General Telecom (rtd.); Chairman of OECD's Committee for Digital Economy Policy (CDEP), Denmark

Michel Ching-Long Lu, Representative of the Taipei Representative Office in France, Taiwan

Theresa Swinehart, Senior Advisor to the President on Global Strategy, ICANN - Internet Corporation for Assigned Names and Numbers

Willie Lu, Co-Founder Technaut Intellectual Ventures, USA; Chief Inventor and "Father", Open Wireless & Mobile Cloud Platforms for Mobile Devices, USA

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Moderator:
Lars Albinsson, Creative Director/Founder Maestro Management, Sweden

Speakers:

Gerald Santucci, Head of Unit Knowledge Sharing, DG CONNECT, European Commission

Gabrielle Gauthey, Group Corporate President, Global Government Sector, Public Safety and Defense, Alcatel-Lucent, France

Claudia Selli, EU Affairs Director, AT&T, Belgium

Aarti Holla, Secretary General, ESOA – European Satellite Operators Association

Christian Buchel, Deputy-CEO & Chief Digital Officer, ERDF – Electricité Réseau de France; Vice-President EDSO for Smart Grids, France

Margot Dor, Strategy Development, ETSI -- European Telecommunications Standards Institute

Wladimir Bocquet, Head of Policy Planning for Government and Regulatory Affairs, GSMA Association

Gérard Pogorel, Professor of Economics and Management-Emeritus, Telecom ParisTech, France

Latif Ladid, President IPV6 Forum, Luxemburg

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Moderator:

Jay E. Gillette, Fulbright-Nokia Distinguished Chair in Information and Communications Technologies, University of Oulu, Finland; Senior Research Fellow and Institute Secretary Digital Policy Institute, USA

Keynote Speakers:

Thomas J. Rosch, Retired Partner, Latham & Watkins LLP, USA

Yasser Elshayeb, Director Embassies of Knowledge Initiative, The Library of Alexandria, Egypt

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Moderator:
Hugo Kerschot, Managing Director, IS-Practice, Belgium

Speakers:

Alfredo Ronchi, Secretary General EC MEDICI Framework; Professor Politecnico di Milano, Italy

Alan Shark, Executive Director PTI-Public Technology Institute; Associate Professor of Practice, Rutgers University School of Public Affairs & Administration, USA

Stéphanie Bacquere, Founder nod-A, France

Patrick-Yves Badillo, Professor, Director and Founder Medi@LAB-Genève, UNIGE – University of Geneva, Switzerland

Giovanna Di Marzo Serugendo, Professor UNIGE – University of Geneva, Switzerland

Ismail Dia, Senior Director Government Accounts, Govdelivery Europe, Belgium

Irène Toporkoff, Cofounder and Managing Director, Worldcrunch, France

Andrea Frascati, Business Developer Manager, Smart P@per S.p.A, Italy & **Mario Po'**, Executive Director, Azienda ULSS Venezia, Italy

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Chair & Moderator:

Sébastien Héon, Director of Consulting & Political Affairs, Airbus Defence & Space CyberSecurity, France

Speakers:

Sarah (Xiaohua) Zhao, Partner Perkins Coie LLP, China

Patrick Curry, CEO, MACCSA – Multinational Alliance for Collaborative Cyber Situational Awareness Ltd, United-Kingdom

Kevin C. Boyle, Partner, Latham & Watkins Llp; Editor, Global Privacy & Security Compliance Law Blog, USA

Bror Salmelin, Adviser for Innovation Systems, DG CONNECT, European Commission

Oliver Väärtnõu, CEO, Cybernetica AS, Estonia

Bertrand Lathoud, Information Security Officer – EU , PayPal, Belgium

Willie Lu, Co-Founder Technaut Intellectual Ventures, USA; Chief Inventor and “Father”, Open Wireless & Mobile Cloud Platforms for Mobile Devices, USA

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1st Day

Moderator:

Andrew Lipman, Partner and Head of Telecom Group, Bingham McCutchen, USA

Speakers:

Mark Fell, Managing Director, Carre & Straus, United-Kingdom

Jørgen Abild Andersen, Chairman of OECD's Committee for Digital Economy Policy (CDEP), Denmark

Wladimir Bocquet, Head of Policy Planning for Government and Regulatory Affairs, GSMA Association

Frederic Geraud de Lescazes, Head of Government & Community Relations, Cisco, France

Michael Kende, Chief Economist, ISOC – Internet Society, Switzerland

Hanne Melin, Policy Strategy Counsel, eBay Inc. Public Policy Lab EMEA, Belgium

Claudia Selli, EU Affairs Director, AT&T, Belgium

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Giampaolo Armellin, Head of Research Unit, CRG – Centro Ricerche GPI s.r.l, Italy

Speakers:

Najeeb Al-Shorbaji, Director, Knowledge, Ethics and Research Department, WHO-World Health Organization

Ulrich Wuermeling, Partner Global Co-Chair of the Information Technology Industry Group, Latham & Watkins, Germany

Carmelo Battaglia, Public Administration and Institutional Relations INFOCERT, Italy

Mario Po', Executive Director, Azienda ULSS Venezia & **Giuseppe Grassi**, Director Cardiology Department, Venice Hospital, Venezia, Italy

Alessandro Zanotelli, President and CEO, SPID, Italy

Antoine Geissbühler, Professor and Chairman, Department of Radiology and Medical Informatics, UNIGE- University of Geneva, Switzerland

Florence Gaudry-Perkins, International Director-Global Government Sector, Alcatel-Lucent HQ, France

Romain Lacombe, Independent Open Data Expert, France

Sinikka Salo, Deputy Mayor Healthcare and Social Welfare, City of Oulu, Finland

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Women in ICT: Transforming our Digital Future

2nd Day

Moderator:
Audrey Mandela, Co-Founder, Multimap; Chair & Acting COO, Informilo; Independent Consultant, United-Kingdom

Keynote Speakers:

Effat El Shooky, Technical Director, Women Business Development Center (WBDC) & Founder of Community-Based Knowledge Innovation and Social Entrepreneurship Initiative (CKI&SE), Egypt

Veronique-Inès Thouvenot, Co-founder & Scientific Director, Millennia 2025 Foundation, France

Laura Mandala, Managing Director, Mandala Research, USA

Annelise Thieblemont, Senior Director Government Affairs, Qualcomm, USA

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2nd Day

Chair:
Bror Salmelin, Adviser for Innovation Systems, DG CONNECT, European Commission

Moderator:
Gary Shapiro, President & CEO, Consumer Electronics Association, USA

Speakers:

Thomas Andersson, Senior Advisor Research, Innovation and Higher-Education, Sultanate of Oman

Martin Duval, CEO & Founder, Bluenove Group, France

Effat El Shooky, Technical Director, Women Business Development Center (WBDC) & Founder of Community-Based Knowledge Innovation and Social Entrepreneurship Initiative (CKI&SE), Egypt

Denis Gardin, Senior Vice-President, New Technology Ventures & Managing Director, Airbus Group Corporate Technical Office; President of TESTIA, Airbus Group, France & **Pierre Langer**, CEO Powidian, France

Michael Stankosky, Research Professor, George Washington University, USA

Yoshio Tanaka, Professor Tokyo University of Science, Japan

Julie Wagner, Non-Resident Senior Fellow, Brookings Institution, Metropolitan Policy Program, USA

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Chair:
Ismail Dia, Senior Director Government Accounts, GovDelivery Europe, Belgium

Moderator:
Julia Glidden, President and Founder, 21c Consultancy, United-Kingdom

Speakers:

Samia Melhem, Lead ICT Policy Specialist, Chair eDevelopment Group, Information and Communication Technologies Sector Unit, World Bank Group

Doug Craig, Mayor of Cambridge, Canada

Eric Legale, Managing Director Issy Media, France

Ching-Chih Liao, Deputy Secretary-General Taichung City Government, Taiwan

Eikazu Niwano, Producer NTT Corporation – Research and Development Planning Department, Japan

Takashi Obi, Professor Imaging Science and Engineering Laboratory of Tokyo Tech, Japan

Gerald Santucci, Head of Unit Knowledge Sharing, DG CONNECT, European Commission

Annelise Thieblemont, Senior Director Government Affairs, Qualcomm, USA

Peter Sonntagbauer, Senior Project Director, Cellent AG; Project Director "Future Policy Modeling" (FUPOL), Austria & **Giorgio Prister**, President Major Cities of Europe, Italy

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After the Digital Revolution: Business Models 2.0

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Moderator:
Jean-François Soupizet, Independant Consultant, France

Speakers:

Michael Stankosky, Research Professor, George Washington University, USA

Olivier Gudet, Head of Telecom, SIG-Services, Switzerland

Hesham A. Lotfy, Business Development Expert of the Public Establishment for Industrial Estates (PEIE), Oman

Michal Ivantysyn, Director General ITAPA, Slovakia

Van Khai Nguyen, CEO, CADCAMation SA. / Association innoLAB, Switzerland

Paul Wormeli, Executive Director Emeritus Integrated Justice Information Systems (IJIS) Institute, USA

Shakeel Tufail, CEO SecureNinja, USA

Fabio Perossini, Managing Director, Kpeople, United-Kingdom

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Moderator:

Alan Shark, Executive Director PTI – Public Technology Institute; Associate Professor of Practice, Rutgers University School of Public Affairs & Administration, USA

Speakers:

Clément Allain, R&D Project Manager Institut de l'Elevage, France

Mariane Cimino, Consultant, France Génétique Elevage, France

Sami Coll, Research Fellow UNIGE- University of Geneva, Switzerland

Stéphane Grumbach, Senior Scientist, INRIA, France

Jens-Henrik Jeppesen, Director European Affairs, CDT – Center for Democracy and Technology, Belgium

Jean-Henry Morin, Associate Professor of Information Systems, CUI – University of Geneva, Switzerland

Gerald Santucci, Head of Unit Knowledge Sharing, DG CONNECT, European Commission

Hervé Rannou, CEO Items International, CEO Cityzen-Data, France

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Broadband For Development

2nd Day

Chair & Moderator:
Jean-Pierre Chamoux, Professor Emeritus, Université Paris Descartes, France

Speakers:

René Dönni Kuoni, Director Telecom Services Division OFCOM – Federal Office of Communications, Switzerland

Mario Maniewicz, Deputy to the Director and Chief, IAP Department Radiocommunication Bureau (BR), ITU – International Telecommunication Union

Jean-François Bureau, Director of Institutional and International Affairs Eutelsat, France

Jules Dégila, Independent Consultant, Benin

Fadhilah Mathar, Head of Strategic Planning and Partnership, Division of ICT R&D and Human Resources Development, Ministry of Communication and Information Technology, Republic of Indonesia

Ali Kone, COO & Co-Founder, Coders4Africa Inc, USA

Samia Melhem, Lead ICT Policy Specialist, Chair eDevelopment Group, Information and Communication Technologies Sector Unit, World Bank Group

Madeleine Scherb, Economist/President Health and Environment Program, Cameroon

ABOUT THE GLOBAL FORUM

The Global Forum/Shaping the Future is an annual, independent international event dedicated to business and policy issues affecting the successful evolution of the Information Society. 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 organisations 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.

The Global Roadmap

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 23rd edition of Global Forum took place on Monday, 17th and Tuesday, 18th, November 2014 in Geneva, Switzerland.

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:

A Connected Age –
Opportunities & Disruption in a time of transformation

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 2014 are listed in chronological order corresponding to their sequence in the final conference programme, as listed in the beginning of the present document.

Welcoming Addresses

Day 1 – Morning – Plenary Session

SÉBASTIEN LÉVY, Vice-President Global Forum / Shaping the Future & Partner Items International; Administrator Silicon Sentier, France, warmly welcomed the attendees of the Global Forum 2014 in Geneva.

The fact that the Forum takes place in Geneva is not only pleasant for all admiring this beautiful and cosmopolitan city, the surrounding lake and mountainside, but also symbolic. Geneva has a long history of diversity, tolerance and peace. It is home to many international organisations including the European Headquarters of the United Nations (UN), the World Health Organisation (WHO), CERN and the International Federation of Red Cross and Red Crescent Societies (IFRC) - making it a key centre of international co-operation and universal dialogue.

The theme of this year's Forum is 'opportunities and disruption in a time of transformation'.

Digital has changed the game in nearly every area one can think of. It has changed the way people do business, buy, work and live. The fast digital transformation of our global economy and existing way of life seriously disrupts traditional business logics.

Reaping the benefits of such disruption depends on our ability—the ability of business leaders and government policymakers—to successfully drive the change, now and in the future.

Change is inevitable – but above all, we must be clear about what we want in terms of shaping our future, policies and goals.

John F. Kennedy once said, "Change is the law of life. And those who look only to the past or present are certain to miss the future."

This is more relevant today than ever. The Global Forum will have an exciting line-up of distinguished speakers discussing the impact of digital disruption. What are the challenges these changes present? What are the inherent opportunities for digital innovation and business transformation?

On this note, the Vice-President of the Global Forum declared the 23rd edition of the Global Forum open.

SYLVIANE TOPORKOFF, President Global Forum / Shaping the Future, Founder & Partner Items International, opened the session and welcomed the participants of the Global Forum 2014.

Sylviane Toporkoff thanked the State Chancellery of Geneva for the great support. If the Global Forum is held in Geneva, it is thanks to an invitation launched three years ago.

Another special thank you was given to the sponsors and partners of the Global Forum without whose support the Forum would not be possible.

The focus of this year's Global Forum is 'a connected age'. It is impressive how much we depend on digital connections. 10 years ago, the European Space Agency launched the Rosetta mission and on 12 November this year, Rosetta's robot Philae, after more than 6 billion kilometres, landed on the comet Churyumov-Gerasimenko. This is extraordinary—even if there are some communications issues that may have been easier to avoid with today's technology.

Before giving the floor to the State Chancellor of Geneva, Ms Toporkoff briefly introduced the mission of the State Chancellery of Geneva. The State Chancellery is the decision focal point of the Cantonal administration. It is the dynamic interface between the political institutions and the citizens, between the Genevan authorities and the representatives of the international authorities, between the administration and its partners. Active as well in the information of the public as the installation of international non-governmental organizations, the reception of the heads of state who stay in Geneva, the promotion of Geneva's interests, the State Chancellery is also at the forefront in the exercise of political rights. Its Internet voting system is known worldwide.

ANJA WYDEN GUELPA, State Chancellor of Geneva, Switzerland, provided a particularly inspiring keynote address:

Ladies and Gentleman,

I am very happy to welcome you on behalf of the Government of the canton of Geneva, for this new edition of the Global Forum. This year, the canton of Geneva is not only a participant as usual, but also one of the partners. We have worked together…, hand in hand, the Chancellery of State and the organizers, to offer you the best topics and speakers about digital future issues.

The Global Forum was created 22 years ago and defines itself as an "independent, international and neutral think-tank on digital future issues". "Independent, international and neutral" are qualities often used to describe Geneva or Switzerland in general. This is why it makes great sense that finally an edition of this forum takes place here.

When I see the number of participants and the number of sponsors in front of me, I have to confess, that I am not very surprised with regard to the quality of the program and the topics selected about digital future.

"A connected age: opportunities and disruption in a time of transformation" is the title of this year's edition of the Global Forum. Educated as a political scientist, concepts such as "opportunities, disruption and transformation" have always fuelled my curiosity. Today, as a government official, issues about change and innovation are at the core of my activities and interests.

If there is no doubt for me that technology is a driving force of change, its impact on politics and on public management is not as straightforward as it might be in the private sector.

No fear, I am not going to list the differences between the private and the public sector and their respective abilities or disabilities to adapt to technology: the literature is full of knowledgeable and insightful analyses on this particular issue. As the first speaker, I have the honourable opportunity to humbly raise some issues that might fuel discussions in the coming sessions of the forum. So here is my question:

"What if technology did not matter at all? What if we were wrong in assuming that technological innovation is the driver of social and political transformation?"

It is often considered that public authorities are bound to understand the innovative business models and the new mechanisms induced by technological change that highly impact our societies and the public sector in particular. It is true that governments and administrations are constantly challenged by these innovations and their speedy development, and they have to adapt rapidly to this new environment.

But what if the obsession to adapt and to implement new digital tools under the concept of e-government, for example, made us miss the point of change, the meaning of change?

I can see some of you raising eyebrows: "Where is she heading to? What is she saying?"

What I am trying to say is simple. Governments, public administrations are clearly in a dire need of technological innovation. This usually is what is meant when we are talking about "e-government" or “e-administration”. The public sector has to develop digital platforms and innovative tools to interact with citizens. No question about that. But technology is not an end. It is not THE end. It is the beginning.

One of your sessions is entitled "21st Century Challenges – The Situation of the Digital Citizen Now".

I am sure that discussions will revolve around what the public sector must do to address the needs of connected citizens, or around how public sector should organize its structure towards more flexibility and responsiveness. These are legitimate questions.

The canton of Geneva has already started to take part in these new dynamics. Following the global trend of open big data, Geneva has recently offered access to a wide range of data regarding our IT Geographical system, which is one of the most sophisticated in the world. This new approach is undoubtedly reversing the usual model by granting public access to data that were previously reserved to the administration. As side effects, this also concurs to add value to our know-how by rendering it public, to extend autonomy levels of the individuals, and to increase significantly transparency of the public sector.

One of the duties of the State Chancellery of Geneva is to organize elections and ballots.

As you know, the citizens of our country are called to vote every three months to decide on a very wide range of different subjects. The big challenge for the authorities is to find and offer the largest possibilities to allow people to express their vote in the safest conditions. It is in this sense that the Canton of Geneva has decided more than 10 years ago to look into new technologies and develop its own "homemade" and public electronic voting system. Recently upgraded with new security measures, this system was, from the start, supposed to increase the turnout of the electoral process. Although it is undoubtedly a huge success, the global turnout has not been significantly increased by this new technology. It appears that people who used to vote via the postal system rather shifted to the electronic version of the ballot. And while it was expected to increase the involvement of young voters, it did not have a significant impact on this section of the electorate.

Don't get me wrong! The Geneva electronic voting system is a brilliant innovation, ahead of many competing systems developed by private firms. (And as you know, governments today tend to try to rely less and less on private foreign companies). Thus, our electronic voting system is the perfect illustration that the public sector is capable of innovation and flexibility.

And while we are planning with determination new developments in the very near future, one must admit that it did not modify the relationship between the citizen and the public authorities, and that it did not boost significantly the participation of the citizen.

This conclusion lead me to think that technology alone is not the solution and that if we want to transform this relationship to have an impact on people, one has to do more than rely on technological tools. Technology is not enough for change.

That is why I decided last year to launch an online video-movie contest to encourage the young voters to take part in the political decision process. The second edition of this contest, called CinéCivic, just ended last October with three mini movies being awarded a prize, upon 23 received. The main goal of this project is not only to encourage young people to vote, but to empower them and to offer them the opportunity to speak to other young people, in their own words, using their own language and codes.

For this contest, we exclusively relied on the Internet as the primary communication channel together with intensive use of social medias like Facebook and Twitter. As a result, we have received, over the past 2 years, more than 45 video-movies, mostly very well designed and creative. In addition to the films, we started an interactive debate and discussion with young people on politics and democracy to better hear and understand their needs and their suggestions. In fact, as less than one young citizen out of three is voting, and the category which is voting most are adults between 70 and 75 years old, it is impossible for a region like Geneva to do without the young generation when it goes to solving the problems of tomorrow with creativity. Imagine a private company trying to find new products for the future using only surveys of their elderly clients.

I do not yet know if this will have an impact on younger citizens' participation in the electoral process. But what I have learned is that we need the ability to challenge our way of communicating with our citizen; having a two-way discussion with citizens is essential. Technology is a mean, not an end. Public organisations can have the best and most innovative digital tools to interact with individuals, if they are unable to adapt the way to conceptualize and organize their relationship with the outside world, they will end up with a nice website or a trendy IPhone App, but will fail to accomplish their mission.

In that sense: "Technology does not matter at all! But just a little bit!"

On behalf of all the members of the Government of the State of Geneva, I would like to thank you again to have chosen Switzerland and Geneva for this new edition.

I hope you will enjoy the sessions and the discussions and also, of course, your stay in our beautiful city.

Thank you for your attention.

▸ ▸ ▸ *You can follow Anja Wyden Guelpa on Twitter @AnjaWydenGuelpa*

The following question addressed to the State Chancellor of Geneva concerned the recent upgrade of the e-voting system.

Ms Wyden Guelpa explained that even if the system is 10 years old, it constantly evolves. Geneva has just introduced the second generation of the system with two main changes: The first one is the introduction of the principals of individual verifiability. This means that a voter can check whether his vote was cast, and cast in the right way, by the server. This represents an additional security element for the citizens. It even goes further than the other voting channels: When using posting services, you don’t know if the ballot will arrive in time and if the vote will be registered as meant to be.

The second innovation is to eliminate the Java applet because it wasn’t very user-friendly. Citizens had to make a lot of updates and it was not possible to use tablets and iPads with Java.

DÉSIRÉ KARYABWITE, the IP Coordinator of the E-Strategy Unit at the ITU Telecommunication Development Bureau, represented Hamadoun I. Touré, Secretary-General ITU - International Telecommunication Union, who wasn't able to participate due to other obligations.

Désiré Karyabwite introduced a video message from **HAMADOUN I. TOURÉ, Secretary-General ITU - International Telecommunication Union**:

The Secretary-General of the ITU extended his warmest greetings to all participants of the Global Forum.

The future is digital. There is no doubt about that.

People are more connected than ever before in the history of civilisations. We have witnessed how the digital revolution has changed the world we live in. We have seen the digital transformation of our lives in the way we communicate, learn, do business and entertain ourselves. We have seen how digital technologies have improved healthcare and food production while introducing efficiencies in energy generation and water management. Earth observation and monitoring have improved dramatically as has our response in the aftermath of natural disasters.

Governance have become more transparent as citizens have increased access to digital platforms. Smart solutions are available to improve our cities, our homes, our businesses.

In this connected age, the opportunity is right to explore new avenues—not only for the further enhancement of digital technologies but also to widen the scope of digital inclusion, to stem the ever widening divide that keeps people of accessing the benefits of ICTs and to harness this vast potential to help achieve sustainable development and shape the future we want.

The right to communicate is centre to the Information Society. It is a key principle for equitable and universal access to information and knowledge that in turn empowers people to meet their aspirations and achieve their development goals.

ITU is therefore committed to pushing for the roll-out of broadband on which the framework of the digital world rests.

Broadband-based ICT networks are powerful cross-cutting enablers to achieve the three pillars of sustainable development – economic growth, social inclusion and environmental balance.

It is our intention to ensure that the digital world rests on strong foundations. An eminent think-thank as the Global Forum must therefore consider strengthening the building blocks of the digital world.

First and foremost, we must tackle the biggest challenge facing the digital world: cybersecurity. Greater connectivity also brings vivid greater risks as our physical and cyber worlds overlap. There is an increased need to address the related challenges of ensuring network security, human rights, rule of law, good governance and economic development. In embracing technological progress, cybersecurity must form an integral part of that process.

We are on the threshold of new and as yet unforeseeable advances, that will continue to amaze us as our digital world continues to evolve and grow. We must take the pitfalls in account, address the challenges and create appropriate incubators for further development.

This collaborative vision for the future must be nurtured so that we can all reap the benefits of the digital age.

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Opening Session

Day 1 – Morning – Plenary Session

A Connected Age
Visions from EU, Americas, Asia, BRICS & Africa

ANNA GOMEZ, Partner Wiley and Rein, USA, moderating, welcomed the distinguished panel and briefly set the scene.

The digital transformation of global economies continues at a breathtaking speed. Since last year, the digital economy and regulatory policies have continue to grow and to evolve. Topics this year are big data, internationalisation of the Internet, unmanned aircrafts, driverless cars, seemingly daily cybersecurity breaches, the Internet of Things, high speed broadband, disruptive, sharing, economy apps, not to mention net neutrality.

Economic imperatives of cost reduction and globalisation are driving business decisions while regulators are focussing on setting and enforcing rules of the road that allow innovation to flourish while protecting privacy and data driving innovation and investment in their own economies and freeing up spectrum for the many mobile users in our digital economy.

Some quick forecasts of what is to come:

While in 1992 there were as many devices connected to the Internet as there were people living in San José, California, today, there are more connected devices than there are human beings on the planet.

The global Internet of Things market will grow from about 2 trillion to 7.1 trillion by 2020. Today, about 90 percent of our Internet of Things devices are being installed in the world's developed regions and by 2020, we will have up to 26 billion individual devices worldwide.

The US market for unmanned aircraft systems will grow from 5 billion in 2013 to 15 billion dollars in 2020 and the global market of consumer unmanned aircraft systems will exceed 1 billion in the next 5 years.

By 2018, 62 percent of new cars sold worldwide will have embedded Internet connectivity. By 2020, 4 of 5 of smart phone connections worldwide will come from the developing world.

With so much connectivity comes challenges. How to ensure universal broadband connectivity? How can policy makers set the tone to allow innovators to enter and disrupt the market? How do we allocate sufficient spectrum to meet consumers' and the innovators' needs and how can policy makers create an environment conducive to the take-up of cloud services that address users concerns about privacy and security? Who should govern the Internet and how?

ROBERTO VIOLA, Deputy Director-General, DG CONNECT, European Commission, thanked the organizers and underlined the Commission's support of the Global Forum. He then provided a concise overview of the new Commission's focus, activities and actions.

The new European Commission under President Jean-Claude Juncker took office on 1 November. It is the ambition to be the first digital Commission in the EU's history.

During his election speech, President Juncker has made very clear that "digital" is priority, as it is the key to growth, prosperity and jobs in Europe.

Growth in Europe has been sluggish during the last few years. This can only partly be explained by the financial crisis. It is also due to a profound transformation of our society. Some call this a new industrial revolution and, as in every industrial revolution, traditional jobs are destroyed and new once are created. Europe has the ambition and the duty to be in the forefront of this revolution.

The first goal of the new European Commission is to complete the digital single market in Europe—a market of 500 million citizens. It will be the largest in the world, where goods, services and ideas can be exchanged. The only real barrier will be the technical capability of the Net rather than any bureaucratic barriers. Thus, the first important task of the Commission is to complete the necessary legislation for the single market in Europe. But also to continue discussions with the US to ensure through the trade agreement the largest free trade area for e-services.

Another key objective of the Commission is to put together an investment package of 300 billion euros to boost the economy. A big part of the 300 billion euros is going to be invested in the digital area. Digital is important not only on the policy side, but also in terms of boosting investments. On the legislation front, the Commission is going ahead with the plans for creating legislation in the telecommunication area fit for purpose.

The legislative process for the Telecoms Single Market Regulation, which basically includes issues such as roaming, net neutrality and a better frequency harmonisation in Europe, should be completed in the coming months.

Net neutrality is a hot topic all over the word and the European Commission is working very intensively to create legislation for the whole EU. Because net neutrality can not be dealt by 28 different legislations, the former Commission has proposed in September 2012 a legislation that would apply all over Europe. The European Parliament has voted its opinion on the question in April 2013 and now the Council of the EU is busy voting its opinion. Once the two opinions would be formed, Parliament, Council and the Commission will meet and will try to find a compromise. As both Council and Parliament want to conclude a deal on the legislation, this should take no more than few month from now.

The future is going to bring reforms in the regulatory framework, especially looking at things such as governance, spectrum or the way networks are regulated. Furthermore, the Commission hopes to conclude the framework for network security. There is a new directive that will foster cooperation of the Member States in the area of network security in order to have a coordinated response to cyber attacks.

The European Commission is very much busy in defining Internet governance. It is very active in coordinating the European position concerning the globalisation of the domain name functions and takes part of the reflections on the future of ICANN.

GARY SHAPIRO, President & CEO of the Consumer Electronics Association (CEA)®,

USA, delivered a great keynote on the need to embrace change and growth.

CEA is a national non-profit trade association representing 2,000 technology companies and producing the word's largest innovation event, the International CES® held each January in Las Vegas with 3,500 exhibitors and more than 150,000 attendees from around the world.

Every government in the world faces the same issue, which is the desire to spend and invest on the public, usually exceeding the revenue coming in. There are some imbalances in the national and international budgets—how to make those up? You can raise taxes or cut spending but both are difficult to do. There is a third option which is growth. Growth only comes from innovation. Growth only comes because something is different.

Never before could anyone with an idea and a broadband connection become a global company, virtually over night. This is happening very quickly and it is going to continue to happen. And those governments and countries that figured out what produces countries' revenues essentially are creating jobs and winning and doing better for the people than those governments that do not. It is very important how governments and people approach this, because there are things that have happened very quickly and that made a difference. For example, broadband connectivity is really taking over the world because companies are making investments and are encouraged to do so.

Things have changed because there are one billion smartphones that have been sold around the world—with embedded sensing devices that cost almost nothing. Gyroscopes, ultraviolet radiation sensors, accelerometers and other sensing devices have been created for almost no cost due to production in mass quantities, and very clever people are coming up with ways of putting them together, of gathering information, of having people benefit from it. That is where we get this huge growth in categories like wireless health, wearables and some of the other things. At the same time, there are huge advances in other technologies, such as nanotechnology, robotics or the Internet of Things.

Today, if you want to buy something, you have 2 choices: you can go to your local retail store and buy it, or you can go online and all will be delivered to you by a reliable delivery service.

In a few years you will have 5 choices: you will have those two choices, plus it can be delivered by a driverless car. We are getting there very fast (the projections are 2020 to 2030) with automatic collision avoidance systems, etc., being offered. This will fundamentally change economies over the world: If people aren't driving, if there are no collisions, it cuts down the need for people who fix cars, drivers of all types, insurance companies and many more—but it will do a lot of good things, too, including keeping people safe.

Another way will be drones, or UAVs (unmanned aerial vehicles). This is a very fast-growing category. So many things have been already deployed for government purposes, for surveillance purposes, for security purposes, and soon it will be for package delivery purposes.

The fifth way will not be necessarily a delivery way, but will be your own manufacturing outfit at home with 3D printing devices. Today, 3D printing is for industrial use, rapid prototyping, etc. Soon, it will be used for things such as replacing buttons. But we are quickly going to an area where it is useful for food, especially in the context of sugar and chocolate. It is even used for creating artificial hands and other things that are making a difference in peoples' lives.

What is the role of governments in all this, especially when there are other new businesses being created as we are striving towards a shared economy? Uber and Airbnb are just two of such businesses, among many others. How governments respond to this in their existing regulatory schemes is very important, because of course this is going up against existing businesses, weather they be restaurants, taxicab services or hotels in terms of different services that are being offered. And every government is trying to define itself by how they respond to the new businesses. Because these new businesses coming in and disrupting things are where the future is.

However, it is the ambition of every human being to preserve the status quo, to preserve where you are today. But the natural condition is that change is inevitable. Things will change and our business and local environment around us. And to the extent you embrace the change and get ahead of it rather than fighting it, you will always be better off.

The speed in embracing change will determine the winners and the losers. There are differences in countries, there are differences in culture and there are differences in governmental approaches. Countries with long, big plans are not likely to do well. Governments or cultural societies need to focus on things which make a difference. One of them is diversity. The more diverse a government or a business is, the better off it will be in terms of having new ideas. The second is the speed of change and welcomeness to change. The third is investment capital, and the fourth is cultural—how do you approach new ideas? Do people take risks? Are they encouraged to do so even if they fail?

JØRGEN ABILD ANDERSEN, Director General Telecom (rtd.); Chairman of OECD's Committee for Digital Economy Policy (CDEP), Denmark, delivered a thoughtful keynote on the drivers of our digital economy.

There were some very remarkable focus points at the G-20 Australia summit on 15 and 16 November in Brisbane. When looking at the concluding communication from Brisbane, we see the words innovation, growth and jobs. These are the items which are on top of the minds of ministers all over the world—at least in the economies present in Brisbane. The digital economy is an extremely powerful tool to address these challenges of innovation and growth and jobs.

Facts and figures speak for themselves. Neelie Kroes, former vice-president of the European Commission and commissioner for the digital agenda, once said: "ICT is responsible for half of Europe's productivity growth and a quarter of our GDP growth." ICT is therefore at the heart of our economy. This is a very clear signal that digital economy is important.

McKinsey made a study for the G8 summit in France some years ago, also with some very interesting conclusions: The Internet has created as much growth in 15 years as the industrial revolution did in 50 years. And the Internet has created 2.6 new jobs for every job it has displaced. So, the Internet is a job generator not the opposite.

We just have to look at the app economy to see the importance of the digital economy. One could say that the app economy stared with the first iPhone in 2007. A US study was carried out 2 or 3 years ago on the development of the app economy. The figures on the US app economy was that it has become in very few years a 20 billion dollar industry having created almost half a million new jobs.

In February this year, the EC announced some figures about jobs and revenues in the app

economy. With respect to jobs, it was said that the app economy in Europe has 1.8 million jobs right now, which will rise to nearly 5 million in 2018. It has revenues of 17.5 billion euros rising to 36 billion euros.

The examples show that the digital economy really leads to innovation, growth and jobs. But what is the role for governments, for the EC, for OECD? Their role is to make the digital economy flourish. It is not only a private sector job, it is also for governments to contribute to this. A lot of debates so far have been about broadband—broadband only to some extend, about regulations to prevent abuse of significant market positions, about net neutrality, about roaming charges etc. These are all very important issues but they are only a fraction of the entire ecosystem of the digital economy. The focus has been too much on the supply side.

For instance, Denmark established a broadband goal saying that all Danish households and citizens should have access to 100 Mbps by 2020. Access to 100 Mbps download speed was available to 23 percent in 2010 and to 70 percent in 2013. But what about take up? In 2010, it was 0.6 percent and in 2013 1.3 percent. There is an enormous gab. There are a lot of empty fat pipes. Supply side focus is by far not sufficient, we also have to focus on demand. All elements of the ecosystem of the digital economy are very important: e-infrastructure, broadband, e-literacy, e-skills, e-security, e-privacy and e-content. There must be something important at the end of the line to make it attractive for customers to apply for a broadband connection.

Fortunately discussions about the importance of demand are taking place in a number of organizations, in particular in OECD. A lot of activities relating to the development of new content are going on. For instance the work on big data, which is a part of a cross-sectoral OECD project called New Sources of Growth: Knowledge-based Capital. We are talking about data driven innovation growth and well-being.

Data are a key foundation of the Internet economy. The volume of data is constantly increasing and the use of large data sets present many opportunities. Just to mention a small fraction of big data, which is public sector information. A study carried out by the EC in 2012 estimates the direct and indirect value of the reuse of PSI in the EU to approximately 140 billion euro annually. And PSI is only a fraction of big data.

The potential of big data was discussed last month in Tokyo at the Global Forum on the Knowledge Economy, which was hosted by OECD together with the Japanese Government. The Forum discussed benefits and challenges of data driven innovation.

Without going into detail, one particular striking benefit is that empirical studies have shown that the use data and analytics can boost productivity by around 5 to 10 percent. But there are also challenges related to privacy or the lack of data specialists. Data specialists are accounting for only 0.5 percent of the total employment of most of OECD countries. So the lack of skills is a clear barrier.

The potential benefits of data driven innovation for the digital economy and for our society are enormous, but the challenges, which to a wide extend are also about ethics and the policy implications, are quite prominent. We must ensure that data driven innovation is applied in a politically acceptable manner. Very demanding for governments, it includes telecomm regulation, consumer protection, competition regulation, data protection, education

and data analytics, and other experts with high level e-skills etc. This is not the task for a single minister, e.g., the minister responsible for ICTs, and it is not the task to be dealt with by only individual members responsible for the individual issues but working in silos. A whole-of-government approach, a coherent approach is needed—preferably chaired by prime ministers to make sure that ministers work together in this coherent approach.

MICHEL CHING-LONG LU, Representative of the Taipei Representative Office in France, Taiwan, started his presentation in a rather unconventional way by using songs and puppets to illustrate that Taiwan is a connected and open society. Taiwan is a small country with only 36 000 m2, representing 0.025 percent of the surface of the world, and a population (26 000) as small as 0.3 percent of the world population.

Nevertheless, Taiwan is a real representative of a digital society: Taiwan spends 3.06 percent of the GDP for R&D, 74.2 percent are invested by the private sector. This means that the public sector invests only 24.8 percent.

Nobody can stay outside the connected age, neither can Taiwan. In terms of per capita income, Taiwan's economy ranked as the 19th largest in the world by IMF.

Taiwan has a very open society and the respect of cultural diversity is part of Taiwan's life. Taiwan has a very strong focus on international cooperation: There are currently more than 500 co-founded projects ongoing between the Taiwanese government and the international community. Among those are 44 ongoing collaborative projects between France and Taiwan.

Taiwan encourages visitors from abroad—not only professors but also students. Taiwan invests in its new generation. More than 18 percent of the national budget are spent on education. Taiwan has more than 10 000 students, among them more than 13 000 are coming from France.

Taiwan has a strong focus on intellectual properties. Moreover, the living standard in Taiwan is rather good. Taiwan has a dense import-export matrix, and close collaboration between the private sector and public administration to bring together this new digital era into reality.

THERESA SWINEHART, Senior Advisor to the President on Global Strategy, ICANN - Internet Corporation for Assigned Names and Numbers, gave a great talk on a world converting into digital:

Retaining a connected age is actually going to be a task, because we are facing a generation of users that don't know a world without a digital economy. They don't know the contrast of this—there has always been the use of apps and mobile phones for the children that are growing up today. How to ensure that, as we are looking at policy making and at retaining a digital economy that allows for continued innovation, investment and innovation on the edge?

If looking at the growth of the digital economy and the social and economic implications, it is quite striking: the digital economy is starting to outpace the offline economy.

ICANN had helped commission a study from the Boston Consulting Group, called "Greasing the Wheels of the Internet Economy". The report, which looked at some additional statistics and influent factors on the digital economy in general, came out in January 2014 and is available online.

Countries with a higher Internet activity can accrue up to 2.5 percent in GDP growth, compared to countries with low online activity. But for SMEs this can also mean up to 7 percent revenue growth. There are huge economic and social implications for what we are facing today.

The study looked at some different areas. An "e-friction" index was created to look at different countries and elements that are relevant to access and the use of the Internet. It touched on infrastructure, which counts for a huger majority of what impacts digital economy, and looked at factors such as broadband penetration, connection speeds, IPv6 deployment, Internet exchange points, and various mechanisms of strengthening infrastructure.

It also looked at industry, things like ease of starting a business, access to ICT skills, access to financing, a strong business legal framework, intellectual property rights, impossible contracts.

The area 'individuals' includes trust in online payment systems, online financial services, literacy, percentage of people online, among other factors, as the user and the consumers is playing a strong role.

And information, including what covers local content, local domains, website registrations, freedom of the press, freedom of access to official data and e-government programmes in general.

The study showed that those areas that have a lower friction tend to have larger digital economies. However, there are still many impediments to assess in the use of the Internet and this is leading to digital investment and growth. These impediments directly relate to structural regulatory and educational nature.

Disruptive technologies lead to a huge pragmatic shift and impact policy discussions. There is no industry that hasn't had to change its business models or hasn't had to evolve. It is touching across all sectors. But we are also seeing consumers and users playing a different role. They have an easier mechanism of expressing their voice or a demand and this is also

impacting things. There are a lot of economically disruptive technologies and this impacts in particular the emerging economies, this is where we see market shifts. The mobile Internet, the Internet of Things, cloud technology, advanced robotics, 3D printing, the drones, and various other things.

There are also those who are resisting change. You have economic growth, you have opportunities, investment in infrastructure, you have a need to change the way businesses can start up and in parallel you have new technologies. However, change is always hard and often there is resistance to that. So, how to balance all these needs when moving forward?

So, there is this balancing of the innovation and into that, the equation of policy making. How to address policy making for Internet related issues that impact the online environment, that don't harm this innovation and growth and take into realisation that changes are often hard? There need to be some tough discussions on how to deal with the online environment.

We often hear the terminology "multi-stakeholder", bringing all parties to the table. How do you actually do that? How to do that to retain the evolution of the Internet that also allows for innovation at the edge of the Net? How do you ensure accountability among the parties that are representative, that parties that have roles and responsibilities regardless of which sector it is. Those accountability mechanisms and those who hold responsibility often time shift in the context of the online environment or need to account for additional players. How do you ensure transparency in activities, so that one can actual see what the interests are of the different parties coming forward? And how do you factor in the users and the new voices, and how do you look at new models of governance and accountability and ensure that you have the right representation and participation?

There are organisations that deal with Internet policy issues and deal with meeting the needs of consumers or users. How do those organisations and institutions need to evolve?

In the context of ICANN, there has been a big change occurring that relates to the announcement by the US administration on the 14 March this year about its intention to transition stewardship of the IANA functions to the global multi-stakeholder community, if they can made a proposal that meets the criteria that were set out by the US administration. This is in itself the evolution of a multi-stakeholder organisation, the evolution of one organisation that is dealing with the addressing part of the Internet.

In the context of ICANN, the IANA functions which deal with naming, so everything of the right of the dot (IP addressing, IPv4 and IPv6, and protocol parameters), that area is what is being transitioned. ICANN is asked to facilitate the discussion. The discussions are ongoing right now in the global community—and they are open for everybody.

The principles that the US administration highlighted in the context of what a proposal from the community should entail is that it needs to address 4 principles: Support and enhance the multi-stakeholder model, maintain the security, stability and resiliency of the Internet, meet the needs and expectations of the global customers and partners in what is referred to as the IANA services, and maintain the openness of the Internet. NTIA also explicitly said that it will not accept a proposal that replaces the role that NTIA currently has with a governmental-led or an intergovernmental organisational solution.

This is a very important discussion that is occurring now. When this announcement occurred, another topic that came out was in the context of accountability. With the role the US administration has had in his historical relationship with ICANN, when that relationship changes, is there anything around ICANN's accountability, in the context of what the US was playing, that needs to be addressed and strengthened during this time of transition. So, we had the opportunity to convene again the communities in order to look how does ICANN's accountability need to be addressed the context of this changing historic relationship and how, in addition to other issues that the community way want to be addressing in the longer term.

These proposals are being worked on. The hope is to have proposals in place to enable the transition to occur by early to mid next year—with the objective of trying to have something in place when the contract elapses in September 2015. This is a major dialogue that is happening in the context of the evolution of one organization that has a global impact.

In conclusion, we need to treat issues around Internet policy, similar to how we are looking at important issues such as trade or the environment. We need to take this seriously in the context of the next generation and realise that there are many influential factors occurring here. We need to took at the digital economy and at the benefits it is bringing us, but also the challenges. And we need to look at how do we retain an Internet that is stable, globally accessible—and one where the securities, stability and resiliency of its own growth is retained. Because in the end, it is the next generation of users that will strive to enable this environment to continue to exist, but they haven't had the benefit knowing an environment without theses amazing technologies.

WILLIE LU, **Co-Founder of Technaut Intellectual Ventures, USA; Chief Inventor and "Father", Open Wireless & Mobile Cloud Platforms for Mobile Devices, USA**, provided an insight in the revolution of the Internet and the stages we are passing through:

If we look at the Internet revolution in the last 20 years, there are different types of system architectures: First, the Internet of People, whose purpose is to connect people together via mobile communication (and facebook). This can be considered as the First Generation Internet.

We are now entering the Second Generation Internet, which is the Internet of Vehicles. The Internet of Vehicles represents a huge market, especially in the US and China. China will reach 50 million cars very soon.

The Internet of People is based on technologies like CDMA, OFDM, OFDMA and normally uses terms like 1G, 2G, 4G etc. In the Internet of Vehicles we still continue using this wireless technology but in a data modus or WIFI technology.

The Internet of People is focussing on the mobile person. The Internet of Vehicles is focussing on the mobile office, the mobile home, and the mobile enterprise. In the future, your vehicle is not just a car anymore but a mobile office, home or enterprise.

The Third Generation Internet is the Internet of Aircrafts, both manned and unmanned aircrafts. Every day, there are 3 000 aircrafts over the US.

Technically it is already possible to use ad-hoc or mesh networks to connect to an aircraft rather than to rely on satellites. It is possible to provide 10 Gbps bandwidth (uplink) per aircraft when using such networks. The main application in this context is mobile travel and delivery. Air China and China Mobile are already realizing field tests with extremely high speed in the sky.

In the future, it will be possible to use a smartphone in the aircraft without being constrained to switch it off. The technology is already available; it has just to be put in aircrafts. In the future, aircrafts will be connected to each other by ad-hoc and mesh networks without a line to the satellites.

We need to stop focusing on 3G, 4G, etc. because the bandwidth is limited. We have to focus on very high speed wireless, and our main objective should be improving its performance.

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Q&A

The framework of the digital economy rests on broadband and the lack of broadband deployment has significantly hampered large scale deployment in certain economies. According to a recent GSMA report on mobile-to-mobile, m2m accounts for 1 in 10 of all mobile connections in the US, in contrast to 1 in 20 in Europe and 1 in 100 in Africa. What can policy makers and entrepreneurs do to ameliorate this divide?

Jørgen Abild Andersen, OECD's Committee for Digital Economy Policy (CDEP), underlined that this is a discussion which is going on for quite some years now. It is very important not to focus only on trying to encourage investment in broadband if there is nothing to use that broadband for. One should not blame large telcos for having some trouble in being pushed to invest in broadband if there are no customers. The Danish figures were very clear on this: You have to do something on the content side to justify the huge investments in broadband. And that is where governments can do something: Data driven innovation requires a very good infrastructure all over the world. And this a job for a government to join all the efforts in the different responsibilities of ministers to ensure the data protection regulation fits with the competition regulation, that there is a sufficient amount of data specialists to exploit the opportunities of big data, ensure that there is good competition between telcos etc. This will create a healthy climate for things to develop on the content side and this, at the end, will justify the large investments of the broadband infrastructure.

Gary Shapiro, CEA, explained that in the US, even when there is vast disagreement on issues like net neutrality, there is total agreement that broadband is something that everyone wants. It is part of the Maslow's hierarchy—high up there with food and water.

Everybody wants more broadband and the question is, how much does it cost? The content is there. Netflix is providing it, Amazon is providing it, the traditional distribution mechanisms are providing it and are disrupting everything. One of the major networks, CBS has just announced to going directly outside of the traditional cable service to provide things on Internet.

It is fair to say that a large portion of the public demands broadband. The question is how to get there—even in this great debate on net neutrality, which even the president of the US has weighed in on. No president ever has to weigh in a debate by an independent

commission. He chose to make a public statement himself. Despite this great disagreement, the agreement in the US is focussed on everyone wants broadband it should be ubiquitous, it should be not discriminating against new businesses, and also competition is something which would be really good.

And in the so-called net neutrality debate is about the fringes. Both sides are very scared of a future that they don't know about. For instance, AT&T just announced to stop all broadband investment in the US until the net neutrality argument is settled. Just the existence of the debate is already having a negative impact. Because if you want broadband investment and infrastructure than having this type of debate is unhealthy, at least with such uncertainty attached to it.

If you have competition in broadband, if consumers have a real choice, if they have great disclosure and transparency on what is occurring and the ability to get out of any contracts if they change, then the net neutrality issue will become less important over the time. Regarding the content creation side of it, with great government services provided over it, with tremendous entertainment and education, information and healthcare services—we are there. The question is, is the government doing something which is harmful? Are taxes too high? Are they making it difficult to local governments demanding things, in return for a monopoly giving in broadband provision? Those are the issues which disturb broadband investment. And then, there are issues which are difficult and have to be debated, such as privacy, cybersecurity. What are you giving in return for all this information you are accessing?

Roberto Viola, European Commission, stressed that governments should address market failures—what seems to be easy. The difficult part is to detect market failures. With respect to broadband, Europe has the best performance in the world. Sweden, Denmark and Switzerland are the best countries in the world when it comes to broadband indicators.

The EU has a rather sophisticated regulatory framework and the prices for broadband in Europe are relatively cheap. The fact that 70 percent of the US has only one broadband supplier would be a market failure in the EU and would be a case for regulation. Nevertheless, there are cases where it would not be seen as market failure: this would be cases where the EU wants to give a sort of a natural monopoly in an area to make companies invest. This example shows that it is rather difficult to spot market failures.

However, there are other areas with market failures, where no one wants to invest, and governments should concentrate on these cases.

But the trick is also to find a balance when it comes to grey areas. Maybe private companies will invest, maybe not. What should the government do? Should it regulate to foster investment? Should it just wait and see? This is the difficult part and this grey zone is something no one is getting right. Some people in the EU think the regulatory pressure is too strong in Europe, some people in the US consider the regulatory pressure in the US too light. The old debate on net neutrality is about finding a right balance between who is providing the access and who is delivering the services. It is a difficult balance.

Looking at the "best in class" in the world, but also looking on failures in policy, is probably the way forward. Governments should never attempt to change something that works. They should always try to find a market failure and then intervene. But if the market works, they should leave hands off.

Michel Ching-Long Lu, Taipei Representative Office in France, added that it is important to focus on improving the quality of life. The experience in Taiwan is very interesting. On one hand the government is definitely responsible to invest. But on the other hand, in Taiwan, many of the people working in the public sector are coming from the private sector. This is why in Taiwan the private sector invests 74.2 percent in R&D. The government invests less. However, this doesn't stop progress in Taiwan.

Jørgen Abild Andersen, OECD's Committee for Digital Economy Policy (CDEP), agreed that the need for governments to intervene should be based on cases where there is a market failure—but it is not only the question about whether there is a market failure strictly related to telecoms. E.g., if the development of the digital economy is suffering from a data protection legislation which is much to rigid, you should have a look at the data protection legislation and see weather it could be softened to enable that the digital development will take place in a more rapid pace. Another example is the market failure related to the education of data specialists. There is an enormous potential developing on the basis of big data as a source of data driven innovation and there are only very few data specialists available for doing this. This is a kind of a market failure and the question is, what can be done to encourage universities to educate more candidates with the right education. This is a challenge governments should address. The headline of all this is, what can be done to overcome these market failures to make demand work much better than today,

The moderator, **Anna Gomez**, Wiley and Rein, referred to the mentioned uncertainty around net neutrality leading to less private deployment. At the same time, it seems that a lot of innovation during the last 10-15 years came as a result of a regulatory vacuum and an uncertain environment. For instance, the apps economy has grown despite not having any type of regulation. Other examples are Airbnb or even Uber. Does a regulatory vacuum allow innovations to spring up out of nowhere or is that uncertainty preventing new innovations by established parties?

Gary Shapiro, CEA, stressed that these are two very different examples. Uber is an example of a company which didn't exist a few years ago and which had to take huge risks. Their strategy has been going everywhere, despite ambiguity and sometimes even clarity in the law, to go forward and rely upon a diverse popular service to rebel against the government—and they have been very effective. This is an example of people, though the power of a popular service, telling their government that it is wrong.

Broadband deployment means billions of euros of investment. In a country like the US, which is so diverse geographically with different types of landscapes and a lot of planes and mountains, it is not right to compare it to the market leader of the world, South Korea, where there are a lot of relatively new vertical buildings being put up and the broadband penetration is the highest in the world. There is tremendous investment and it does go sometimes into the ability to recover your investment. Fiber deployment is very expensive but gets a huge pick-up rate in urban cities.

Ambiguity is a good thing because a lot of businesses should take risks, and the more you are taking risks, the more you are rewarded. And you are more likely to take risks if you are a start-up than a large well established company with public shareholders.

You have to innovate or die. The biggest mistake that every company makes is just thinking that things will not change. Meanwhile everyone is trying to change and beat you up. You have to risk and part of that are legal and regulatory risks. Part of the challenge is to educate policy makers that the fault is not regulation.

Willie Lu, Technaut Intellectual Ventures, Open Wireless & Mobile Cloud Platforms for Mobile Devices, commented that sometimes policy is moving too slow compared to technical advancement. New ideas come up, innovation is done and then innovators are confronting legislation and policy makers.

Theresa Swinehart, ICANN, underlined that the Uber example is a very interesting example to look at in the context of the user and the consumer and that this is actually changing the laws in some of the states. It is also going to end up changing how traditional taxi driver industries are currently working. For instance, taxis in Washington DC are going to start looking at how to use apps and different kinds of technologies in order to be responsive to the user demands and user interests that they are seeing in the pick-up of the Uber technology. The user and the consumer are real drivers in many of these things and this is part of what is disruptive because it is a new element, the extend to which they drive some of the changes.

The moderator, **Anna Gomez**, Wiley and Rein, then asked the panel when are the users responsible for their own security as they utilize connected devices and at what point is it the provider's responsibility?

Theresa Swinehart, ICANN, explained that we are still in a grey zone. There is several examples where companies are being suggested to play roles as arbitrators in certain decisions or in the enforcement of certain areas of policy. Those are examples of where traditionally the government has been the arbitrator or the traditional system has been the arbitrator. We are seeing privacy policies with some of the big social networking companies as again examples where companies and users are driving a policy that has historically been a governmental kind of role. This is becoming a bit of a grey area.

However, there is a need for educating users in their responsibilities, their role in putting information out, and how that is going to be used. This came up in the debate around the right to be forgotten. You can't actually get rid of some of the information out there—so then where is the education and the responsibility of the user? We also need to be looking at the responsibilities of corporations and other entities in relation to them being put into a role that is not a role that they should necessarily want to be in. The example of being an arbitrator about the enforcement of policy is one area.

Roberto Viola, European Commission, pointed to the fact that the last hundred years have shown that governments, especially democratic governments, are there to make sure that the rights of the citizens are respected. The Internet is not an exception to this rule. The right to be a human being, the right to be judged for what you do, not for what you are supposed to do, is a right governments must ensure—also in the Internet. If someone goes for a job and the jobseeker looked at the Facebook site and has already discarded him, this is not legal. In a democratic society this should not happen. People have the right to stand for an interview, to express themselves and to be judged for what they are—and not by an algorithm that pre-selects people. This is one of the fundamental debates we should have in

democratic societies. It is not right that your data is being spied. This is not the right of the citizen—quite the contrary. Users have to be educated, but governments have to be educated, too. Moreover, the fundamental constitutional rights have to be updated in order to be up to this fast moving world. To a certain extend, it is also a good thing that policy is moving slower than innovation, but today we are at the juncture where some of the fundamental rights of the digital society need to be put on paper.

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Session 1

Day 1 – Morning – Plenary Session

Drivers For Our Connected Age

LARS ALBINSSON, Creative Director/Founder Maestro Management, Sweden, moderating, welcomed the participants and gave a short introduction into this session on drivers, both on the technology and policy side, by referring to the changes in the mining industry caused by the evolution of technology:

There are two big iron ore mines in Northern Sweden, Kiruna and Malmberget. The two cities needed to be moved due to the expanding iron ore mines. 90 percent of all iron ore in Europe comes from these two mines. The annual downstream business is 400 billion euros.

Mining has become a high-tech business with automated vehicles, control rooms etc. These mines have the biggest electricity railway on earth and each of them has 600 km of paved road below the surface. More importantly, they have a full 3G GSM network that is operational all the way down to the bottom of the mine, which is 1 500 m below the surface. This GSM network is inside the biggest known magnetic ore body in the world, and thousands of tons of rocks are blasted every night—and despite this, the network is operational.

The mining industry is highly depended on ICT. Operating these mines requires talents. There are 188 professions represented inside the mines—with 2 being physically heavy, all the rest requiring education.

In order to attract talents and motivate people to move to small towns 200 km above the Arctic Circle, collaborations with universities have been initiated. It turned out that the students were not afraid of spending a couple of years in this isolated environment. Students today use a lot of connected technology, such as Snapchat, Instagram, Skype and other social media, which make them feel connected to friends and knowledge all over the world.

The example shows that tech development is not just about big western cities and modern service industries. It also happens in rural areas and mature old industries.

GERALD SANTUCCI, Head of Unit Knowledge Sharing, DG CONNECT, European Commission, shared a thought-provoking view on three critical aspects in the context of drivers of our digital age:

First, better regulation. This is a concept that has been applied in the EU over the last 15 years and which has developed very fast from 'better regulation' to 'smart regulation' to 'fit regulation'.

It is time to acknowledge that policy making in Europe, and possibly all over the world, should no longer ignore the Internet drivers. We have to regulate in a modern way—we should be big on big matters and small on small ones. For the time being, despite all the considerable work that has been done, policy making has rather failed to adapt to the digital world.

The public sector, in the years to come, is much likely to undergo a process of disruptive modernisation which will transform the nature and the purpose of legislation in the digital age. The government must get ready to leverage the possibilities of digital technology for deciding whether legislation is a right approach, given a slow speed, and that incentive-based ways of legifering may work more efficiently and effectively. DG Connected refers to this as "Internet readiness legislation".

Second, anthropocene. The word was popularised by the Nobel Prize-winning chemist, Paul Crutzen 15 years ago. He argued that we are entering a new epoch and that the current geological epoch (the Holocene) has come to an end. The name of this new epoch, Anthropocene, reflects the major and ongoing impact of human life on Earth.

It is not very likely that humans will be replaced by the robots or systems they create. However, maybe the question is rather, whether in the longer term—beyond the Anthropocene, which means an epoch dominated by the actions of men, it won't be the machines that we so smartly create, that will lead towards a new epoch, the Robotocene.

Third, ICT technology has been increasingly democratised. Many of the technologies were born in the military system. Then, they have been further developed by companies, and nowadays more and more by individuals. We have ICT not only around us, e.g., at home or in the car, not only on us, e.g., smart glasses and smart watches, but more and more in us—just think about the Google X research unit that is working on disease-detecting nanoparticles in our bloodstreams.

GABRIELLE GAUTHEY, Group Corporate President, Global Government Sector, Public Safety and Defense, Alcatel-Lucent, France, [www.alcatel-lucent.com], shared her thoughts on ICT issues and some of the key drivers that drive change, innovation and disruption in our industry:

We are in a time of big disruptions and there are three drivers that drive these disruptions in our industry: The first one is the explosion of mobile devices. In 18 months, the smartphone has reached the same penetration in humanity than colour TV in 15 years. The acceleration of technology evolution is huge. It is the innovation in the history of mankind that has reached the most rapid penetration—followed by connected devices. In a few years everything will be connected. The second is the explosion of video. The third is the explosion of cloud.

These three changes in our industry are absolutely key and vendors and industries anticipate

a multiplication by a factor of 25 of traffic explosion within the next 5 years.

That means that people who think we are done with the network are wrong—we have never needed as much investment as today. 10 trillion US dollar will be needed in the telecom sector in the world for the two next decades. However, there is a problem: This investment is both needed in the core, it is needed in the backhaul and in the access.

How do we do, in a time where the revenues of those who have built the network in the past, i.e., mainly the service providers, are not matching with this huge need of investment, and in a time where most of the value is shifting to the OTTs? There is big mismatch and there is a big need to attract long-term investors. There is a need to envisage new investment models.

The current buzz word is new investment models, infrastructure sharing, active infrastructure competition on top of common passive networks—and that is a big change in the industry. There are various models around the world: We can either envisage, like in the US, a clash of giants, i.e., vertically integrated models with competition with the OTTs and rather little infrastructure competition (only 20 percent of the population has the choice between 2 service providers for ultra-broadband).

In APAC we see market shakeouts, e.g., in New Zealand, Australia, Singapore. Singapore is a small city-state with 20 service providers on top of a common shared passive infrastructure. That is another model than infrastructure competition.

Europe still hesitates. Europe has two platform countries where you have competition between cable and the service provider, and countries like France, saying that it is not affordable to have a duplication of fibre in each home. We need to extend the model of active infrastructure competition, that we have enjoyed in the copper world and that has been proven beneficial—but how to transfer this to the new world? In Europe, with its scattered initiatives and many local authorities investing, we can see a kind of generative bazaar.

In terms of models, Europe looks at what happened in the developing countries: They don't want to duplicate passive infrastructure. Passive infrastructure is there, but they want to attract long-term infrastructure funds to this passive infrastructure, which is 80 percent of the cost. And then, they want to have competition on top—active infrastructure competition which is only 5-7 years rate of return and not 15 years. This is a very different investment profile. And of course service—and the service competition is global, worldwide, the active is regional. Service providers should be able to offer its networks throughout Europe, passive is generally very local.

That is a new way to envisage the network. It is compatible with the fact that the network is increasingly going to be all-IP, cloud, on common passive infrastructure, and that it is going to happen on top of this common infrastructure in the cloud. That is what is built with software-defined networks and network function virtualisation. The network is increasingly going to be virtualised on top of commonly built infrastructures. Not only in the fixed world, some countries are even envisaging very disruptive models by sharing the mobile, not only the passive and not only the active networks, but also the spectrum.

CLAUDIA SELLI, EU Affairs Director, AT&T, Belgium, [www.att.com], discussed how mobile technology has the power to change the way we live and do business.

In 2007, AT&T was one of the first carriers to deliver the smartphone and in just 6 years (2007-2013), the company has seen an increasing data traffic on the network, equal to 50 000 percent.

If the pace of advancing technologies has been very slow during 70 years, there has been an incredible change in the last decade. The smartphone will become the remote control of our life, starting from our home, our car, but also wearables.

Mobile technology will impact each and every industry over the next five years. With sensors, embedded in the agricultural field, it is possible to monitor the water and adapt the irrigation systems. Sensors in cargos allow controlling high sensitive merchandises in terms of temperature etc. All this enables businesses to react in real time; e.g., to decide, if a merchandise is broken, to not deliver it to the final customer, and to replace it in real time. Mobile technology will be also touching and transforming the healthcare system.

What is needed for this type of technology to take off are investments in the infrastructure and in technology. But how do we attract investment? Certainly with policy frameworks that don't stifle innovation, but pave the way for technology and that are forward-looking and high level.

In the next 5 years, the EU has the opportunity to re-launch the ICT sector and the digital economy. For the time being, companies are confronted with 28 different regulatory markets. What is urgently needed now is a simplification of rules that would allow, not only big multinationals, but in particular SMEs, to be able to deliver their services.

AARTI HOLLA, Secretary General, ESOA – European Satellite Operators Association, zoomed into one of the key drivers of our digital economy and digital age, that is

The Video Evolution – Driver & Disrupter

There are many divergent views on where the Internet is headed, the trends in consumer patters, what they want, what they consume, what will be the driver behind the networks of the future. But one thing that everybody does agree on is that video really is a key driver, if not the main driver, of IP traffic in the coming years. Cisco predicts that it will be 80 percent by 2016.

There is a tendency to think that people want video anywhere, anytime and on every device. However, the last point about "every device" has become somewhat of a slogan. Empirical evidence is that most TV viewing remains linear. People are still watching TV as they did in the past in front of a TV set—the difference being that those screens are much bigger, better and with higher resolution than they were ever before.

Viewing of non-linear TV is migrating from the old fashioned DVD viewing to the latest OTT, such as Netflix. Viewing is moving from big screens to bigger screens with some usage of smartphones and tablets to watch video, but this is typically when people have recorded something from home and are watching it on a plane, on a train and the like.

Why video does dominate the pipes? The broadband networks are getting congested

because of video consumption. It still does not dominate the way people consume it. The way people consume video still is very much in a broadcast mode, not in a broadband mode.

An example from the UK to put this in perspective: the BBC iPlayer is probably one of the oldest catch up TV systems which is there, it will be 7 years old this year. But still that mode of consuming via iPlayer represents only 3 percent of all BBC content which is viewed.

With the surge of video traffic on broadband networks and the pipes getting clogged up, previously successful business models have to be re-thought. In the past, telecom companies could afford to roll out fibre at a slow pace but corresponding to demand in a given area. It is not affordable for them to deploy universally; cable is only viable in urban areas. Mobile operators are announcing decoupling of their revenues from network cost. They can no longer pass those costs simply on to the user given the amount of competition and the declining ARPU. Terrestrial broadcasters are facing a lot more competition from satellite, cable and IPTV. And content providers, given that their content is now being accessed increasingly online, are less able to rely on advertising revenues.

Tomorrow's business models have to be at the same time affordable for the user and commercially viable for the operators.

We need to start thinking out of the box. All telecom operators, whether they are mobile or fixed, have got to find ways of overcoming silos. The comfortable models that we have been happy with in the past and that made money in the past will not make money going forward. There is a pressing need to deliver content in the most cost effective and spectrum efficient way. The answer needs to include all user devices, wherever those devices are being used. People want choice, they want to watch whatever they want, when they want and, if they want, on a device as well.

No single solution can meet the requirements of watching this content at home, on the move, in urban and rural areas. That means that the answer will be a patchwork of solutions that relies on different technologies and different regions will need different solutions. Spectrum alone is not the answer. We have a tendency to think that it is all about spectrum—that is not true. One has to start from the service requirement. What is that the users want, and one of the things we know that they want is video. That has to guide the correct technology mix that is going to be able to deliver that. Satellite is a technology that enables not only HDTV but also UHD as well as total coverage.

It is the right technology mix, that is going to direct the R&D investments, dictate what spectrum is required in the future and also ensure the most efficient solution. This should be the main guider and push behind policymaking going forward.

CHRISTIAN BUCHEL, Deputy-CEO and Chief Digital & International Officer, ERDF – Electricité Réseau de France; Vice-President EDSO, Belgium, provided a most interesting insight in the digital challenges of an electricity DSO:

ERDF is a French electricity distribution system operator in charge of operating and maintaining electricity distribution grids on 95% of the French mainland territory. EDSO is an umbrella association gathering leading Distribution System Operators from 17 EU countries, currently covering 70 percent of the EU points of electricity supply.

The picture of yesterday's distribution grid was the following: Big production generation sites (nuclear, coal or water) are connected to the high-voltage grid and the customers are connected either on the distribution grid or on the transmission grid, according to their size.

Today, this is still valid, but the system is strongly challenged with approximately 95% of renewable directly connected to the distribution grids. Also, DSOs today are going digital. Technology is needed, not only to do a better job better, but also to connect all the new usages of electricity, such as electric cars. For instance, within 16 months, more than 3000 electric car (EV) charging stations have been installed in Paris to allow market players to develop electrical car sharing.

Hence, digitalizing the grid becomes more and more important in order to connect new uses and new generation, while maintaining the quality of supply, both in terms of power quality and to avoid outages.

The challenge is a technical challenge—but also a financial one: The grids in Europe and all over the world are aging, they were built 40-70 years ago. Renewing the grids requires huge investments. And it has to be done in a smart way to include and connect the new technology. ERDF in France, for example, invests 3 billion euro each year. On an EU level, the EC estimates that 400 billion euros are needed until 2020, that is twice as much as TSO grids.

Speaking more particularly for ERDF, the digital transformation is a great opportunity. There are 5 very important trends for the business of DSO: 1) Digital relationship, especially with the customers. 2) Big data becomes an important trend, especially in view of the rollout of smart meters providing more and more real time and consumption data. 3) Connected objects and devices, such as smart meters and captors installed on the grid. 4) The digitalisation of processes and 5) last, but not least, social and collaboration practices are a new opportunity to communicate, e.g., in case of electricity outage, ERDF already started using social media.

MARGOT DOR, Strategy Development, ETSI – European Telecommunications Standards Institute, shared some most interesting insights in

A connected age, the standards side of things

We are living in a connected age and we need interoperability. Interoperability is maybe another way to call standards, but at the end standards and interoperability will remain in the same picture.

Standards are not just about pipes—even at the network layer, everything is being virtualised. This is the first challenge. ETSI works a lot on network function virtualisation and software-defined networks. Even companies like Ericsson stated that three quarters of their revenue in 2013 was made on software and services.

The second challenge is that all sorts of industries, in order to enable this, have to interconnect and inter-work. There are people that need to work together with different business models and different cultures, with different organisations to produce standards, and it is not about ETSI arriving and telling them how the world should be and how they should work—it is about finding the right terms of the dialogue.

This is also true from the public sector and for-profit sector. And here the roles are changing: We see this in the cloud, where the governments are not only a huge user but they are also provider and client. When ETSI started working on the so-called Cloud Standards Coordination (CSC) in Europe, some of the collaborating private sector companies were amazed by the cloud developments in some administrations.

A couple of weeks ago, Europe launched the Electronic Identification and Trust Services (eIDAS) Regulation. The general echo was, that—now that there is an eID, a system, regulation and technology etc.—in order for this to take up, we need to make sure that there is a number of applications, including from the private sector for the private sector. However, the question is, if you have a unique ID to get online and it is both or voting, for taxes and for private applications, who is going to be liable when things turn bad? There are some interesting questions in terms of roles and functions and we have to find ways to work together and to define the terms of the dialogue.

The third challenge is that there will remain a need for anticipatory standardisation—the big stuff for big architecture, the commonly built networks, such as 5G.

Increasingly, we need to move towards participatory standardisation, which is parallel to product development. Here, people come together and start writing the specifications as the product develops.

Even more increasingly, we need to move towards responsive standardisation. This is an area where there is already standardisation and specification. One case of responsive standardisation is that there is a legacy of standards, e.g., from ZigBee, 3G, 4G etc., and you need all this technologies to speak together. The second case of responsive standardisation is where the cycle of implementing standards is upside down—it starts with implementing, testing of interoperability and than the source code might become the standard.

WLADIMIR BOCQUET, Head of Policy Planning for Government and Regulatory Affairs, GSMA Association, focussed on

Recognising the unique role of spectrum for mobile broadband

Spectrum is the oxygen of the mobile industry. Looking at what happened during the last years in terms of development, from the standards' perspective but also the harmonisation of the spectrum, spectrum can be considered as one of the key drivers for this connectivity.

In less than one year, the ITU will organise an "The World Radiocommunication Conference 2015" (ITU WRC-15) in Geneva. This international conference will be an important milestone for this connected age and the digital communication.

One of the topics to be discussed during this conference will be the possibility to allocate new spectrum to the mobile broadband. The debates will be intense but this definitely represents an important milestone for future developments.

Regarding the drivers, such as spectrum, for the mobile broadband, there are three main challenges: The first challenge is the massive capacity growth, both for personal communication and machine-to-machine/ Internet of Things connectivity. A number of forecasts expect the global mobile data traffic to grow 10 times from 2013 to 2019. From a spectrum perspective, this means that it is important to adjust the need with harmonised spectrum by releasing the already allocated spectrum under appropriated licensing regimes. It must be a globally harmonised spectrum under technology neutral licences.

Another important aspect in this context is driving the spectrum efficiency. Ensure all spectrum users are using this precious public resource efficiently. This will help free up spectrum for those who need it most.

Then, as mentioned, the ITU WRC-15 will be a key milestone for the mobile industry having all the regulators working together internationally to agree upon new mobile allocations. This will be the best way to support massive capacity growth.

The second challenge is to connect the unconnected. Only half of the world population are mobile subscribers. There is still a long way to go and we have to make sure to have the appropriate policy approach to increase connectivity.

One key point is to make sure that, from a spectrum perspective, we support the coverage spectrum. Spectrum doesn't have the same characteristics between higher and lower frequency. Lower frequency is appropriate to be used to facilitate coverage. This spectrum is called the digital dividend, represented by the 700-800 MHz band. The idea is to have a globally harmonised standard and ecosystem to efficiently deliver this connectivity, especially in rural areas.

Another key point is sharing, but from a voluntary basis and not mandatory. Having the right regulatory environment to support voluntary sharing, both passive and active, will help to connect the unconnected.

The last point is having the right framework. It is important to create a framework that supports guaranteed access to spectrum under very clear and consistent regulations. This guarantees quality of service, improves coverage and encourages investment.

The third challenge is to encourage investment in the network. Investment is necessary due to the significant growth of traffic, but also due to changing user mentality and disruptive applications.

One key point in this context is having a light touch regulation to avoid over-regulation to facilitate investment.

Clear spectrum licensing is needed to make sure that all the Telco investors will have enough confidence to invest, but also a long-term plan and roadmap regarding spectrum to provide guarantees and clarity. Releasing spectrum is very long process and mobile operators need to have clarity about perspectives and a supportive environment.

GÉRARD POGOREL, Professor of Economics and Management-Emeritus, Telecom ParisTech, France, addressed disruptions in our societies and in the world economy:

The problem(s) with the Connected Age…
And can we fix them?

The connected world has had fantastic outcomes and fantastic successes, with great innovations that came up in the last decade. But we also see the challenges we are facing in our economies. All those technologies have not translated in proportional significant progress in the industry. The productivity curves are desperately flat.

Today, in the world, there are catch-up economies which put into action existing technologies and, based on the low cost, succeed in achieving high growth rates. There are commodities based economies, like in Africa or Australia. The innovation machine is very much concentrated in America; and Europe is somewhat in the middle. Europe is not a commodities economy, it is not able to catch-up because of the labour costs, and its innovation machine is moderate.

We have a difficult situation and this translates, especially in Europe but also in America, in a very challenging phenomenon, which is the disappearance of the middle-class. The advent of the middle-class in Asia and Africa with hundreds of millions of people achieving middle-class status—which is great news—is counterbalanced in Europe and America with stagnant incomes for all those in the middle in the past two decades.

We have to talk to the various stakeholders and ask them a few questions. The industry should do something about productivity—productivity in manufacturing is progressing very quickly, but productivity in management processes is lagging. Recent studies showed that there are big discrepancies in the productivity of management processes among countries. All those connection tools we have available at this time are not used very productively in companies.

We have had problems with the financial services industry, which has had a big responsibility in the problems we have been having in the last few years. But the financial services industry would have a big role to play in Europe, putting together initiatives and talk to industry players and incentivise them to consolidate and really work at a European level.

Telecom operators are taking advantage of the fragmented market. This is not good. There are some very short paragraphs in the Commission's documents saying that the telecom industry should consolidate in Europe. The present situation in Europe, with 28 regulatory

apparatus and regulation authorities and more than hundred telecom operators, is just not sustainable in the long run. And this is a major hindrance for European consumers, European citizens and the European industry in general.

There are messages to Member States as well. Member States have been able to use the EC as a ruse of reason tool to implement measures, which have to be implemented, but are not very popular.

We have to talk to the telecom operators, we have to talk to the EC and we have to talk to the Member States.

LATIF LADID, President IPV6 Forum, Luxemburg, appealed for

The big shift to the v6. world

We have run out of the IPv4 address space three years ago and we have not yet moved to the new address space. Just for this year, we need about 800 million IP addresses in order to cope with the current growth.

We are not investing in the future but just keeping the current infrastructure—even adding new plug-ins such as carrier grade NATs which are reducing the Internet performance. We are all moving to IP at the end of the protocol itself; this is a really serious issue.

There will be 50 billion devices connected by 2020. The US estimates that, by 2022, there is something like 14 trillion dollars at stake in the environment of the “Internet of Everything” (with the IoT being just one section of the entire chain). The issue in Europe is, that Europe is not capitalizing on the various investments that have been done, especially by the EC.

One of the biggest issues of IoT is privacy first, and security afterwards. If you have privacy, you have basically security. But if you have very good security, you can also have privacy. The interoperability issue is fundamental in order to make the IoT to look like the Internet itself when we have end-to-end.

According to Kevin Ashton, who coined the expression “Internet of Things”, we need addresses. He mentioned that we should use IPv6. There are not many projects from the EC in this area. There might also be some internal controversy whether IPv6 is the right thing to do. We have to become neutral in terms of advising new technologies. Especially since we have invested trillions of dollars in telecommunication, we cannot just say, let’s invest in something new. You can invent new things in new topics, but when you have a massive infrastructure that is already producing revenue you have to augment that technology. Of course it is possible to add some smart management solutions like SDN or NFS, but this will not resolve the issue.

When moving towards IoT, we also have to think about fixing the power problem. We have to think about wireless power; new techniques outside of the current power models, and especially the scaling, that will sustain. We are talking about zillions of devices and the power concept that we have today will not fit alt all.

Then, how to make all the data formats to work and to be open to make them intercommunicate. The Internet today is an open source protocol and as such the IoT needs to be done. Thus, we need to look at how HTML is going to work. There is for instance the Constrained Application Protocol (CoAP) defined by the IETF.

However, the first thing to do, is to use IPv6.

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Q&A

The moderator, **Lars Albinsson**, Maestro Management, emphasised that the actual situation reminds to the situation in the train industry at the turn of the last century, in the 1800s, with competing train systems. Everybody built the roads and the carriages and the business models. And if you go back historically, you can find fantastic visions of trains going to each and every house. But this fierce competition model eventually created problems when trains became a huge infrastructure, and we could see a kind of fusion, merging and even nationalisation of large train systems to take the next leap when it became a kind of a necessary infrastructure. The electrical industry went through the same type of change when the grids became national interest etc.

Referring to today's industries, with huge investments in front of them but a business model that doesn't support these investments, the question addressed to the panellists was, whether there is a need to restructure this industry? Is it necessary for the next step to think in those terms?

Gabrielle Gauthey, Alcatel-Lucent, confirmed that the industry is at a turning point and the vendors have done something that the service providers have not yet done: Vendors really reinvented themselves and constantly reinvent their business and investment models.

We talk about necessary consolidation in Europe. But certain models in APAC, such as Singapore, show that it is possible to accommodate 20 service providers with different investment models. The OECD just issued a report saying that there is no buzzword that there is going to be only 3 viable operators per country. This is not the right way to do.

Of course everybody calls for a necessary harmonisation of spectrum allocation in Europe, but there is private religion and public religion and a lot of people are advocating against this—not only countries or individual regulators.

We need to reinvent new investment models. There is a move of the Telcos towards the cloud. There is a lot of complain about OTTs that do harm to the existing service providers—but what if the existing service providers really thought of competing against the cloud? They could by reinventing themselves and moving away from certain investment models. We can no longer afford the dogma of infrastructure competition everywhere. We need competition, but we need other investment models, infrastructure at other layers.

Gerald Santucci, European Commission, stressed that we are living in times of change. There is even an acceleration of change. We are witnessing something that we have foreseen, we see the problems, we have a correct view of what is going to change, but we don't have a correct view of what needs to be done, yet.

Things are going very fast. 75 percent of all transactions on Wall Street are done by computers without any human direction. We are entering times where humans will have to live with the idea that they are going to loose control of the devices and systems they create. How to deal with that? Where will intelligence be in the future? It may be in the systems, in the machines, but this brings up the notion of what intelligence is. What will be the articulation between humans and machines?

We are going to have more and more data—and this is not a problem of quantity. The issue is that the data we have to live with will be a different kind of data. It will be data taken by the sensors embedded by new devices.

Intelligence though micro-controllers, more but different kind and lost of control—these are the big challenges we are facing, but don't see how to cope with it.

Wladimir Bocquet, GSMA, agreed especially regarding the situation in Europe. What is important from the spectrum perspective is to have the visibilities and the certainties for investment. Without clarity and visibility, people just won't invest. This is the same for the regulatory framework. It is easier to invest when having a long-term perspective.

Voluntary sharing is rather important—not only the sharing, but also the voluntary approach. This requires the suitable regulatory framework letting the operators the choice of doing what they consider as appropriate for the market. When there is some interest, the operators will get together and invest together. But they need to have the choice to do it and they need to have the possibility to better understand their market and asses how they want to invest. In Finland, for instance, two operators decided to create a kind of joined venture to have a full sharing agreement to cover Finland's rural area. The regulatory framework was there, just as the certainty concerning the investment.

Aarti Holla, European Satellite Operators Association, underlined the need for infrastructure investment. However, it is not just about private investment, but also about R&D investment. The future, in order to have sustainable business models, we are going to have to see some serious innovation and also some convergence in a way that different technologies are working together. There is a reluctance among different stakeholders in the telecoms world to think differently from the way they have before and work with other sectors within the community.

One thing policy makers can do is to incentivise that. E.g., in the EU there is a 5G PPP Horizon 2020 framework, which is making funds available for R&D. Policy makers in the Commission could incentivise R&D into innovative hybrid solutions, which is something that is not happening today.

Claudia Selli, AT&T, stressed the fact that nowadays businesses are reinventing themselves in a sense that there is not always a clear definition of the different players: Google is becoming a broadband provider, Telcos are often providing video services, cable providers are also providing voice services, etc. At the same time, policy sometimes is not reflecting what is happening. Technology is advancing, but policy is not keeping up with what is happening on the market.

It is important to attract investment. You need clarity in terms of rules, you need to know what is happening on the market in terms of policy. At the same times the rules don't have to be too detailed, but high level in order to allow technology to advance.

Christian Buchel, EDSO for Smart Grids, added that in the European energy sector there are 28 + 1 regulators (28 Member States plus the EC). 20 years ago, Europe decided to split the grid from the supply and generation. The grid is a regulated business and the job of a grid company is to enable things in a neutral way. At that time, regulation in Europe was mainly driven by the question of competition with the aim to avoid that big companies become bigger and bigger. But these days, competition is no longer the only driver needed in the grid sector; there are other drivers needed, such as more freedom and more liberty for innovation. Innovation is very difficult and has to be done together. There is an ongoing project to develop power-line communication (PLC) in Europe, which is high frequency on the existing electricity grid. In order to develop this worldwide, there is need for room to take actions and a regulation reflecting the situation as it is today.

Gérard Pogorel, Telecom ParisTech, confirmed that there is a need for restructuring the industry. This is especially the case for Europe and its dysfunctional industry structure. The results show that Europe is lagging behind in terms of services in general, investments, new services and an essential element of the future is missing, which is connected services. Not only there is an issue with the structure of the industry, which is excessively fragmented, but this fragmentation prevents Europe to create this kind of industry which has been so enormously successful in the US providing OTT. We cannot compare the EU with Singapore. Singapore is a very rich city-state with 4 million inhabitants. The EU is dealing with a 500 million people market. The rules and the orientations cannot be the same.

Latif Ladid, IPV6 Forum, added that the new telecom managements are more MBA graduated than technically oriented. This creates a big gap between what is a priority in investments. They do not really know the difference between IP, IPV6, WIFI etc.; they tell you what is the business case. Thus, if there is a hidden infrastructure that needs to be rejuvenated or redone, and if the technical staff cannot build the business plan, it just won't be done. Therefore, either one has to fire the entire management, which is a very costly effort, or one has to get them educated.

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Keynote Session

Day 1 – Afternoon – Plenary Session

21st Century Challenges
The Situation of the Digital Citizen Now

SEN. PIERRE LAFITTE, Honorary Senator, Honorary President of the Sophia Antipolis, France, opened the session with a special announcement of an extraordinary initiative:

We all know about the military coalition against the terrorism in the North of Iraq and Syria. However, many organisations feel that bombes and drones alone are not sufficient to fight terrorism. There should be a mobilisation of all the forces, such as different religious organisations like the Fraternity of Abraham, a Jewish-Christian-Muslin organisation, but also people interested in the future.

Shaping the future can also mean shaping the peace. This is an important aim and there are so many people interested in this, that we should try to establish a working group in order to mobilise and develop another type of reply than bombs and drones.

Such initiative would create thousands of jobs in a field where we know that the society needs these jobs related to the future. The digital society doesn't need only engineers and technicians but also many other skills that can be made rapidly usable for the tremendous need of new talents in our digital society.

First contacts have been established to organisations, enterprises and interested individuals.

JAY E. GILLETTE, Fulbright-Nokia Distinguished Chair in Information and Communications Technologies, University of Oulu, Finland; Senior Research Fellow and Institute Secretary Digital Policy Institute, USA, [http://www.digitalpolicyinstitute.org/] moderating, set the stage for the following afternoon panels. He proposed a situation analysis, to think about people, the human factor, to assess the situation of a digital citizen now, whether it is in good shape or not.

Where are we are today? Echoes of Jean-Paul Sartre's famous essay: "The Situation of the Writer in 1947". Sartre says, essentially, what is the situation? If you don't know the situation, you don't know what to do. And once you figure out what the situation is, than you can make a choice.

This is why situation analysis is so important. In the business and professional community, the classic approach to situation analysis is sometimes called SWOT (or WOTS-up?). It is an English-language mnemonics – better called "SWTO". It is much better to start with your strengths and then turn your attention to your weaknesses and threats and finish with your opportunities.

The strengths and weaknesses are the internal view—your strengths and your weaknesses. This is to "know yourself" or the inside view. We are all a bundle of strengths and weaknesses. And then we move to the external view. The threats really come upon us from our weaknesses. After speaking of your weaknesses, it is a good time to think about the threats that are happening. And that is to "know the other" or the outside view.

The Chinese strategist Sun Tzu said "If you know yourself, and know the other, you will win every battle." (Or literally quoted: Know other, know self, hundred battles without danger).

The digital citizen set in a sort of formulaic way is a person x the (± ICT)". And in this context we should demystify what ICT means: "I" is information, that means a message. "C" is communication, that is medium or channel—and the medium or channel conveys the message. The pluses and minuses of ICT makes the digital citizen. And the digital community is made up of digital citizens x (± community) x (± ICT), with ICT affecting both the individuals and the communities together.

Just to mention a few strengths, weaknesses, threads and opportunities of the digital citizen: A great strength of the digital citizen is information access. We have never had so much access to information before. The weakness is information overload; almost all of us are just overwhelmed by the information we have. It was said that the American pilots in Vietnam had too many systems informing them on the state of their airplane; they turned off their systems so that they would be more accurately able to focus on the battles. Propagandised manipulation is a very serious threat. If you are so open to information, you are very open to propaganda.

The French theorist Jacques Ellul said that we seek out propaganda when we are thoroughly propagandised. We only look for the things that agree with us and help strengthen our position. Propaganda, the propagandised person is a very serious threat to the digital citizen. But opportunities, we have unprecedented informed choices and actions to take. We can't take good actions without having information. You need to be informed before you begin to act.

THOMAS J. ROSCH, Retired Partner, Latham & Watkins LLP, USA, [http://www.lw.com/], provided a striking keynote on privacy law in the US:

The 20th century challenges are balancing concentration with investment on the one hand, network neutrality is another word for it. The 21st century challenge is going to be balancing privacy against both of those considerations.

First, the EU has very different views about privacy than the US. The people in the EU have had to endure very different invasions of privacy of the years, communism, fascism, national socialism, that the US have not encountered.

Second, the administration has led the FTC staff, and then the Commission itself, to adopt a new way of analysing privacy in the US. This new mode of privacy was based on unfairness instead of deception. In other words, an invasion of privacy could exist regardless of what a firm's privacy statement said. This mode of analysis was unveiled in a series of reports and then as a law enforcement tool in the Wyndham Hotels case in 2010.

Third, the Brookings Institution, in April 2014, issued the warning to the EU in general and to the FTC in particular that an unlimited view of privacy risked being confused with privacy itself. And the institution's warning echoed concerns which the Commission itself advoiced the Congress in the early 1980s and which culminated in the congress enacting legislation to avoid that result.

The institution thought to separate privacy into three buckets: The first bucket being one in which the interests of consumers were clearly align with those who would invade those interests. The second bucket being on in which the interests of consumers were sometimes coincidental with those who would invade those interests. And the third bucket being one in which the interests of consumers merely, if ever, coincided.

For one thing the buckets approach strikes as being arbitrary, which leads to a second concern, which is that unfairness risks being synonymous with privacy itself. Both are seemingly in the eye of the beholder.

It might be better to anchor privacy policy solely in deception.

YASSER ELSHAYEB, Director Embassies of Knowledge Initiative, The Library of Alexandria, Egypt, delivered a rather thought-provoking keynote on the evolution of the digital citizen. He also stressed that the Library of Alexandria provides a lot of digital content on the Internet.

Captures and sensors are everywhere, everyone has smartphones, tablets, laptops and sometimes even wearable devices recording user activity. Everything is connected and we gather all this information, put it into large databases and then start exploit it. The issue in today's science and technology is how to exploit this information. How to understand our body, the universe, or systems that have been developed many years ago?

We are actually reverse-engineering the world. We are collecting information trying to understand how these systems behave or how our body is behaving. The results can be observed in companies like Nike selling customized shoes, or Amazon generating personalized product recommendations. All this is based on the collection and exploitation of data. Facebook is another example, as well as popular survey questions to gather personal

information.

Maybe, at some point, we forgot the social aspect of a digital citizen. The digital citizens is extremely well connected and knows how to reach people thousands of kilometres far from his home, but he fails to reach his children, his wife or other people close by.

10 or 15 years ago, people taking an airplane expected to have a conversation with the person sitting next to them. Today, people put on their headphones and listen to music or watch videos—even not noticing who is sitting next to them. Even during conferences, participants work on their smartphones and laptops, barely listening to what the speakers are saying.

Homo Sapiens was about physical interactions, speaking to each other, while Homo Digitalis is about virtually being with each other, but actually speaking to someone else, maybe thousands of kilometres away.

A recent study pointed to smartphones as an important threat for the African monarchy and culture: Smartphones are connecting people and are getting people out of their social enclosure and making them a digital citizen, but at the same time, people are forgetting their social context.

This digital citizen has to evolve to make a balance between being connected, but not only virtually—also physically.

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Q&A

The audience then was invited to rapidly express issues perceived as strengths, weaknesses, threads or opportunities of the digital citizen:

- Even if there might be negative aspects, the increased sharing and social networks enable more communication and the people of this new area are using technology as a means rather than as an end. This is certainly a strength.
- The problems that we have today could be resolved and we will have new ones, but in terms of agriculture, food supply, water or health care with the data sensing devices and analytics we will result them.
- The new possibilities for healthcare are an opportunity.
- Empowerment and education through massive online courses are a great opportunity and a strength.
- It might be both an opportunity and a threat to do things at a monumental scale, because it could be everything from education to radicalisation.

- Nation states as a weakness, whistleblowers as an opportunity to expose wrong doing.
- Children spend too much time watching content without supervision; this is a thread.
- It is important not to mix the concept of information overload, which is a thread, with the notion of knowledge, being a strength.

The moderator ended up by summarizing the results: It is not so clear whether we are in a better place or worse place, but we are certainly in a new place. For many of those who see the glass of water half full, this is a bright time; and for many of those who see the threats and the water emptying out of the glass, it is a dangerous time.

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Session 2

Day 1 – Afternoon – Parallel Session

Content, Creation, Communication, Copyrights

The moderator of the session, **HUGO KERSCHOT, Managing Director, IS-Practice, Belgium**, welcomed the participants and set the scene by stressing the importance of content as a key driver of our digital age.

What is content? It starts with the "bricks and mortar" of the Information Society, which are its bits and bites, the data—however, they are useless if there is no information behind and if these information is not transferred into knowledge. Knowledge has to lead to added value and such added value can be, e.g., more insights in our democracy or better insights in our businesses, society and culture, better innovation processes…

Citadel on the Move and Open Transport Net are two EU projects (FP7 - CIP). Both projects are working on smart cities and open data—the bits and bites, the CSV files, the spreadsheets, the PDFs…

For a long time, this was the interpretation of open public data for a lot of public services. They put their not-machine readable data on the web and thought the job was done. What Citadel on the Move has done in the first place, was to develop a process for European cities to easily transfer these uninterpretable data in something that is visualisable and comprehensible for the citizens. The project created a converter on an open platform that simply transforms CSV files, spreadsheets, into JSON files. The project created a small template allowing to visualize all these uninterpretable data in a simple and easy to use mobile application.

Three applications created within Citadel were given as example: 1) The Gent Art Galleries, Belgium, allows to visualise all art galleries on the city map. 2) Issy Tree Finder, France, shows the location of all exotic trees with photo on the city map of Issy-les-Moulineaux. 3) Prague for Moms/Dads & Kids, Czech Republic, indicates playgrounds, barrier-free metro access, pharmacies and smoke-free restaurants and cafés on an interactive city map.

These are first steps to put value into open data. Up to now, more than 55 associate cities and local authorities are using Citadel.

The project Open Transport Net tries to create similar applications by going a bit further using more complex data about geo-information.

ALFREDO RONCHI, Secretary General EC MEDICI Framework; Professor Politecnico di Milano, Italy, addressed the challenging question

Does eContent talk to the heart?

The idea to add some value to already existing data was already addressed by the EC within the eContent framework: Content and services sometimes are built on top of existing data sets, and more than ten years ago the European Commission created the eContent framework to improve the added value reuse of public data sets. At that time, one of the challenges faced when submitting project proposals was to understand: which kind of data sets and how to reuse them—according to IPRs, according to privacy rules, etc.?

The recently emerged keyword "open data" represents one of the nowadays' challenges. Institutions and companies are investing time and resources in order to turn such a concept into reality.

Open data refers to the idea that certain data should be freely available for use and re-use. When dealing with open data we must take into consideration, among others, two main aspects: the public body can legally dispose of the processed data using them freely and eventually re-firing them as it may consider useful? How it can be wise to behave in managing their rights?

This is a real problem when dealing with public administrations especially in the field of cultural heritage, because there is a lot of material, such as books, pictures, maps and other potential content, but people don't know exactly how to manage the rights and how to transfer certain rights to people using the material afterwards.

There are some European Regulations in the EU concerning open data; guidelines in order to use such kind of data sets, basically 2 or 3 directives. Some of the EU Member States adopted the European directives at a local level, other countries were able to tune their already existing regulations in order to fit the European directives and other just continued with their already existing regulations.

All public bodies are mainly concerned about data ownership, intellectual property and privacy. These issues are directly related to questions such as the origin of the data sets, i.e., the responsible of the project, data providers, harvesting procedure etc.; the procedure used to collect the data, the intellectual property ownership and transfer, i.e., who is the actual owner, which rights have been transferred, etc.; the protection of sensitive data and related citizens' privacy issues; as well as statistic confidentiality, i.e., data anonymization.

The release and re-use of public bodies' datasets may impact citizens' privacy. Personal information represent a wide range of data; they include any data concerning any identifiable individual and in some countries this applies even to companies if their data may involve individuals.

Typical sensitive data are name, surname, private address, phone, VAT and social security numbers, email, car registration plate and even photo and voice recording. Personal data in addition means physical, physiologic, psychic, economic, social and cultural identity. Off-limits data are the ones pertaining the intimate sphere of an individual, such as racial or ethnic origins, religious or philosophical beliefs, political issues, enrolment in political parties, associations plus health conditions, sexual behaviours and more.

The project “My data belongs to me” was promoted on the occasion of the WSIS 2014 in Geneva in order to create awareness, especially within the young generation about the risk of putting data and personal information on the Internet. “Internet has a huge memory. Pictures, data and personal information will be stored, sold, duplicated and spread before you can utter the words “my data belongs to me”. But what about the human right of data privacy? This issue will generate legal, technological and moral discussions for years to come, when actions need to be taken.”

Another important particularity in the context of Internet content and services is the aspect of culture, cultural identity and the presence of different languages in the Internet, and here the possibility to access content either in your own language or by matching between the local language of the people using the Internet and the language in which the content is made available on the Internet (by using automatic translators).

Referring to this particularity, the Internet can be considered both as an opportunity to transfer information and to promote knowledge about different languages and cultures, and as a threat, because there are some very dominant languages on the Internet jeopardising minorities and local cultures. There are positive aspects on one side and potential risks in terms of maintaining the cultural and language diversity on the other side.

Given a world population of around 7.1 billion, the majority of Internet content is still in English. In terms of the number of Internet users by language, Chinese is very close to English.

However, new devices and communication standards are inspiring new languages built on abbreviations, phonetic equivalences, graphic signs and emoticons. Smart phones and tablets are breaking time and space barriers including formerly divided people in the emerging cultural phenomenon. This is true both for young generation but even for elderly people that find tablets and smart phones more user friendly than “old” computers. Digital technology is offering new ways to express creativity in different fields: music, images, videos, physical objects and more, enabling young generation to express their feeling and contribute to the creative industries.

To conclude I would like to introduce my experience as a member of the board of executive directors of the World Summit Award. Since 2003, thanks to my role, I have the chance to evaluate the best eContent & Services created in more than 165 countries all over the world, the first phase of the WSIS held in Geneva. This is a unique opportunity to evaluate the state of the art of the digital “environment” in different countries. Where “environment” means “readiness”, infrastructure and applications. With reference to our main topic “diversity” it is not surprising that using the same technical tools products reflects the cultural background of authors. Colours, graphic, look and feel relate to the country of origin. Products coming from multi ethnic countries reflect such richness and offer a multi language interface enabling even small communities to feel “at home”.

"If you talk to a man in a language he understands, that goes to his head. If you talk to him in his language, that goes to his heart" [Nelson Mandela]

ALAN SHARK, Executive Director PTI-Public Technology Institute; Associate Professor of Practice, Rutgers University School of Public Affairs & Administration, USA, discussed his thoughts and insights from many years working with the public sector:

Content, Creation, and Communications
Understanding The Value

65 percent of Americans are dissatisfied with how government works (Gallup Poll, 2013). 70 percent of Americans don't trust government to do the right thing (Pew Research Center, 2013). 85 percent of Americans are frustrated with government generally (Pew), and 61 percent of the world population do not trust government (Edelman Trust Index, 2014).

There has been a very strong push in many governments and there are many similar data sites all over the world. Data.gov is a very interesting website that gives an index of what is going on at least in the US and elsewhere. A large number of cities, counties, and states have open data sites. There is a real movement to look at data.

However, we have still a long way to go. Certainly, we are living in an app-happy world, with apps for everything—and more and more, we are seeing government-apps. More and more, we are seeing cities and counties across the country having their own stores in which you can get apps. But we have not to forget that the apps come about because there has to be some kind of information that is supporting that.

An example is King County, Washington. King County has developed a residential parking calculator. It shows where you can park your car and it goes as far as telling you the property values by houses.

How did this all happen? What does citizens really want? Do they want to absorb government data? Definitely not; no citizen buys a computer or device just to connect to the government. Do they want more information on what government does for them? Do they want more interactive apps and websites? More information about city services? Messages from elected leaders?

The answer is perhaps none of these. We need to develop a new model of thinking that addresses citizen-centric meaningful information, not data. Citizens do want accurate transportation information, schedules, and interactive maps. They do want to transact most business online or through apps. They do want restaurant health ratings and closures. They want really be heard on policy issues. And they want online voting. All of this, hopefully, leads to greater to trust to governments—administratively and politically.

Data is a very interesting thing but most of the countries, whether there are chief data officers or data initiatives, have spent so many time just getting data sites to the point where they can make them public. There are at least 12 to 15 different sites that can be considered excellent for getting data. But that is not where the public is going to go. They are built with the idea that somebody was going to build an app and somehow they would prosper from that. But generally this is not happening. What the citizens want is information; and they really want it in a different format and they need help. We need to provide visualised data in order to help them see things in a more clear manner.

STÉPHANIE BACQUERE, Founder nod-A, France, presented an innovative methodology bringing a new collaboration culture in organisations.

How to create value from data?

Creating value from data is a major issue. There is so many data and there are so many questions related to data: how to make them usable? How to link them to the Internet of Things? Finally, if all this matters, it is because there is a lot of value to be created.

A big financial institute such as BNP Parisbas was not able to provide a useful interface to its customers helping them manage their budgets and bank accounts. At the same time, the French start-up Linxo provided an application enabling customers to analyse, manage and optimise their financial assets.

Why start-ups do it better than public organisations or big company? Because they work differently. We always focus on technology and the digital tools, when often it is about the digital culture. The start-ups have introduced new working methods, more agile, more collaborative, more iterative. They don't talk about innovation, they do innovate every single day. They don't plan 5 years, they prototype, they test, they iterate when it is a success. They don't brainstorm—they make storm. And they do meet customers' and citizens' needs.

Big companies are able to do the same, but they need to upgrade, now. To face the unpredictable world, big companies and organisations must adapt the way they work. They have to integrate the digital culture. This is true for various subjects, but it is even more true when it comes to open data.

nod-A is promoting a new methodology called "makestorming". It has been applied over 5 years in very different areas. If makestorming is able to transform companies it is because it doesn't focus on shifting to change, it focuses on making the project right with a different spirit. Makestorming focuses on results.

Makestorming is based on 5 principles: 1) Organise spirits—give yourself space and time to try to work in a different way. Try, and maybe you will fail, but you may also succeed, something you will never do, if you don't try. 2) Gather the key talents. In most companies you have really smart people. If you have an issue, go and gather people within your organisation—don't work by yourself. 3) Work closely together, according to Joy's Law saying, "No matter who you are, most of the smartest people work for someone else." Work with your ecosystem; go and work with other people and companies. 4) Don't start writing hundreds of documents, start to prototype. Start with something small and concrete, and then iterate—not before. 5) Contribute collectively. There are organisations, because we are stronger together, but most of the time we behave like if we were alone and don't exploit the whole potential of an organisation.

Makestorming has got a strong conceptual background. It takes the best from different cultures and methods. It is not a methodology that is supposed to work and that is supposed to boost a project. It is a method that just does it.

Today, BNP Parisbas is also one of the clients of nod-A. The company wanted to innovate on their living insurances. Usually, it takes them 3 years to launch an app on the market. Thus, even if the project is good, it is already outdated, when comes to the market. Using nod-A's makestorming, it took them less than 9 month from the idea to the launch of the mobile application on the market.

An advice when it comes to creating value from data: Stop planning 5 years; focus on a concrete project, don't try to change everything, focus on something small enough for you to be successful and something that you can measure if you want it to become bigger; work differently, allow yourself to work in different way and make it a success. And only then, grow bigger and go viral.

PATRICK-YVES BADILLO, Professor, Director and Founder Medi@LAB-Genève, UNIGE – University of Geneva, Switzerland, presented a research project showing that creation, content and innovation are more and more based on media.

Innovation and social media: a "media based" golden age?

SMAshIng (Social Media and Innovation) is an international research project involving Switzerland, Australia and Luxembourg. The project is funded by the National Swiss Foundation. First project results are now available.

The first results are based on the following research scope: A quantitative survey—a sample of over 150 members working on innovation, e.g., Chief Innovation Officers. This was followed by a qualitative survey (interviews with representatives of the World Bank, Kurt Salmon, Easyjet and many more), and the development of case studies with specific industries.

When putting in correlation innovation and social networks in the francophone world, it becomes obvious that both strongly increased in the last years.

When asking the 150 innovation professionals to estimate the importance of social networks to foster innovation, on a scale from 0-10, most considered social networks as very important for innovation (the marks 7 and 8 are predominant, with some answers going even above this).
Furthermore, the empirical research done has shown, that there is a so-called digital paradox, i.e., innovation is not leveraged to its full potential since there is no exchange (and therefore cross-fertilisation) between heterogonous actors, due to the clustering amongst homogenous groups.

Internal social networks, i.e. social networks inside companies, behave differently from public social networks. There is a clear dichotomy success versus failure, with very little middle ground.

Specific functionalities such as video perceived as key for fostering innovation. E.g., YouTube, internal social network for large multinational group based on videos.

Millennials /the Generation Y uses social media differently than all other generations combined, thus there are different innovation patterns.

Social networks and innovation patterns strongly influenced by the company cultures.

GIOVANNA DI MARZO SERUGENDO, Professor UNIGE – University of Geneva, Switzerland, provided insights in

Participatory platforms for democracy and engagement

When looking at collaboration, participation and engagement, there is a panel of different levels, types and domains of engagement.

First, there is the basic way of information sharing and exchanging of information, such as Twitter. This is one way of collaborating. But there is also the trend of considering citizens as sensors. An example is the application “Fix My Street”. The basic idea of this application is that people seeing a problem or something broken can report and it becomes visible. It is a way to report to public authorities or governments. Going further than just being a sensor, citizens can be scientists. There are a lot of movements in the direction that citizens can participate or engage in science projects. A forth level of engagement or participation are tools for improving democratic engagement.

Different types of technology tools have been used with varying levels of success, these range from Internet based online platforms to gather opinions, e.g., social media, to innovative crowdsourcing techniques for engaging citizens, to diffusion of information through mobile phones, to actual participative design methods. One example is the TERA (Trilogy Emergency Relief Application) SMS text system which was developed by the International Federation of Red Cross and Red Crescent Societies and mobile telecommunications specialist. It is a two way communication between disaster affected people and aid agencies. It was originally used to help combat cholera in Haiti and will now be used to combat Ebola. In terms of democracy, there are also initiatives of open source platforms to help people engaging in democracy.

As regards platforms for democracy and engagement, there are voting tools, such as the eVoting platform of Geneva, as well as platforms to gather signatures in an electronic manner to raise and to built initiatives. There are also tools like voting advice, where people answer questions and by answering they get an idea of which type of party they belong to.

There are other tools like preferential voting and gathering of opinions, e.g., LiquidFeedback.org, and information, conversation, and vote.

Of course there are ethics issues and risks to be considered: There are privacy and data protection considerations, as well as the freedom of expression. Moreover, these tools should not be used for surveillance or manipulations by government (propaganda). They should support transparency.

At the moment, these platforms for democracy are only an aggregation of opinions and preferential votes, but they also convey collaboration instead of actual participation.

There are also other issues, like cultural aspects, i.e., something that works in Switzerland may not work at all in another country or continent. There are also usage issues, and issues related to the digital divide and the different possibilities that people have or not. Another point is the lack of incentives—even though e-voting exists, people don’t necessarily vote.

How to go further? If we want to keep this transparency and avoid propaganda, software should be open source. Moreover, instead of just collaboration and collecting information, we should go further than that: extreme citizen science is where people really work together to express their problem and to try to solve it, not just only to discuss it. From the

citizen as a sensor and the citizen as a scientist, we could go towards the citizen as a policy maker. We have to think about good incentives in order to make people come, stay and discuss. Of course, ethics and privacy should be respected.

From a research point of view, the ICT part should help finding emerging trends in discussions and involve expert advice. Another aspect is to involve ethics and privacy by design.

ISMAIL DIA, Senior Director Government Accounts, GovDelivery Europe, Belgium, [www.govdelivery.com/], provided insights in the process of content:

GovDelivery

Open Government is a government that creates a governance ecosystem involving the different actors. It has at the core its citizens and businesses to engage them and shaping policy and co-create policies and public services that respond to their wishes, interests and needs in collaborative and two-way interactions.

Internet has transformed not only governments in being more engaged with their citizens but has offered citizens a powerful tool—to create, exchange and inform their peers. The classical silos approach, that has dominated public administrations for centuries, is slowly phasing out for more transversal, open and transparent governments.

Starting this transformation is not easy for governments without being accompanied or supported by their peers, but also by two-way communication systems between them and their citizens.

How can, for example, a company like GovDelivery help empowering the government of tomorrow? GovDelivery is a complete communication system for governments putting citizens at its core. In an open government ecosystem two-way communications between the different actors accede to identify their wins. Without it, there will be no co-creation, no new services and no transformation. As technology is rapidly evolving, GovDelivery is trying to continuously develop and fine-tune the service capabilities to assist and help governments evolve, communicate and empower their stakeholders.

To understand the content process, there are certain points that have to be considered:

Create, edit and manage. To create content for government communication, an organisation needs to assemble a team developer workflow that makes sense; establish rules, everybody will play by; and agree to follow a predetermined game plan.

Then, we have aggregate, curate and optimise. In this step, the organisation aligns content across a larger narrative plus content from this locations and teams; curate it, to provide a consolidated distinct point of view; and optimises it for various channels.

Promote, converse and listen. Here, the organisation stays focussed. Managing inbound conversations and publishing outbound content. It understands, that it has to promote content through traditional marketing methods, as well as socialise it within communities.

Then, last but not least, measure, analyse and learn. During this phase, the organisation measures and analyses the data to understand how the content is changing or enhancing

conversation rates, engagement, loyalty or other key performance indicators, and ultimately consumer behaviour.

GovDelivery tries to regroup all these major aspects of the content process. In some ways, you have to create synergies. This is called the content collaboration tool, where “create, edit and manage” overlaps with “aggregate, curate and optimise”. Here GovDelivery facilitates content, editorial workflow, empowers the organisation to manage teams, either externally or internally, and enables collaboration on content for government communication purposes.

Next, there is the curation and conversation tool, where “aggregate, curate and optimise” overlaps with “promote, converse and listen”. Here, GovDelivery helps to promote, publish and aggregate content in meaningful ways. In many cases, the company also helps manage the content optimisation process by using social signals and can even facilitate some level of unified content conversation.

Then, there are social content analytical tools, where “promote, converse and listen” meets “measure, analyse and learn”. Here, GovDelivery helps maintain relevance in conversation, while also providing insights into what we should be talking about, from specific social channel analysis to semantic processing of social media conversations.

And, finally, engagement automation tools, where “measure, analyse and learn” comes back around to overlap with “create, edit and manage”. Beyond classical automation, GovDelivery has not only the ability to manage most of the content but they can do so from the point of view of helping to optimise content for engagement and conversation purposes.

IRÈNE TOPORKOFF, Cofounder and Managing Director, Worldcrunch, France, presented a pioneering way to produce high-quality content.

All news is global...

Newspapers are still a very valid source of information. The problem is the language. There are a lot of interesting newspapers; in every country there is least one interesting source of content.

Worldcrunch was born three years ago as an innovative digital source for news and journalism. The idea was to translate the best of the non-anglophone press into English. Worldcrunch selects, translates, and edits the most relevant content from the best global publications everyday, making top-shelf international journalism.

Today, Worldcrunch has world-class source partners, some of the most reputable newspapers, across the 5 continents, and the number of partners is continuously growing.

Worldcrunch selects its content from more than 35 source-papers from all around the world. The idea is also to inform in a different way: On any topic, there is not only a bias according to the writer of a story, but also a cultural bias. Worldcrunch provides different visions of the same topic. For instance, if you translate on the same day the information from a French newspaper, a Russian newspaper, a German newspaper or Brazilian on exactly the same topic, e.g., on what is currently happening in the Ukraine, the cultural bias becomes obvious.

Translation is done manually by journalists as it requires the complexity of human minds able to understand the context of the content.

Information is made available on Worldcrunch.com and mobile Apps. Furthermore, Worldcrunch regularly publishes electronic newsletters and has established a B2B model by selling content to third party newspapers, especially in the US, where newspapers have less foreign correspondents. The distribution partner is the New York Times Syndicate.

On the occasion of the Global Forum, Worldcrunch launched its premium weekly newsletter on Smart City innovations from around the world, compiling information on what the smartest cities and enterprises are doing to improve life and chart a new urban future together.

Worldcrunch is already partner of the most prestigious universities, including SOAS, the University of London, Goldsmiths, Science Po Paris, ESCP, the EMLYON business school.

ANDREA FRASCATI, Business Developer Manager, Smart P@per S.p.A, Italy & MARIO PO', Executive Director, Azienda ULSS Venezia, Italy, presented an ambitious project:

Humanities 2.0 in Venice:
The e-Museum of Medical Science

Venice is one of the worldwide cities that best represents, in its secular history, innovation, challenge, creativity, and sustainability. Venice is also the summit of culture, an art and a science like no other.

Landmarks of this priceless value are those which refer to San Marco: the Basilica, the Bell Tower, the San Marco Square, and near to the border of the lagoon, the ancient Scuola Grande of San Marco (SGSM). This school, that has been for centuries the most powerful private organization in Venice, is today a very important museum centre for the medical science history.

This historical pole of human sciences that has accumulated culture for seven centuries, today, thanks to technological innovation, can also spread it and multiply it with the opportunities of the network, respecting the compatibility of this complex place.

To fully benefit from open data, it is crucial to put information and data into a context that creates new knowledge and enables powerful services and applications. As linked open data facilitates innovation and knowledge creation from interlinked data, it is an important mechanism for information management and integration.

The transition from open data to linked open data was best described by the 5 Star Model presented by Sir Tim Berners-Lee.

The power of linked open data. We know that the web is like a giant global database. You want to build a new application that shows the correspondence among economic growth, renewable energy consumption, mortality rates and public spending for education. You can already do all of this today, but you probably won't. Today's measures for integrating information from different sources, otherwise known as mashing data, are often too time-consuming and too costly.

Two driving factors can cause this unpleasant situation: First of all, databases are still seen as "silos", and people often do not want others to touch the database for which they are responsible. Secondly, data is still locked up in certain applications. Data cannot be re-used

as easily as it should be.

Although the idea of linked open data (LOD) has yet to be recognised as mainstream, like the web we all know today, there are a lot of LOD already available. The so-called LOD cloud covers more than an estimated 50 billion facts from many different domains like geography, media, biology, chemistry, economy, energy, etc.

All of the different ways to publish information on the web are based on the idea that there is an audience out there that will make use of the published information, even if we are not sure who exactly it is and how they will use it, e.g. Twitter.

In some ways, we are all open to the web, but not all of us know how to deal with this rather new way of thinking. Most often the “digital natives” and “digital immigrants” who have learned to work and live with the social web have developed the best strategies to make use of this kind of “openness.” Whereas the idea of open data is built on the concept of a social web, the idea of linked data is a descendant of the semantic web.

The basic idea of a semantic web is to provide cost-efficient ways to publish information in distributed environments. To reduce costs when it comes to transferring information among systems, standards play the most crucial role. An ideal scenario would be a fully-harmonised internet where all of those layers are based on exactly one single standard, but the fact is that we face too many standards or “de-facto standards” today.

Linked open data projects are happening all around the world, expanding the way that we access cultural heritage. Libraries, museums, and archives are figuring out new ways to export their data in triples, integrate external linked datasets into their collections, and develop new interfaces for users to experience cultural heritage.

Several organisations and informal groups have made headway in developing new user interfaces that allow those interested in culture heritage to experience open and linked collections in new ways. Many of these projects are still at a proposal stage, but highlight the work that has yet to be done and the challenges that will have to be met in order to integrate linked open data into every cultural heritage users experience.

Why is Linked Open Data important for Humanities 2.0 and its community? The goal of the LOD program is to publish its library data on the Web in a way that makes its semantic relationships available to other data sources. The SGSM describes linked data as the appropriate conceptual framework for achieving this goal.

The SGSM will release Linked Object Datasets comprising 10 000 medical objects reflecting the evolution of cultural history of medical science between 1190 to 1850. It links 5 datasets containing information about the historical medical-library, archival documents of hospital since 1190, the museum of pathological anatomy, the museum of medical instruments, and an 18th century historical pharmacy. The metadata, serialized in RDF-XML format, are available via a web service interface.

The results of the project will be presented in May 2016.

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Q&A

The first questions addressed to the panellists were, how to overcome this mass amount of information and make this jump from information to knowledge? And, will data and information be free but are we all going to pay for knowledge?

Irène Toporkoff, Worldcrunch, stressed that there is a lot going on in terms of providing information, but either it is too dry, just one data after the other and even if you are an expert, it is not easy to read, or it is culturally biased. Worldcrunch tries to avoid these two issues and, with the help of a network of journalists all round the world, provide information in a very editorial way. But is also the look and feel of information provision. People are less and less inspired when reading information. But people need this moment of getting inspired when reading—but, that has a cost and people are willing to pay for that. Another approach, where the end user may not pay, is a B2B solution customizing information on specific topics for certain businesses.

Alfredo Ronchi, MEDICI, underlined that it will be necessary to add the context, to add connections and thus to make relations between specific sets of information and connecting all the things and then we built the integral context on order to try to get closer to knowledge.

Alan Shark, PTI, emphasized that knowledge is like wine; it comes with age. Humans have to absorb the information from which to make sense of it in a knowledge kind of way. We cannot make that bridge between information and becoming knowledge, but we can bring information at a higher level for people. It might be necessary to rethink some things. We have to expect more from the citizen and the consumer; they have to make sense of it.

Mario Po', Azienda ULSS Venezia, explained that open data stay in the past. The past and the future are our culture. Our culture and civilisation have a process. Its important to work on scientific historical documents because this is the focus of our future. There are three questions in the context of healthcare: How citizens, nurses and physicians can use this data? How the memory of science can support the development of healthcare? What are the methods and the content to support our actions?

A question from the audience was "What is the role of storytellers within this very academic conversation content creation and communication?"

Irène Toporkoff, Worldcrunch, pointed out that journalism is about stories. When presenting 3 different stories about the same topic, but from three different important newspapers, the fact of placing those three stories next to each other is a choice and storytelling itself. There is not only the storytelling of the story itself, but the way it is presented. The way the stories are presented next to each other is an editorial choice. When reading these three stories on the same topic under three different angles, this takes to your heart and people will choose a side.

Alan Shark, PTI, stressed that is important to use storytelling where it is appropriate. When teaching we are storytelling. This is the way students learn. But when it comes to governments and important information and knowledge this is a serious business. We can make it look better and make information more digestible. Storytelling can be done in pictures, it can be done in graphics etc. but governments have to be careful not to be too clever in their presentations.

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Session 3

Day 1 – Afternoon – Parallel Session

Advanced Cybersecurity & Privacy
Build Confidence & Future

SÉBASTIEN HÉON, Director of Consulting & Political Affairs, Airbus Defence & Space CyberSecurity, France, [http://airbusdefenceandspace.com/] opened the session and briefly set the scene for the following presentations.

The "Business Innovation & Skills" Department of the British Government has published the following figures for 2014:

The rate of attacks on the information systems of organisations is almost constant: 81 percent of large organisations had a security breach (down from 86 percent a year ago). Thus, from the attackers' view, nothing really changed. 16 is the median number of breaches suffered by a large organisation in the last year (down from 21 one year ago). This is a significant decrease. However, cost are constantly increasing: the average cost to a large organisation of its worst security breach of the year amounts to £600k-£1.15m (up from £450-£850k a year ago).

The job for attackers is rather easy, they just have to try to attack. However, organisations dealing with cybersecurity have not been doing nothing in the past years. It is understandable that improving cybersecurity takes time, it is a complex problem with technical, legal, and geopolitical issues to solve, but the central question is, what have we done in the last years and how is the ICT community reacting to tackle threats and bring the full benefits of the new technologies.

The first very good news is that much has been done to improve the security in our digital world. The second good news is that ICT continues to develop at a fast pace and provides us with connected fridges, connected cars, … This is very good news for our daily life, but at some point it will bring some security problems and this time we should try to think smart and think about the security before implementing technologies that are widely developed and widely used.

The panellists address both the initiatives that have been implemented, new security trends and the technology we have to secure in the near future.

SARAH (XIAOHUA) ZHAO, Partner Perkins Coie LLP, China, summarised the current situation in China, from a regulatory and corporate perspective.

Cybersecurity & Privacy Rules in China
Regulatory and Corporate Perspectives

According to China Internet Network Information Center, the number of Internet users in China has reached 632 million in July 2014, among them, 83 percent use mobile phone devices to access the Internet. There are 257 million users of social media. Given that China has 1.4 billion inhabitants, there is still room for growth.

There is no direct law focussing on cybersecurity in China, but there are many rules, regulations, policies and measurements related to this area: There are approximately 100 regulations, administrative measures and local policies directly or indirectly related to Internet information security and privacy issues.

This means that if an individual's personal information was invaded, it is very difficult to bring a lawsuit to the court in China. But things are changing.

There is no comprehensive cybersecurity law issued in China yet, like the FISMA in the United States, and there is no comprehensive privacy law issued in the country. But the government is working hard on the drafting the laws and regulations governing the areas, and there are new positive developments, such as the recent rule, Circular No. 11 of 2014 by the Supreme People's Court that became effective on 10 October 2014.

For the first time the Circular No. 11 of 2014 has formally provided the legal ground for bringing legal actions at Chinese civil courts under direct claims of invading of personal information security and privacy.

Moreover, the 2013 Guidelines for Information Security Technology of Personal Information Protection within the Public and Commercial Systems have set forth the technical standards for the industry.

The Circular No. 33 of 2014 by the State Council strengthens the content control over the Internet. Certain other rules imposed restrictions on messaging app application system. In June 2014, the Chinese government has issued a "National IC (Integrated Circuit) Industry Development Promotion Outline" that set the 350 billion Yuan revenue goal by 2015 with 20 percent increase in each following year. The major reason behind is to ensure the control over information security technology.

The characteristics behind these recent regulations are very clear: On the one hand, it is enhancing the protection over privacy, but on the other hand it is also to tightening the control over cybersecurity. The government tries to strike a balance of protection versus control.

Governmental initiatives created a lot of business opportunities over software and hardware, chips, cloud computing, IOT, and other related industries.

However, the restrictions and the resulting market changes create challenge for foreign companies to get into the Chinese market. They may no longer be able to get into certain areas. The Chinese procurement law is one example: Because of security issues, the domestic companies are required to buy domestic equipment.

As a result, there is more cooperation of foreign companies with Chinese companies via contractual agreements and less establishment of foreign invested Chinese legal entities. There is more licensing than sale distributions. A lot of innovative technology deal structures could be done under conventional foreign invested corporate structures in China.

PATRICK CURRY, CEO, MACCSA – Multinational Alliance for Collaborative Cyber Situational Awareness Ltd, United-Kingdom, discussed the importance of creating collaborative cyber situational awareness.

Internet Governance and Cybersecurity

Statistically, more than 1 person out of 3 is victim of identity fraud or theft. However, most people would not tell anyone.

The situation is becoming more complex, the nature of the thefts and how to value them or the losses are growing, and there are new elements in the market place to help deal with a lot of this increasingly complex measure and countermeasure.

The EU project MAPPING (Managing Alternatives for Privacy, Property and Internet Governance) is around governance and cybersecurity. Interpol is one partner of this project, which involves organisations around the world and is linked to 9 EU programmes.

MACCSA is the Multinational Alliance for Collaborative Cyber Situational Awareness. It is about how organisations share cyber-information, so that the Internet and other things can work. It came out of a 15 nation military activity and with the UN and other assistance it is now an international organisation registered in the UK. It is a mixture of organisations working to help make the Internet, and indeed cyberspace, a safer place.

MAPPING is a 4-year EU project (2014-2018). MAPPING's goal is to create an all-round and "joined-up" understanding of the many and varied economic, social, legal and ethical aspects of the recent developments on the Internet, and their consequences for individuals and society at large. It specifically capitalises upon and debates the existing innovation policies, business models and legal frameworks related to the implementation of the Digital Agenda for Europe, as well as the changes needed to set up an improved governance structure for the EU innovation ecosystem.

The former Vice-President of the EC, Neelie Kroes, was very instrumental in driving the EU cybersecurity strategy. There is this tension between security and privacy. It is about protecting data, not data protectionism. And the strategic objective is to make the EU the safest place to do things digitally. Trust is key. If there is no trust, there is no relationship, no information sharing and supply chains do not work.

iOCTA, the Internet Organised Crime Threat Assessment, provides a description and analysis of the latest trends and the current impact of cybercrime within the EU.

The numbers are very high. At the peak of the crash in the banks we didn't know how much money have been lost in Europe. The estimate was over 500 billion euros in one year. The conclusions of law enforcement in Europe is that we are not winning the battle against organised crime, because primarily of anonymity. We are losing and one of the outcomes of that is more legislation.

Examples are eIDAS (electronic IDentity, Authentication and Signature) and other directives like Business Register Interoperability, to better handle businesses, or the Legal Entity Identifier (LEI) for banks. Moreover, the G20 just announced that they are going to support traceability of beneficiaries in organisations, i.e., who is behind an organisation, because this inability to trace people behind organisations is a major fraud factor.

There will be 50 million smart meters by 2020 in 30 million buildings in the UK. Should we be worried? 76 percent of the financially active organisations in UK are not registered in UK or at all, but it is not possible to tell the difference, anyway. In cyberspace everything links to an organisation and fake organisations are a big problem. 65 percent of IP theft is done by insiders, so hacking is not necessarily the main problem. Moreover, organised crime is expanding online.

In terms of trends and solutions, there is much greater effort going into counter fraud from governments and that links to cybersecurity. You cannot do cybersecurity without linking to counter fraud. And that means that we have to continue to work on that balance between privacy and security.

In terms of reactions, we got lots of different regulations coming in. These are stimulating the industry to improve solutions and provide new services which small organisations can use. For instance, the creation of trusted clouds is on of the hottest activities today, internationally. The core of this is around collaborative trust between organisations.

Example: Two organisations want to share information, because they want to work together and they have a very simple stack. There is a red line between collaboration and competition, but organisations have to collaborate, because otherwise they would be completely isolated. But they also need to compete, so this line moves up and down. But the basis of what they need, are data for interoperability so that they can understand each other. And they need infrastructure that they can trust. But the cybercommunity has to do the same, so we are seeing a huge amount in the organisations that are being set up to help normal business organisations keep safe, and when things go wrong to help them recover.

What we have today are a lot of breaks. There are a lot of things that are happening, but they don't join up. Metaphorically speaking, there are a lot of people thinking about how the window and the roof is going to look like, but they have no idea about the foundations. Our job, collectively, is start building the foundations on which you can build the rest of the building. There are regulations, e.g., the EU Network and Information Security Directive (NISD) and international standards to give the tools to the toolbox. The key to this is collaborative risk assessment. Within the EU, 23 risk management frameworks have been assessed, and among those 5 were broadly interoperable. They deal with collaborative risk, they have control frameworks inside and they include dynamic risk. If you cannot do a risk assessment, in any organisation, you have no idea what you are managing.

How to treat this? The risk has to be transferred, so there are new insurance models emerging, and we have to mitigate the risk and put controls in place to prevent things going wrong. On top of that, we need to deal with what happens when things go wrong. According to the EU regulation on instant notification, you have to immediately report to the regulators and victims.

We need to be able to help prevent, therefore we need cyber-situational awareness to share information around the state we are in. And when things go wrong, we have to work together in instant management. In terms of situational awareness, identity management is critical—if we cannot recognise who we are across organisations, then we cannot build trust. On top of that, we then can build cybercontrol frameworks, and we have them in the standards that we are starting to use, and taxonomies that allows to operate, i.e., we are using the same language and the same rules.

KEVIN C. BOYLE, Partner, Latham & Watkins Llp; Editor, Global Privacy & Security Compliance Law Blog, USA, [http://www.lw.com/] dived deep into the topic of security and privacy protection.

Cyber Defence & Breach Response
Privacy Issues

The privacy security paradox is that you cannot have privacy without security. As cyber threats increase, and we move from a world where we try to build a fence around our sensitive data and keep the bad guys out, although we assume that they are in and we have to go find them, the paradox is that a lot of the things you have to do to find the bad guys have significant privacy implications.

Often, privacy goals and security goals are conflicting. The key one is that there is an obligation mandated by governments around the world to provide privacy. But to provide privacy, you have to use security tools that are looking at what is happening inside the network on a very detailed basis and that has significant privacy implications.

The circular security process involves looking at what is happening in the network, analysing what is happening in the network and responding to it. Among the various tools that are utilized are detection tools such as IDS (Intrusion Detection System), IPS (Intrusion Prevention System), DLP (Data Loss Prevention) and SIEM, which is a tool that looks at logs and correlates them.

Some of them might be innocuous from a privacy standpoint, some of these tools are hugely intrusive because especially in a DLP you are basically reading everybody's emails on their way outside the organisation.

It is important to think of the tools in the defence and response toolkit in terms of privacy impact. There are some that have more limited privacy impact and some that have significant privacy impact, in particular when you are dealing with Advanced Persistent Threats (APT)—even if they are often not very advanced but just very persistent. To stop APTs you need to do very intrusive surveillance of the network and certainly, if you find out that you have been compromised by an APT and people are really in the network, you have to use those tools to get them out. That is the most intrusive thing you have there.

An example of how these tools might be used within in an active defence situation: You have not been compromised, but you are trying to make sure that somebody is not going to compromise you. And all along the active defence way, people are looking at very detailed aspects of information that is transiting the network and therefore personnel information that is embedded in that information, e.g., text messages, email messages, files etc.

The problem is that all of that activity is happening in defence of the network in order to maintain privacy, because you cannot have privacy without security. And it runs against laws all over the world that are not consistent. What might be perfectly acceptable in the US will not be acceptable in France, and conversely, things that maybe perfectly acceptable in France won't be acceptable in the US. And there are many instances of conflict.

You face all of these compliance issues, with all of these tools, and again, increasing risk with the ones that need to be used to fight the most obvious threat today. What to do? A good approach is to go back to the privacy first principles, an approach developed in the US. The key points here are disclosure, transparency, the least intrusion necessary to get the job done, and balancing the interests of security and privacy.

If you look at those key principles, you can easily think about how to approach the problem of implementing these tools, which is obviously disclose their use to everyone who is affected by them, not store the information that you collected for longer than you need to get the job done, not collect information that is not really necessary to the task which you are trying to accomplish with the security tools and inherently always balancing these interests.

There is a rise of data nationalism in response to Edward Snowden and other disclosures. There is a bit of a push right now with government regulations to try and mandate that data about citizens of a country be processed in that country—which is an interesting idea, but might be at the end of the day more of a threat to security than it is one that would deliver security and therefore privacy, because you are spreading the effort of protect information across many players who may not be as well equipped to get the job done.

You can implement all sorts of regulations about how you are going to maintain security and privacy, but the curious thing is that people won't always follow them, and we can also see that governments won't follow them. The government in China won't follow those rules, even though they implement them and impose them on themselves and on the government in the US. Ultimately, all of this falls to private industry to get done those balances and look at those competing aspects described above and deliver what consumers demand.

BROR SALMELIN, Adviser for Innovation Systems, DG CONNECT, European Commission, presented EC's response to cybersecurity, both on the voluntary and regulatory perspective.

Policy Developments on Information and Network Security: State of Play

The challenges facing Internet security have become ever more pressing, e.g., the recent Heartbleed and Shellshock vulnerabilities. The economy is dependent on the level of Internet security. To solve the problem, the EU works on a mix of voluntary and regulatory measures: The proposed NIS (Network Information Security) directive and data protection reform in the context of forthcoming regulatory measures, a public-private NIS Platform as a voluntary measure, and research.

The purpose of the NIS directive is to improve national capabilities on being alerted but also to share the possible security breaches across the Member States, because this allows to have a wider front on both knowledge and actions which are jointly responding to those security threats on the European perspective.

Following the directive, each Member State must have an NIS competent authority and must establish the computer and emergence response team in order to be able to react fast enough, but also to share the security breaches. The cooperation aspect is really important because having 28 Member States, it is totally impossible to just leave responds to one or few regions in the European space, related both to early warning and coordinated response. It is capacity building, it is collaboration, and it is creation of common culture in security matters.

The directive is looking at the structures for coordinated response for approaches on risk management and the organisational things, but is also very much focussing on the incident reporting. The EC suggests that all the incidents are being reported and shared. It is important to look at the issues very holistically. It would not be appropriated to segment that activity to much into detail but its needs to be a holistic approach driven by all the participants in this platform.

The platform activity is voluntary more related to cultural building and it is needed to really look at the sharing of common actions between the actors. The platform will not include the security breaches on the individual or micro-enterprises level, but above a certain size of the organisation this collaboration is expected to happen.

The EC does not impose any details, as it is a voluntary sharing platform, but certainly supports the activity.

The third component is research; R&D investment in the Horizon 2020 programme, both ranging from the very technical aspects of security to practical projects addressing ICT, privacy and security together. One important element here is to see that we need to experiment to see the privacy and security issues in the wider context, e.g., identity management and how that is related to innovation as such. If we go to stringent interpretation of identity management and privacy, it certainly creates friction for value creation models, innovation models, business models, behavioural models. Where to draw the line? How to experiment what is acceptable and what is not?

We need to have all the players involved. We have some ideas but what is it in practice? The

Horizon2020 can provide a good and safe framework for those kinds of experience.

We need to have the public sector, we need to have the private sector, but we also need to have the real world environment to do this kind of experimenting and prototyping relating to these issues.

OLIVER VÄÄRTNÕU, CEO, Cybernetica AS, Estonia, delivered an overview on the security framework Estonia's digital society is based on and presented some current initiatives.

Estonia takes a plunge?

Estonia is a very small country with 1.3 million people, but it is highly digitised. One of Estonia's premises for the digital society is that everybody in Estonia has an identity card, which enables strong authentication and digital signatures. 30 percent of voters voted online in the last European Parliament elections. Over 95 percent of personal tax declarations are submitted online, most of banking is done online. There is a real push towards an online digital economy. "Estonia is the first country to offer e-residency to people around the world, offering state-proven digital identities that give access to services like online banking, education, and healthcare." Estonia sets up "data embassies" around the world to allow the government to "operate in the cloud" even if the physical territory is occupied.

Estonia has developed a technology framework called X-Road. It connects different data bases but also government agencies via a secure communication layer. X-Road is a public-private initiative—private sector organisations like banks, energy companies, and telcos, are part of the infrastructure. X-Road was invented in the early 2000s. The history behind it is that Estonia, at that time, had many registries, all very different, managed and developed by different organizations and financed separately. Most of the users were very small organizations without security knowledge and with a very small IT budget. There was the need to pull these resources together in order to take the next step and merge data from different providers. The security requirements have been very high. Registries contain personal data that might be used to make high value decisions or might be needed in real time.

The idea was to develop a mechanism to push a certain security framework to the building blocks in Estonia's Information Society, in order to eliminate the problem of "being as strong as your weakest link". X-Road provided a certain level of security. At the same time, in the early 2000s, there was a very strong political support to ICT innovations. Estonia had a separate council under the Prime Minister which was specifically responsible for the development of an e-government agenda in Estonia. And last but not least, Estonians are receptive to technological change.

Today, more than 160 databases are offering services via X-Road (producer certificates). More than 3 000 individual services are provided to the citizens. More than 900 organizations are using X-Road daily (consumer certificates). There are over 400 million transactions per year; 12 years uptime; 0 hours downtime; and no incidents reported.

Today, Estonia is running the version 6.0 of X-Road and this will also be the infrastructure adopted by the Finnish government in 2015.

Another specific technology developed by Cybernetica and offered to Estonia is secure computations or secure multiparty computation. It enables the processing of confidential

data. The data is encrypted by the data owners, white noise is added into the encryption, the data is split into three, so that the servers that are processing the data don't know what they are processing, and the people who are in the need of information can make queries based on this data.

Estonia has launched a pilot analysing tax income data of individuals in Estonia, without leaking them, and comparing them with educational data. Thus, the government can take better decisions regarding educational policy.

BERTRAND LATHOUD, Information Security Officer – EU, PayPal, Belgium, [www.paypal.com] highlighted a few trends in:

Cybersecurity and Cybercrime in a Complex World

PayPal is a strong enabler global of e-commerce. The particularity in Europe is that PayPal is considered as a bank and thus holds a banking licence which covers the whole EU. This means that PayPal, as a technology company, had to adapt to this heavily regulated market. PayPal had to reconcile the perspective of a start-up with a traditional and rather conservative industry.

As a financial institution, PayPal is facing many criminal activities and the company confirms the bad news one gets every week in the media about either IT disasters or IT attacks. They all have a common characteristic. We are facing an increased complexity of many aspects of the Internet life and this is leading to an increased vulnerability and exposure of people, organisations and infrastructure.

In terms of the complexity of threats, one point to keep in mind is that after a fairly Darwinian process, the criminal ecosystem is now rather resilient. It is a market of criminal services and this means that we cannot make it disappear just by one decision or action. We have to live with it, but it is also subject to disruptions, therefore it is possible to act.

The Internet of Things is coming, but how to manage the security of transactions performed on our behalf by connected objects? For instance, your fridge will order some food so you can take it after work in some drive in. How this will be authenticated? How to make sure that these zillions of cheap devices don't become a huge army of zombies controlled by cyber criminals?

Users want greater ease in the usage of technology. Users want to be able to use technology simply limited by their imagination. In the context of payments this means being able to make payments anywhere, anytime and in any way. This is far from what we had been used to in the financial industry where payment processes are very strictly defined. There will be serious challenges in detecting and neutralising fraud.

PayPal has been investing a significant amount of money to make sure that its service is secure. This meant, first of all, very traditional security engineering. But PayPal had to acknowledge that even if they were are successful in being secure, it is not sufficient. Too many parts of the e-commerce infrastructure were beyond the company's reach. Therefore, PayPal started to look at wider concepts, usually summarized as ecosystem of resilience, in order to ensure that even parts that are not under the control of PayPal, but that are needed for financial transactions, are secure. This involved looking at the foundations of Internet, such as open technological standards. It also led PayPal to work more with users and to

provide them with relevant information and advice so they won't fall for easy traps or classical fraud schemes.

But one has also to look at governments and regulators, who are also stakeholders in this. Current regulation is probably too slow for the Internet age. Regulators react to a problem when it is perceived or detected. The difficulty is, that in big markets, a problem needs a fair amount of time to become detectable or reach the radar of regulators.

Then, they will engage experts and specialists in order to define the problem properly and design the relevant regulation. This will take years. That is the reaction pace. And finally, if we want to reach control we have to implement these regulations and again, a few years have past. Obviously fraudsters are not waiting for the regulation to be published, they just move away if their schemes don't work anymore. We have to find ways to move this model that was valid in a slower world to the world of the Internet. The question is, how regulators can help the other stakeholders to fix the security issue.

It is important to keep the goal of regulators in mind. Their role is to make sure that all stakeholders are treated fairly and independently from the resources they own or access in a given transaction. In terms of cybersecurity, this means that they have to promote save practices that are relevant to the current usages and threat context.

The first constraint will be to accelerate their decision cycle, and for this they will have to get the right data in the right time and so make sure that all the stakeholders are involved so that then the decision can be implemented quickly.

Another thing is that they will have to make sure, in order to avoid breaking the innovation cycle, to focus more on outcomes, which means to make sure that the industry and users are save rather than prescribe a given technology or process to promote safety.

They don't have access to big data. There are lots of data available and it will allow to analyse best practices in far more scientific way. This means that the regulators are being able to promote, adapt or discard these best practices in a more acceptable way for the industry because it will be based on actual data and not on impressions.

To conclude, security is not going to be a solved issue in the coming years, we have to accept this. It will require a strong change among all parties involved and regulators could be effective facilitators of this change if they start by showing the example. Security, as a field, will have to be simultaneously effective but also enabling innovation at a fast pace. This is a huge challenge, basically in terms of robustness and agility. This also means for lots of security practitioners that they will have to face the challenge of change.

WILLIE LU, Co-Founder Technaut Intellectual Ventures, USA; Chief Inventor and "Father", Open Wireless & Mobile Cloud Platforms for Mobile Devices, USA, addressed the critical issue of cybersecurity in the mobile cloud.

For the 2nd Generation Internet, the Internet of vehicle, and the 3rd Generation Internet, the Internet of aircrafts, three technical issues are very important: The first issue is that we have to support open wireless, rather than single wireless. The second issue is mobile cloud, and the third, and very important, issue is mobile cybersecurity.

For example, for the Internet of aircrafts, cybersecurity is very important because the pilot is relying on using an iPad to control the aircraft.

The understanding of cybersecurity from a technical perspective is very different from the one from a policy maker perspective, focussing on policy regulations. The technical perspective focuses on the implementation of hardware or software products.

Everything is mobile and the most important issue is the wireless. The issue is that, irrespective of the technology (LTE, 4G, …) used, there is currently no security in wireless communication. If someone parks his car in front of your house, he will be able to catch your channels, make phone calls on your account or access your bank account.

So, how to resolve the problem in wireless? The pilot is using a mobile device and there is a lot of information transmitted between the ground and the aircraft, and between aircrafts. We are relying on a communication ad-hoc or mesh network between aircrafts to get high speed Internet. The information transmitter from one aircraft to another aircraft and all the way to the airport, is a high speed channel, providing 10 Gbps transmission. Information comes to the pilot and goes to a lot of channels and ports.

The solution is a technology called mobile DNA. Mobile DNA is the combination of user ID, device ID, transmission ID and content ID, using an algorithm, a mathematical matrix, to generate a very long series code. This code depends on the application field. The level of security in a military usage is different from the usage in the consumer market. The mobile DNA is embedded from the physical layer to the application layer.

Mobile ID is a key encoded from the application layer to the physical layer to solve both ID fraud and transmission thread.

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Q&A

The first questions concerned the Google and Apple initiative to reinforce encryption and not store the keys so they do not have to share it with law enforcement. This was to reinforce privacy and the trust of the user. Do these initiatives reinforce cybersecurity for everyone or can we really create vulnerabilities for the good guys and expect the bad guys not to use them?

KEVIN C. BOYLE, Partner, Latham & Watkins Llp., pointed out that, if the systems are secure and really do work, then you do enhance user trust and you assure users that, unless government goes through proper channels, there is not going to be some effort to do it without the user knowing ultimately about it, if the only way to access the information is with the keys the user is created. Trust No One: Encrypt Everything, as some people say.
It enhances individual privacy and it is a natural reaction to what has happened. One can argue whether this is the best policy result from the standpoint of catching bad guys, but, for better or worse, it is where we are.

Patrick Curry, MACCSA, answered that the EU project MAPPING is absolutely in the middle of this. There just have been international meetings with lawyers and security experts in Berlin, who assume that we are all trustworthy and competent and that technology is the answer. The key point here is, that we already have this. In Apple, with file encryption, you have the option to store your key with Apple or not. And the default is that you don't give it to Apple. The question is, what happens if you lose your key and you didn't give it to Apple? Most users make mistakes, even the smartest ones.

Willie Lu, Open Wireless & Mobile Cloud Platforms for Mobile Devices, advised never to trust policy regulation but only technology. Divide all information in three parts: general information data, business information, and personal information. Each type of data has a different security level, with personal information data having the highest security requirements. And then, solve the security with technology. Policy regulations are not the same all over the world, law enforcement is different.

Bror Salmelin, European Commission, stressed that it is important to look at technical development and policy development at the same time. He gave the example of health data protection: Probably, if you are in full health you want to keep it rather closed. But when you are lying unconsciously on the street and using this data would help save your life, would you give automatic consent to use that data? Can we have objective measures? Is privacy actually dependent on the context? The answer is yes, but where do we have these real world experiments to see what is acceptable and what is not? Where are the barriers and how is technologies can tackle this issues? It is really a deep question. It's not that easy—it is technology and policy together.

Sarah (Xiaohua) Zhao, Perkins Coie LLP, agreed that technology should go together with regulatory protection. The Chinese governments sometimes requires to disclose your encryption code. Whatever you have there, when disclosing it to a huge government, you don't know whether it will be protected or not. Microsoft for instance disclosed certain codes so that some of their software can be sold in China. Google didn't want to disclose with the result that they withdrew from China. Most of the foreign companies actually don't give their best technologies when they need to disclose the code to the Chinese government.

The next question, addressed **Patrick Curry**, MACCSA, was about the business model of MACCSA, who is financing the project and how does it relate to the UK Cyber Essentials Strategy?

Patrick Curry, MACCSA, emphasised that the project he was talking about is MAPPING, which is a EU FP7 project on Internet governance, privacy and trust.

MACCSA is a not-for- profit organisation, based in the UK, that is tasked to be truly neutral in enabling the implementation of information sharing for cyber situational awareness. It is a membership-based organisation, but MACCSA has been asked for so much more that the Steering Group has now asked to adapt the commercial model to be able to build operational capabilities that also run on a not-for-profit model.

Cyber Essentials is an initiative by the UK government which has just been mandated for all government contractors. It has 5 cyber controls at a very high level which are mandatory. Cyber Essentials is from the Department for Business, Innovation and Skills (BIS) and is still at a very early stage.

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Session 4

Day 1 – Afternoon – Parallel Session

Future of Regulation, in the Age of the Internet

ANDREW LIPMAN, Partner and Head of Telecom Group, Bingham McCutchen, USA, welcomed the participants to this traditional panel of the Global Forum—a session he moderates since 20 years now.

Regulation changed very dramatically over the last 20 years. 20 years ago, the focus was very different, e.g., the question was whether or not, there should even be competition. There has been a very spirited debate between the chairman of the FCC and representatives of the EU in terms of, whether or not, a competitive model even made sense or whether telecom was a natural monopoly. Meanwhile, hundreds of millions of dollars have been invested to prove that it isn't.

The focus has been very different from what it is now. It was concentration versus investment. What we have seen then, was legislation in the EU and legislation in the US, and the 1996 Telecom Act that is taken as a given, opening up and encouraging competition and recognizing that there is still need for regulation, increasingly with a light touch. But the issues have changed. Regulators become a lot more multifaceted, dealing with a lot of different issues. We have seen the EU catch-up and surpass the US in terms of the degree of competition, for both wireless and wireline. We have seen leadership in the EU, especially in the Internet of Things. But the pendulum keeps swinging back and forth—slightly towards regulation, back to regulation—depending on the macro-environment. And then, there are certain areas, like roaming and spectrum, where regulation is needed. The US is in the midst of a big debate over network neutrality. We have also seen two very critical issues that superimpose on regulation: privacy and cyber-security.

Regulation has changed; it has become more nuanced, more nimble. There is, in some respects, the healthy scepticism for regulation, including in some instances the regulators itself, but nonetheless a need for regulation.

In his introductory speech, **MARK FELL, Managing Director, Carre & Straus, United-Kingdom**, talked about some very creative thinking in the Internet of Things

You won't have effective regulation until we go up a level and fix the governments. Often in the past, regulatory change didn't really lead to results people have intended. Those results haven't happen because we haven't got the appropriate governments mechanisms in place.

With respect to the future regulation in the age of the Internet, the Internet of Things is definitely the direction in which things are going. The Internet of Everything, the industrial Internet—there are many different terms for it. However, at the end of the day, we are going from fixed computing to mobile phones to sticking this same technology in almost everything. We are starting to stick it into umbrellas, cars, planes,… And we still have 99 percent of the devices in the world to connect and hook up to the Internet. No one really knows whether it will be 50 billion or 70 billion connected devices by 2020.

How do we regulate this. Traditionally what we have done is, we mapped out the value chain in an area; e.g., finance or retail, and tried to create legal relationships between the stakeholders in that value chain.

In an IoT-world, everything becomes a service. XaaS, SaaS is no longer Software as a service, it is everything as a service. And that means that we have to revisit how we manage these service delivery and mechanisms in the IoT.

Traditionally, regulation is about state intervention in the private sector, in the private sphere to basically create rights, duties, obligations, liabilities and privileges. It is intervention by he state. But governance is broader than that. Governance is about the set of control mechanisms, intervention mechanisms that we as a society put in place to make sure that we have a proper balance of stakeholder interests.

We need smarter intervention moving forward for that to happen. And only if we have smarter intervention, will anything we do in regulation make any sense. Smarter intervention is three things: It is a new mind set when we intervene, it is a new mechanism when we intervene, and it is a new principle to guide when we intervene. The kind of like a Punch and Judy show ("we need more regulation", "no, we need less regulation"), might work for a while, but when a market matures you need a more sophisticated way to decide on when you intervene.

Part of the problem is that we have the wrong intervention mindset. At the moment, we have this kind of notion that we can predict and control IoT systems or technology systems. Most notably we can see that in the financial markets. We had a massive financial blip on 6 May 2010. 1 trillion dollars were wiped off the stock market in some minutes and if that had been at the close of the day, it would have been one of the biggest losses in financial history. Luckily the system rebounded, but if it happened, that would have been peoples' pensions and savings just evaporated. And that came from a mindset which prevailed in the financial market that trading contains risks but that we can basically predict and control risk. We could master algorithms and markets and use algorithms to decide when to trade and how to trade. That is very dangerous.

n software, we don't use predicting control. The so-called waterfall development methodology has been replaced by agile programming, which is a more iterative trial-and-error mechanism. The new intervention mechanism is best summed up by the "OODA Loop" (Observe-Orient-Decide-Act) which was created by the US Air Force to enable fighter pilots to quickly assess and adapt to complex and rapidly changing environments - ones that cannot be controlled and in which poor decision-making can be a matter of life and death.

It is a very useful methodology, which can also be applied in technology markets. Basically, we load up in a centre a value chain or a system, e.g., the financial system, the retail system etc., and ask "who is best placed to gather sensory inputs in this environment?". When regarding technology environments, there are sensors all the time, e.g., temperature sensors taking a reading every 40 seconds, which makes 7 million data points in 10 years.

The next question is "who is best equipped to make sense of this data"?, Then, "who should use this new knowledge as a basis for decisions?" And, "who would translate these decisions into action". Is that the private sector? Is that government? Is that civil society? It is probably a mix. Each one of these stakeholders is cycling that loop potentially moving forward using algorithms, experts, non-experts, and they can be configured as individual non-experts, individual algorithms, crowds of algorithms. Each of those has its strengths and weaknesses. In the 20th century, we had the Soviet Union believing that groups of experts could allocate stuff to an economy. This didn't work so well. We also had a blind belief in the wisdom of crowds, non-experts, and we had also problems there. Now we are blindly walking in that belief in algorithms as a kind of magic thing that is going to solve everything. But we already know from the 1930s that algorithms have limitations. Each of these mechanisms has its strengths and weaknesses. Algorithms have no sensitivity context. If sending a done into a battlefield, there is no algorithm in the world which will distinguish between a combatant and a non-combatant. We have to be very careful when we employ algorithms.

This is the reason to propose a new intervention principle in IoT: The principle is that anyone of those agents, be that the public sector, the private sector, civil society, in any of those manifestations, as individuals, experts or algorithms, they get to intervene in the OODA loop only if (so, by default, there is no intervention), and in so far as, it is reasonably foreseeable that the objectives of the proposed intervention cannot better be achieved by the system running itself or in default of this, by another agent.

The critical word here is objectives. What are the objectives of our financial markets? Right now we have a predator-prey ecosystem on our high-frequency trading platforms. Is that what we want, or do we want competition, do we want chiliastic ecosystems?

With that principle, the question is "what are the objectives we want moving forward". If we can solve governance, regulation will start to fall into place a lot easier.

The moderator followed-up with the question, "what makes regulating the Internet of Things so challenging?"

Mr Fell supposed that it is probably the speed. Everyone expects to cycle that loop at very high speed. The real challenge is how to get all those different intervention agents to cycle as a team, to be accountable and to cycle that loop at the right tempo.

Over the past 20 years, telecom regulators have played an important role in breaking up monopolies within the telecom sector. The moderator addressed the question to **JØRGEN ABILD ANDERSEN, Chairman of OECD's Committee for Digital Economy Policy (CDEP), Denmark**, whether this is still an important role for telecom regulators or is there a change in role for regulators and regulation?

The role of a regulator has changed drastically between 1991 and 2012. When starting as a regulator in 1991, regulation was all about regulating to prevent abuse of dominant positions in order to ensure consumers the best and cheapest telecom services. It was a very simple goal but it was in the days of monopolies. Regulators were very focused on this issue.

However, the overall societal goals have changed dramatically since that period. It is still important to prevent abuse of a dominant position, it is still important to ensure consumer protection, it is still important to allocate spectrum to the telcos, but the societal goals have broadened enormously.

The overall societal goals are now more concentrating on enabling innovation, growth and jobs. This is what is on top of the minds of politicians. And, it is the politicians who really make the basis for the regulation, regulators carry out.

The question is, what does that imply? First of all, there is still a need for preventing dominant positions, for consumer protection, for spectrum allocation etc. But, on top of this and increasingly, e.g., data protection regulation has become important.

On top of this, issues which do not require regulation in the old-fashioned sense become important. For example, the increased use of e-government in all countries is seen as a very important element in the development of the digital economy. Is e-government taking place on the basis of regulation? No.

We have a shortage of IT-specialists who can really drive the development. Is increasing the number of IT-specialists a question of regulation? No, but it is very important. Only 0,5 percent of the total workforce in the OECD countries are IT-specialists—and they are increasingly becoming important. But this is not a question of old-fashioned regulation.

Furthermore, achieving the societal goals increasingly requires that we focus on standardisation and interoperability. To some extend this is a question of regulation, but not fully.

And finally, there is a whole question of Internet governance. Are the issues related to Internet governance a question of regulation? No, even if this doesn't mean that governments can sit back and let happen. They have to intervene in one way or the other.

In conclusion, instead of the regulation we knew back in the 1990s, we need to reshuffle and introduce smart intervention—not old-fashioned regulation but trying to use a whole series of tools from the toolbox.

The next question addressed to Jørgen Abild Andersen was whether the traditional policy goals that we achieved through regulations, such as better and less expensive telecom services and consumer protection, are those still the same goals or have these goals evolved over time?

Mr Abild Andersen stressed that, to a wide extend, they are still the same, but they are not very high on the agenda, because it is obvious to everybody that prices have decreased dramatically over the last 20 years. It was a very hot topic at the beginning of the 1990s, but it is not that important anymore.

In terms of cheaper and better services in a sense that there is a larger variety of services, we see that the variety today is enormous. At the beginning of the 1990s, one aim of regulation was to have several pipes to the homes. Denmark has been very successful in having several pipes to the home and it's the same in most countries now. This is no longer an issue. Things are still the same, but importance is less.

WLADIMIR BOCQUET, Head of Policy Planning for Government and Regulatory Affairs, GSMA Association, was asked how policy makers support the long-term and massive growth in data from smartphones, iPads and iPhones and connections from people, but especially connecting machines.

From the regulations and policy perspective, there are two broad challenges to achieve: On one side, there is an impressive growth of data traffic caused by the multiplication of devices. GSMA estimated a 10 times growth in data traffic for the coming 6 years. In terms of devices connected to IoT and M2M, we are even talking about several billions of times. However, whatever the number, the tendency indicates that we are in a key period in terms of traffic growth, in terms of connectivity and in terms of the number of connected devices.

From the perspective of GSMA, key drivers to cope with this unique time for mobile communications are the following:

The first topic is spectrum. Spectrum is one of the key elements and the oxygen of our industries. Having the right spectrum for the right applications with the right regulatory frameworks is crucial. E.g., having connected cars with specific connected devices requires a different regulatory framework than smart metering. It is important to find in a light touch regulation environment the most appropriate way to facilitate and guarantee the implementations.

The second point related to future regulation, is clarity and certainties. If you decide to implement an infrastructure in the context of IoT or M2M, it is not for 6 months or 1 year, but for several years. A regulatory framework associated to the deployment that provides clarity and certainties over this period of time is absolutely crucial.

The third aspect is having the right regulatory framework to facilitate investments. We know from a certain number of studies that the mobile economy and mobile broadband deployment have a strong impact on the society and the economy of the country where it is deployed. Increasing the percentage of mobile penetrations of a country positively impacts its GDP.

But to facilitate implementation and to facilitate deployment, clarity and certainties in terms of regulation are absolutely key. For instance, in the context of spectrum and licence renewal, in some cases 6 months before the end of the license stem there is no clarity about what will happen and if it will be possible to have a continuity of service. This is definitely not the right environment for investment.

Having certainty and clarity and a light tough regulation will help both the IoT and the M2M community but also the personal communication on mobile broadband to be deployed.

The next question addressed to Wladimir Bocquet was: Do you think that regulators are aggressive enough in terms of finding spectrum? E.g., in the US, 61 percent of the spectrum is controlled by the Federal Government and they are now beginning, with the leadership of the FCC and others, to try to share that spectrum on a dynamic basis between the government and the private sector.

Mr Bocquet explained that it is the right moment to be more aggressive. The mobile ecosystem has done a great work to improve the efficient use of spectrum. Refarming is a key example: Refarming is when you have a spectrum for a specific technology and typically the 900 and 1800 MHz frequencies were licensed for GSM technology. But thanks to the creation of an ecosystem we use a more efficient technology, LTE or the 4G, on the same spectrum to have a more efficient solution to cope with this data traffic increase.

Definitely this is a critical time for regulators to look at the real need for the next 5 to 10 years. Spectrum licensing and spectrum release is a long term business. But also to take the right decisions next year at the World Radiocommunication Conference 2015. The ITU WRC-15 is the key conference organised by the ITU with the objective to release in a harmonised way spectrum for different users of the mobile broadband.

As regards dynamic spectrum sharing, this is, once again, just a matter of clarity and certainties. If you have a dynamism that creates uncertainties, complexities to implement and people are not sure about the ROI, this is not the right environment to invest. If you have the right conditions, the right environment and the long-term certainties to invest, you will succeed.

Whatever the way you release spectrum or you want to implement the licensing, you need to have certainties and clarity on the use.

FREDERIC GERAUD DE LESCAZES, Head of Government & Community Relations, Cisco, France, was asked to provide Cisco's vision forecast for the next 5 years in terms of global IP traffic and usages.

Since 8 years, Cisco is publishing each year a so-called virtual network index. It is an open data index. For the 5 years period of 2013-2018, Cisco is forecasting is an ongoing global explosion of IP traffic.

There are three trends to keep in mind: First, there is a king usage in IP traffic worldwide, which is video. Second, the rise of machine-to-machine connections. For example, M2M connections in France will increase from 0.3 percent to 5 percent in 5 years. This is a multiplication of 17x.

Third, there are differences regarding regions worldwide. As an example, at the horizon 2018 Cisco is seeing, particularly in the US, a huge augmentation of connected cars IP traffic. It is amazing to see this so quickly appearing in the picture of the index. It makes sense when you go to California and you are stuck on the Highway 101 from San Francisco to Los Angeles for hours. Here, it makes sense that some OTT players, such as Google, are running for connected cars business. But in Europe, in Berlin, London and Paris, you would rather use public transportation. Here, the first wave of innovation will come from different sectors, such as public transport help or local services for older people or young people.

What we know for the 5 years to come: First, the explosion of devices and IP traffic—there will be 50 billion devices connected in 2020. This means, that there is a need for more spectrum. Today there are about 12 billion connected devices, from smartphones to other connected objects all over the world, but the amount of spectrum remains the same. Spectrum is key and we need harmonisation of spectrum at an international level.

The second point is that it becomes more and more complex for any kind of service provider to manage those networks, because there will be microcells, macrocells, there will be hybrid clouds, public and private clouds, and there will be critical data. E.g., in the case of connected cars, there is the risk that there are data to get back to the user with a very slow latency and that data from the parking slot are waiting a few hours to be to be send to the data centre.

It will become more and more complex. We will have hybrid networks and the challenge will be to keep them secure and resilient. There is a need for clarity on the long run in order to deploy and invest and to prepare the next Internet of Everything (IoE) revolution. IoT is already a mature market, even if big data analytics might not be mature, yet.

The concept of the Internet of Everything is broader. It is about the combination of items to create the value. The first item is connected objects, the second item is data, and the third item is new processes, because it is a new way of working. And the fourth item is people with new skills. In 15 years, 54 percent of the jobs in Europe will be dramatically changed by the IoE revolution or will disappear.

In conclusion: Regarding policies, there is spectrum and harmonisation. Regarding security, there are best practices to share. We need smart intervention and a sort of light touch pragmatism, i.e., we should wait a little bit to see what is going to happen and how it will be used, before regulating.

The moderator then asked whether there has been anything that Cisco has overstated or understated in the last few years.

Mr De Lescazes explained that Cisco was born 1984 when a young Stanford University couple invent the multiprotocol router.

As regards forecasts in its virtual network index, Cisco has been surprised by the rapid rise of M2M and connected cars traffic.

There are now 3 billion people online, but it is still less than half of the world population. **MICHAEL KENDE, Chief Economist, ISOC – Internet Society, Switzerland**, described what are the remaining regulatory barriers to connectivity for the other 3 billion people.

We have a rather good idea of the policies that would help get people online. In countries that have liberalized and introduced competition, prices have come down. We have seen countries with good spectrum policy getting broadband out there. Infrastructure sharing is very important to lower the cost of entry; making sure that licences are cheap so that people can buy them; and where there is not going to be private investment, this can be supplemented with a good public investment.

One thing that is missing and that would make the intervention smarter is measurement. In some countries is very little measurement. When you put in new cable or you introduce new spectrum or other things into the system, there is very little measurement afterwards to show that it has been effective or to help figure out why it has not. And then, when going to the next country it is very hard to say if this is was worked, because you don't have the measurements. This is where a lot of the focus has to go, to getting further is to be able to show the countries that are holding out, that have liberalized, that have introduced smart policies, what the benefits are and how it worked in other countries.

The next question addressed to Mr Kende was about the 2 or 3 policies and regulatory changes that would best promote adoption and best generate Internet usage.

Mr Kende stressed that, often, when we focus on the digital divide we look at access and affordability. 10 years ago, that was certainly the case that people just couldn't afford getting online or they couldn't afford to use the Internet very much because of the cost. Now in many countries, thanks to mobile broadband, most of the countries can get access through 3G or some type of Internet signal. Even in countries where penetration is below 10 percent, up to 90 percent are covered by mobile and could get mobile signals.

If looking at surveys of non-Internet users or asking them today, "why aren't you on the Internet?", the answers "not being able to get access to the Internet" and "not being able to afford it", don't always come up on top anymore. It is people saying, they are just not interested, or really don't understand it or don't trust it, which is surprising to those using the Internet every single day. It is really a question of content; there is not enough content available that is locally relevant, such as the local government's issues, job sites, transportation online etc. All these things we take for granted don't just exist in these countries.

Governments should not just focus on the supply side. Those issues are pretty well known. They also should focus on the demand side and put government services online, make it a good hosting environment for foreign countries to bring their content and host it locally, make it available and to lower the cost of devices, taking away luxury taxes on devices etc.

The next billion can be brought online with more interesting services. Access exists and is out there for the next billion of Internet users. These people are choosing to spend their money elsewhere and currently just don't see the need.

Regulation and innovation are often becoming a question of trade-offs, whether we are allowing innovation on one hand, or achieving public policy adjectives, such as consumer protection or financial stability, on the other hand—either one or the other. **HANNE MELIN, Policy Strategy Counsel, eBay Inc. Public Policy Lab EMEA, Belgium**, answered the question whether that trade-off is necessarily the case or can we design in the future regulatory models that enable to pursuit both goals, regulation and innovation?

She stated that this is possible but there is a thug of war we need to break out of: the false choice between companies and their innovation on the one hand, and regulators and some higher good of the other hand.

At the heart of this is this aspect of "cycling the loop intelligently" as Mr Fell argued. We aren't asking that question and not asking the question "how do we cycle the loop intelligently" means that we are not seriously trying to understand how to leverage different stakeholders and the tools that we have at our disposal when creating policy. It also means that we are still thinking of traditional regulation as our principal choice, not as one of many choices, we don't view the choice as being between a series of tools in a regulatory toolbox. And that is a problem because it is less and less possible to achieve the societal goals we set, if we try to do so in a top down - regulator versus the regulated entity - approach.

When talking about automation, hyper-connectivity, smart cities etc., not one agent or person will have a full view on all the information or not even be able to fully control or oversee the consequences of ones actions. The less control we have, the more we need to move towards outcome oriented, flexible and participatory regulatory models.

It is about asking the question, how do we intelligently cycle the loop, and asking this question means these two tracks: partnership, realising the strengths and weaknesses of the different stakeholders and actors, but then also thinking more broadly in terms of the tools we have in the toolbox. And that toolbox is an ever-growing toolbox.

The following question was whether it fair to say, in a rapidly changing and dynamic telecom market, that regulation should be like white pepper to be used only sparely?

Hanne Melin emphasised that it is probably not a question of "less" or "more". The broader range of different policy making instruments, regulatory instruments, we have, the less it becomes "salt & pepper"-like. It rather becomes "how do we solve this problem efficiently?".

In 2011, the OECD did a survey of 15 EU countries, and they found that these countries used traditional regulation as their first, and in most cases only, choice, even when it necessarily was not the best option. The survey also found that alternative models had not been sufficiently considered or developed.

The EC has put out better law-making reports annually. They have been very interesting because part of these reports has been a chapter discussing alternative tools, such as co-regulation or self-regulation. But in 2007, the Commission stopped discussing alternative ways of regulating and this is a shame.

It is more a question of broadening the palette of regulatory instruments.

CLAUDIA SELLI, EU Affairs Director, AT&T, Belgium, [www.att.com], highlighted the critical components to ensure success of the mobile Internet, given the social and economic benefits that it can deliver.

There are three main components to achieve the full societal benefit. First of all, providers that really deliver and offer a premium network experience. AT&T, for example, is shifting towards an all-IP type of network—wireless, all-wireless, all-cloud based—to offer a better experience to its clients and customers.

But in order to be able to offer such experience, a lot of investment is required. Thus, the second ingredient is investment. During the past 6 years, AT&T has invested 119 billion dollars in upgrading and improving its networks. A factor that is key to attracting investment is a policy and a regulatory framework that are growth-oriented and certain and that don't stifle innovation, but pave the way for innovation. This would really bring in investment to the market.

The third key element is spectrum. Spectrum is the lifeblood of our mobile industry and with the M2M world and the related data increase, more and more spectrum is needed. But we also need a harmonised spectrum, not only at the EU level but internationally. Furthermore, we need longer life licenses, because investing with spectrum requires certainty and a general view on what is going to happen. The key point here is really removing barriers to have growth, innovation and investment in the market.

The following question addressed the issue of what is needed from a regulatory perspective when we look at the next wave of connectivity and we look on the Internet of Things?

Claudia Selli explained that M2M is really about everything being connected and is affecting industries horizontally, going from agriculture to ICT to shippers to transport etc. But, even if there is the potential of connecting everything, in order to do so, device manufactures need an efficient and unified model.

In order to achieve that, M2M manufacturer often partner with just one single mobile network operator. In fact, the operator can use existing bilateral agreements to connect all the different countries where the M2M manufacturer wants to deliver the services. Moreover, with a single operator there is the advantage that you can negotiate just one wireless contract, you can also use a global scheme and you can use the support for billing, provisioning, and ordering.

The other element is international roaming. That is key to the mobile machine-to-machine success. Certainly one agreement can allow to eliminate barriers and to bring in new technologies. It also allows new companies also to have it easier to develop and to expand, e.g., from Europe to other countries.

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Q&A

Mark Fell, Carre & Straus, summarized the three core messages of his presentation: We need a new mindset, which means that we need to move form a predicting control approach to more of a trial-and-error iterative approach. We need a mechanism that makes that reality, this is the OODA loop, and we need a principle which guides us on how to cycle that loop.

Internet governance is heavily debated, in particular in the last years. **Jørgen Abild Andersen**, OECD, was asked whether there is a particular role that regulators should play in that context?

He stated that there is absolutely no direct regulatory role to play for regulators in that context. That should not mean that regulators should not have an opinion about what is going on. It is important to make sure that the multi-stakeholder model is maintained. It has been working very well over the years, it has been a vital prerequisite for the success of the Internet and one could say: if it ain't broke, don't fix it. However, it is slightly broke and it needs to be fixed.

On 31 December 2013, the Second Accountability and Transparency Review Team (ATRT2) submitted its Final Report and Recommendations to the ICANN Board of Directors.

Some vital recommendations were made in that context about increasing accountability, increasing transparency, but also that it is very important to work in a dedicated manner to avoid that picture to be established that ICANN is driven only by North America and Europe. Inclusion is very much needed and the facts and figures speak for themselves. As it is right now, it is dominated by the US and Europe. This is a pity because we need all parts of the world to be included, and this is one of the most important challenges for ICANN in the field of Internet governance in the next years. The board of ICANN has taken up the recommendations made by ATRT2 and has accepted to implement them.

Wladimir Bocquet, GSMA, was asked about the issue of mobile-specific taxation to deliver short-term government income at the expense of a country's long-term tax revenues.

Mr Bocquet emphasised that taxation has to considered very carefully. In some cases, short-term objectives lead to such mobile-specific taxation. Definitely, mobile communication, mobile broadband, including personal communication, IoT and M2M are important sectors and have a positive impact on the society and the economy. It is important to make sure that the tax environment is not limiting the benefit of developing and deploying broadband. GSMA definitely encourages regulators and governments around the world to make sure that there is no specific taxation on the telecom sectors, and to make sure to put priority on the long-term investment and long-term benefit of the citizens and the populations rather than looking at short-term solutions.

As regards spectrum auctions, there is often the issue of reserve price or expected price in certain countries. This is not the right approach to maximise the benefit and the use of a scarce source like spectrum. We have to focus on long-term objectives and benefits and try to maximise these long-term benefits and should avoid short-term views on that scarce resource.

The moderator then asked **Frederic Geraud de Lescazes**, Cisco, what is the killer policy element for action for policy makers in smart cities, to turn it from a dream to reality?

Geraud de Lescazes underlined that the key element is to get orchestrated convergence of the governance inside the city. The end of silos is the starting point for everything. This works for companies, cities and states. When a city is aiming to transform its public transportation or waste management, this cannot be done in silos. Convergence is key. The base is to create a multi-service platform, then you can aggregate from different sensors and captors, from waste management, lightening, pedestrian walking signs, pollution etc., in order to use the data and to create value and new services for the citizens.

Cities must get rid of silos. There must be a political leader, someone who already understood what is at the stake, even if nothing has happened yet. We see pilots all over the world, but up to now, there is no city that has created this multi-service platform to welcome every known and unknown service.

We are no longer talking about telecom policy. The world has changed. IT is in every sector, from industry to services. We need to find a holistic policy. Governance rather than policy is the key.

Services are continually migrating to the Internet, not just telecom services but increasingly banking and health. **Michael Kende**, ISOC, was asked how regulation can adapt and promote such convergence and what role can regulation play and what role can economics play?

The word silo is very relevant in that context. If you think about telecommunications regulation, the companies own the wire, whether it is a cable wire or copper wire, telecommunications regulators are for the service. So you can have a telecommunications regulator and the goals were very easy to understand: what is the coverage, does everyone have universal services and what are the prices etc. In many countries that regulatory framework has just crossed over to the Internet with a telecommunications regulator looking at broadband, making sure that prices are low, making sure that they have enough spectrum if its wireless, making sure that there is enough coverage etc. But you cannot tie the services to the wires anymore. You can have banking, health, and all these services available, and in order to promote those, you need to get other ministries and businesses involved.

For instance, why is Kenya the prime example of mobile banking? Why haven't other countries been able to duplicate that? In Kenya they didn't know how much money this would be worth. Now, when trying to duplicate it in other countries, everybody wants to get their hands in it and there is no high enough level of government to put some framework in place.

The best example of a government that has been able to address this issue of how the Internet covers many sectors is Singapore. In Singapore the regulator is split into two parts, one part is the traditional regulatory agency, but the other part is a development agency, which is responsible for making sure that ICT needs of the top 7 industries of Singapore are met. They really go out aggressively and have the mandate to make sure that the best technology is available, whether it is electronic IDs, whether it is nationwide WIFI, make sure that the things are in place to make the industries progress. That is the way governments need to start looking at this.

Hanne Melin, eBay Inc., was asked whether it is realistic to expect for regulators over night move from today's approach of regulation and start implementing experimental regulatory models?

It has to be a process. There is a recent article about what business management can learn from soccer. Also policymaking can learn from soccer. The first point is "be generous with the information, avoid silos, get stakeholders involved, increase transparency. Basically, try and engage rather than enforce. We should move a bit more towards engagement and ensure that everyone is aware of the strategy. The strategy might be to achieve those societal goals.

The second point is "avoid micromanaging", ensure that all the players know their role, but then, let them play their role. And with this comes also exploring other tools in the toolbox.

One possible regulatory model that could be used to "avoid micromanaging" is principles-based regulation or performance-based regulation. It hasn't been used as much as it should. The reason is that it has some drawbacks. When you use a performance-based model, you set up the goal and then give the players quite a lot of freedom in how to achieve that goal. But in doing so, there have been, and there are, difficulties in measuring and monitoring compliance. And that creates distrust on both sides—distrust on the regulators side because regulators have difficulties in measuring compliance, but also distrust on the regulated entities' side.

Perhaps, if we take the traditional performance-based model and we combine it with technology, perhaps we can overcome some of these shortcomings. Perhaps we can translate performance goals into something measurable and use data analytics to monitor and improve performance.

The third point is "celebrate success". Not sure what this is in the area of policy making, it might be best-practices, but it could most likely be something more.

The communications market looks very different to just 10 years ago. **Claudia Selli**, AT&T, was asked whether regulation is really keeping up with the industry.

We have seen an incredible speed of innovation within the last 10 years. There has been incredible growth and the market looks completely different form what it did 10 years ago. There is no longer a clear line in the consumer space: Telcos are providing video services, OTTs are providing messaging, or the cable providers are also providing voice-type of services… These services, respectively the providers, are sometimes treated in a different way by regulators, while consumers treat them in the same way, i.e., often they don't even know the difference among the providers.

Regulation today looks very familiar to what it was 10 years ago, while the market is completely different. It will be necessary to take a fresh approach in promoting competition, which is key. We have to approach the market as if it were the first time that we are looking at it.

The market looks very different from what it was 10 years ago. We also have to bear in mind that there are differences between the consumers. E.g., if a regulator is drafting a regulation having just consumers in mind, you don't consider another space, which is B2B, and sometimes regulation can stifle the type of work that is being done in other fields which is completely different. When you connect big multinationals this is a completely different type of business. You have bilateral negotiated contracts, it is highly transparent. So, sometimes, some type of regulation can be stifling.

The second point is that we need a growth-oriented policy type of framework to address consumer needs, also including consumer protection.

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Session 5

Day 1 – Afternoon – Parallel Session

Connected Health

The session's chairman and moderaor, **GIAMPAOLO ARMELLIN, Head of Research Unit, CRG – Centro Ricerche GPI s.r.l, Italy**, [http://www.gpi.it/], welcomed the participants and presented the scenario of the session: the sequence of the speakers corresponds to an imaginary care pathway.

Mark is a 70 years-old citizen facing surgery at the OU of cardiology. Mark lives alone in a small town, about twenty kilometres far away from the hospital. Mark's daughter (40 years-old) lives in the capital city where the hospital is located.

The presentations were organised corresponding to the following steps in Mark's fictive care pathway: 1) Pre-operative check and admission. 2) Activation and management of the plan. 3) Service activation and delivery. 4) Connected resources and data.

Pre-operative check and admission:

NAJEEB AL-SHORBAJI, Director, Knowledge, Ethics and Research Department, WHO-World Health Organization, discussed technology-enabled models of healthcare delivery.

Connected health: the way to Universal Health Coverage

The goal of universal health coverage is to ensure that all people obtain the health services they need - prevention, promotion, treatment, rehabilitation and palliation without risk of financial ruin or impoverishment, now and in the future.

How can the use of ICT help to achieve this goal?

"A connected health based on affordable and secure information and communication infrastructure and services will ensure effective collaboration and networking between and among healthcare professionals and citizens which will contribute to achieving Universal Health Coverage". Universal health coverage cannot be achieved by one institution or one healthcare professional alone. It has to be a collaborative effort, including the exchange of data between the different stakeholders. A data element that is captured in one place, is accessible in other places for the sake of the patient.

Healthcare is shifting rapidly from paper to digital. We are moving from being passive and static to being active and dynamic, from being active to being proactive, from being standalone to being networked, from being isolated to being connected, from availability of the data to accessibility of the data, from ownership of the data to location of the data, from a

single format to a hybrid, multimedia format, from single access to multiple access, from physical to virtual, and from fragmented to more integrated.

The implications of this are manifold. There are privacy and confidentiality issues, but also legal and ethical issues. There is the risk of data losses, data corruption and denial of services. There are standardization and interoperability issues hindering the seamless exchange of data. There is also the aspect of trust in technology versus resistance of professionals and patients. And there is this avalanche of health and medical information—there is so much information collected.

However, there are also a huge number of positive implications: One is definitely the empowered citizen and patient through better access to information and participation in the care delivery and also by joining communities that have similar health conditions.

It has enabled multidisciplinary health team work through the true sharing of data among clinicians, nurses, social workers, etc., i.e., different care professionals can actually see the patient from different angles—and this is key for the concept of connected health.

It has also enabled to move care, especially for aging populations, from hospital to home, it enabled self-care and community care.

Moving data is the essence of connected health, Moving data rather than moving patients for better care including supporting telemedicine, telecare and homecare through a network of caregivers. This is the move from hospital to home, implying a focus on innovative technologies such as sensors, implantables and personalized medicine. There is an increased focus on the interoperability of data and systems. And, last but not least, a real opportunity for cost saving and improved quality of care.

ULRICH WUERMELING, Partner Global Co-Chair of the Information Technology Industry Group, Latham & Watkins, Germany, [http://www.lw.com/] illustrated that we have to balance privacy with what is needed to make connected health happen.

Privacy Concerns and Laws

There are growing concerns by individuals, by governments, but also by businesses with respect to privacy. Recent studies have shown that one of the major concerns of CIOs is privacy compliance and the concern that any type of privacy breach could affect their company and its reputation. It is a growing concern on all levels.

Connected health has a very specific nature in this regard, because it is dealing with highly sensitive data. Because of the high sensitivity of the data, there are major security risks in case the data becomes compromised. There is also a major risk of misuse by people who have access to the data.

Connected health is one of the top challenging areas with respect to privacy law. There are solutions with respect to IT security requirements, but do we have solutions in privacy laws?

There are a couple of general principles: Data protection laws specify what you can lawfully do with data; anything that is not mentioned is not lawful. Thus, there will always be an issue when facing something new, as it was not thought about how things might work in the future.

Whenever privacy law tries to regulate very specific areas, there is the risk that what is defined as lawful is not going to be enough for what is coming in the future. Every time, you start something new, the legislator has to intervene and change the law in order to make it possible. This is a huge challenge for connected health because we would like to have the technology much faster than the legislators are able to support it.

Within most privacy laws there are limitations to change the purpose of data processing. This is a real issue in connected health projects, because you have data that has been collected for a certain purpose and now this data will be used for other purposes. Often, in these kind of projects, we are thinking about collecting something new, but in reality we are just combining information that already exists in different places.

There are discussions at EU-level about eliminating the possibility to change the purpose based on the so-called "balance of interest" clause. Although, this is important for many areas, because if the interests of the data controller overwrite the interests of the data subject you can change the purpose. The EC has proposed to remove that possibility. This would mean that people often will get stuck when trying to collect data from all types of existing sources for connected health purposes.

In addition, we have special protection for health data. Most data protection laws consider health data as sensitive data, or - like the US - have very specific laws around health data. Here, the rules become even less flexible in terms of what you can do.

And then, there are notification and transparency requirements, which can become a heavy duty if you are introducing systems in the area of connected health.

The tendency is to strengthen all this limitations even further—in the EU, in the US and all around the world. Things won't become easier for connected health.

There are two types of solutions that could be used: one is to provide transparency. Transparency is appreciated by privacy laws, but it is also difficult. Do we really expect the patient to read all this? There has been a study with regard to websites, asking how many hours people would need within a year to read all the privacy policies of the websites they are visiting. In fact, they would not have time to do anything else than reading them. Transparency has limitations.

The other solution we often see in connected health is consent. Asking the patient for consent is the kind of solution that people believe works for anything. But there are not only practical, but also legal issues around that: How freely given is that consent if you ask a patient? It might be the case that the patient won't get the same medical treatment without giving consent.

Consent, as a concept in privacy law, is an issue that rises from the fact that legislators do not have the imagination to regulate the details. If legislators want to do privacy laws, the easiest thing they can say is, "well, you can only act with consent". Hereby, they move the problem to somebody else—the data subjects, who have to read pages and pages of consent clauses and notices and who then have to decide, and maybe there are patients who are not even in the condition to decide.

It is the responsibility of the legislator to introduce the rules in a way that they work, without putting the pressure on the individuals to make a decision every time. In areas like connected health, we need to make sure that the legislation strikes the right balance instead of just moving to the concept of consent.

Activation and management of the plan:

CARMELO BATTAGLIA, Public Administration and Institutional Relations INFOCERT, Italy, [https://www.infocert.it/], provided a most interesting insight in the topic of

Open Infrastructure for digital Healthcare
Bridging the digital divide and supporting advanced solutions

InfoCert is the first Certification Authority in Italy, having issued and managing more than 4.500.000 qualified certificates of digital signature. InfoCert is a market leader for trusted services (electronic archiving and long-term storage, Registered E-Mail,). InfoCert designs and implements high profile IT solutions for document dematerialization within enterprises, associations, professional councils, public administrations and intermediaries.

Over the past 5 years, Infocert has been engaged in introducing, deploying and enhancing digital healthcare in Italy. At the same time, the Italian government is investing in modernizing its healthcare sector.

Infocert strongly believes in the benefits of the digitisation of processes, both in the public and the private sector. For this reason, Infocert dedicated a part of its investment in the creation of a value added solution.

With regards to healthcare, Infocert focuses on three key elements: Putting in place locked processes allowing to guarantee security of access to data; a nofew way to define the relationship between doctor and patient which becomes more and more remote in the documental process; and the dematerialisation of documents in the workflow. This has both a social impact, environmental impact and an economic impact. Paperless e-health reduces the risk of infection and increases the efficiency of diagnosis.

In this context, Infocert considers some applications to process health in particular importance: electronic signature, identity management systems, enterprise content management and long-term archiving.

There are many points to consider. InfoCert solutions allow you to remote and dematerialise the relationship with the user, while fully respecting the user experience established, through the use of: Management of medical reports and images, other sources management and EHR.

In the more general process of rethinking at-the-counter activities, InfoCert paperless solutions are the factor which enables paperless processes: Advanced electronic signature at the counter and identity management

Furthermore, InfoCert helps healthcare providers rethink their back-office activities in order to reduce costs and improve their efficiency by electronic invoicing and the use of an electronic health records recovery system.

LegalCloud is InfoCert' application for the dematerialization of healthcare processes. There are three types of documents to consider: In structured documents the type of information and their position is determined in advance, e.g., the medical report. In semi-structured documents the type of information contained is known but its position can change, e.g., invoice. In unstructured documents the type of information contained is variable and there is no planned document structure, e.g., a letter.

Identity management to access Healthcare services. In this context, InfoCert has been selected as identity trust provider.

The graphometic digital signature is an example of an Advanced Electronic Signature. The patient can chose between the digital or paper-based process. In case the patient selects the electronic signature, he signs the contract with the graphometic digital signature, the contract is filed within the medical record and the document is digitally stored. Experience has shown, that this can lead to a 20 percent cost saving compared to the printing of documents. Furthermore, processing speed can increase by 15 percent.

Infocert deploys its healthcare solutions all over Italy.

MARIO PO' , Executive Director, Azienda ULSS Venezia & GIUSEPPE GRASSI, Director Cardiology Department, Venice Hospital, Venezia, Italy, presented an impressive project:

The digital management of drugs in the cardiology unit of Venice hospital

The Venice Hospital has an important past and is today an innovative hospital. IT and cardiology are strategic fields in Venice.

Venice Connected Health System (VCHS) is a network of programs built within three years. Different software and IT systems were built and implemented for the needs of the local health system and hospitals, serving around 300 000 inhabitants and 30 million visitors and tourists of the Venice and the Venetian Beaches annually.

Ippocrate e-prescription: Hippocrates in this mosaic is the "tessera" having as target the e-prescription. The aims are 1) reducing the clinical risk of drug prescription; 2) reducing the clinical risk of drug administration; 3) optimising the drugs supply chain (supply, stocks and return of hospital drugs).

Such software has to be "s-centred"—simple, safe, cheap, sure and solid.

The Venice Hospital is working closely with a software house in order to meet highest standards, to improve the quality of care, and get prescription safe.

The hospital headquarters decided to start in a high-intensity treatments ward, i.e., cardiology. Here, a strict precision of drugs is required and there are frequent prescription and posology changes. The idea was, "If the software works with us, it will work in any other department."

More information can be found on www.ulss12.ve.it

The website www.healthvenice.com provides information related to healthcare (first aid

points, hospitals, location of defibrillators etc.) for tourists in Venice.

Modern anatomy was born in Venice in the 16th century. The scientific method supports health technology innovation in Venice.

The S.S. Giovanni e Paolo Hospital one good example for the important mix of history, culture, research and new innovation in the field of strategic management.

ALESSANDRO ZANOTELLI, President and CEO, SPID, Italy, [www.gpi.it] presented a highly innovative system connecting e-prescription to the logistic supply chain.

How does drug logistics enable care processes?

Administration data and clinical data has to go together. Physicians don't like to prescribe and then sign the prescription on a paper. Furthermore, the drug supply chain has to start bedside and has to end bedside. When the physician makes a prescription you have to trigger all the process and the process has to end with the bedside medication administration by the nurse.

SPID is designing, producing and trading automated systems for drugs management in the healthcare facilities. The Buster System is the flagship product of the company: the solution provides the safe prescription and administration of medications, with significant economic and organizational benefits.

The Buster System is a complete solution for the management of drugs in hospitals. The System is composed of both hardware and software. The computerization of therapies ensures the complete traceability of all operations of prescription and administration whereas the robotic medicine cabinets in the ward and the automated warehouse for the central pharmacies, ensure the complete traceability of all the pharmaceutical packages.

The Buster System is composed of the following main components: The Bustermed Suite, a powerful software platform for the management of therapies and pharmacy logistic. The Nursy-rolly, a computerized medicine trolley for the management of therapies. Busterspid, a sophisticated robotic cabinet for the management of drugs in the ward. Busterpick, a high-tech automatic warehouse that manages the work-flow of the drugs in the central pharmacy.

[A short video presenting the Buster System was shown]

The Buster System is already employed in Italy and starts having international success.

The only way to collect clinical administration data in hospital is by giving tools to the physicians, so that while they are working they are collecting data.

Service activation and delivery:

ANTOINE GEISSBÜHLER, Professor and Chairman, Department of Radiology and Medical Informatics, UNIGE - University of Geneva, Switzerland, provided a flavour of what healthcare in the digital age will look like.

Easing the transitions in healthcare: impatient ePatients

One of the key challenges in healthcare is to manage transitions. Moreover, information is a key element of healthcare. Over the last 40 years, many tools have been developed through computation, using algorithms, connecting machines etc. There is so much we can do in terms of improving quality and efficiency of processes through computation. The other aspect is conversation and how to connect the different stakeholders in a meaningful way. One of the diseases of our healthcare system is that it is very fragmented and this is causing a lot of problems.

One of the key actors of the healthcare system—the one who is massively underutilised to improve our healthcare system—is the patient. It is the e-patient, the patient who has access to information, who has expectations about how information is managed and how the patient and his relatives will be involved in the healthcare processes. They can be called "impatient e-patients", they are impatient because the way our systems evolve is actually much too slow compared to the pace of the evolution of the digital area; and the tools that are available now are part of it.

Information is care, this is something that has taken a while to be understood, but is now very clear for many people involved in the world of health IT. Healthcare is an information intensive domain. We are progressively entering the digital age and healthcare is probably one of the last sectors of society in doing so.

As healthcare is entering the digital age, it is about to be submerged by a data deluge. This is due to two things: One is the development of predictive medicine, i.e., the fact that we are now staring to sequence genomes, to collect information about proteomes and metabolomes, all these highly complex molecular medicine domains. But the other reason is what can be called participative medicine and the fact that patients are now starting to generate health information, tracking themselves, contributing to the data that is used for healthcare. This is both a challenge and a huge opportunity.

Healthcare is fragmented, it is based on loosely connected successions of episodic visits to various care professionals. There have been attempts to integrate these, but those continuities of information hurts especially the chronic patients who have complex diseases and who are usually part of a network of 5, 10 or 15 care professionals involved in their care over a long period of time.

Health IT is part of the solution and there are 2 key tools that have been developed: the Electronic Health Record (EHR) and the Health Information Exchanges (HIEs). Those tools have the potential to improve a key aspect which is the continuity of care information. It is important to make sure that we are able to bring the right information to the right person at the right moment in those complex environment. It is key to provide quality and support for the decision making, but also to improve the quality and efficiency of care.

And this is true, not only for professionals but also for patients and their relatives. This is the

area of patient empowerment. The problem of patient empowerment is that we live in an information world that is rather complex and noisy. We are in a world where information can mean everything and can be used also to mean the opposite of it. One of the key challenges in the provision of quality tools for patient empowerment is how to manage access to quality information. Social networks for health and healthcare are developing, and there are tools that care professionals are starting to work with on information prescription. The idea is that you don't just prescribe medication and drive robots to do that, but you also prescribe information so that patients and their relatives can access quality information.

And then work on the trustworthiness of online health information. Geneva has the Health On The Net Foundation (HON), one of the pioneers to promote trustworthy online health information with a HON code. This is a code of conduct which is now awarded to about 8 000 websites if they follow quality criteria for providing health information.

Geneva University Hospitals is developing a number of tools for patients. Among those, a very simple tool to help patients to understand how a hospital works. A key feature is that they get an estimate of how long they would wait if they go to an emergency room of one of the Geneva University Hospitals, but also of the competing hospitals in Geneva. Obviously, such a tool, deployed on a mobile phone, is very simple to develop. What is very complex is to get the right information from all partners. Technology is not the key challenge, the challenge is getting quality of information and people agreeing to work together.

Another interesting tool developed is how to deal with patient education and patient involvement. Patients that had a heart failure can use a disease-specific app with videos and teaching material, but also tools that will ask them to be involved, to record their weight, to record their vital signs and to be connected to their treatment so that they know why they take medication and when and when they need to adjust it.

Another example is the use of serious games to foster learning and participation, e.g., for children that have had a liver transplantation.

One of the key developments is using these new tools that help people track their activities, track their calorie intake, track other aspects of their health and develop new social interfaces that will try to influence their behaviour. These tools can be bracelets or other devices that help people understand how they are active and measure what they are doing. What is very interesting is how to develop collaborative tools that will actually make the users of these devices having a healthier behaviour. In collaboration with the polytechnic school of Lausanne, Geneva University Hospitals is developing collaborative games leveraging on social dynamics that are based on collaboration rather than competition. Results have shown that by doing so it is possible to change behaviour in a more effective way.

HIEs are the kind of infrastructure needed to connect all stakeholders. Geneva is running one of the Swiss HIEs pilots, called "Mon dossier medical". It is about patients owing the access key and following the principle "Nothing about me without me". You can not build any of the tools without involving the patient. If the patient is not in the driver seat, it will not work.

There is a need for laws that clarify the roles and responsibilities and Geneva went through this legal process. It has been a long process, but if you don't do it your project is unlikely to succeed. Geneva decided to make sure that the information that is used in this federated health information exchange stays where it is produced, rather than being centralised. And this is something that has helped create trust among all the stakeholders, including the patients.

An important movement that is coming is this quantified self movement—the fact that people track their health. This should be used to connect to information systems. Telcos have understand this and today, almost every mobile platform will have or already has some health infrastructure to be put in. This is very important because it probably going to change how much those tools can make a difference, because they are embedded in the device that people have every day with them and that they trust. There are technical issues, there are practical issues, there are policy issues, and there is much to learn when moving forward. But it is a very important movement.

Health professionals have been quite reluctant in terms of making all these information available to their e-patients. But patients have grown up, they know how to deal with information. We need to provide mechanisms to understand this information, to be guided when needed, but we need to make this information available. We also need to make sure that patients can add information to the system. This is key to the adoption, adherence and participation.

Experience has shown that patients are willing and want to contribute—this is an important aspect in care. We should also consider social networking, even it is about physicians ranking or if it is about saying, this hospital is not so good, another one is better. Social networking can be an opportunity for patient engagement and should not been seen as competition or a problem. We also have to develop consumer vocabularies and interfaces for mutual understanding.

FLORENCE GAUDRY-PERKINS, International Director-Global Government Sector, Alcatel-Lucent HQ, France, [www.alcatel-lucent.com], presented one of the larger mHealth projects Alcatel-Lucent is involved in.

mHealth:
A powerful tool for access to health in developing countries

mHealth is a subject that holds much promise, in particular for the environments in developing and emerging countries. There are not enough doctors, health workers and infrastructure.

Some figures to illustrate the significance of the mobile revolution in developing and emerging countries:

Mobile penetration in Africa should reach 85 percent by 2015, whereas only 7 percent of households have a fixed internet connection (less than 1 percent in Sub-Saharan Africa). Many people in these countries are using their mobiles to connect to the Internet. In Senegal, 90 percent of people who access Internet do it from their mobiles. In Ghana, it is 55 percent. In China, 83 percent of connections are done by mobile. In India, 7 out of 8 people connect via their mobiles.

Moreover, smartphones are reducing more and more in price. They are less than 50 dollars now and the price is expected to continue to lower. By 2017, it is expected smartphone penetration in Ghana will be 40 percent.

The idea of a very powerful computer in the pocket of each and everyone is no longer a futuristic one, but much work remains to be done.

According to a study carried out by PwC and GSMA in 2013, mHealth could save over 1 million lives just in Sub-Saharan Africa over the next 5 years. In developed countries, mobile health solutions could save 400 billion dollars by 2017.

mHealth is less disruptive to healthcare in emerging markets because for a majority, it is not a substitution to care but rather the only access. A study realised by PwC in 2012 showed that South Africa, India and Brazil are ahead of the US and Europe in mHealth. 61 percent of surveyed patients in emerging markets knew what the term “mobile health” meant, versus only 37 percent in developed markets.

A study realised by GSMA in 2013 gathered mHealth projects around the word. They observed 117 mHealth projects in Europe, 191 mHealth projects in North America versus 363 mHealth projects in Africa.

The aspect of reverse innovation or frugal innovation is very important in this context. A lot of these projects are being constructed with low resource settings and given the fact that the industrialised countries are trying to solve major cost issues in their healthcare systems, there are probably things that they can learn from the innovation that is happening in these particular countries.

However, there are a multitude of pilot projects and the big challenge in mHealth is trying to get to scale. One solution is the multi-stakeholder partnership model, i.e., for parties to collaborate and use collective impact and intelligence. Too many of these pilots are being done in a siloed manner and this involves a lot of complex cross-sector work between ICTs. It would be more efficient if we also make more crossovers between the public and the private sector, as well as research and academia.

Alcatel-Lucent is participating in the Senegal mDiabetes project emanating from the “Be He@lthy Be Mobile” initiative led by a ITU and WHO initiative (focused on mHealth and NCDs.). The project’s goal in Senegal is to use mobile technology and mHealth to fight diabetes.

This is a true multi-stakeholder partnership between the international organisations from both sectors (ITU for telecom and WHO for health), the government of Senegal (both the Ministry of Health and the Ministry of Telecommunications as well as the Agency who handles eGovt), the data privacy commission, the regulators etc, but also NGOs, and the private sector, e.g., health insurance company (BUPA), pharmaceutical company (Sanofi), mobile operators (Orange/Sonatel, Tigo, Expresso), as well as the entire diabetes ecosystem in Senegal, including the important patient association. The partnership is using collective intelligence and collective impact in order to achieve scaling and sustainability.

The project launched with a mDiabetes pilot around Ramadan in June 2014. 3 500 diabetic patients received 25 simple messages and recommendations before and during Ramadan to prevent the problems due to fasting. SMS is a simple tool, but it can already make a big difference.

Connected resources and data:

ROMAIN LACOMBE, Independent Open Data Expert, France, discussed how important access to information and open data are to healthcare in general, and how powerful it can be as a lever for change, but also as a policy lever for international organisations, for governments and all the other stakeholders.

Why is it so important and challenging to use open data as a tool to support connected health? The potential of data is clear. There is the quantified self movement aiming to measure all aspects of daily lives. But also Call Data Records (CDR) that mobile operators collect can reveal interesting patters about societies or countries. Orange for instance was able, just by using call data in a country like Ivory Coast, to show how some of the localities where socially much more closely linked together than others. This kind of data could be interesting to study epidemics.

Personal data as well is very interesting if we think of the Apple Watch as a healthcare device, as a Trojan horse of consumer electronics into healthcare. Just imagine if its next version would have a blood sugar level sensor, what that would mean for diabetes worldwide.

If we see the same rate of acceptance in wearable technologies that we have seen over the past 10 years with smartphones technologies, we might be able to solve some of these global issues just because individuals will have access to personal and much more relevant data about their own health.

Public data that is made accessible to the public should be used and show great potential for improving the healthcare system. An example from the open data experience in France: one of the major health scandals that happened in the country over the last decade (the Mediator case) was to a large extent caused by the lack of information on the discrepancy between the amount of usage of a specific molecule and the number of occurrences of the diseases the drug was authorised for on the market. Having opened this data would have meant that citizens, world drug groups and even government officials from other branches of the government could have seen this coming. So, open data could have literally saved lives.

Of course the natural limit to openness and data transparency in healthcare is that every health data point does stem for individual patient records at some level. That is were the privacy issues come in play.

What is so frustrating in using data to improve the health care system is that this argument should actually be moot though. Certainly, there is a lot of data for which we should be concerned about privacy issues, but it turns out that there are gigabytes of datasets of public interest linked to health care outcomes and research that have absolutely nothing to do with personal identifiable data, and that can already help us achieve or at least get closer to some of our public health objectives.

Accessible coverage—if we want to have coverage that is more accessible to people, we need better access to healthcare and this means having more usable applications and online services, which sometimes are very difficult for governments themselves to develop. But make your data about the healthcare system available and you will see start-ups, innovators and developers build much better apps to help the general public get access to healthcare.

Affordable care—affordable care means lowering cost and curbing the long-term explosion in

healthcare cost. An example of open health data: using datasets about prescriptions of generic drugs in the UK, researchers were able to show if you just brought all the different local governments to the level as the best one in terms of generic drugs usage, be it for only one kind of molecule (statins for cholesterol levels), you would be able to save about 200 million pounds per year—these are 200 million pounds left to better serve the public. This is the sort of findings you can make if you open government data to the public.

In looking at some of the major preventable challenges we are facing, air quality and air pollution is becoming one of the largest preventable health risks. Why don't we have more access to information about our environment? And this is where the link between smart cities and healthcare comes into play, because more access to environmental data and "exposomes", all this data about our environment, should help us have a better understanding of the conditions under which we should treat patients.

So smart cities really are better cities, and more open governments mean healthier citizen.

SINIKKA SALO, Deputy Mayor Healthcare and Social Welfare, City of Oulu, Finland, touched upon the 3 items:

1) How to redesign a smart service connected model which uses ICT tools and personalised services?
2) What are the requirements for the infrastructure for connected health?
3) The health ecosystem for R&D and innovations.

Mrs Salo referred to a fictive article published in the New York Times in November 2020. The article is supposed to describe how Finland has succeeded to cut the cost of the health expenditure while, at the same time, the proportion of the digital health business rose.

Furthermore, the fictive article describe that the success was based on a Finnish data miracle, a digital health revolution. The digital health revolution aims to enable the utilisation of data about the individual as part of personal preventive services. The idea is that all data is health related and the individual has the right to decide how to use the data.

However, this scenario has already become reality in the City of Oulu. Oulu has created a new innovative process to redesign a smart service model which is a truly citizen-centred next generation cost effective high quality system—integrating social and healthcare. It empowers the citizens to manage and maintain their own well-being, by using the latest ICT tools and personalised services.

The key issue indeed, is how the data is available for the use in the right place, at the right time, for those people who need it; and how we are able to use the data for R&D and for the new business opportunities.

This kind of integrated service platform already exists in Oulu. Oulu Self Care Service is available for every citizen, free of charge. It is provided by the local government. And, it is connected to the data basis that is used by the professionals. The platform offers a great variety of features (appointments, lab results, secure discussions with doctors and nurses, etc.) and guarantees the highest security of data.

The Oulu Self Care System was already designed in 2008, but today it is embraced by local residents and professionals and is used in the every day life.

However, the intention is to expand the system in order to further increase benefits for both citizens and professionals, and to include more apps and solutions. It is not the technology as such, but it is the impact on people which made the success.

In order to get best out of this kind of connected health ecosystem, interoperability is key. And there is a need for cooperation between various parties when selecting the standards to be used.

Infrastructure is essential for connected health. To meet the present and future demand of connected health and the Internet of Things, we need fast and reliable data transmission with high quality.

The Oulu City WiFi network including 5G is under construction and should be running in 2020. This will be connectivity between connected people and connected machines, complex multi-layered systems of overlapping, big and small, services. The wireless world 2020 is created in Oulu today.

Oulu's tool for connected health innovation is the Oulu Health Connected Ecosystem. It combines health, well-being, bio, ICT, professionals, research communities and companies. It is the biggest living lab in Finland. This kind of Oulu Health Connected Ecosystem cooperation model enables to translate research results into effective health policies and concrete outcomes as well as new business opportunities.

From the local government's point of view, the City of Oulu is investing in better health and well-being but also in creating growth and prosperity out of health at the same time.

The Oulu region has 250 000 residents and is the largest urban centre of the Northern regions in Scandinavia. It is located midway between Asia and North America and has excellent global and local connections. Oulu is one of the youngest cities in Europe, the average age in Oulo is 43 years. Thanks to the universities in the city, the educational level is very high (one third of the population holds an academic degree). Given this high reputation and a hunger to invest in next generations, health care and well-being solutions, the city looks for the best partners when carrying out the work.

The reason for this city engagement are the citizens. The young people are our future and they deserve smart fast and high quality connected services. The key issue in terms societal impact is, how the data is available for those people who need it in the right place and at the right time.

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WIL - Women in Leadership Breakfast Workshop

Day 2 – Morning – Plenary Session

Women in ICT: Transforming our Digital Future

WIL conducted a great morning session at the Global Forum in Geneva on November 18th, 2014. The session focused on the way in which women from advanced economies and emerging economies are influencing and impacting the ICT sector. Organised by Items International, the Global Forum is an international think-tank on the digital future.

The WIL session gathered an audience composed of ICT experts and enthusiast from around the world. Looking at the role of women in the transformation and adoption of ICT, the session moderated by **AUDREY MANDELA, Co-Founder, Multimap and Chair & COO of Informilo**, covered perspectives from emerging and advanced economies, with speakers participating from the US, UK, Egypt and the EU.

Delving into the emerging economies perspective, Ms. **EFFAT EL SHOOKY, Technical Director at Women Business Development Center- National Council for Women in Egypt**, contextualised the position on women in Egypt within the recent changes undergone by the country, and the formation of the new constitution. This set the tone for Ms. El Shooky to explain how ICT is being used to reach women in in villages and is empowering them to transform their lives through greater access to e-learning platforms, and providing the ability to seize entrepreneurial opportunities and become social entrepreneurs through the creation of their own micro-businesses'. In turn, through access to ICT tools, a community of women leaders has begun to grow and women are becoming more active in their societies as business professionals and consumers.

Building off of the intervention of Ms. El Shooky, Ms. **VERONIQUE INÈS THOUVENOT, Co-founder & Scientific Director, Millennia 2025 Foundation**, presented a program called Zero Mothers Die, which uses Mobile Technology to reduce infant-mother mortality rates, and improve pre and post natal health of women in emerging economies. This program was developed through the Millennia 2025 and is providing the opportunity for women to shape their own futures through the use of mobile services. Ms. Thouvenot explained that the program distributes a free cellular phone to women who have registered their pregnancy-through the mobile device they receive information and video's specific to their pregnancy and are given a number of minutes per month to contact and communicate with health care professionals and others. This initiative not only reduces infant-mother mortality rates, but familiarises women with new technology, can provide knowledge capital for women and creates a safe more prosperous future for women and their communities.

Shifting the lens from emerging to developed economies, Ms. **LAURA MANDALA, Managing Director, Mandala Research**, mentioned that without a doubt we are entering a new age, an age of information technology and telecommunications. Ms. Mandala presented some telling data on the number of women entering and making it to the top of ICT companies, revealing that in reality, in the USA, less women earned computer sciences degrees in 2011 (18%) than in 1985 (37%), and only a small percentage are able to break the 'glass ceiling' and join the executive or senior management teams. Furthermore, Ms. Mandala mentioned that a disconnect between users and business teams composition is becoming more clear, for example, the company Pinterest which is valued at 3.8 billion USD, had a female user base of 70% in 2013, but has a 100% male board of directors. Similarly, Google, Facebook and Twitter all went public with male boards, although Ms. Mandala mentioned, we are seeing some diversification occur in these companies now. In essence, there is a great need for companies in the ICT sector re-align themselves to represent their consumers and the general population, with more gender parity among their executive and senior management, as Mandala research has found that mixed gender teams are often more innovative, creative, productive and resilient.

Rounding out the discussion WIL Women Talent Pool alumni Ms. **ANNE-LISE THIEBLEMONT, Senior Director, Government Affairs, Qualcomm,** bridged the discussion from the emerging and developed economies by sharing some initiatives Qualcomm has been spearheading for women in ICT in both areas. In Malaysia for example, Ms. Thieblemont shared that Qualcomm has set up a mentoring program for women which is linked greatly to enhancing entrepreneurial potential in women- raising their access to status in society. In the United States the company has likewise done a lot to combat the lowering number of women in ICT by enhancing girls and women's interest in ICT through tech skill and mentoring camps. Ms. Theiblemont also shared that most growth has been in the mobile market, with smart phones, and that by 2018 it is expected that most technology owned by users will be smartphones. Lastly, Ms. Thieblemont mentioned the benefit of programs like the WIL women talent pool, as opportunities for younger women to grow into leaders, identify opportunities and connect and network with peers, as well as with inspiring high-level women.

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Session 6

Day 2 – Morning – Plenary Session

Catalysts for Innovation
Turning Ideas Into Realities

BROR SALMELIN, Adviser for Innovation Systems, DG CONNECT, European Commission, chairing the session, stressed that innovation can not be controlled; it can not necessarily being led, it has to be orchestrated. As introduction to the session, he set a certain perspective on the innovation ecosystem, beyond the clusters, and illustrated how important the interaction between the different player is.

Open Innovation 2.0 – co-creating ecosystems!

Innovation is to make things happen. The faster the better, the success rate counts, the speed counts. Related to innovation is the courage to experiment and to find the unexpected. It is not a linear extrapolation of the past, it can contain those components, but it is much more complex.

When we look at traditional policy makers, still in most of the documents we see the thinking of linear innovation models, applied research, industrial research deployment. But actually in very few cases that is valid. In some disciplines you have it, but what is more important is that you grow a lot of seed to be harvested, to be mashed-up, to be interlinked into the innovation process.

From that perspective, the EC tries to push for new kinds of understanding innovation: user-centric, user-driven innovation, open innovation and looking at that from an experimental mash-up perspective.

VUCATIONAL society -- How to prepare ourselves for a society that is Volatile, Uncertain, Complex and Ambiguous. This means that we cannot predict the future. We can catalyse and make qualified guesses. It is also important to notice that we don't have necessarily time to do analyses anymore.

The same is reflected in enterprise structures. When looking at modern enterprises, we should not even speak about networked enterprises anymore. It is really grabbing on those competences which are needed at the moment. It is more opportunistic than any time before.

Then, looking at the dimension of crowds in innovation. It is important to seek the extraordinary. When you ask experts on solutions for a problem, you get a very good convergence, because they are very much the solutions monoculture; monodiscipline and based on the past experiences. However, what is interesting, are the extremes. There are several studies showing that if you ask experts you have a high number of rather well converged answers, which are relatively high value to solve the problem. But, if you go to the crowds, you actually get from the crowd a higher number of those solutions which are of extremely high value. Of course, from a policy perspective it is very interesting to look at that area of interest where the crowd can provide higher value solutions for the problem than the experts.

How to make that happen? According to a MIT study from 2002, you have a clearly higher probability to have breakthrough innovations if you have a diverse research group. Again, diversity matters. This is also why the crowd can provide higher value solutions than the masses of experts.

Based on that, we need to seriously think about two new professions: curators, who take care of the contents, and bridgers, who are inherently curious about absolutely everything and make the connections between disciplines, stakeholders and make the ignition for innovation.

How to make it happen, how to validate those, is very much on experimentation. We need to have real world experiments, designed in the research policy programmes, which very soon reveal whether a solution is failing or whether it is scalable. And if it is scalable, we scale it up fast; and if it is not scalable, we kill them fast, without investing a lot of money in the wrong direction.

Based on this, it is possible to sketch different pictures of innovation ecosystems. It is important not to look at the traditional enterprise public-private-partnership-types of models, but also at all kinds of competences, including the civic society as important player in there.

In terms of the paradigm change of innovation, the EC is trying to move towards an open innovation 2.0 where we try to break the boundaries between disciplines, between different stakeholders, where we push for genuine quadruple helix innovation, orchestration rather than control, where we go beyond the “out-of-the-box”-thinking. We don’t need any boxes at all.

We can imagine the European Innovation System as a kettle, where the public sector is providing the kettle, and the energy, the fire, whether it is research funding or policy funding, procurement etc., and the public sector is taking care of all the ingredients in the kettle, but not determining a priori what kind of soup or regional flavour it will contain. We should create ecosystems with the ingredients, creating those coalitions and have all the players on board.

THOMAS ANDERSSON, Senior Advisor Research, Innovation and Higher-Education, Sultanate of Oman, addressed four important areas for catalysing innovation by putting people at its centre.

Not so long time has passed since there was extensive questioning whether ICT really makes much of a difference. About 15 years ago, it was concluded that it is not the production of ICT that really matters, it is more how it is used. And also, that when you introduce ICT without undertaking organisational change and complementary efforts in skills development and perhaps innovation, you might even have a negative impact. It is not a given how people use ICT, and for what purposes. The result could be plenty of both positive and negative impacts.

Today, the link between ICT and innovation is very strong. The importance of innovation is obvious when we look across different industries and different product areas. Today, innovation happens in all countries across the world—it is no longer confined to developed countries, like in the old days of the product life cycle theory, when new ideas were viewed as developed in the US and then, when production had matured, ended up in developing countries in order to keep costs down and exploit low wages. Today, innovation is everywhere and every country and company is in the hunt for it.

If the value of innovation is so obvious, why don't we have an easier time with it? We are in an unprecedented moment in history, when the ability of more and more human beings to access, to diffuse and to use information is just unbelievable. And still, we have all these issues with global warming, with health, with security, with the financial crisis.

There is a lot, both positive and negative, going on. But what is really critical here does not really have to do with technology; it is about people! It is important to realize that and to take that observation the whole way when it comes to policy frameworks and organisations. It is now essential to invest in people and to further cooperation as well as competition. It is essential what energy people unleash and for what purposes. A society will benefit where the dynamics of social development help catalyse innovation of the sort that meets with the real needs of human beings, society and the world more broadly.

One critical area is education and learning. This is one of the major growth areas of our modern society. Extensive resources are invested in education, but the quality is often lacking. There is still a lot of autocratic teaching, traditional thinking and resistance to make use of the new tools now at hand for more effective learning. Thinking differently about education is very important.

The second critical area has to do with content. Much use of ICT focuses on achieving effective entertainment. Developing content that is inspirational and able to mobilise people for developing their own solutions to various outstanding issues, is critical. So far we have had limited efforts devoted to developing such content? Rather than emanating from IT-industry or specialists, governments and other organisations should attain a stronger positon in driving such content.

A third area has to do with smart cities. A smart city is a particular platform that is now - for various reasons - becoming very important. Perhaps this is because the nation state does not represent the kind of level where you are able to connect with clusters and local communities. The smart city is about enabling people to be active, with the help of sensors and measurements of various responses in real time. The issues addressed span waste management, water management, energy savings, etc. 90 percent of the European cities

with more than half a million inhabitants now reportedly have some sort of smart city agenda. Still, the engagement of human beings, of the citizens, is not really there yet, at least in terms of inspiration and engagement. The platforms that are created by cities, with smart sensors and all kinds of tools going forward, represent a major opportunity to make people more aware, to gain transparency and inspire for social innovation in the local context.

The forth area is ICT itself. Yet outstanding unresolved issues complicate the future of digital communicating and what it is to be used for. The Internet is expanding with more than 2 billion users, and with mobile phones coupled with convergence we are moving towards having 6 or 7 billion people on line in a couple of years. But then there are trillions of devices that will be connected as well, and constantly communicating, that need to be authenticated, authorised, verified. There has to be privacy and security. Our personal data is valuable as it is filling the world with information that can be combined with other information for multiple purposes. And despite that value, our information is now made freely available without any visible price ascribed to it. Hardly any human being is in a situation to know how it is used, or to be able to arrange that your data can be used as a sort of platform for enabling the development of and access to trusted e-services.

Various ongoing research projects try to figure out how to turn the logic around. How to get to a situation where it works for operators and service providers to interact with people on such terms that the value brought by their data can generate some returns for both sides. And perhaps that is also the way to lay the basis for more trusted services and sharing of valuable content.

For a policy to be effective in calatyzing innovation, we need a strategy spanning a spectrum of such issues, putting people at its centre.

MARTIN DUVAL, CEO & Founder, Bluenove Group, France, outlined the importance to involve both your internal and external ecosystem in the process of dynamic collaborative innovation.

Open innovation is not so much about processes but about the culture of an organisation, whether this is an enterprise or a public service. Companies start to understand that there is a way, through open innovation, to create a competitive advantage by being better than others in managing risks, in collaborating with the stakeholders of the ecosystem.

However, there is still much to do to improve collaboration within the organisation as well as trying to improve collaboration with the stakeholders of the external ecosystem (customers, start-ups, labs, universities etc). In general, it takes as much time and resources on improving the collaboration within an organisation as on improving collaboration with the external world.

Open innovation is about how we are, as an organisation, systematic in the way to involve every stakeholder of the ecosystem in the innovation process. Organisations that are good, or even better, in doing this are creating leadership and competitive advantages. They challenge the question of how to go further by involving the customers in the innovation process? How to go even further by involving the suppliers in the innovation process? Of course, including the employees or the start-ups, in case of a major corporation.

bluenove has designed an implementation framework because open innovation is very concrete and operational in the way levers towards the external ecosystem are implemented. It is about being systematic in implementing these levers, but also about how do we call for experts when we have a problem to solve. Sometimes innovation starts like that, and the organisation has to ask itself, what to do in the case that there is a problem and a need for external experts to support the organisation.

There are many levers and when implementing them all, organisations get closer to an open innovation culture.

An open innovation organisation is not only about sharing what we know, but also about sharing what we don't know. It is not easy for a company to step towards sharing information about what they don't know. There are portals where companies start listing their problems that are still unsolved. It is a big "cultural" step for a company not to fear that their customers or competitors see them listing the problems they cannot solve. But there is a higher chance to find the right people that will help you to solve the problem, than actually one of the competitors looking at the problems you have—which, in most cases, are already known as it is competition in the same domain.

We should add to the notion of Open Innovation 2.0 the social dimension, because there is a direct bridge to social responsibility. When a company is very good at implementing open innovation strategies, it is all about having the stakeholders involved in the innovation process—and what is social responsibility if it is not better interacting with the stakeholders? There is a true link between open innovation and social responsibility, even if this connection is often not very obvious in companies, as innovation managers don't talk very much with the social responsibility managers. There is more to do in this area.

However, not every collaboration requires ICT. The best organisation will find the right way to implement open innovation with the right mix of online collaboration approaches and offline approaches. It is all about people, it is all about humans and this still requires physical meetings. In terms of open innovation skills, it is important to find the right balance between online and offline collaboration. Of course, online approaches have the advantage to be able to target crowds and to manage collective intelligence. When it comes to getting 50 000 people to contribute to solve a problem, there is definitely a need for online tools. But it is sometimes also about getting just few of these people physically in a room, at the right time of the process. The whole disruption often happens with the way and the skills organisations are mixing online and offline collaboration.

EFFAT EL SHOOKY, Technical Director, Women Business Development Center (WBDC) & Founder of Community-Based Knowledge Innovation and Social Entrepreneurship Initiative (CKI&SE), Egypt, described a great initiative aiming at encouraging and supporting innovation for communities.

When talking of knowledge innovation and social entrepreneurship, we are not talking of services or products, but of the quality of life. CKI&SE cares much about the impact on the people constituting the community.

There are some major issues to keep in mind when talking about innovation for communities. First, it is very difficult for the communities themselves to identify their challenges. What are their real problems? Or course, there are healthcare problems, education problems, but theses are not the real problems the communities are facing and in which we need to exert effort to find solutions.

CKI&SE tries to identify the challenge that the community is facing and also to find existing practical experiences, e.g., whether they are facing a problem related to waste, as most of the villages do. A primary issue here is identification of the challenge. Once the case is identified, the question is, what are the existing practical experiences to be built on?

At the same time, when taking about innovation with the communities, we need them to be part of the process.

CKI&SE then collects the best practices related to this case—and figuring out the existing best practices is generally a rather difficult task. It is also important to identify who are, or who could be, the community stakeholders to be involved in the process that is going to be adopted for this community. Furthermore, it is important to put into place a kind of value chain process in order to make sure that the innovation could be commercialised and would bring revenues or better quality of life to the people of the community, because they are what matters.

A major problem CKI&SE often faces, once there is a product, a service or a project, is the question of the business model that is economically viable for all stakeholders and partners, people or agencies or NGOs… In other words, the issues of compilation of practices being able to move from innovation to commercialisation, identifying business models and trying to put into place micro-businesses that these community people can create out of the innovative or the solutions put in place.

Partnership is absolutely key for the design of such project. Partnership between science and research, innovation, the social aspects and the people of the community; building this partnership and putting into place the proper alliances that ensure the successful implementation of the innovation. At the same time, dissemination of the service or the product or the experience itself is very important in order to achieve cross-fertilisation of the impact of the innovation.

DENIS GARDIN, Senior Vice-President, New Technology Ventures & Managing Director, Airbus Group Corporate Technical Office; President of TESTIA, Airbus Group, France & **PIERRE LANGER, CEO Powidian, France**, presented a very concrete product of open innovation:

Denis Gardin introduced Airbus as a big traditional industrial group which is used to manage large projects in a very linear manner. During the last 4 years, open innovation had been introduced in the company. It was a long journey and required leaning inside the organisation. It required the processes to validate the projects, but most of all, the agility and power to bridge across the organisation. It is important to have the right people, entrepreneurs, people who want to develop new things, who want to connect to the outside.

To illustrate a successful open innovative process in the Airbus Group, Denis Gardin handed over to Pierre Langer to present the PowiDian project.

PowiDian stands for “Power in all Meridians”, which means an energy station which is supposed to provide electricity anywhere at any time.

Airbus Defence & Space is number 2 in PMR (Private Mobile Radio Networks) worldwide, i.e., networks for Blue Forces or private networks for big organisations, where you need rural coverage everywhere in the country and a high level of reliability for the networks.

Airbus Defence & Space could not find in the market a suitable solution to get reliable electricity for disseminated and isolated telecom base stations. Sometimes, there was no solution at all; sometimes, the only solution was the use of diesel generators, which was not satisfactory for various reasons.

Starting from a white paper with the idea of developing the “ideal” solution, an innovative solution has been developed, using renewable energies and advanced li-ion batteries and hydrogen storage.

This has been developed by programmes by Airbus but at the end of the day, the company realized that such a solution is very interesting for telecommunication, but also has an enormous potential in wider markets. This coincided with the arrival of a new CEO of Airbus, when the company decided to slightly refocus its strategy on “”we make it fly”, i.e., “we do everything that is flying and if it is not flying, it is not really core business anymore”.

PowiDian is a typical case, where Airbus needs the technology, but don’t want to be involved as it is not core business. Thus, the company initiated a spin-off process after having carefully checked the viability (technology, market study, seasoned management team).

PowiDian designs and sells SAGES (Smart Autonomous Green Energy System): an intelligent turn-key solution to produce everywhere reliable green electricity using renewable energies and hydrogen long term storage.

The strength of the system is that you have only one architecture, but three products or usages: “autonomous”, i.e., there is no electricity network at all; “back up”, i.e., it is possible to connect to the grid, but the grid is unreliable; and “mobile”.

How does it work? It is possible to use any type of renewable energy (solar panels, windmills, geothermal or hydrogen power etc.). When there is too much wind or sun, instead of losing the energy, you charge your advanced lithium ion battery and for long-term use, you

create hydrogen out of water. Thus, you produce locally your own hydrogen, you store it (by using a number of disruptive technologies), and once there is no more wind or sun, you take automatically the hydrogen through a fuel cell and produce locally your own electricity. And, configured with some intelligence inside, e.g., remote administration, optimisation, algorithms for predictions or for self-learning, control algorithms etc., it is possible to have a very long life cycle with a good performance. This technology enables to produce all the electricity needed, all year long.

The following assets have been transferred from Airbus to PowiDian: There have been 4 years of prototyping, technological surveys and a market study, transfer of know-how, i.e., software, mechanics, chemistry, electronics. Airbus also provided free software licences for mathematic simulations as well as worldwide patents and supported PowiDian, not only in finding investors but also with a strategic agreement to help PowiDian sell its products.

Who benefits from whom in such an approach? There are clear benefits for Airbus, they will benefit from products supplied by a pure energy player. Airbus shows that it promotes internal entrepreneurial spirit and generally improves its political image.

PowiDian benefits from the transfer of key assets at unbeatable conditions. Airbus is backing PowiDian in finding private investors and there will be commercial and technical cooperation with Airbus.

What are the benefits for the customers and Europe? Both Airbus and PowiDian customers will benefit from innovations. PowiDian will create 12 jobs in 2015 and may take a leading role in European energy transition plans.

With his usual brilliance, **MICHAEL STANKOSKY, Research Professor, George Washington University, USA**, discussed the topic

Mosaic of Innovation -- A Prism of Wonder, Magic, Mystery

When you look at innovation, it has so many flavours. But there is one magical potion that brings them all together historically, it is the connectivity of disciplines and ideas with people.

There are 42 disciplines and sub-disciplines that comprised Knowledge Management. It is like a mosaic. How to make sense of all this?

The first Chief Knowledge Officer of the US Government once said that “Knowledge Management was nothing but process, people and technology; and people are the most important.” But this is wrong—tell that to United Airlines when their technology reservation system goes down and they will tell you what is most important at that moment of time…

The problem is that we don’t know how to do the “and”. The history of the origins of the zero (0) is fascinating, but also the ampersand, the and sign (&).

“Consilience” is the name of a book by Edward O. Wilson, published in 1998. It is “the unity of knowledge”.

We are always talking about connectivity. In the October issue of Vanity Fair, Walter Isaacson talks about the great connectors. It is all about connectivity, convergence of disciplines, things happening at the boundaries of disciplines; from chemistry to mathematics

etc. While innovation has a lot of flavours, we need to feel better about this inter- and multi-disciplinary world we live in. But the challenge is, how to put it all together.

STEM has always been especially since the School of Engineering and Applied Sciences, but it is giving way to a whole new paradigm, called STEAM, which is Science Technology Engineering Arts and Mathematics.

To quote Walter Isaacson in the Vanity Fair, “The people who will succeed are those who can link beauty to engineering, humanity to technology, and poetry to processors.”

The archetype of that is Leonardo da Vinci, who created the “Mona Lisa” or “The Lady With the Ermine”; and also come up with concepts for helicopters, various machines etc. It is that type of people we need to create today.

YOSHIO TANAKA, Professor Tokyo University of Science, Japan, addressed the issue of

Catalysts for Innovation in Japan, Turning Ideas Into Realities

The IMS project, a cooperation project between the EU, IBM and Japan realised in the late 1980s, still bears huge relevance in the current context of catalysts for innovation.

An airplane best illustrates the concept of innovation as dual engines with things and services. Our approach in this new area should be to promoted by things and systems

IT essentially contributes to business growth. In addition, with the progression of IT we have produced a tangible and intangible benefit to the users. But the boundaries between technology and service providers has become bigger and unclear.

New things will be declared with new services or systems.

The concept of things and systems is simple but implies a change of business models. The proposition is a business design which promotes the cooperation of the things and systems.

Two organisations have been created in April this year: The Things & Systems Society and the Things & Systems Consortium. Both are interacting in order to provide a practical case to the society and to make the industry change their business model.

Japanese’s industries are very strong. Many of its products are number 1 products in world. One mission of the Things & Systems Society is to encourage the manufacturing companies to incorporate the new business mechanisms of the things and systems concept.

JULIE WAGNER, Non-Resident Senior Fellow, Brookings Institution, Metropolitan Policy Program, USA, delivered an excellent insight in the creation of new innovation districts.

For the past 15 years, the geography of innovation has been dominated by places like Silicon Valley, like Research Triangle Park and other science parks. This is true for the landscape across Europe, the US, South America, Asia and other global regions.

Research at the Brookings Institution, Metropolitan Policy Program over the last 2 years have been documenting that there is a shift of innovation occurring, that the geography of innovation is shifting to urban and urbanizing areas. There is now a growing model; there is a new model to be exploited and to be discovered.

Brookings has found that there is this proliferation of so-called innovation districts. They are small in scale, they are at the sub-city scale, at the neighbourhood scale. There is tremendous amount of work that is happening at the city level.

These innovation districts are defined areas that are merging due to a number of trends. When asked for the reasons to come to these places, people answer that they subscribed to open innovation, that they very much focus their work on collaboration, on convergence but also add the reason of proximity. These firms, that are wanting to benefit from the value of open innovation, are also seeing the value in being physically next to other firms, other entrepreneurs and start-ups. They are seeing a new value of place.

Another piece to this, which is particularly important in the US, is that there is a resurgence of cities, where there is a demographic, whether it is the Millennials or the senior population, both of this demographic are valuing cities again and they are moving there. Large cities are redesigning themselves to attract these demographics.

There is this resurgence of cities and now, there is this concentration of innovation that we didn't have before at this sub-city scale.

Innovation districts are geographic areas, where anchor institutions, such as research universities, companies with extensive R&D, research hospitals, are clustering and connecting with firms, large and small, start-ups, entrepreneurs, that are encouraging and supporting incubators and accelerators. Physically compact, transit accessible and technically wired, they offer mixed-use housing, office and retail, to enable the innovation ecosystem. These innovation districts are "live, work, play, learn, innovate" spaces.

An example is Kendall Square in Cambridge, Massachusetts,. When you walk down that street, you have MIT, which is producing a great number of spin-offs which decided to stay put, that are located adjacent to MIT. You find that there is an emerging group of companies in bio-science, you have the Cambridge Innovation Center, which is housing a number of the start-ups in bio-science and other fields, and as latecomers, Pfizer pharmaceuticals and Google. They want to have proximity to the universities, the entrepreneurs and the spin-offs, and they want to draw on this creative and exceptionally well educated talent pool.

The creation of such innovation ecosystems is not just happening in Cambridge, it is happening in Boston, in Philadelphia, in Atlanta, in Saint Louis, in Seattle, San Francisco, but also in Barcelona, in Stockholm, in Berlin and London.

In its diagram of innovation ecosystems, Brookings placed physical assets as a crucial component of creating an innovation ecosystem. It is not just about pools of economic assets, it is really about the convergence of economy shaping, of place making and network building. And when combining this with a risk taking culture, you then are creating this innovation ecosystem.

Examples for economic assets are the Drexel University in Philadelphia, which is a research university; Amazon in Seattle is another anchor institution or Eriksson in Stockholm. These are the kinds of drivers that are starting these places.

In terms of physical assets, for instance, in the public places one has to think about, how to reinvent the physical round to be in the service of innovation? How these parks and plazas and open places can be reconfigured to create collision points and get people to mash together and create new relationships? Whether it is thinking about where to place chairs, where to locate eateries, what are the kind of programming that you have to entice people to come together.

The individual buildings, which were once a sort of one-shop, one company on one floor, are now being entirely reconfigured. There is now co-location, the sharing of office spaces. There are companies that are intentionally building extra space to have entrepreneurs locate there and tend to collaborate. An example is the shared laboratory space in Cortex, Saint Louis. They created this shared space to offset the cost of entrepreneurs. This something happening all over the world.

Another physical asset is the large scale investments that are being made. In Stockholm, for instance, a tremendous amount of money is spent to cover highways in order to create this kind of connections mentioned above, and connecting the university hospital to a series of life science clusters, life science firms and entrepreneurs.

With respect to networking, the concept of understanding how actors are relating, how they are connecting and how they are doing it at many different levels, is instrumental to this conversation of open innovation. In some of these innovation districts, they have hired people just to think about this issue. They are choreographing that now in these places.

There is this new model emerging in cities and in urbanising areas, where physical is a strong component of this, it is this mashing of the economy of the physical and the networking. Although, having a risk taking culture is an important element to making this model continue.

The chair of the session, **GARY SHAPIRO, President & CEO, Consumer Electronics Association, USA**, represented the consumer electronics industry in the US.

The US consumer electronics industry is an industry of over 2 000 different companies that are doing just about everything in technology, including creating a lot of products enabling to communicate without physically being next to each other. There is conference equipment, there video cameras, and all sorts of technology enabling people to communicate and participate in society without being face-to-face.

CEA has established a foundation with the mission to link seniors and people with disabilities with technologies to enhance their lives.

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Q&A

The chairman then asked **Julie Wagner**, Brookings Institution, why being physically near to each other is still important to mankind?

Julie Wagner explained that the process of innovation is changing. There is open innovation and there is this greater focus on collaboration and convergence. When Brookings interviewed over thousand individuals, but also large companies such as Google, Pfizer, or Spotify, about "why do you move here", the answer was, "because proximity matters", out of sight does mean out of mind.

Studies and additional findings further support that: e.g., R&D laboratories are clustering at very small scales. They are intentionally clustering at scales that are a quarter of mile or less.

The following question was addressed to all panellists: How important is proximity and how important is proximity to the serendipity and to the idea creation process?

Thomas Andersson, Senior Advisor Research, emphasised that investing in tangible assets, roads and real estate etc. is relatively easy, but investing in new ideas, taking that risk and relying on complementary skills of people that are very different, requires a lot of trust. This proximity really has to do with the importance of trust when you are taking risks in developing the new ideas. This is where you need that ecosystem to work out. Of course, you don't have to meet all the time, you can communicate and collaborate with people all over the world, but now and then, you also have to meet in order to build that personal relationship.

The chairman followed-up with the question, whether this is because a lot of the investment that goes on in a world of innovation is really focussed on the people as much as the idea.

Mr Andersson commented that one cannot separate the skills, the talent, the willingness to take risk, to open up complementary networks and bring them together. That generates win-win, and this is essential for that trust to hold.

Michael Stankosky, George Washington University, added that if you look at the great innovations historically, they haven't really happened in clusters. Where is the empirical evidence that clustering, in terms of patents etc., works? We need to look at everything and we need to look at the whole world. All these good ideas need to be perused, but we should not forget the "aloners" like Tim Berners-Lee, who created the Web, or other great inventions that didn't come out of clusters. We have to be careful, that sometime we launch on to an idea which is positive, but we don't know how to stitch it in to the rest of the ecosystem. And this is where Steve Jobs made it, because he tried with the new and he failed, but then he came up with an ecosystem of convergence.

Martin Duval, Bluenove Group, answered that some big social issues can only be solved by a large number of people. "Proximity" are those moments in the innovation process when it is time to meet physically, especially with a small group of people. It is all about using the technology to manage in new ways access to a very large number of people. There could be long online debates over a period of several months to solve a problem, but then use the assets of proximity to meet as a small group of people. Management of innovation is going to be about how companies or groups are able to manage both at the right time. Proximity is also a small number of people at the right time in the innovation process, mixed with a large number of people online, but also involved in the innovation process.

Bror Salmelin, European Commission alluded to a study of the Cambridge University carried out 20 years ago, that looked at communication intensity. Roughly the result is that as long as the coffee remains hot, you have your communication distance in the building. Also, if you are on different floors, the communication distance is huge. So, it really has a very important role to play.

Moreover, the work of the New Club of Paris, a thing tank on knowledge society intellectual capital, has shown that actual structural intellectual capital matters. The more you have structural intellectual capital, the better you are regarding competitiveness—and that matters for countries, for enterprises, for organisations in general. What that also says, is that intellectual capital, the knowledge per se, is not important. It is how it interacts with the others, how you make these horizontal collisions, and this again refers to proximity.

The chairman referred to the myth of the individual—a myth because usually there is a team involved. How important is the team, selecting the members of the team, who you put in there and who you don't put in there?

Yoshio Tanaka, Tokyo University of Science, explained that big companies in Japan are generally employing the same specific type of persons and that these big companies don't really generate innovation. Innovative people don't get the support they need in these large organisations. He gave the example of Shuji Nakamura, who has been awarded with a Nobel Prize. Nakamura had to leave the big company he was working for in order to pursue his innovative project.

Martin Duval, Bluenove Group, emphasised that there is a trend over the last 2 to 3 year in terms of the big innovation challenges, where companies try to gather ideas from their own employees. 4 years ago, this was about getting ideas from individuals, but today, it has become a criteria in many big challenges, to come from a team. There are organisations using these challenges to force people to create a transversal team with people they don't even know in order to be able to submit the idea in the challenge.

Effat El Shooky, Community-Based Knowledge Innovation and Social Entrepreneurship Initiative, referred to innovation camps bringing together all stakeholders of a project, including the members of the community. At the beginning, these people aren't even aware that they could be of value in the process of gathering ideas from within the community itself. Proximity and face-to-face communication are essential for the success of the innovation camps.

Denis Gardin, Airbus Group, then was asked, "how important was it to the success of PowiDian that that be a project that has essentially spun off from a large company to a start-up?"

Mr Gardin explained that, from a strategic point of view, such a technology, i.e., the production of energy, would not fit into a group like Airbus today, because Airbus focuses on building aircrafts and satellites etc. It was important to find a way to realize this project as a spin-off. However, it was extremely important to find the right team of people to make it happen. That is what is usually lacking in big companies when talking about open innovation. We learn about the processes, we do benchmarking etc., but at the end of the day, if we don't have the right people, we have nothing. The team is absolutely key.

The chairman then concluded this session asking the panellists to choose two keywords they consider as important in the context of innovation:

- Opening and Innovation – Martin Duval
- Enable and Inspire – Thomas Andersson
- System and Communication – Yoshio Tanaka
- Courage and Curiosity – Bror Salmelin
- Team and Creativity – Denis Gardin
- Curiosity and Perseverance – Pierre Langer
- Consilience and Wine – Michael Stankosky
- Proximity and Convergence – Julie Wagner
- Intercommunication and Value chaining – Effat El Shooky

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Session 7

Day 2 – Afternoon – Parallel Session

Citizen-Centric Smart Cities

JULIA GLIDDEN, President and Founder, 21c Consultancy, United-Kingdom, and moderator of this session, welcomed the participants to the "speed dating of smart cities". She then moderated the session with sharp observations and thoughtful considerations.

ISMAIL DIA, Senior Director Government Accounts, GovDelivery Europe, Belgium, [www.govdelivery.com/], chairman of this session, introduced the topic of smart cities.

Local governments and cities have been pioneering public sector transformation for some years and have become a laboratory of what can be called smart or open government. Citizen local communities have the advantage of larger governmental structures to be in direct contact with their citizens as well as to directly impact on their lives by providing services in many areas responding to the needs of their citizens and local businesses, from reviving neighbourhoods to boosting local economy, to educate their citizens of tomorrow by building schools, and efficient transport infrastructures.

Therefore, cities are highly looked upon when talking about open governments, smart cities or citizen engagement in policy shaping, e.g., e-participation, urban planning participatory budgeting etc. What will change to live in a smart city? Although there is no single and universal definition of a smart city, the smart city of tomorrow will be multi-faceted with a main ingredient, which is the citizen. A smart city empowers its citizens to live better, move better, work better and be smarter consumers. ICT, Internet and social media are changing the way we live, travel, consume and produce thanks to a fast and personalized and multi-dimensional information flow. Today, we can already buy, ask questions, compare, meet, save time and use services tailored to our lifestyle and needs in one click.

Therefore, thanks to more connected urban networks, we can save energy and raw materials, because we are better informed and aware of the challenges we are collectively and individually facing.

Finally, we participate in the creation of this information to share with others and in an unprecedented free trading system. Today, we are more likely to use services than to possess goods, an example is carpooling or car sharing. The economy of sharing and collective intelligence is emerging and invites cities and local governments to find new economics and service models closer to its citizens and businesses.

A number of questions to shape a vision of smart cities:

- What kind of data is important to our organisation?
- Have we prioritised our data?
- How is data currently accessible to employees during a crisis?
- What can we do to improve?
- What location-based solutions already exist to start addressing my problem?
- What role does technology play and what is our technology roadmap?
- How often are we planning and preparing for a crisis?
- How do we become more agile and proactive to address complex problems our community faces?
- How have we encouraged collaboration?
- Have we engaged the right stakeholders to discuss how to become more resilient?
- What are the biggest threats to our community, environmental, infrastructure, transportation climate change and other?
- How to migrate the threats?
- What kind of opportunity exist for us?

SAMIA MELHEM, Lead ICT Policy Specialist, Chair eDevelopment Group, Information and Communication Technologies Sector Unit, World Bank Group, delivered a thoughtful and deeply committed talk on measures African cities are taking to become smarter.

Leveraging technology for better living in cities

The World Bank invests in developing countries through loans, grants or credits. Its clients are public sector institutions. The group "Transport and ICT Global Practice" is a group of 350 people out of a population of around 16 000 at the World Bank. Transport and ICT Global Practice uses technology for development and to achieve the Millennium development goals and then, after 2015, the sustainable development goals.

The group's biggest concern are the very poor people, the bottom 40 percent of the pyramid, as well as the extremely poor people—those that live on less than 1.25 dollars a day. And for these using technologies for development is indeed a challenge, as it is often not even possible to reach them.

The World Bank's ICT strategy has three fundamental pillars: The first one is "connect", to help increase broadband connectivity, often through public subsidies, in areas where there are market failures. A lot of time is spent on training regulators, hoping to modernise the regulation process and make it fitter for the 21st century. The World Bank also finances e-government, so the clients are ministers of health, education, or ICT. And the third pillar is innovation. Under the innovation work, the Transport and ICT Global Practice group has started to work with local governments around the world, trying to help make these smart cities.

The biggest clients are in Africa. Two years ago, a big initiative called "Smart Africa" was initiated in partnership with the World Bank, the ITU, African Union, and African Development Bank. The Smart Africa initiative focuses on 7 pillars, one of them being the smart city. The World Bank is currently working on smart cities in countries like Tanzania, Kenya, Rwanda, Nigeria, South Africa and alike.

A smart city needs to be connected, its citizens need to be connected to the smart city

government. The smart city government needs to be connected to the central government and all that data generated is not supposed to create noise but improvement of the service delivery. A smart city not only opens up its services to the citizen, to the businesses, the tourists etc., but also, on the back end, works to reform the delivery of its services in general, e.g., waste management, transport, lighting, safety etc.

The aim is not to make the smart city a third world innovation or activity, but to make these cities to use the smart city concept to even upgrade their slums, or even improve life in refugee camps. Millions of people live today in refugee camps under atrocious conditions. How to reconcile the concept of a smart city and smart government and at the same time having the contrast with the areas that are ignored, like slums etc.

We have witnessed a huge revolution. In 2050, there will be around 9 billion people. 100 years ago, there were less than 1 billion. How to scale up and serve this population? How to ensure peace, stability, jobs and education? How to do this without technology? It is critical that technology, which is considered by many people as an area of innovation, “cool stuff”, great gadgets, and lots of for-profit, also has a huge role to play in making sure we have a stable world with 9 billion people, thereof 57 percent living in cities.

In most of the developing countries, you see governments still using procedures and processes dating hundred years ago, whereas technology allows to bypass many of the steps that are required to get a drivers license, a passport etc.

What can we do to help local authorities? 80 percent of cities provide the same services, they provide urban management, waste management, transport, safety, etc. How can we, through collaboration, cooperation and disruption to how municipalities work, help cities, that want to become a smart city, acquire the best and the greatest—and that doesn’t mean the most technologically advanced, but the best adapted to their environment of all these many systems that exist already.

How do we get everybody to converge around service delivery? Every city does it, Barcelona, Helsinki, Rio de Janeiro, Seattle, each of the major cities is doing some of that—but how to take that model and put it in a country that is facing a more challenging environment and create these North–South and South–North knowledge flows, so that the cities in developing countries do not have to reinvent the wheel, but can pick up solutions that exist already, adapt them, hopefully change the back end, and use most of their financing to train people, the civil servants, the first-time responders, the clerk sitting in the office and issuing passports and driving licenses to change their daily routine.

ERIC LEGALE, Managing Director Issy Media, France, representing one of Europe's leading smart cities, discussed the topic of

Smart city: a citizen centric vision before being a technical vision

The key question we have to keep in mind is, "what is a smart city?" When asking this question to private companies, the answer will be that it is about technology, infrastructure, fibre and alike. For a city like Issy-les-Moulineaux, the smart city is, above all, a societal project. It is a vision we have of the city of tomorrow.

Last summer, the French press published a map with 77 smart cities around the world. They defined a smart city corresponding to 7 different criteria. Of course, within these criteria are aspects like infrastructure, energy, and transport, but also aspects related to governance, social education, culture, citizen participation in the decision making process of the cities, and aspects related to environment and security.

Being a smart city requires having a very good infrastructure and requires to be a "digital city"—but it is much more than that.

Issy-les-Moulineaux, a small city closed to Paris, is experiencing since 20 years now the vision of the city of tomorrow. It is to give the citizen the means to be competitive in the market and the possibility to discuss with their elected officials, the majors and the administration in order to provide better services.

For Issy-les-Moulineaux, the smart cities strategy is a second wave of the digital revolution. And because today, cities have this modern infrastructure and because they have a smart population, they can go further and change the way they manage energy, mobility and governance.

However, this requires giving citizens and companies all the information that might be useful for the development of new services and applications. And of course, open data is a great opportunity for that.

Issy-les-Moulineaux is participating in the EU project "Citadel on the move". It is not enough to say, "we have to open the data". The first question for most cities is "how to open the data?", because it is not so easy to know, where this data is and what kind of data can be opened.

Citadel on the move has developed a toolkit of how to get started with open data and how to use them. The project has developed very concrete tools, such as a converter for data available in Excel files, and a tool to directly publish the data in a simple and easy to use mobile application. Issy-les-Moulineaux, an urban area with about 300 000 inhabitants, is supporting other cities in the project.

We need to be ambitious with regard to the technical opportunities of the smart cities development in order to change radically the way we are living in our cities. For instance, digital technology is an opportunity to change the way we move. An inhabitant of Paris loses more than 2 days by year in traffic jams. And this might even be worse another cities around the world.

Together with other European cities, Brussels, Antwerp, Barcelona, and Birmingham, Issy-les-Moulineaux is collaborating in 2 EU projects, called "Open Transport Net" and "European

Cloud Market Place for Intelligent Mobility" in order to find new solutions to smart mobility.

Finding ways to fight traffic congestion will be the challenge for the next years in the cities for the good of the environment and the quality of life of our citizens.

EIKAZU NIWANO, Producer NTT Corporation – Research and Development Planning Department, Japan, talked about some high level functional requirements for citizen-oriented smart cities.

Social trust, cross-sectorial integrated services and e-self-governments for citizen-oriented smart cities

The trend is moving from sector specific regional ICT to the smart city having an overall ICT city platform. This Smart City Operating System (SCOS) supports sensor network and IOT/M2M technologies, big data, open data and personal data technologies.

Up to now, a city-wide optimised and efficient management of hardware infrastructures in terms of smart cities has been deployed mainly for electric power, water and gas supply etc. A the same time, social issues, especially citizen-oriented ones, have to be discussed more. Addressing "social" autonomy based on ICT may be a lever for sustainable smart city development.

Last year, NTT proposed e-self-government as the next step of e-participation. It is "ICT based spontaneous and autonomous social environment" that supports self-governmental entities, dynamically and trustingly.

The key concepts of high-level function requirements to realise citizen-oriented SCOS are social trust management, cross-sectorial regional life service and information integration management, and e-self-governance management capabilities.

SCOS is an ICT environment that enables citizens to create and support/cooperate with self-governmental entities and to use multi- and cross-sectorial integrated services on the basis of social trust. The platform (SCOS) operator provides citizens with trust-related information, service integration and life cycle management of e-self-government and will charge a usage fee.

DOUG CRAIG, Mayor of Cambridge, Ontario, Canada, described the challenging pathway of building a smarter city.

The City of Cambridge, Ontario, Canada, is one of the fastest growing areas in the country. It is part of Canada's Technology Triangle (Camebridge-Waterloo-Kitchener). It is the home of Blackberry, it is the home of Christie Digital, it is the innovation centre where IMAX theatre first began.

Cambridge has about 130 000 inhabitants and is located at the confluence of the Grand and Speed rivers. The old historical Cambridge Post Office will be transformed into a digital library. A 100 000 square feet textile mill houses the finest school of architecture in Canada.

The Mayor of Cambridge confirmed the experience made in Geneva, that young people don't vote. It is part of what a mayor faces when trying to make change in the community, innovate or moving the community in a different direction.

Once you arrive at a destination like a digital library, and you look at the pathway back to the beginnings, it started with the school of architecture that has been brought to the city 10 years ago. 100 000 square feet, 500 students and professors, not just staying in the school but being part of the overall community, being investing in what the city is doing, sitting on committees, being part of festivals etc., helping the city in terms of design within the community. They have had an tremendous impact. They will be doubling in size in the next couple of years to again, have another impact on the city.

One of the first things Cambridge did was to build a new city hall. It became the first Gold LEED, or Leadership in Energy and Environmental Design, City Hall in Canada—green wall, biomechanical systems and all kinds of other environmental features. And a great influence came from the school in terms of how the city looked at things.

Cambridge also looked at transforming its libraries, which is not the easiest thing to do, because of all the facilities you have, next to skating rings, schools etc., libraries are the most highly valued by the citizens. The city wanted to expand and transform and move into more of a digital age. The new Hespeler Library was created by building a glass enclosure around the historic Carnegie library—to make the outside world to come in. It is a transformational building which reflects the surrounding community during the day and acts as an illuminated community beacon at night.

The library has been well received by the community—after a certain period of time. The library was creating experiences. Cambridge had no library anymore but idea exchangers. A program was created to make the libraries a place of idea exchanges, a place of orchestrated experiences.

The city then decided to build a digital library, without any books—something even more difficult to digest for some citizens. But this is the way Cambridge moved on in terms of changing to what they believed is a community in terms of connection from neighbourhood to neighbourhood.

The next project is to transform the old post office into a digital library by 2016. The Galt Post Office is a national historic site, built in 1885 by the Canadian architect Thomas Fuller. The restored building will be part of the new city, it is on the river and it interconnects with all the aspects of the downtown area. It interconnects the community, cross the river is the school of architecture. It will be completely designed from the bottom up to be a digital library. It will be

a place that orchestrates experiences and it invests in people.

When you build new structures, when you build new things, you are not just building buildings but you are investing in people.

CHING-CHIH LIAO, Deputy Secretary-General Taichung City Government, Taiwan, presented the experience of Taichung City in creating age-friendly environments aiming to make city services and facilities more accessible to an ageing population.

Taichung - A wonderland of the grey-haired

The mayor of Taichung has been invited to the leading health policy event in the EU, the European Health Forum Gastein (EHFG), held this October in Austria, in order to present Taichung's strategy to make the city become an "age-friendly" city.

As many other regions in the world, Taiwan is facing an aging population. The population aged over 65 has exceeded 2.69 million, accounting for 11.5 percent of the total Taiwanese population. Compared to those figures, Taichung is a rather young city, with 250 000 persons over 65 (9.39 percent).

The smartphone penetration in Taiwan reached 60 percent. 22 percent of the population over 60 years hold a smartphone.

72.5 percent of smartphone owners use the smartphone to access the Internet, versus 76.8 percent accessing the Internet from their computer.

In July 2013, the Taichung City Government launched the "Age-Friendly Mobile Navigation Project".

59 public hearings have been organised to collect and integrate requirements directly from the elderly and identify what kind of service they want. The outcome has been clustered in 6 categories: Social welfare for senior citizens, age-friendly activities, my favourite locations, age-friendly medical services, age-friendly volunteers, and more services.

In July this year, the programme was launched on smartphone. Within few months, 3000 people downloaded the programme to access these services for elderly on their smartphones.

TAKASHI OBI, Professor Imaging Science and Engineering Laboratory of Tokyo Tech, Japan, described a new ID number system to be used in administrative procedures in Japan.

Towards one e-ID card for Everything

Japan is an aging society and expenses are increasing in social security areas such as welfare and medical insurance.

In order to balance revenue and social security expenditure, the Japanese Government decided to introduce a new ID number exclusively in taxation- and social welfare-related areas.

A new legislation to create this ID number system to be used in administrative procedures, the so-called “My Number Act,” was promulgated in May 2013. Every resident in Japan will receive a 12-digit ID number in October 2015.

This “My Number”, will be effective from January 2016, together with a new eID card, the so-called called ““My Number card”.

It is planned to issue the My Number card to 87 million people within 3 years, this corresponds to 2/3 of the Japanese population. At the same time, the card is also available on demand.

The existing national e-ID card is difficult to be widely used in e-business. There is a lack of applications, it requires specialized hardware and there is no need for high level authentication in the private sector.

Now Japan is ready to provide the “real deal” for citizens, allowing to realize multi-functions with one e-ID card. The New Japanese PKI (JPKI) will be disclosed to the private sector under permission of the Minister of Internal Affairs and Communication. The intention is to support multi-devices, CATV STB, smartphone, etc. Moreover, JPKI will be accepted by banks, credit card issuers, etc.

To make the My Number card a success, it is necessary to start many services at the same time. First demonstration projects have started in October this year.

ANNELISE THIEBLEMONT, Senior Director Government Affairs, Qualcomm, USA, [www.qualcomm.com], spoke about

Connecting the cities of today – inventing the smart city of tomorrow

We live in an urban world. Cities are home to over half the world's population, producing about 80 percent of the global GDP. By 2050, up to 70 percent of the world's population is expected to migrate to urban environments (up from about 50 percent today). Today, cities use about 75 percent of the world energy.

Throughout the world, public budgets are under pressure. Inefficient spending must be reduced and the quality improved, e.g., water or energy management, transport, lighting etc. The use of advanced technologies and integrated platform can generate significant savings for local governments. How to do this?

Some of the use cases around connectivity have involved transportation, infrastructure, energy, government, healthcare, and education. This requires partnership, a great amount of innovation, most likely cultural change and the use of a combination of connectivity technology from cellular 3G/ 4G to short-range to unlicensed connectivity aspects to connect the people, the infrastructure, the services together.

One of the most important questions is, how to scale across the cities? How to provide interoperable solutions that can move from one city to another, that can move from people to people. The key will be to leverage current commercial technology.

There is a lot we can already rely on today. In the context of transportation and vehicle, there are a multitude of vehicles that are already connected. The short-term experience is definitely the connectivity within the vehicle, but if you push the envelope, the future would be safety and connecting the vehicles for public safety to first responders, public safety agencies, hospitals etc. In the future, the vehicle will be connected to the infrastructure. E.g., the electric vehicle get charge on to the grid and how that load on the grid will be managed by the utility company.

Intelligent connectivity will be at the core of smart cities and there are already commercial mature technologies that can provide the level of security and quality of service that is required for some of those use cases. Those use case range from cellular short-range, device-to-device communication, that will also require the use of extreme densification of infrastructure and connectivity to provide that level of security and quality.

In terms of intelligent connectivity, it is an underlying service of all departments, whether these departments are within a government or a public or private organisation. There is really a need to break down the traditional vertical procurement models. This is one of the key incentives for sustainability, scale and dropping the cost down.

Another opportunity and challenge is the need for evolving culturally and new business models, private or public, and to think differently how the infrastructure and connectivity can be bundled.

There is also an opportunity and challenge around the quality of service. It is important to provide the right balance between privacy and security. In addition, how can those connectivity aspects provide the resilience of the network, i.e., robustness versus best effort?

In the context of interoperability and scalability, there is a need for spectrum harmonization and to rely on international standardization for interoperability at a city level.

PETER SONNTAGBAUER, Senior Project Director, Cellent AG; Project Director "Future Policy Modeling" (FUPOL), Austria, [http://www.fupol.eu/en], presented a major smart cities initiative:

FUPOL –
Leading ICT solution for policy design and implementation

FUPOL has been developed within the EU FP7 R&D Programme. The project had a budget of 9 million euros, with 16 partners across the world.

FUPOL supports leaders of smart cities, but also regional and national government institutions, politicians and political parties, as well as companies involved in large infrastructure projects. It is localised and supported in many European countries through local partners.

Smart city leaders need a new governance model. They are deciding their political priorities in a transparent mode and with the active participation of citizens. This is where FUPOL comes into play as it provides a complete package to support policy design and implementation.

FUPOL provides software tools, but also implementation guidelines, such as social media guidelines. There is a multitude of features: It is possible to analyse social media (find out new topics, identify opinion leaders, 24/7 monitoring and alerts etc.), to communicate effectively with citizens and stakeholders through electronic means (e-participation, campaigns, opinion maps, large scale e-surveys, etc.), as well as to simulate the impact of policy changes, i.e., "what will happen, if…."

FUPOL is a proven solution. It is supported by major institutions and organisations, among them "Major Cities of Europe" and UN Habitat. A pilot has been launched in Kenya in cooperation with UN Habitat. Other pilots are realised in Yantai (China), Zagreb (Croatia) and Skopje (Macedonia).

FUPOL is currently expanding its network of support partners and in this context FUPOL is looking for business partners around the world.

GIORGIO PRISTER, President Major Cities of Europe, Italy, explained where an organisation dealing with cities sees the benefits of being a partner of FUPOL.

A “traditional” politician would present his or her election programme to the citizens. He/she then would be elected and start thinking about how to implement the programme, which usually includes some innovative changes helping to make the city become a better place to live and to do business. He/she would rely on a staff of competent people to help implementing the programme, but he/she would not usually involve the citizens in this process.

However, citizens want to participate and have their say in the decisions. Thus, an innovative e-politician would also rely on social media. He/she would open a blog, use Facebook and Twitter—but this is when the “problems” start. If engaging citizens, not only in communication but in discussions on what will be implemented, you will get thousands of messages with different opinions. Many of these opinions would be very valuable but how to manage them? How to select them? FUPOL is exactly answering to this kind of questions and supports the process of policy making. It provides information about the main categories or hot topics that the citizens are discussing about in the social media. It helps visualizing how they evolve in time. It helps focus on the key requests of citizens and to present different solutions. It is possible to start a debate, to present different alternatives and to simulate the impact of each alternative. At the end, one gets the final feedback from the citizens and is able to decide by relying on engaged citizens and by looking for the best possible solution.

FUPOL is really about citizen problem solving. It is about listening to the citizens; it is about taking advantage of crowds and diversity. It is about how to leverage the wisdom of crowds and the value of diversity in a city in order to take the best possible decision.

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Q&A

The first question was addressed to **Gerald Santucci**, Head of Unit Knowledge Sharing, DG CONNECT, European Commission. There are so many programmes, applications and approaches that are in the market place. What still do we need to do for citizen empowerment?

Gerald Santucci, acknowledged that there are many applications today. At EU level, there are two main ways to enter the journey of smart cities: the European Innovation Partnership (EIP - http://ec.europa.eu/eip/smartcities/) and Horizon 2020, a research and innovation programme (http://ec.europa.eu/programmes/horizon2020/). Within the EIP, there are six so-called "Action Clusters" on sustainability, infrastructures, mobility etc., but there is in particular one that is named “Citizen Focus” aimed at identifying successful patterns for citizen engagement processes and tools and at publishing a handbook of best examples – perhaps in Berlin in May 2015.

The experience made during the last year on motivating cities, industry and academia all over Europe to express their commitment to work on smart cities has been quite positive. The European Commission received a total of 370 eligible commitments with over 3000 partners in total. The Citizen Focus Action Cluster received around 50 commitments, for example from Alicante, Paris, Turin. There are many success stories. However, two things are still missing:

First, there is a need to achieve a better combination of apps. There are many apps – the number is not the issue, the issue is how to combine them. We need more knowledge sharing within and across cities in order to identify the best practices and experiences that can be replicated across Europe. This would lead to faster and greater deployment of good ideas and, at the same time, a kind of joint procurement in future to bring down costs.

We also need large-scale involvement of citizens. We cannot imagine smart cities without smart citizens. We need to make them more engaged. Many European cities, in this respect, run Living Labs where citizens can see solutions in practice, give direct feedback and influence the future of their neighbourhood directly. Living Labs are a very good instrument to use because they showcase for example energy efficiency in buildings or street lighting, local Wi-Fi networks in deprived areas, innovative vegetation or urban gardening which all need the involvement of locals to function. This is a way to educate people, to bring to the people the demonstration of what a smart city is and the value it could bring.

So, there is still a long way to go, but we can be optimistic: The first apps exist, we need to combine and disseminate them and use Living Labs and other instruments for a faster and better deployment.

The following question addressed to **Ismail Dia**, GovDelivery, was, “how can we translate emotions and feelings into the technology of things. How to keep the Internet of Everything human?

Mr. Dia stressed that we are increasingly involving citizens. But this is a rather recent trend that gained momentum a few years ago. We are trying to involve more citizens and to understand what they want by asking them directly—however, it is a bit strange that we haven’t done that much earlier.

We talked a lot about what cities should look like; now we are engaging much more on a basic level, trying to get information and to understand what people really want from technology—not just thinking about more speed, more connections etc. Sometimes you have to stop and think is this really necessary?

The “social” has been eluded from the conversations in technology for a long time. Now, by more and more involving the citizens, we are getting more and more social.

The question addressed to **Samia Melhem**, World Bank Group, referred to the idea of reshaping, and not reinventing, the wheel. What does it really going to take to get that knowledge sharing and that replication?

Samia Melhem, underlined that everybody is struggling with this. There have been so many sessions about innovation, so many smart people coming together with the same idea, e.g., around making a city more efficient, better quality of life, less environmental damage etc.

This is where the government has to intervene as well to help selecting, out of this universe of amazing ideas that exist already, what is the part we can reuse, where can we use these innovators to populate and use this smart city platform on a sustainable basis. There is so much to do. It is much more than just building a platform—it is populating, maintaining and expanding it.

Let us take some of that innovation, energy engagement and the leadership of the city to make that work—not just for one application, e.g. lighting or transport or..., but for every service by going from one city to another.

Vendors could make a lot of money if coming together and talking to the mayors and the utilities that are in the back end. This means many meetings and it is arduous, but that has to happen if you really want to have a smart solution.

Eikazu Niwano, NTT Corporation, was asked about the issues to solve as when putting in place a Smart City Operating System (SCOS).

Mr. Niwano explained that the first issue to consider is the question about the responsibility for trust. In order to guarantee trust, one has to provide evaluations or estimations of trust as well as attributes to guarantee trust. Who has the responsibility is one of the main issues to be solved.

Another issue is the question of how to start the platform from the business point of view. Without this kind of combined or integrated services it is difficult to start. Who promotes and manages the platform from a business point of view is very important and has to be discussed.

Referring to the digital Library in Cambridge, **Doug Craig**, Mayor of Cambridge, was asked whether there are any other libraries in Canada or around the world that have embraced this vision?

Mayor Craig gave the example of a library being build in Halifax that will be mainly digital and that gets a lot of federal funding, Cambridge didn't get this. Other digital libraries are in British Columbia and Florida, there might be further in other parts of the world.

Ching-Chih Liao, Taichung City Government, was asked to tell a bit more about the way geographic information systems are helping with the age friendly apps? And maybe it is possible to take these apps to younger people?

Mrs. Liao explained that this app is based on GPS and a location based service. It is very easy to use for elderly people, because with the smartphone they can locate where they are or find a service nearby.

However, this kind of service is not the only one in the Taichung. There are a lot of different apps using geographic information systems, for example for public transportation. The air pollution is very high and with this app, Taichung tries to encourage the use of public buses instead of the motorbike.

Another issue related to an app is the extreme weather. People need to know when the heavy rains are coming, which place would be safe and where the next shelters are located in case a flood comes.

Taichung continue to gradually introduce services as long as the citizens need it.

Takashi Obi, Imaging Science and Engineering Laboratory of Tokyo Tech, was asked what prompted the Japanese government to work with the private sector and start embedding the ID-card?

The aspect of multi-usage represented a real benefit for the service providers. Two cases have been chosen:

One is a hospital use case. In a near future, the patient will go to the hospital with the My Number card. The hospital will check the validation of the card. Once a prescription is uploaded, the patient will pay with the My Number card at the hospital. Later, at the pharmacy the prescription will be downloaded and the patient will pay the medicine with the My Number card. In this case, the patient doesn't have to use the credit card. The hospital knows the serial number of the certificate, but doesn't know the credit card number.

The second use case is the bank use case. In this case a customer opens an account signs with the digital signature. The bank verifies the application data with the certification commission. The bank then sends the serial number of the certificate of the digital signature to the Japan Agency for Local Authority Information Systems (JLIS) and receives the serial number of authentication. The customer can use online banking immediately and doesn't have to wait for a credit card.

A questioner from the audience wanted to know about the main element to engage citizens in participating in policy making and the life of their cities.

Doug Craig, Mayor of Cambridge, explained, that that there are 2 angles to look at. Cambridge started inviting the school from downtown to be part of the community in terms of committees, being part of festivals etc, which they were existed to do.

The other issue is the participation of young people. They are not engaged at all. Maybe one should look at Scotland with the referendum and lower the voting age to get kids involved, to be part of and have a real stake in what is happening.

Ching-Chih Liao, Taichung City Government, underlined that young people are not very interested in political voting, but they are very interesting in voting in areas like business, culture or education. A low voter participation of young people is no indication that they are not using IT. In Taiwan, many young people use IT. It is now time, to bring IT to the elderly.

Samia Melhem, Wold Bank Group, proposed to engage youth groups through tech camps or boot camps, to make them part of the solution, but also giving them some financial means to implement what they are suggesting—not just getting them for a day, feeding them, making them feel good and dropping them. There has to be a sustained relation with youth clubs, using libraries, using gyms, and alike. Give these youth groups a small budget and some visibility to make them be part of the system.

The following question was whether it is possible to address, with a smart cities approach, the social, cultural, and educational integration and engagement?

Eric Legale, Issy Media, France, emphasised that public stakeholders have to change their minds. We need a new vision of the way local authorities are managing the cities. The time where local authorities are the only ones deciding about the management of a city is over. We have to learn to build the city of tomorrow together with all the stakeholders and citizens, including the companies that are implanted in the cities.

For example, the first French pilot project for district level energy usage optimisation, IssyGrid, is a private smart grid project with 10 major companies and the City of Issy-les-Moulineaux. It is a 2 million euro project, with the only role of the city being to stay in the background and to help the consortium if help is needed, to disseminate the project and to mobilize citizens. This project reflects a new spirit at the local level.

Alan Shark, PTI, reminded to keep in mind that a smart city movement is a process and a journey, not a destination. What threatens smart cities more than everything is having a young population coming into the ranks and not feeling part of this. We have to figure out how to get our young more engaged at a very early age.

Every corporation should figure out civic responsibility and do this with game playing: Show what it is like to be a mayor, show how the budget processes work, let them build a city virtually—and get them engaged at a very early age. It is important to include our young in an earlier stage. Right now we are dealing with it too late. If we don't do that, we could be here 10 years from now and fighting just to keep democracy alive.

Bror Salmelin, European Commission, pointed out that we are still talking about what is good for "them"—not looking at citizens as active agents/ subjects in the process of smart cities. We are still in the mentality, with some exceptions, of treating the citizens as objects for a smart city. We need to have them fully involved. This also means that the city leadership needs to have a spirit of letting go—a fundamental mindset which we have very few examples of. It is not about smart citizens—it is about normal citizens, us, in our multiple roles. And it is about strong interaction and us all in all our roles being the active agents.

Effat El Shooky, CKI&SE, added that it is very helpful to create roles for the community members themselves. One major role is the role of the change agent. Young people living in the community became the drivers by playing the roles of change agents. Another role is the role of a facilitator, who just tries to understand what is really needed. This is the best way of getting young people involved.

Samia Melhem, World Bank Group, brought out that cities and city officials have to rethink what is a job, it could be a part-time job, it could be a job paid by a collaboration with operators on free minutes. We have to be flexible. With the access to technology, young people think that they will become the next millionaire. This is great, but imagine the disappointment that happens, when a lot of poor unemployed young persons have access to this stuff and their great frustration of not being able to get there. There are countries with 60 percent unemployment rate among young males. We also have to rethink productivity, because sometimes productivity comes at the expense of massive employment. Policy makers have to make this balance and compromise.

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Session 8

Day 2 – Morning – Parallel Session

After the Digital Revolution: Business Models 2.0

The moderator, **JEAN FRANÇOIS SOUPIZET, Independant Consultant, France**, introduced the session by insisting on ongoing changes: We are moving from business models based on efficiency, economy of scale, asset intensification, concentration and central control, towards new models corresponding to a new environment. In fact, on the one hand, social factors such as higher education, standards of living, social complexity and longevity and on the other hand, successive waves of technology innovations facilitated by the spread of IT are changing the world. A few key words may help to characterize this emerging context as the power of the multitude, the changing role of the end-user, the bypass of existing structures or the rescue of old assets through the digitisation. To illustrate where we are and where we came from speakers are invited to present their experience and to give some insights on what is to happen and on the sense of the on going mutation.

MICHAEL STANKOSKY, Research Professor, George Washington University, USA, stressed the role of knowledge in new business models and the importance for leaders and managers to understand and value the knowledge assets lying in their organisations. This is a key element for strategic management both in an offensive approach, to take benefit of these resources and in a defensive one to be able to protect these assets and to measure the importance of the damage in case of loss. He proposed the basis of what could be seen as a roadmap for Knowledge Management in the web 2.0 organised in a three steps approach: a) identifying the inputs, i.e., the human, organisational, relationship capitals and intellectual property, b) mentioning the processes to follow in order to reap the benefit of the knowledge capital, such as codification, collaboration, convergence and coherence and finally c) the return on assets. In conclusion he mentioned that, based on his very large experience, return on assets could be as high as 200 percent.

Knowledge Management: “Leverage Knowledge Assets”

What is recognized, but maybe not understood today, is that we live in a knowledge-based economy. In a previous panel, the structural capital was mentioned, which is a rather misunderstood and ill-defined term. It is the ‘organisational know-how’.

When looking at knowledge assets or knowledge management, people often say, how can you manage knowledge? The answer is, when you don’t manage it, you won’t make any money.

The American Productivity and Quality Center (APQC) published a book called “The New Edge in Knowledge” (2011). Knowledge assets are defined as human capital, organisational capital, relationship capital, and intellectual property. APQC found that businesses who understand those and how they impact on their business will have a return of over 200 percent on their asserts. That is 200 percent profit!

If you ask executives the question, “if I came into your office a week from now, can you give me an inventory of your strategic assets?”, not one person could do that—although it is not possible to deliver a product or service without those critical assets. It is the lifeblood of an organisation.

We are living in a knowledge-based economy and over 70 percent of the strategic assets of organisations like Google, Microsoft, Airbus or Ford are knowledge-based, i.e., human capital, organisational know-how and relationship capital. And relationship capital is not just customers and the supply chain—but also competitors, it is who you know and what you know.

We don’t have business models today that can take these intangible assets and make them tangible in our mind. We don’t know how to productise our intangible assets. We don’t have a name for them. We know what a barrel of oil is worth, but we don’t know what a barrel of brains is worth. And we don’t even have a similar language. There are no standard names, no standard valuations.

We live in a knowledge-based economy and we don’t even know what that means. This is a real problem today. If you don’t know what your strategic assets are and how to name, value and inventory them, then how can you manage, i.e., plan, organise, resource and control, them? We talk about business models, but we don’t even know what the fundamentals are.

Nigeria recently recalculated its GDP. They had these intangibles and when recalculating they incorporated the film and telecom industries into Nigeria's GDP. Nigeria overtook South Africa as the largest economy in Africa just by recalculating these intangibles.

By inventorying their intangibles, putting them in a matrix, and hiring a senior vice president IBM added to their bottom-line 6 billion dollars over night.

How do you leverage these assets to make a profit, or to have a better government or even your personal—you don’t even know what you know!

In summary, when we talk about a knowledge-based economy, business models in a new area, we really need to get back to basics. But no one knows how to do that, yet…

OLIVIER GUDET, Head of Telecom, SIG-Services, Switzerland, [www.sig-ge.ch/] stressed the key role of communications infrastructures and insisted on the fact that even virtual things need physical paths. He presented the activities of the Services Industriels de Genève (SIG) company in the rolling out of FFTH. He demonstrated how the SIG network offers services to nearly half a million of Swiss citizens, paves the way for the development of smart opportunities and finally acts as an enabler of new business models 2.0. The case of Stockholm could be seen as a good illustration of the transforming power of the fiber technology in urban areas. The FFTH network contributed to set favourable conditions for direct economy, new infrastructures and very high speed access and insured a very high global economic return. In conclusion, we are on the eve of a new era, more precisely at the end of the beginning of the digital revolution.

Fiber To The Home as enabler of Business Model 2.0

SIG is providing basic services, starting from water to electricity, waste treatment, wastewater etc. These are basic services needed to advance towards a better future. It is rather exceptional for such kind of company to have a fiber network, but it is actually related to the basic services SIG is providing.

Are we really after the digital revolution? As Winston Churchill said, “Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning”.

Even virtual things need physical paths: Paved roads were a strategic asset for the Roman domination of the Mediterranean area. Not only for military purposes and transporting goods, but also for communication (speed). The paved road of today is the backbone of the optical fibre. A strong communication network is necessary to allow new digital business models to be created.

Before 1995, there was no optical fiber in Geneva. In 2009, only very few buildings (banks or big companies) were connected. However, it is not possible to realise a digital revolution with only few connections. Thus, SIG decided to extend and build the network. Today, it is no longer a B2B network but a real FTTH network, covering almost the entire area of Geneva.

This simple service, connectivity, brings new smart opportunities, such as increased security for the citizens—they simply have to connect to the video protection service. SIG is also connecting all antennas for the mobile telephony (except those of Swisscom) and has connected the first building to manage the building’s energy in a smart process.

As the example of Stockholm shows, this kind of network can entail great benefits: The city of Stockholm has built a fibre optic network since 1994 and calculations have shown that the economic return generated by this network is equal to three times the investments made to build this fibre optic network. It amounts to a socio-economic return of 1.9 billion euro.

This is a dynamic that doesn’t stop, because if you provide technology, people are learning how to use this new technology, they will create new companies and so on. It generates a virtuous cycle of progress based on this technology. That is the idea behind the huge investment SIG is making in Geneva.

The following comment addressed the fact that SIG is working as a facilitator for a new business model based on updated tools for communication.

Olivier Gudet confirmed that an important aspect of this network is the neutrality of SIG. SIG is not offering services on that network but allows everybody who wants to provide services over this network to use it. This is a big difference compared to an operator building this kind of network. There is no competition.

HESHAM A. LOTFY, Business Development Expert of the Public Establishment for Industrial Estates (PEIE), Oman, [http://www.peie.om/], stated that web 2.0 is not about front-end technology; it is about meaning and intelligence in the back end. The BioBleu programme carried out by organisations from UK, France and Oman exemplifies the importance of a long-term and global approach based on science and indigenous knowledge since the beginning. On the contrary, technology alone used in a short-term thinking may lead to catastrophe. The collapse of Northwest Atlantic fishery since 1992 led to put 40 000 people out of work in 5 Canadian provinces and several billions dollar relief package to be disbursed to coastal communities. In the same way the situation of fishermen in other countries went down. More technology in fishing would have just increased the pressure on the ecosystem and worsened the situation. But the solution based on open-ocean aquaculture became a new problem. All pollution roads coming from fish waste, fish meal and fish oil, drugs and chemicals, diseases and parasites lead to the sea jeopardizing the biotope and threatening the fishes to drown in the sea. Against this background, the BioBleu programme is following an ecosystem approach and it proposes a new concept of closed recirculating aquaculture including a large controlled interaction with the natural terrestrial and marine ecosystems. Obviously the project is based on an online information system for sustainability, but technology is harnessed to serve objectives coming from a global and long-term vision.

Program BioBLEU
Communicating Science & Information For a Knowledge-Based Sustainable Marine Life

To quote Tim O'Reilly: "Web 2.0 is not about front end technology, it's about meaning and intelligence in the back end".

Web 2.0 will be one of the tools that is going to be utilized to approach a certain meaning which we sometimes forget during our race for business and profitability.

Newfoundland, Canada, was one of the richest areas in the world in terms of cod fish. The last fish in Canada was caught in 1992. Nobody believed that this could ever happen. How could this happen? There were two forces at this time—science and indigenous knowledge versus short-term thinking: There were the traditional fishermen who, based on their knowledge, have given the warning that the fish is disappearing. At the same time, all scientific warnings said that the cod fish was in crisis. But this was opposed by two factors: As cod catches declined, factory trawlers used ever more powerful sonar and satellite navigation targeted what was left—despite all the warnings. At the same time, short-term thinking of the government and politicians (the fear of politically unacceptable job losses) led to the catastrophe. After the last fish was caught, 40 000 people were out of work in 5 Canadian provinces, and a several billion dollar relief package was disbursed to coastal communities.

What happened in Newfoundland is certainly not a singular example. It is what we are currently living through: We don't know what are our priorities and are overexploiting our natural resources in an incredible way.

In the 16th century, one ship could get 100 tons of fish per season. Today, the satellite-based navigation systems ships can get 200 tons of fish per hour.

80 percent of our planet is water and oceans. Our life depends on it. In Canada it was the same blindness to reality. Are we going to wait until the catastrophe occurs, while talking about businesses and profitability and taking innovation for entrepreneurship?

There is an extreme overfishing in the whole ecosystem. Aquaculture is often considered as a solution, but actually puts additional pressure on the ecosystem. In fact, all pollution roads lead to the sea. Moreover, eutrophication, the process of excessive nutrient enrichment of waters, represents a further threat for fish and other aquatic species.

According to the Food and Agriculture Organization of the United Nations, 52 percent of fish stocks are fully exploited, 20 percent are moderately exploited, 17 percent are overexploited, 7 percent are depleted, 1 percent is recovering from depletion, and 80 percent of the world's fisheries are fully- to over-exploited, depleted, or in a state of collapse.

An Indian proverb says "When the last tree has been cut down, the last river poisoned, the last fish caught, only then we will realize, that one cannot eat money."

Programme BioBLEU is a collaboration between Newcastle (UK), Corsica (France) and Sur (Oman) on how to use ICT, biophysical means of monitoring and research to be able to tackle this problem.

BioBLEU tries to apply a science and technology perspective based on systems thinking. The idea is to integrate biophysical monitoring with the socio-economic and environmental data. BioBLEU uses an ecosystem approach. Actions carried out within Bio-BLEU include wild population monitoring, preserving the biodiversity while involving the fishermen in order to get their indigenous knowledge. The programme is also doing a kind of ecological aqua-engineering, such as artificial coral riffs. Sur just started testing new kinds of aquaculture with zero percent discharge. The objective of BioBLEU is to create Online Information Systems for Sustainability.

MICHAL IVANTYSYN, Director General ITAPA, Slovakia, addressed a different aspect concerning the potential of open data in the public administration in Slovakia. The challenge is well known, everywhere the complexity is increasing, in particular in public administrations and it becomes the major inhibiting force in government efficiency. It was the case in Slovakia notably for public procurement, a field in which efficiency is a sensitive factor for both citizens and companies. The Slovakian administration made available some open data: tender proposal, composition of committees, public contacts etc. Based on the open data, key information such as probable price of the winning offer, probable competitors or even market share or success rate over time of competitors are now within reach for all competitors and open data is a new and unstoppable driving force for government efficiency.

Open Data in Slovakia
A new driving force for the 21st Century

According to Moore's law, the costs of computing power halve every 18 months. As such, Moore's law has been considered the driving force of technological innovations, productivity increase and economic growth. In contrast, the concept of Eroom's law says that costs of medical drug research per unit double every 9 months.

As Moore's law is the major societal driving force for innovation and productivity, Eroom's law can be considered as a major inhibitor. These two examples illustrate the pattern that every driving force has its opponent, an inhibiting force. And by using a driving force we can overcome the inhibiting force and avoid stagnation!

Costs of real experiments are getting higher exponentially, computing power is getting cheaper exponentially. So, why not using computing power to make virtual experiments?

The increase in bureaucracy is the major inhibiting force in government efficiency, and especially in public procurement.
The dynamics of bureaucracy are governed by the Parkinson law: Parkinson's law predicts that bureaucracy will expand at a rate around 7 percent per year, irrespective of any variation in the amount of work to be done.

The growth rate of bureaucracy in Slovakian public procurement seems to be in accordance with this hypothesis. The public procurement law in Slovakia is so complex, that politicians announced a simplified version. However, a first proposal of this simplified version is longer than the current version…

In consequence, the costs for companies just for submitting a proposal are increasing. Only big and influential companies can afford to submit proposals. As a result, there is less competition among companies, with higher prices and less innovative solutions. Less than 1 percent of the winners are located outside Slovakia.

However, there is a solution to overcome this bureaucratic obstacle: Open data is the new and unstoppable driving force for government efficiency!

The open data concept refers to governmental data that are being published in a way allowing computer processing. Today, we are in the middle of the open data revolution. Data sets are being published every months at unprecedented rates. Apart for calls for tenders, open data in Slovakia concern the tender proposal of every contestant, members of committees, public contracts, invoices to public institutions, official feedback to every winner as well as accounting data of every legal person.

ITAPA has set up a platform with more than 50 000 subjects involved in public tenders. It is even possible to know who selected the winners and to visualize the whole network of relationships.

The usefulness of these data was illustrated by the example of a company that received a notification on an open tender in Slovakia: Thanks to the analysis of open data, it is possible to know potential competitors and to assume the level of transparency of this specific tender. Furthermore, it is possible to estimate the tender price to win the offer based on previous tenders. It is also possible to "zoom" into specific competitors, to see the market share of a specific company, its success rate and its main competitors. Such information enable the company react very fast and to create a strong offer with reliable partners.

Thanks to open data, public procurement in Slovakia has become much more transparent and preparing a proposal less expensive.

But factories are not going away and, on the contrary, they are inventing new ways of delivering goods and services. This was the message from **VAN KHAI NGUYEN, CEO, CADCAMation SA. / Association innoLAB, Switzerland**, when presenting the Factory of the Future (FOF) roadmap. Data-information-knowledge is the new "oil" of manufacturing (and our society) and next asset towards smart manufacturing. The next IT wave is the Internet of Things and an advanced simulation system called Cyber Physical Systems. FOF will be a complete and end-to-end digitised description of product-process-resource and even the plant will define the digital foundation. The Industrial production process could then be based on a "scientific model" that is an integrated support for decision covering all the different levels of the company, from the shopfloor to the management, and including the different temporal decision timetables. Business parameters and its model will be tightly mapped (or linked) to the real parameters and events whereas today a big gap still separates the real (manufacturing process) and the virtual (business process). This will allow the new business paradigm based product-service integration (and "mass-customisation", although this term is self-contradictory whilst being used by many experts, and "consumactors"), fair business and sustainable supply-chain production based on proximity production. Several challenges and threats are still at stake, notably education, energy, resource etc.

The Factory of the Future

The term "industry 4.0" evokes the fourth industrial revolution, with the first being mechanisation, the second electricity, the third automation, and the fourth being knowledge.

Manufacturing is still very important. China has become rich thanks to manufacturing. It is the first industrial activity of humans and without manufacturing, there wouldn't be any products. It is enabling activities for all the other sectors.

Manufacturing today is not an isolated activity. Manufacturing would not be possible without IT. Manufacturing is also driven by IT progress and thus, IT should also be a core business of manufacturers–otherwise they will be dominated by IT companies.

The enabling trends that drive manufacturing today are the "6C": customisation, community/ sharing of ideas, enriched content, cyber-processing, cloud, and connectivity/ interoperability.

All this means that we have to integrate and converge towards a new ecosystem of manufacturing. The US want to re-shore manufacturing and invest a lot of money to re-shore manufacturing companies. However, the next business model won't be re-shoring but next-shoring or close-shoring.

The population is increasing; there will be 9 billion people in 2050. At the same time, the population increment is decreasing (that means the demographic future will not be so catastrophic !). The close-shoring perspective emphasises that products should be produced close to the consumer/ close to demand.

In 2030, there will be about 5 billion middleclass consumers. The majority will be in Asia, followed by Europe and North America. The close-shoring concept is important for a fair trade policy between the different countries and IT enables such kind of implementation.

The next enabling technology in manufacturing will be the Internet of Things. It will be possible to make machines and objects communicating with each other. The objects will communicate and adapt themselves to the environment. However, never forget the human and make sure that he is able understand all this.

In conclusion, the world isn't getting worse, it's getting better, despite all the depressing news! The advanced Factory of the Future is the key issue contributing to our ability to change the world for the better!

PAUL WORMELI, Executive Director Emeritus Integrated Justice Information Systems (IJIS) Institute, USA, addressed how governments are struggling to reinvent how they interact with their customers, particularly how governments are attempting to learn how to share knowledge and collaborate to solve social problems while engaging citizens in radical new ways. He summed up the journey of knowledge: it is about preserving integrity and relevance; but today the knowledge is in the network and it is mostly produced by collective intelligence. Then, the challenge lies in the capacity to set up mechanisms of cooperation, which allow getting the "power of the multitude", in this particular case the citizens are active and willing to commit themselves in action, which traditionally was exclusive matter of the public authorities. A good illustration is given when what is needed is instant access to critical knowledge, which is usually characteristic in case of catastrophe. New ways of co-organization are experimented such as BarCamps, WorldCafe, knowledgeCafe, Teachmeet, CtisiCamp, CrisisComons Unconferences. Clearly, we could see here the emergence of new ways for exercising the citizenship supported by the web 2.0.

New Business Models -- Impacts on Government

It is not that the digital revolution has happened and is done and now we have to figure out what to do. A revolution in technology occurs about every 3 years.

Government in general has the habit of following industry by 3 to 5 years and waking up to changes, environment and technology. That is no difference in this case which might be called the third revolution of technology.

The two identifiable trends are: 1) The major global technology companies that manufacture and sell most of the technology we use, have shifted their market focus during the last 10 years from major companies, in particular Fortune 500 companies, to the consumer. The consumer is now driving the bus of technology, not major corporations. 2) Major companies

in the technology field have recognised that the original purpose of the computer has been abandoned. The original purpose of the computer was to count things, and computers were used for financial purposes etc. Now IBM declared that the purpose of the computer is to provide insight, and that is a fundamental change in the use of technology. Government has recognized that this particular change is extremely important because if there is anything governments at all levels need to know, it is how to get insight in what people need and expect of them.

There are 80 000 units of local governments in the US, all of which are completely autonomous. This chaos leads to a lot of competition but also fosters a lot of fresh thinking, particularly in smaller areas of the US, in the sense of becoming more progressive thinkers.

What has happened in the governments' response to the digital revolution is that people are starting to believe that their government comprises an enterprise and they are beginning to use the enterprise model to think about what is that what government does. And as you dive more deeply into what an enterprise is, governments are just discovering that they have a variety of jurisdictions they have to deal with (other towns, cities, counties, states) and a number of different disciplines within any level of government—but they are tied together by a mission communality, a common interest in serving the public and meeting their needs as characteristically and traditionally provided by governments.

As governments began to think about themselves as an enterprise, they began to think about the edges of an enterprise and how to share knowledge and communicate with the various components of an enterprise, and how to build themselves into an enterprise that serves the public in its broader sense. The concept of knowledge has become much more of a focal point in government, particularly in preserving the integrity and relevance of that knowledge, as it is shared with citizens and other government entities. Non-profit organisations have become much more prominent in thinking through the purposes of government and the kinds of solutions. People are now recognising that knowledge is not what it was 10 years ago.

Knowledge 1.0—it would be nice if we could codify it and stick it in a database. We are very good in building databases, but we have never really understood how to quantify and describe and codify the tacit knowledge, the human knowledge that goes with the descriptive knowledge.

In fact, what has really changed, and that is recognized in many government circles, is that knowledge is now in the network—the human network, the social network, the technology network. It doesn't stand alone and that is a phenomenal influential change in the way government is describing how to deal with their missions because they focus more and more on collective intelligence, the intelligence of all the citizens, of all the organisations that comprise government servants and groups the government works with, whether it is industry, non-profit or community groups. There is now an awareness that the collective intelligence is what governments have to discover in order to do their work. Because we can no longer wait for knowledge to be accumulated by one or more experts—we need knowledge immediately to deal with a critical problem, whether it be earthquakes, hurricanes or changes in society that require immediate action.

Governments are looking at new forms of how to operate. It is very important to conceive of a theory of change when you begin to introduce new technology or new ways to govern, to figure out how that logic chain applies to give you a ROI that is measured in terms of customer satisfaction or QoS. There is a ROI in government every much as it is in industry.

One of the things that is happening all over the world is that governments are looking at wild new forms of how to gather and create this collective intelligence. One of the most common things is the notion of a Crisis Camp. In Los Angeles, after the earthquake in Haiti, there was a gathering of 200 people (programmers, scientists, firemen,…) which came together to create a geographic map of Haiti, which had never existed, and digitised it. And over a weekend they created a way for people who had lost contact with their families to make queries and connect with their family after that. This all happened between Friday night 6pm and Sunday night 8pm.

That process of a Crisis Camp has been replicated 18 times around the world since then. And governments are looking to that because they are realising that it will take new forms to gather that collective intelligence, create that collaboration and create a true partnership with their citizens. One of the best lessons that has came out of this web 2.0 revolution or business 2.0 revolution is that the importance of sharing the responsibility with citizens has become vital to governments throughout the world. Governments involve citizens as a true partner and this is changing governments.

And if the new business models were built on vulnerable technologies, like an idol with feet of clay? **SHAKEEL TUFAIL, CEO of SecureNinja, USA**, shared his views on the challenges of cybersecurity. He first enumerated what is at stake when we talk about protection; valuable properties, anything considered as an asset, data, time, money, reputation and branding, legal situation etc. Then, he characterized the security challenges: i) connectivity and Internet of Things are increasing connectivity and adding new vulnerabilities with mobile usages, ii) growing complexity as systems are getting bigger and distribute faster than ever, systems are constantly evolving on the fly including new software components, framework plug-in, open source software and interfaces as well as becoming extensible to third parties; and iii) compliance with regulation and standards. As a matter of fact, cybersecurity is a concrete response to a very real threat. The 2013 data breach investigation report mentions 18 organisations and 27 countries concerned by 621 breaches, and 47000 incidents. In addition, Mr Tufail exposed the case study regarding the Sony hack resulting in a potential cost up to 24 billions dollar to be put in face of the limited cost of prevention. In conclusion, managers are invited to pay more attention to cybersecurity and to better value the services of specialized companies.

The CyberSecurity Experts

If you have an ID, passport, health insurance, facebook account, if you have a drivers license, if you have anything in the world today, some of your most personal and private information is in the hands of other people and companies.

What we are trying to secure when it comes to digital assets? You can secure a person, a car, yourself, a data base—it is based upon an asset that you are trying to protect. We have data as a first asset that we are trying to protect; so we have confidentiality, integrity, privacy, accountability, non-repudiation etc. But we are also looking at availability; if your system, application or network is not online or is too slow that could cause a lot of damage—not only financial. And then, of course, money—financial transactions—businesses rely on finance. But also non-financial issues such as reputation, brand, lost of trust are very important. Legal compliance, we have more regulations and compliance, especially in the field of IT, than ever before and certainly government has their own unique areas that they have to protect, including military, Intel and mission critical systems. All of this results in money but it can also cost lives. Thus, it is something very important we have to look at. However, the security budgets are in general the smallest budgets of an organisation.

It is common opinion that security is a lot about data or networks. But actually 90 percent of the attacks that occurred today happened through human-social interaction, whether it is social media or a fishing attack (which is where you get a link in your email or IM or on the web and you click on it and somebody steals your login and password). Those are very common security flaws in systems.

We are more connected than ever. We have more devices and issues connecting us than ever before. What are some of the reasons why security has become such a big problem? In the past 15-20 years, we had some of the best technologies, security devices, products and services in the market, but in the last few years, we have had some of the largest data breaches in the history of mankind. Why? First of all, we are more connected than ever. There are 7 billion people in the world and more than 2 billion people connected at anytime on the Internet. Our systems are becoming more complex with more and more features. We are constantly evolving our systems—faster than security can keep up. And then, of course, security regulations and compliance.

According to the Verizon Data Breach Investigations Report (2013), 78 percent of intrusions took little or no specialist skills. So the issue of "we need to be technical and we need to understand technology in order to prevent (or to attack)" is false. 62 percent of breach detection takes months or years, and 70 percent of the breaches were discovered by third parties. And it is happening in all sectors of society today!

Sony in 2010 had a breach. They have 167 000 employees and almost 90 billion dollars in revenue. There are many companies within the organisation (Sony Ericsson, Sony Pictures, Sony Computer Entertainment, Sony Music Entertainment, Sony Financial, Sony Life, Sony Bank etc.) —and this is true in the governmental and the private sector. The problem in today's enterprise security is the fact that organisations have these verticals within their organization, they are very huge. If you look at Sony, they are larger than the population of Aruba and the Cayman Islands combined. And the person in charge of IT and security or the vice-president of development or the CIO for Sony Pictures doesn't really communicate with Sony Music or Sony Bank etc. What happens is that within the organisation there is a disconnect. But at the same time, they like to collocate all their networks and applications together. What hackers found out was if they break into one system, they can attack other sites. And this is what happened: The first attack occurring in April 2010, actually was a major attack with almost 77 million credit card numbers and personal information of people that play Sony PlayStation online were stolen. And over time, between 2010 and 2011, Sony had 22 attacks all across the enterprise.

According to industry analysts such as Forrester or Gartner, the potential cost of the attack over 10 years would amount to 24 billion dollars— with 171 million dollars already spent. The attack was very simple, the attackers were able to detect a common coding flaw called SQL injection to gain system access. The cost of prevention would be less than 10 000 dollars.

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FABIO PEROSSINI, Managing Director, Kpeople, United-Kingdom, illustrated that human solidarity in economics is also going trough new models. The CROSS project focuses on "investigating the non-monetary economy effects for citizens in a large-scale pilot" in Italy, United Kingdom and Spain. Starting at the end of 2012, in November 2014 the CROSS project has collected in the city of Turin, Italy, more than 190 000 bits of solidarity involving almost 10 000 citizens; the goal is to achieve 50 000 citizens involved by May 2015 with 1 000 000 bits. After one year from the Trieste presentation, some positive pending issues have been dealt with, notably how to describe and reward the civic value of such a huge phenomenon and how to capitalize on the experience for further development. The challenge for the project is now to create an ecosystem around that co-production of services, based on solidarity, where service efficiency is not anymore the main objective but the quality of life of all kind of citizens involved as single persons.

CROSS -- Citizen Reinforcing Open Smart Synergies

This is the experience of the city of Turin, where this project about the non-monetary economy started from an analysis of the voluntary service in the city provided for people with difficulties (not covered by traditional assistance). The idea was to give evidence of what is going on and what is not traced by any GDP or other business indicator.

It is clear that something happens. There is something in the world that could not be measured in a financial way. The very first objective of the CROSS project was to understand what is going on. In order to do so, the project decided to follow the solidarity happenings around the world.

In the city of Turin, the project started at the end of 2012, and today more than 190 000 bits of solidarity involving almost 10 000 citizens have been collected. The goal is to achieve 50 000 citizens involved by May 2015 with 1 000 000 bits.

The intention is not to give a value to what has been collected. But there are now more than 10 000 citizens involved and the project is collecting their data about activities which are not paid, but creating a civic value for the entire community and creating a tangible value for the user.

In traditional business each service has a price and can be valued. This is not the case with respect to voluntary services—this is a sort of an intangible tangible. The question is: How to describe and reward the civic value of such a phenomenon? There are some experiments ongoing, such as exempting these persons from house taxes or offering free bus tickets. This might be a solution, but the feeling is that we should find something more profound.

In fact, we try to describe a non-monetary economy using the terms and wordings of the monetary world. This doesn't work. There should be another way and the CROSS project is opening the door for such kind of discussions.

However, one thing is clear: such phenomena based on voluntary civic work are not organized and can not be governed, they are just happening—and they represent an enormous value.

The CROSS project is providing a system to collect data. The challenge for the project is now to create an ecosystem around that co-production of services, based on solidarity, where service efficiency is not anymore the main objective.

However, the project starts from social services, but the aim is not to remain in the area of solidarity intended as a social service. The idea is that this mechanism can work in a lot of other areas. E.g., the “customers”, “suppliers”, “buyers” etc. should be seen more and more as stakeholders. We should get to a perspective where customers, producers, suppliers, buyers could be part of the same environment and sharing more than just the business part of the process.

We have to go beyond GDP. CROSS is an efficacy driven project and when talking about efficacy, the project mainly focused on the quality of life, i.e. the well-being, of all kind of citizens involved as single persons.

As a conclusion, it is worth mentioning that the idea has been directly inspired by a resolution of the European Parliament. A further comment was made by the **French Senator PIERRE LAFITTE** who stressed the importance of the work done by within the CROSS project. He also mentioned a project supported by the Sofia-Antipolis Foundation to set the legal basis for a new model of private company taking care of both the interest of the shareholders and those of the stakeholders, meaning third parties directly interested or impacted by the company’s activity.

The moderator, **JEAN FRANÇOIS SOUPIZET**, concluded the session thanking the speakers for the richness and the diversity of their contributions. The impact of web 2.0 on information related activities – knowledge management, communication infrastructure, open data, cyber-security – has been extremely well illustrated. Furthermore and may be in a less expected way, the session allowed to hear about other fields equally impacted – the factory of the future, R&D facing concrete challenges, the changing citizenship and possible revamping of a social non-monetary economy. The new wave of technology is entering into a feedback loop; it will transform the economic and social context but it will be also transformed by this context.

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Session 9

Day 2 – Afternoon – Parallel Session

The Power of Data & The Internet of Things

Information Strategy: Developing New Information Products &Services

ALAN SHARK, Executive Director PTI – Public Technology Institute; Associate Professor of Practice, Rutgers University School of Public Affairs & Administration, USA, welcomed the panellists and delegates and set the stage for the following presentations.

In 2013, for the very first time, machine-to-machine communications surpassed human communications. Today, people create 2.5 quintillion bytes of data every day.

It is hard to imagine what these things all mean. It is mind boggling and obviously a trend that continues, as we explore this brave new world of the Internet of Everything and all the data that is associated with it.

Data is almost like rain. Only now are we realizing how to collect it and make sense of it.

According to Cisco, 50 billion smart objects will be in use by the year 2025. We are becoming truly an interconnected global community. And this growth is 5x faster than electricity and telephony—it is really rapid adoption.

The Internet of Everything is linking people, things, data, and processes. The session will address the issue of how all this comes together.

Regarding this journey from data to information to knowledge to wisdom, the public starts getting interested when it comes into information. And then, suddenly, the more we know, we get into knowledge and hopefully wisdom. These things do not happen over night, they are absorbed by people in different ways, by different means and in different timings.

This is how we see ourselves progressing in this new brave world.

CLÉMENT ALLAIN, R&D Project Manager Institut de l'Elevage, France, gave an overview on the opportunities provided by Precision Dairy Farming.

Scope, applications and prospect of Precision Dairy Farming

Precision Dairy (Livestock) Farming, or smart dairy farming, is the combination of sensors to measure biological parameters on animals (production, behaviour, hormones, enzymes,…) and the ICT required to transfer, store and transform this data into alerts and information for the farmer. This also includes the decision making of the farmer and the action undertaken by the farmer derived from the information that is provided by the sensors and the information system.

The definition also includes all the automatisms, like automatic milking systems and automatic feeding systems that are linked and that are generally controlled by the farmers, but also more and more by sensors.

Precision Dairy Farming is boosting all over Europe and even in all developing countries that produce milk. The environment is conducive to the development of Precision Dairy Farming. One reason is the evolution of the farms' structure. There is an increase of the herd size and in work productivity, i.e., there are less farmers for more animals.

The second reason is related to changes in the economic context. Milk producers are confronted to very volatile prices, regarding both milk and food. Farmers need technologies and tools to have a positive profit margin.

Third, there are new societal demands from the consumers, looking for quality, animal well-being and environmental effects, but also from farmers, in terms of workload, constraints and income.

All these needs and requirements meet the ICT tools availability. There is a tremendous rise of sensors and automatisms in dairy farming—for calving detection, health, feeding, reproduction, herd management, heat detection, … And this is just the beginning.

What are the future possibilities for Precision Dairy Farming? At the animal level, technologies, such as 3D imaging or drones, provide new opportunities in the area of specific health problems. Improvements in data analysis lead also to an improvement of alerts detection performances, especially for disease detection.

Regarding the farmer level, most of the devices on the market provide an informational alert, but this is not enough. There is a need to deliver advice and not only information or alerts. At the same time, some of these systems taking autonomous decision or actions are already operational. Are we evolving towards the farm without farmer?

At the animal population level, the sensors data could be used to detect emerging epizootic diseases. Moreover, there are huge possibilities for genetic selection on new traits recorded by sensors.

At the consumer level, there are more and more demands like animal well-being: how to measure it is a challenge. But if there were solutions, they could be also used by policy makers for subsidies or control.

MARIANE CIMINO, Consultant, France Génétique Elevage, France, provided an insight in the problems of exploiting the potential of big data in livestock management.

Impacts and issues of Big data and Open data in livestock management

Livestock management produces a lot of data. When looking at the evolution of data towards big and open data over time, it started with financial and economical data. Then came animal identification and traceability of movement, e.g., in France, movement represents 50 million transactions per year (for cows). Afterwards, we entered the era of genetics and genomics, which produces a lot of data to improve the selection of animals, but also the improvement of the races. Now, there is a lot of health and environmental data with different kinds of sensors on the animals, but also on the farms and on different materials.

In the past, data were collected for public interest objectives, e.g., to fit regulations or to serve R&D programmes. The intermediate players (veterinarians, markets, commercial operators, etc) were sometimes used as transmission belt. Today, the exchanges between the intermediate actors and the regulations or R&D levels don't work anymore. That means that the farmers receive few services except in the form of advices from the intermediate actors, although they are at the origin of the production of exchanges. Moreover, there is no real governance of all these actors. Sometimes there is even competition between them.

Although the potential of big data exists at the source of the data warehouse. It is a tremendous amount of data that is produced, but this data production is not used by R&D or others.

There are other issues. One is the uncompleted value chain. There are a lot of data on live animals and then, there is a hole with no data on the downstream distribution cycle, e.g., data on meet, milk… It is a real problem to involve all the actors of the value chain, and not only the farmers.

Moreover, there are only few experts and searchers that are able to make such data analysis. There is a need to train data analysts and data scientists. Furthermore, there is no link between structured historical data and new data (web, open data…).

SAMI COLL, Research Fellow UNIGE - University of Geneva, Switzerland, provided a sociologist's perspective on big data.

To make the world a better place?

Big data is about knowledge, but what kind of knowledge are we talking about? Some of the experts in the social scientist area are of the opinion that causality doesn't matter anymore. What matters is correlation between facts, to make analysis less science oriented and more efficiency oriented.

A humorous example of the use of correlation was given, by referring to the exchange between former Marine and combat veteran Joe Pyne and musician Frank Zappa in 1965. It went like this Pyne said, "Well, I see you have long hair. You must be a girl." Zappa fired back, "So, I see you have a wooden leg. You must be a table."

Big Data are often considered as enlarging choices and enhancing the equality of choices. However, big (commercial) data is not about social inclusion. Recommendation systems of are a good example: According to your consumer profile, and the products related to a product you're about to buy, a recommendation system suggests products you might also like. It is sometimes frightening to see how relevant the recommendations are. According to some studies, this system helped Amazon to increase its sales by 20 percent. The problem is that, according to an increasing number of studies, these systems tend to put people in cultural cases, that prevent social mobility.

Big Data, as many emphasise, might be a revolution in the way we produce and understand knowledge. However, the type of knowledge produced by big data is not equivalent to the traditional forms of knowledge production, i.e., science, physics, medicine, etc.

This type of knowledge is peculiar and is particularly oriented, at the very first stage, on an immediate efficiency. It doesn't really matters anymore why a decision has to be made. It matters that, according to the facts, it has to be made.

Big data is not democracy. Actors who are enabled to make decisions, based on this new type of knowledge, are not the same anymore. There are not necessarily elected or chosen by people. This shift of power can be observed in many examples, if not in our everyday life activities. A very relevant example of how private actors are getting power on issues that used to be the "garden" of public actors is the foodflex programme in the US.

Privacy is not the antidote. We usually see privacy and data protection policies as the answer to draw lines at the potential abuses of information systems and, as we call them now, big data.

Privacy has become quite rapidly obsolete in our information age. Its basic principle states that no data should be gathered about persons without their permission, that should be based on what someone wants to do with the data. In the era of the big data, there is a big contradiction between the very principle of big data and its potential to create innovation, and the very limiting principle of privacy.

This is why the definition of privacy has become a matter of the first importance. The question is: who has the power to define what privacy is? Privacy, as conceptualised by the legislators, is not understood in the same way by citizens. Privacy is a very subjective concept… and a normative one!

To say it provocatively, privacy is not only a tool of protection against surveillance, but also a tool of governance. The more you shape privacy, the more you can control it. A concept that tend to individualize people to make them fit the surveillance projects.

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The following question referred to big data algorithms and recommendation systems, like the one used by Amazon. To what extend are people's choices being eroded? If suddenly it is made so easy to see things, people may miss other things. Or is it bringing greater diversity?

Mr. Coll answered that one has to make a difference between inter-diversity and intra-diversity. It is bringing greater intra-diversity, i.e., diversity only in your own social group. Each social group has a greater diversity than before.

STÉPHANE GRUMBACH, Senior Scientist, INRIA, France, delivered a thoughtful talk on some of the impacts of data.

We live in a world where more and more data is produced and this data is raising fundamental questions. There is the fear that correlation could replace causality and somehow algorithms working on data could replace experts.

There are many promises about data, but there are also many threats, which are often strongly related to the promises.

The strongest impact of data is enable automatic intermediation. Intermediation is the capacity to intermediate between people, between people and services, between people and things or between things themselves. A search engine is an intermediation system, it intermediates between people searching knowledge and the pages that contain related knowledge. Social networks or Amazon are all intermediation platforms, they connect people or people with services in ways that are much more efficient than what we were able to do before.

One example is carpooling. Carpooling systems were impossible some years ago. They are possible today for two reasons: It is possible to easily identify people having the same or complementary needs (same route, same day etc), and in addition to that, it is also possible to trust the people you will be travelling with, in the same way you trust the taxi drivers or professionals of transportation systems.

There are three very important things about intermediation systems: The first point is that the main web systems we know are all intermediation platforms, e.g., Google, Facebook etc.

The second point is that intermediation systems have more and more conflicts either with enterprises in the traditional economic sectors or with states. Recent examples are the problems with Uber, Airbnb or Amazon. Those cases were settled in various countries, and in particular in European countries, but also in the US—either with an agreement with the state or by decision of justice.

For instance, Amazon had a conflict, that is now settled, with the publishing company Hachette. Both companies wanted to decide about the price of e-books. Airbnb had conflicts in terms of fiscal issues in the countries it operates. If we want to know what innovation is, we have to look at those conflicts. These are the places where innovation goes on.

The third point is, that if you are not convinced that intermediation systems is the most important topic, than look at the top capitalisation in the world. The crude oil industry was dominating the top capitalisation with the car industry and the pharmacy industry. Now, increasingly, the intermediation industry, the data industry, is coming up. Apple or Google are now ahead of crude oil industry.

Why is intermediation so disrupting? Intermediation systems abolish the difference between the consumer of services the and producer of services. We are all in the capacity of being journalists, taxi drivers etc. There are many things people can do today, which was not possible before when we had to be a professional and work for a company to do this. Today it becomes possible and step by step the law and the legal system changes to support this.

Abolishing the difference between producer of services and consumer of services has two

major consequences. The first consequence is citizen/ user empowerment. It enables users to do many things that they were unable to do before. So, it shifts the power down from the companies that were offering the service before, to the people who can now do it without the company.

At the same time, it also shifts the power up to the intermediation platforms, taking the business model of the traditional industries. This is becomes obvious in the conflict between Amazon and Hachette: who decides the price of e-books? Even if Hachette won this case for now, ultimately the platform will be in the capacity of deciding the prices, and also what are the books to publish and what should be advertised. There are many cases like this.

There are many services of the public administration which will be disrupted in the same way the private sector is disrupted. Social security, tax administration, identity, interior affairs, security, etc. And this will probably go faster than most people expect, for the simple reason that the public administration has tremendous budget difficulties, while the big companies that are running the intermediation platforms have tremendous growth.

We will see various sectors of the public administration going to the private sector. And this will be eased by the fact that the public sector has decided to publish all its data under open data, and those data will be accessible to all the citizens, but also to the major companies that are able to develop services that will be adopted by the population.

There will be changes in the way our administration is managed, and there will be many changes in the way our political systems will be managed.

Another issue at a more geopolitical level: If you look at these platforms, they are concentrated in a few places on the earth. Essentially in the US, and particularly in one small region in the US, the Bay Area. Many of these big systems are in China. 2/3 of the 20 largest systems are American, 1/3 is Chinese, but there is not one single system of large size in Europe. In Europe, people are using American and Chinese systems.

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The question of the moderator concerned the information overload. How machines can help us filter things that we chose to digest? How can citizens absorb data?

Mr Grumbach stressed that intermediation systems will be the answer. They have a tremendous knowledge on what we do, what we like, and what we want to do. They will filter the information. There might be many questions related to how the algorithms are actually filtering the information, but at the end, people will depend on algorithms to do that. Currently we get advertisements from Amazon, but the personal assistance will emerge—and partly already exists—that will know what we want to get as information and what should be rejected.

JENS-HENRIK JEPPESEN, Director European Affairs, CDT – Center for Democracy and Technology, Belgium, advocated for the preservation of fundamental and long principles of data protection.

The Center for Democracy & Technology (CDT) is a non-profit organisation, a civil society group, focussing on technology policy as it pertains to human rights, consumer rights, or civil liberties.

Companies and local authorities are looking at ways to deploy these new technologies to solve societal challenges and to help individuals, and there is a huge potential of these technologies. CDT's mission is to look at ways to ensure that consumers and citizens retain control and retain autonomy in agency in a scenario where data is recorded constantly, shared and stored with the purpose to make these solutions work.

CDT's main contention is that the fundamental and long principles of data protection law still apply in the big data and Internet of Things environment. These are principles such as notice and contend, limits on retention of data, limits on collection, limits on data transfer etc. These principles absolutely apply, and should apply, in the big data and Internet of Things scenario. The challenge is to work out what does that look like exactly in these new scenarios. It is not clicking 'yes' to cookies on websites. This point has already passed. We have to look at other ways.

As policy makers and societies we need to be open about some of the trade-offs that exist. There are potentially some extremely interesting and valuable services that could be deployed, if only we were able to collect, share, and process the data in an indiscriminate way. People might not want to agree to that sort of collection of data and we need to make sure that consumers and citizens still retain the authority to opt-in and opt-out to these system and say 'yes' it is okay, 'no' it is not okay.

The 2014 White House Report on Big Data and Privacy, released in May by the President's Council of Advisors on Science and Technology (PCAST), contains a very illustrative fictional scenario:

Taylor Rodriguez prepares for a short business trip. She packed a bag the night before and put it outside the front door of her home for pickup. No worries that it will be stolen: The camera on the streetlight was watching it; and, in any case, almost every item in it has a tiny RFID tag. Any would-be thief would be tracked and arrested within minutes. Nor is there any need to give explicit instructions to the delivery company, because the cloud knows Taylor's itinerary and plans; the bag is picked up overnight and will be in Taylor's destination hotel room by the time of her arrival.

Taylor finishes breakfast and steps out the front door. Knowing the schedule, the cloud has provided a self-driving car, waiting at the curb. At the airport, Taylor walks directly to the gate – no need to go through any security. Nor are there any formalities at the gate: A twenty-minute "open door" interval is provided for passengers to stroll onto the plane and take their seats (which each sees individually highlighted in his or her wearable optical device).

There are no boarding passes and no organized lines. Why bother, when Taylor's identity (as for everyone else who enters the airport) has been tracked and is known absolutely? When her known information emanations (phone, RFID tags in clothes, facial recognition, gait, emotional state) are known to the cloud, vetted, and essentially unforgeable?

When, in the unlikely event that Taylor has become deranged and dangerous, many detectable signs would already have been tracked, detected, and acted on?

Indeed, everything that Taylor carries has been screened far more effectively than any rushed airport search today. Friendly cameras in every LED lighting fixture in Taylor's house have watched her dress and pack, as they do every day. Normally these data would be used only by Taylor's personal digital assistants, perhaps to offer reminders or fashion advice. As a condition of using the airport transit system, however, Taylor has authorized the use of the data for ensuring airport security and public safety.

That is an interesting scenario and one can the see efficiencies and convenience associated to this. However, most people will not readily consent to the kind of surveillance that would be necessary to make it work. And the key is that, in the future as well, we retain the authority to say 'yes' or 'no' to this.

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The following question was, how to control that kind of information? How to educate people to realise how much they can opt-out and how that will be a problem or an asset in the future?

Mr. Jeppesen explained that there aren't yet all of those answers. However, as innovators and researchers think about these solutions, one of the ways to address it is to take this into consideration from the beginning. E.g., taking the farming example: How to make sure that only the farmer gets this information and that his bank doesn't get it?

JEAN-HENRY MORIN, Associate Professor of Information Systems, CUI – University of Geneva, Switzerland, highlighted a number of challenge which are really problematic today.

Social Things, Data in a Digitally Responsible Society

The socialisation of things—let's consider the Internet of Things is here, and it is here to stay. The Internet of Things will generate lots of data. Everything will need to interconnect.

In the video "The story of Brad the Toaster" (http://vimeo.com/41363473), a world of peer product networks, we are looking at new business models behind the servitization of the production of goods, in which goods will determine by themselves the best suited places for them to live.

This is an interesting concept, because it opens a whole range of new thinking processes in the area of business models, in the area of logistics, in the area of sustainable production of goods.

We have been accustomed to buying goods which are built by design with obsolescence features. If manufactures were inclined to produce goods by which they would be able to permanently connect, they would be able to check on the status of these devices and eventually replace them on a service model before failure happens to these things.

Things will "socialize", they will need to interconnect and talk together. It is just a matter of time before social networks of things emerge as it happened with Facebook for people.

In terms of data protection, we suffered a major breach of trust last year with Snowden and the NSA. This should have led to some form of revolts, but these revolts never happened—probably because these services are just to big and to pervasive today for us to get rid of them. There is a major problem with this issue of trust, of services and systems. We knew it, but we needed to have this reality check of what happened last year. Now things are clear.

The second point is the EU data protection reform, which is right around the corner. We are in the final phase of seeing this regulation adopted. This will be a major disruption in how businesses and things deal with the information they collect and manage. There will be 2 years for implementing that reform, and even if it will take more time, this is the context we are in.

At the core of the reform is the re-appropriation of personal data by people. This means that companies are going to be handing off a lot of our data back to us. What are we going to do with that?

In terms of challenges, first of all, we need to restore trust in our digital society. We cannot move forward without the confidence of being able to use systems and services with the current level of distrust.

The second point could be called the data “hot potato” effect: Assuming that we are getting back our data. This also means, given the constraints that will be imposed in terms of compliance by the data protection reform, companies will not want to manage our data anymore. Data is going to become a problem. Data will flow out of companies; as far as they can, they will just hand it off. Are we ready for this?

There is room for improvement in terms of digital responsibility, based on informed trust and transparency. This principle could be named collaborative compliance (co-compliance). The idea is to recover a more adult, mature relationship between the parties in a transaction, conversation, or relationship. It is not the traditional command and control, but more peer-to-peer like.

Another point is that we are moving away from trusted third parties towards something that could be called trusted shared parties. Some of the emerging infrastructures based on block chains and transparency will be instrumental.

Finally, education and training are key, together with public policies. We need the frameworks for this to happen in a responsible and sustainable digital society.

GERALD SANTUCCI, Head of Unit Knowledge Sharing, DG CONNECT, European Commission, presented a clear and concise overview on the history and perspective of the Internet of Things in Europe.

Internet of Things: Europe takes up the challenge!

The concept of the Internet of Things was coined by the British technologist Kevin Ashton, 15 years ago. In the same year, there was another concept, addressing more or less the same phenomenon, Ambient Intelligence. Ambient Intelligence occupied the scientific and political circles for about 6 years. Then, suddenly it vanished.

The Internet of Things had a very slow take-off. It was coined in 1999 and there was no real discussion on it before 2005, when it was awaken by an ITU report. In the same year, the European Commission started working on a communication on RFID, and on the last page of that communication, published in March 2007, it was announced that looking ahead the Commission would initiate a debate on the Internet of Things".

The Internet of Things as a concept was born from the RFID community. But today, there are at least three main drivers for the Internet of Things from an industrial point of view: There is the RFID world (sensor manufacturers etc.); historically, they were the first to jump into the IoT revolution. Over the years, the consumer electronic world joined the IoT community, and there is at least a third source, which is the Internet world, those who are dealing with integrated cooperative platforms, the semantic web etc.

One issue is that these industries are quite different. They have difficulties in working at the same pace and in working together. They need to converge in order to make that IoT will no longer be something addressing different market niches, but something that is a full part of people's daily life.

What will make that confluence happen? Probably it will be data, because all these sectors have at least one same requirement, which is to understand how data can be collected, stored, processed, monitored etc. This should happen very fast.

In 2010, the EC established an Internet of Things Expert Group. This group worked closely with the ITU in order to provide a definition of the Internet of Things:

"The Internet of Things is a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual "things" have identities, physical attributes, virtual personalities and use intelligent interfaces, and are seamlessly integrated into information network."

This definition describes something that is not yet reality. However it will become reality much faster than we thought a few years ago.

In 2007, the EC started to support IoT-projects within the Seventh Framework Research Programme. With a budget of 100 million Euro over 6 years, 25 projects were funded—many of them had use cases in smart cities, health, logistics etc.

The results can be consulted on the website of the European Research Cluster on the Internet of Things (IERC): www.internet-of-things-research.eu/ This is a cluster of all the projects that have been financially supported by the EC so far as well as projects receiving support on a national level, which cooperate with the EU-funded projects.

Furthermore, there is an ongoing call of H2020 with a budget of 51 million Euro for IoT. Deadline is 14 April 2015.

The EC is preparing the second ICT in H2020 Work Programme which will cover the period 2016/2017. The Internet of Things, due to its cross-cutting nature, will be treated as a focus area. We will have to combine IoT with cyber-physical systems, with cloud computing, with big data etc. It will no longer be a single entity, but a spectrum of technologies that are neighbouring the IoT.

IoT will be one of the domains that will have to consider what we call Responsible Research and Innovation (RRI) and Social Sciences and Humanities (SSH). In other words, it will be requested to care not only about technology but also about the societal and ethical implications of the work.

HERVÉ RANNOU, CEO Items International, CEO Cityzen-Data, France, provided a vendor's view on big data.

Innovation in connected things & big data –
towards platforms for cities

Together with Cityzen Sciences, a French company that specializes in smart fabrics conception and development, a smart t-shirt has been developed. The smart shirt integrates micro-sensors enabling to monitor the wearer's temperature, heart rate, speed, location, and acceleration…

The objective is to provide a personalised service. Every individual's health risks are different and the analysis of health risks has to be adapted to each person.

Data is the key component of this product. First of all, because it is important to understand in real time what happens, but also to cross the data from many sensors and to analyse historical data in order to have a real meaning of the data. This was the reason to create Cityzen-Data—not only with the objective to address the market of smart fabric but to address the market of the Internet-of-Things in general.

Cityzen-Data analyses data coming from the body in the same way it can analyse a transport system or an energy system. The issue is different, but Cityzen-Data has defined statistical and mathematical models to analyse the risk for people and the risk for systems.

The real challenge a technology vendor is facing today is not understood by many people. The main challenge is the volume of data. For instance, if you take a data base in a bank, it is about 1200 operations per year per user. If you divide the operations of Facebook by the number of the users, it is about 1500 bytes per user per day. The data generated by new flights is 1 to 4 terabytes and a new car is going to generate 10 terabytes per 10 seconds That is a huge amount of data!

Cityzen-Data is working on a health project and this is 600 billion data a day. This is a completely different dimension of data management. It will change the way we will understand the data.

One of the most interesting challenges are smart cities, because smart cities is related to data coming from people and data coming from infrastructure. There are many questions related to the governance of these data for people and the governance regarding the data coming from infrastructure. Today, when a city has an operator operating a water infrastructure or an energy infrastructure, the data belongs to the operator—even if the operator asked the city to invest in the infrastructure. Thus, there are more and more cities around the world creating obligations to have access to the data. This point is going to change the way we will govern data in the future.

Big data is also a big chance regarding technology, because all the data we manage today is managed as relational data base. Big players are going to deal with this kind of technology. In the future, data will be managed in a different architecture and data base.

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Q&A

The first question was about the professional capabilities in public administrations required to figure out how to leverage all this intelligence into something manageable.

Alan Shark, PTI, explained that a public administrator is a generalist with some specialisations. In the past, when it came to technology, it was very easy for them to turn to their IT-department to get answers. They didn't have to worry about knowing too much themselves. This has all changed. You have to know and embrace technology as never before. A data scientist however, is still a specialisation that is growing. It is somebody who might have greater skill sets in interpreting and studying data and perhaps less about managing people, departments etc. It is a specialist whose job it is to love numbers, understand numbers, to look for trends and to be able to make sense of this, and to develop some kind of service out of that. But the public administrator is still the one who has that leadership role within organisations.

The next question referred to the fact that people are often speaking about data analysts. However, the main question should be to find potentially successful services. If you have the service, you harness the data and then use the data to built the service. In Europe, there are lots of data analysts, but there is very little concern about services.

Hervé Rannou, Cityzen-Data, emphasised that big and open data is a very new technological field. When dealing with data in general, you need people who are going to deal with the systems, with the cloud, with data visualization and the services. It is not only technology, but the entire value chain that has to be considered.

Alan Shark, PTI, referred to a survey carried out in the US about how many local governments were using social media matrix that were built into web sites. 89 percent of the workers responding said, not at all. The following reasons were stated: 1) too busy; 2) I have not been trained; 3) no one above me ever asked me.

There is an absolute disconnect among the various portions within our public systems of governance where people don't know what they don't know and they never ask. There are people who know, but they are not asked…

Gerald Santucci, EC, stressed that it is true that there will be an increased volume of data, but what is more important to realise is that it will not be the same sort of data we know today. It will be a new kind of data, generated by sensors, and we will have to learn what it means in terms of opportunities and threats. Besides the "4 'V's" – Volume, Velocity, Variety, Veracity, I believe we should add something around Novelty or Discovery – new kinds of data will profoundly affect human apprehension of the world. To use a metaphor, we will move from the macroscopic view of data to the microscopic view of data – like in the early part of the 20th century scientists discovered that atoms were composed of certain subatomic particles. In addition, that data will be largely generated not by humans but by robots, devices, systems and machines. We also have to understand what the consequences are.

The last question referred to the use of algorithms. Algorithms are basically amplifiers and have no context sensitivity. How to make sure that algorithms are applied to problems where they are good at providing solutions? How to make sure that algorithms are used in a positive and appropriate way?

Clément Allain, Institut de l'Elevage, underlined that in the farming sector, for the majority of the systems that are on the market, the algorithms don't take decisions alone. It is always a combination of the farmer's observations with additional information received from the sensors and the information system. This is why it is working so well, because the farmer has the feeling that his/her observations are confirmed by additional information. Systems, that are completely autonomous have no success on the market because the farmers have the impression to lose control.

Alan Shark, PTI, proposed to distinguish between different kinds of routines where that is less of a problem, whether it is road automation versus value judgements.

Jean-Henry Morin, University of Geneva, reminded earlier propositions of designing an ethical operating system. There are leads going into this direction. Talking about digital responsibility today definitely goes in this direction. But just think about ethics, ethics is something that relates to philosophy and culture. How to implement it or how to measure it? How to find universal principles? It will probably take a long time.

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Session 10

Day 2 – Afternoon – Parallel Session

Broadband For Development

JEAN-PIERRE CHAMOUX, Professor Emeritus, Université Paris Descartes, France, the chairman and moderator of the session, welcomed the participants and introduced the topic of this session, which was built in collaboration with the ITU.

The idea behind the topic was twofold. The session takes place very close to the Geneva ITU premises, the ITU Tower. As the lead UN agency for ICT issues, ITU was formed 1865 at the International Telegraph Convention. It always supported both telecommunications in general as well as those countries lacking infrastructures and help those countries keep pace with their time.

Thus, being in Geneva, it seems natural to have a topic related to development and, as today the problem of development is often related to broadband, a session on Broadband for Development.

The second reason is to provide a platform for the exchange between experiences made in the developing countries and developed countries.

The session will be divided into the following three sections:

I. The need for infrastructure and services
II. Analysis of existing policies
III. Insights in typical applications requiring broadband

I The need for infrastructure and services:

RENÉ DÖNNI KUONI, Director Telecom Services Division OFCOM – Federal Office of Communications, Switzerland, provided a remarkable picture of how Switzerland tackles the issue of broadband as universal service:

Broadband for Development – Rural Areas in Switzerland

The national Strategy of the Federal Council for an Information Society in Switzerland has been established in 1998; it then has been revised twice, in 2006 and in 2012. It provides a common framework for the activities of the federal administration. The implementation of the strategy is decentralised (federal, cantonal and community levels).

Two main objectives were set by the Federal Council in 2012: Switzerland's economy will become innovative and internationally competitive through the use of ICT. And, ICT will be used for the benefit of all and will make Switzerland an attractive environment for living. The last objective refers to the need to have some ubiquitous dimensions of ICT in Switzerland.

Switzerland is a liberal country with a liberal approach to regulation, where only few parts of the telecom market are regulated. It is an ex-post regulation for certain areas. Regulation is in general on demand or on complaint. Moreover, there is no regulation of fiber access in the Swiss Telecoms Act so far.

However, on the other hand, there is a relatively demanding universal service obligation, which is aimed at some operators.

Next generation access deployment is part of the governmental strategy on the information society, with no federal money involved. The goals are not related to a certain bandwidth at a certain time, but are of more qualitative nature, such as good quality infrastructure. Switzerland has therefore a tradition of good quality infrastructure, there are ducts, there are spare capacities and a strong cable industry.

This was not done "by design", but it was to some extend by hazard. It happened like this, because the communities were involved from the very beginning, even 15 years ago, in setting up their local networks and local cable operators.

Furthermore, there are FTTH cooperation in cities, which is a rather recent trend. In larger cites, the utility companies and operators like Swisscom have some kind of cooperation where they try to roll out fibre networks and share cost. They roll out 4 fibres, instead of one, in order to be able to benefit from the same investment afterwards.

There is also a multi-stakeholder working group, led by the government. The political debate is focussed on investments, protection of investments and on coverage without using federal money.

In terms of universal service obligation, there is already a strong obligation to serve the whole population throughout the country—in every village and in every house which is inhabited throughout the year—with 1 Mbit/s download. This will be increased to a bandwidth of 2 Mbit/s download as of January 2015. It is important to know, that this doesn't mean a best effort service but a guaranteed service.

There is a financing mechanism behind, which has not been used so far: If there is a net

deficit, all the operators together would have to share the burden according to their market shares. This system is in place and it is consistent at the moment, but it will not survive in the long-term, with further increasing guaranteed bandwidths throughout the country. The cost would be too high and there is a need for another system.

In terms of fixed wired broadband provision in the OECD, Switzerland is leading when it comes to “normal” broadband (1 to 5 Mbit/s). It is most likely that there is a correlation between the GDP per capita and the broadband deployment. Switzerland is on top of the ranking in terms of NGA development in the OECD. Regarding wireless broadband, Switzerland does not perform that well and is more in the middle of the OECD ranking.

However, once you leave this macro-level and you enter in the field that really matters for people, i.e., what is the bandwidth provided in their homes and not the average of a country, the question of the affordability of network rollout comes into play.

A cost model of a FTTH greenfield rollout has shown that 60 percent of the Swiss population lives in profitable clusters, i.e., in regions where a network rollout would be economically viable.

Switzerland has different networks, which is a sort of coincidence. This is not normal case in other countries and it helps Switzerland tackle this issue.

The example of the region of Surselva was given. Surselva is an alpine region, with a high rate of agriculture and tourism. Most houses have 2 Mbit/s download, some have 10 Mbit/s download, and you could even go to 100 Mbit/s download. There are still some white spots in the map, but they are due to the non-existence of cable. If there is cable (it is locally paid cable) you can go up to 100 Mbit/s in a mountainous region.

This was not designed by governmental agencies. People make pressure on their local governments and there is a lot of competition in Switzerland. If you have competition, you should use it to strengthen your position as a client.

MARIO MANIEWICZ, Deputy to the Director and Chief, IAP Department Radiocommunication Bureau (BR), ITU – International Telecommunication Union, provided a very clear overview of the role of the ITU in bridging the digital divide and supporting mobile broadband growth.

Bridging the digital divide through mobile broadband

There are almost 7 billion mobile-cellular subscriptions worldwide, which is as much as the world population. There are as much subscriptions as people, of course with some people having more than one SIM-card and others some having no mobile at all.

Even more striking is that, in 2005, the amount of cellular subscriptions per year in developed countries and developing countries was almost equal. Today, three-quarter of these mobile subscriptions are in developing countries and not in developed ones.

This is the basis for mobile broadband, because people access mobile broadband mainly through their phone. This has provided increased access to the Information Society throughout the world.

In terms of growth rates of mobile broadband penetration, all regions, both developed and developing countries, continue to show double-digit growth rates, but Africa stands out with a growth rate of over 40 percent, which is twice as high as the global average. By end 2014, mobile broadband penetration in Africa will have reached almost 20 percent, up from less than 2 percent in 2010. Regarding growth rates of mobile broadband penetration, Africa is followed by Asia-Pacific.

All the players involved in this phenomenon, governments, the private sector and other types of organisations, should work together in planning a sustainable growth.

The role of the ITU is to catalyse and to help that this collaborative planning between the various actors in the sector happens. ITU coordinates the shared global use of the radio spectrum, promotes international cooperation in assigning satellite orbits, works to improve telecommunications infrastructure in the developing world and assists in the development of worldwide technical standards.

ITU divides its work in three areas: 1) the radio communication sector, which mainly deals with spectrum and the satellite orbit. 2) The standardisation sector which deals with the technical standards that are followed by the vendors and manufacturers of equipment and terminals, and 3) the development sector, which is the one that helps developing countries to bridge this digital divide and keep up in this and other ICT related issues.

One of the roles of the ITU in bridging the digital divide and supporting mobile broadband growth is the allocation of spectrum for mobile broadband through regular planning at World Radio Conferences (WRCs). Operators and service providers are complaining that they don't have enough spectrum to meet the demand for mobile access. This is an issue that has to be addressed. The WRCs are the gatherings of all the Member States, roughly every 4 years, in order to discuss the use of the frequency bands for radio communications, in particular for mobile broadband, but also for a wide range of services and applications relying on spectrum.

The demand for spectrum is growing considerably, not only due to the increasing number of mobile users, but also due to an increasing M2M communication. Regardless of the result of the next WRC, it is envisaged to allocate 50 percent more spectrum to mobile use than that one that is currently allocated—and despite of that, it won't be enough.

Therefore, it is not only a matter of having more spectrum, it is also a matter of using it more efficiently. One of the issues within this efficiency of the use is harmonization of frequency plans. In the past, each region had its independence in using the frequency plans, and if the regions were not provoking any interference to other regions, they were free to allocate frequency bands as they wish. Today, there is an increasing pressure in harmonizing this, because otherwise mobile devices will have to be either different for each region or so complicated, in order to be compatible with any plan, that they will be heavy, costly and cumbersome. If we promote harmonization, simple mobile devices could be used worldwide.

Standardisation is another important aspect in order to make the equipment interoperable. Moreover, standards, as well as interoperability and conformance testing, also provide a clear progression path to continuously improve networks technically.

ITU also engages in promoting internationally agreed best practices, both at the technical and the regulatory level, in order to have a compatible and harmonized playing field for everybody.

Moreover, ITU provides technical assistance to Member States, especially to developing countries in order to support them in the implementation of ICT initiatives and regulatory advancement to meet their local needs in a global context.

Harmonization, standardization and ongoing planning are needed in order to grow mobile broadband sustainably, in front of the growing demand.

Government policies oriented towards long-term outcomes are vital, considering the limited nature of the spectrum resource from which mobile broadband is sustained.

International agreements through the ITU have this purpose, made under consensus, ensuring in this way a stable regulatory platform for securing the long term investments needed to deploy resilient, scalable and reliable national broadband networks.

JEAN-FRANÇOIS BUREAU, Director of Institutional and International Affairs of Eutelsat, France, presented how satellite operators see the demand for broadband and what their contribution could be.

Socio Economic Contribution from the Space Infrastructure

Satellite operators are ordering the satellites, i.e., they are the clients of the space industry for the manufacturing and the launching of the satellites, but they are also the clients of the terrestrial segment of the space system for the purchase of antennas etc.

Once the satellite is put into orbit, the job of the operator is to sell the capacity of the satellite to provide services to the people. Historically, operators started with selling broadcasting services—TV was the main part of the job. However, during the last 10 years, a lot of new services have been developed in the field of telecommunications, especially for the Internet and broadband activities.

In August 2014, there were 1 235 satellites in operation, of which 458 at the geo-stationary orbit. Half of them are delivering services dealing with telecommunications: 38 percent are delivering commercial communications, 16 percent are serving government communications (safety, security, military, e-education, e-heath etc.).

Regarding the value chain of telecommunications satellites business, the manufacturing and launching of satellites and the terrestrial terminals selling amounts to almost 10 billion dollars.

At the same time, the services sold with this satellites amount to 110 billion dollars. The relation between the investment and the return on investment is 1 to 10 with regard to the services and applications sold.

Telecommunications by satellites have increased the downstream value (ripple effect) of their applications and services, the value of which is now estimated between 8 to 10 times more important than the upstream value.

Diversification of applications and services, increased competition among more many satellite operators are two of the key features of the time: end users and consumers should take benefit of it!

The history of the telecommunications by satellite industry is related to the development of the broadcast, TVs and video activities, and their technical standards, and this will continue. Broadcast and video consumption will remain the leading driver of the telecommunications loading: hybridation between satellite and terrestrial networks will be the appropriate and affordable answer to feed the needs.

Far from being a “niche”, the satellite contribution to the dissemination of information technologies will accelerate and extend. Convergence between broadcast and broadband will be a new driving change which will require a wider based regulation in order to take the best of the different technological solutions.

Telecommunications by satellites has a key role to play in the provision of Internet and connectivity: In 2008, 1.1 million households were receiving Internet by satellite; in 2013, 2.25 million; and it is estimated that, in 2023, 8.8 million people will get access to the Internet via satellites. Satellite is currently providing an Internet of 20 Mbits/s downstream for households and this capacity will further increase.

The two main active areas are Northern America and Europe, but the satellite economic model especially fits the needs of the emerging world.

There are many systems combining terrestrial and satellite technology, such as IP trunking or backhauling. Moreover, satellites will soon provide Internet in the aircrafts. Satellites are providing virtual professional networks and are backing up the terrestrial networks in case they collapse. The satellite provides telecommunications and connectivity services which are more and more complementing the terrestrial ones.

Why is the satellite needed in any broadband development plan? The intrinsic advantage of the satellite is that the cost of the service is not related to the distance. The cost remain the same, whatever the distance. Satellite is therefore the most appropriate tool to provide services to far away populations from terrestrial networks.

Furthermore, the investments in the satellites are financed by the satellite operators upon their own resources. There is no need to ask fur public money to finance satellites.

Another advantage is the readiness to provide immediate service once the satellite is operational (6 weeks after launching). Thus, satellite can accelerate the development of digital usages.

In many emerging countries, the challenge is how to manage the increase of the populations in cities. Many governments are thinking about how to promote solutions that incite people to stay where they live, in their countryside towns and villages, and not trying to move to the cities. Satellites represent an important tool to help the people stay where they live, in the countryside, and to develop activities and SMEs there under the same conditions as if they lived in the capital.

II Analysis of existing policies

JULES DÉGILA, Independent Consultant, Benin, outlined what is happening today in the area of public policy in Benin and what are the perspectives for the months to come.

Benin is one of Africa's most stable democracies. The country has undertaken many reforms in order to improve its economic situation and has made considerable progress. Benin serves as a transit country for several landlocked countries in West Africa.

The SAT-3 submarine cable has a landing point at the coast of Benin. A second fibre connection will come very soon.

Benin is lacking infrastructure and well-defined policies in order to spread the use of broadband. This is where Benin has to focus on during the next years. Making this digital vision, that has been around for years now, happen is priority of the Benin government.

There have been some wrong decisions, especially regarding the incumbent operator, that is still owned by the government. This has not really helped the country follow the pace of technological development.

Now the government has taken the decision to define a policy to attract investors, but also technology partners. Even with what is in place at the moment, run by the government, there are many limitations, there are many downtimes and blackouts. There is a need for skills and technology partners to invest in the telecommunications sector in Benin.

Developing countries have a demand for broadband, the customers are there as well. Moreover it is an interesting market.

During the last 3 years, a Canadian telecommunication operator deployed rural telephony solutions in rural isolated areas in Africa. The only two criteria were: the existence of 2000 people and no coverage in terms of GSM operators' coverage. 2000 people, no electricity, no access to water—but with the appropriate technologies, it is possible to make the business case work and to make money. The market is there.

Benin has 10 million inhabitants, next to Benin is Nigeria with more than 170 million inhabitants, and if you take the Economic Community Of West African States (ECOWAS), you have 15 countries with 300 million people and many of them using Benin as a transit point for goods and services. The digital and market opportunities are obvious.

The other point is that many companies are willing to go to Nigeria. That is where the money is. But sometimes Benin is used as test bed. The same culture, 2 hours away from Lagos, companies can test their technology there in smaller environment. It could be reasonable to start from Benin and then go to Nigeria.

FADHILAH MATHAR, Head of Strategic Planning and Partnership, Division of ICT R&D and Human Resources Development, Ministry of Communication and Information Technology, Republic of Indonesia, delivered a great insight in the way Indonesia tackles broadband development.

Indonesia broadband plan and national competitiveness

Indonesia is an archipelago comprising more than 13 000 islands. It encompasses 34 provinces with an estimated population of over 252 million people, making it the world's fourth most populous country. Indonesia consists of hundreds of distinct native ethnic and linguistic groups and is characterised by religious pluralism within a majority Muslim population. Indonesia is a republic with a presidential system with over 600 governmental bodies, including local governments.

Indonesia has the world's second highest level of biodiversity (after Brazil). The country is leading export of natural gas, coal, geothermal, palm oil, copper…

Climate in Indonesia is almost entirely tropical and ideal for plantation. Indonesia is well-known for its agriculture, mining, marine tourism, but also its cultural heritage, such as the Borobudur Temple—one of the largest Buddhist temple in the world and World Heritage Site.

Less competitive countries would merely rely on their natural resources, which Indonesia has abundantly. But because most of these resources are non-renewable it is important for Indonesia to generate growth by utilising the fortune of its natural resources combined with ICT capability.

The Indonesian Ministry of Communication and Information Technology is working hard to ensure that there is no brown spot all over Indonesia. Broadband is strongly related to economic development; it implies jobs, revenue, efficiency, growth, productivity and empowerment for disabled, young people, women etc.

Internet access with guaranteed connectivity which is always connected, durability and information security guaranteed and has a triple-play capability with a minimum speed of 2 Mbps to fixed access and 1 Mbps for mobile access.

From the perspective of Indonesia and its national goals, broadband in considered as a set of transformative technologies to the country’s competitiveness.

However, there are still some obstacles related to broadband development in Indonesia:

1) The unequal diffusion of information access due to a number of factors, including scattered islands and uneven distribution of population. The affordable access and connectivity is the primary problem complicating basic effort to access information.

2) The shortage of ICT infrastructure allowing broadband access and the slowness of the establishment of the network infrastructure ecosystem.

3) The unfavourably high price for broadband connection discouraging the national broadband ecosystem. In terms of the average income per capita, the connection price corresponds to 27 percent of the income per month. This figure is much higher than the average expenditure for the household’s basic needs, such as education and health.

4) The on-going coordination problems between intra and extra-governmental bodies, not to mention the lack of an integrative policy framework from central and local government.

5) The issue of interoperability in order to provide high-quality services to citizens. It is important that services can be accessed from the widest possible range of technology from all over Indonesia.

In order to achieve competitiveness through the digital economy, the Government of Indonesia launched, this year, the Indonesia Broadband Plan. This programme intends to harness existing resources and develop comprehensive approaches with regard to the following four dimensions:

The first one is the supply/ infrastructure aspect, which focuses on availability, accessibility, and affordability. The second aspect is broadband demand and adoption. The key objective of this dimension is to ensure, as far as possible, the improvement of awareness and the ability to maximise the use of broadband to foster literacy and other kinds of e-sectors. Indonesia is going to ensure that the next edition of its national broadband society strategy is one that develops collaboratively with the government, the private sector, the community and the international partnership.

The third dimension, related to how government provides financial resources, should ensure the sustainability of the broadband development. The fourth dimension is dedicated to regulation and institutional aspects of broadband.

III Typical applications requiring broadband

ALI KONE, COO & Co-Founder, Coders4Africa Inc, USA, underlined the need for a collaborative plan in order to work on broadband as a goal, and achieving the migration to development and the consistent use of broadband. He provided examples showing that Africa is demanding broadband:

A CODERS4AFRICA Perspective

Regional and state leaders across the Africa increasingly recognize that the Internet is the indispensable infrastructure of our age. To ensure a high quality of life and a globally competitive future for all citizen, these broadband champions need more advocates to join their ranks.

Broadband connectivity is among the important tools for economic development that planners and policy makers must consider when they ponder the potential of "secondary drivers " for economic development.

Coders4Africa is a software development firm that trains, hires and manages technology teams in Africa. The company has distinct training programs, outsourced development programs and foundry programmes to nourish and grow internal ideas.

Coders4Africa became corporate this year, but was initially a non-for profit organisation that has build a community of 15 000 developers across Africa. Coders4Africa is developing local Apps—mostly related to development purposes, but not exclusively. It is based in Senegal, Ghana, Kenya, and Ethiopia.

The goal is to provide jobs to talented developers and to enable them to work in some of the interesting challenges and problems through ICT work. There is a lot of value they can add by bringing their perspective and their innovation in the way those problems are approached.

One of the very first apps that has been developed is Daral, an application for livestock management. Cattle theft is a big problem in Africa and the client (Amadou Sow, Secretary of the Union of farmers of Fatick, Senegal), wanted to find a way, in case an animal gets lost, to alert the authority so that they can act right away. Coders4Africa introduced that as a project in its training programme in Senegal and had 5 people working on the project. The solution that came out of this, was a sort of management system and the ability to inventorise all of the cows belonging to the cattle herders in the network. Animals are registered on a web-based application, which generates a unique number. To use the application, the farmers use a mobile telephone and SMS messages. If a farmer is missing one of his cows, he can send an alert and everyone in the network will receive this SMS alert.

To further extend the system, it has been associated with the veterinary programme, so that the farmers can follow the laws and regulations, making sure that they participate in the vaccination campaigns for the cattle etc.

This is an application providing a real solution to a practical problem, and there have been many other applications of that type since then. NGOs contact Coders4Africa in order to work on specific problems and develop solutions. There is s real need for these kind of local apps.

An objective is to have a kind of big data solution, based on a locally hosted cloud, in order to study behaviours, the usage and problems these people have. This is not only about social aspects, but usage. It would be helpful to have more data and analyses to provide insight and help the government to take better decisions.

SAMIA MELHEM, Lead ICT Policy Specialist, Chair eDevelopment Group, Information and Communication Technologies Sector Unit, **World Bank Group**, provided some field experience in how broadband and new technology stimulates development.

The only mandate of World Bank's unit Transport & ICT Global Practice is “affordable and accessible broadband for all”. This requires going to those countries which are the least connected, i.e., which have the highest amounts in terms of poor and isolated populations, and where broadband is the least affordable.

There are many studies about what is affordable. The Alliance for Affordable Internet, which has done a number of studies in the last few years, defines that it is 5 percent of the annual income. So, if you are a European family and you are making 50 000 euros a year, 5 percent would be 2 500 euros. That is 200 euro a months. However, this is what is paid in many of the client countries of the World Bank—countries, where the average salaries are much less than 5 000 euros per year. There is a big mismatch.

Many of these client countries have the ambition to become an information society, knowledge economy etc. But, how can they get there if there is such a mismatch between the cost of broadband and the annual salaries? There is a lot of work to be done. There is often the myth that there is no need for public sector investment in broadband, because this will be done by the private sector. It is true that the private sector has been investing a lot in broadband infrastructure and telecom, but only where it is profitable—in the big cities, in the

rich areas. Many areas are not connected at all today, they might become at some point profitable for investors after 4, 5 or 10 years, but right now there are a lot of areas that are not connected and they are missing out enormously on all the progress done, in terms of health, education, economic development, peace etc.

The unit Transport & ICT Global Practice has invested around 1.5 billion dollars in ICT, of which 80 percent is in broadband. What has been done with this amount? First of all, the World Bank provides a lot of support to public-private-partnerships. The Bank subsidises, through loans or credits to governments, a portion of that investment that will make the investment attractive to a consortium of operators.

The World Bank has participated in a lot of work in East-Asia-Pacific. Around 27 small islands are now part of the connected Pacific Island through Papua New Guinea and Australia.

The World Bank has collaborated a lot in Africa through 3 big regional connectivity projects: One in East Africa is inking 17 countries to the Eastern Africa Submarine Cable System (EASSy), e.g., Mozambique, Madagascar, Kenya, Rwanda, Uganda, Tanzania, even Somalia and South Sudan. The World Bank has projects in the West African part of the continent in order to linking countries to the Africa Coast to Europe (ACE) Submarine Cable. Benin is one of them. And now the Bank is working on Central Africa, Cameroon, Chad, Central African Republic etc. to ensure regional connectivity. There are a lot of landlocked countries there and they are paying a high price of this connectivity isolation.

What are the lessons learnt over the last 10 years? Connectivity has created amazing growth and private sector creation in these countries. Everybody is talking about Nigeria and Kenya, but this didn't happen by accident. One has to see this through a comprehensive timeline. You see a country investing heavily in technology, and Kenya is one of them. The World Bank has put 200 million dollar to help the Kenyan government, not only in broadband PPPs but also to connect universities, so that the Kenya Education Network (KENET), which is the local research network in Kenya, is now connected to UbuntuNet.

Research networks are very important for knowledge transfer, collaboration, R&D, innovation etc. There is a big role for the education sector. And there is a lot to do in view of the size of the world population in 2050. It is going to be impossible to build enough schools and universities to absorb all that youth. The only solution that we know of today that will work, is distance learning, e-learning. Massive content online in addition to other policies measures, like reforming curriculum, training the teachers, having accreditation certification etc. This is impossible without affordable broadband.

The second element the World Bank is focussing on, and which is very important for the countries where 60 percent of the population is still working in the agricultural sector, is ICT for agriculture. There is a need to connect rural villages, there is a need to connect the cooperative to where their markets are, the intermediate market sales point, wholesale, retail, etc. The needs of these people are very different from what we are imaging sitting in DC Paris, Geneva or even in a capital like Nairobi. It is important to understand the information needs of rural populations, farmers, and helping them connect so that they know the prices of their goods, how they can get products, cars etc. faster and cheaper is key. There is a big revolution around agriculture and ICT.

Another important element is ICT for public sector reform. In all countries around the world public administration is lagging very much behind, even in the US. And the public administrations in the World Bank's client countries are extremely lagging behind. Because all the innovation seems to focus on non-public administration. There is a big gap. How to bring in ICT, the innovators, the fast thinkers and movers in public administrations? Many of the clients of the World Bank are thinking about that and are trying to implement innovation from within. For that, you need to connect government agencies that traditionally have worked in silos, you need to provide data centres, you need to provide shared services, like email, file sharing etc., like one portal to get citizen feedback. You need to do a lot of these aspects that are impossible without ICT.

The Kenyan government has started decentralising power and functions from one central unit to 47 counties, some very developed, some with very little infrastructure. How to solve that problem? And how to have ICT reach out to the 47 counties, the applications that are needed, such as financial management, services to citizens, to businesses, getting permits for construction, getting land titles? How to decentralise this to 47 counties without technology? The World Bank is helping the government roll out a high speed broadband network.

However, technology is great, but it is really crucial to train the people and sustain the knowledge sharing and keep the knowledge of people. A big part of the investment has to got to capacity building. The World Bank is doing a lot of civil servants retaining, new formation, certification, new skills acquisition. And the Bank is starting to do that a lot more with civil society, foundations and NGOs, because their help on the ground is critical.

MADELEINE SCHERB, Economist/President Health and Environment Program, Cameroon, gave a comprehensive and detailed overview of broadband and connectivity in Cameroon.

Broadband access and affordability impact on sustainability development in Africa – Case-study Cameroon

In terms of the percentage of individuals using the Internet in African countries in 2013, Morocco is ranked first, Cameroon is ranked 28 out of 51 countries.

Africa accounts for less than 0.5 percent of the world's fixed-broadband subscriptions, and despite double-digit growth over the last four years, penetration in Africa remains very low.

Many initiatives for developing broadband have been launched through meetings such as the WSIS, the Kigali Summit on Africa connexion and harmonisation of the ICT market inside CEMAC and CDEAO.

Fixed broadband, ADSL, will only reach very few urban elites. Furthermore, a 10 percent increase in Internet goes along with broadband penetration increases of 1.4 percent. Projects to connect sub-regional areas continue slowly due to the lack of finance and energy to implement broadband. The aim is to have 20 percent of the population online by the end of 2014.

Cameroon relies on the following four economic sectors: agriculture (18.4 percent), industry (23.2 percent), mines (8.8 percent), and services (43.4 percent).

Cameroon is a heavily indebted poor country with 21.7 millions inhabitants and an area of

475 442 km². The capital of Cameroon is Yaounde, its main big cities are Douala, Yaounde, Bafoussam, Garoua, and Maroua. Life expectancy in Cameroon is 52.1 years.

Cameroon's telecommunications market is characterized by telephony, ADSL, optical fiber, and the use of websites.

There are 2 leading private operators, MTN Cameroon, a South-African company (sales in 2013: 251 billion Central African CFA franc), and Orange Cameroon (sales in 2013: 174 billion Central African CFA franc, and one public operator, CAMTEL (Cameroon Telecommunications, sales in 2013: 78 billion Central African CFA franc).

At the end of 2014, the estimated market penetration rates in Cameroon's telecommunications sector are 77 percent for mobile, 4 percent for fixed/ fixed-wireless , and 8 precedent for Internet penetration (which is an increase of 1.6 percent compared to 2013).

The State of Cameroon officially received from MTN the WACS (West African Cable System) cable in Limbé, a submarine fiber optical cable along the 14 530 km landed in the Atlantic Ocean by Alcatel-Lucent on behalf of WACS consortium.

The WACS of Limbé is the second landing point deployed on the coasts of Cameroon after the landing point that connects Douala to the submarine cable SAT-3 that entered in service in 2002 and which could soon reach saturation. The WACS cable is also designed to strengthen the position of Cameroon's hub as sub-regional leader in ICT. The third operator, Nexttel (a local filial of the Vietnamese Viettel Group), has the exclusivity to use 3G.

Cameroon has 6 000 km of optical fiber and optical urban loops installed in Yaounde and Douala and 2 landing points of submarine cables in Douala and Limbé. There are interconnection agreements with Chad and projects to interconnect Cameroon to Congo and Nigeria.

Regarding its role in broadband development, the Health and Environment Program (HEP) is raising the awareness of using broadband to facilitate the development of Cameroon. HEP is building a project in ICT and climate change in Cameroon through seminars since 2 years. Last year, HEP went to Cameroon to give education materials to the students of a school in Cameroon. HEP is also promoting a convenient environment to the growth and to the development increased by the broadband connectivity.

The current production of electrical energy in Cameroon is 1500 MW, with an increasing demand of 10 percent per year. Only few people could afford ICT, many of them use the Internet in cyber-cafés (1 dollar/hour). Electricity is not always available. The energy sector is in crisis. The Lom Pangar Dam is a big realization of the government to solve the problem of electricity. Without permanent electricity, the availability and affordability of broadband services can not be improved.

In terms of recommendations, Cameroon should achieve the Millennium Development Goals and other internationally agreed sustainable development goals, highlight the healthy towns projects, train students and illiterates on how to access and use internet for improving their life, achieve digital inclusion for all, and achieve education for all

All stakeholders, governments, industry, NGOs, academia and other international institutions, have a shared interest to

- Attract finance and investments in broadband infrastructure and make internet available to everyone.
- Practice lower cost of the Internet and reducing the waiting time during navigation.
- Ensure capacity building technical aspects of the implementation and management of Internet exchange points through seminars and workshops involving all stakeholders.
- Improve service quality and reduce interconnection costs.
- Spread 3G/4G to almost all of the population in the near future.
- Ensure the availability and access to wireless technology.

Broadband is the best solution for poverty reduction and socio-economic development in Africa, especially in Cameroon.

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CONTACT

CONFERENCE DOCUMENTATION

All conference documentation, including programme, presentations and slides, speakers' profiles, participant's testimonials, photos and related information on the Global Forum 2014 are made available for download on the website of ITEMS International

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HAVE A QUESTION OR COMMENT?

Please do not hesitate to contact ITEMS International if you need any help to get in touch with the participants of the Global Forum/ Shaping the Future.

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Your feedback is important to us and we would be pleased to receive your comments on this year's Global Forum as well as suggestions for the next year's Global Forum.

The team of ITEMS International will be pleased to answer any question and to provide you with more information about the 2015 edition of the Global Forum.

Please make sure to check our website regularly for updates.

ACRONYMS & ABBREVIATIONS

ACAS	Automatic Collision Avoidance Systems
APAC	Asia-Pacific
APQC	American Productivity and Quality Center
APT	Advanced Persistent Threat
ARPU	Average Revenue Per User
ATRT2	Second Accountability and Transparency Review Team
BRICS	Brazil, Russia, India, China and South Africa
B2B	Business-to-Business
CATV	Cable Television
CDMA	Code Division Multiple Access
CDR	Call Data Records
CEDEAO	Communauté économique des États de l'Afrique de l'Ouest/ Economic Community of West African States (ECOWAS)
CEMAC	Communauté Économique et Monétaire de l'Afrique Centrale/ Economic and Monetary Community of Central Africa
CERN	The European Organization for Nuclear Research / Organisation Européenne pour la Recherche Nucléaire
CFA	Coopération financière en Afrique centrale
CIO	Chief Information Officer
CoAP	Constrained Application Protocol
CSC	Cloud Standards Coordination
CSV	Comma Separated Value(s)
DG	Directorate General
DLP	Data Loss Prevention
DSO	Distribution System Operators
DVD	Digital Versatile Disc
EC	European Commission
eID	Electronic Identification
eIDAS	Electronic Identification and Trust Services
EHR	Electronic Health Record
EIP	European Innovation Partnership
ESCP	Ecole Supérieure de Commerce de Paris
EU	European Union
EV	Electric Vehicle
FISMA	The Federal Information Security Management Act
FP7 - CIP	7th Framework Programme - Competitiveness and Innovation Framework Programme
FTC	US Federal Trade Commission
FTTH	Fiber to the Home
Gbps	for Gigabytes Per Second
GDP	Gross Domestic Product
GSM	Global System for Mobile Communications
HDTV	High Definition Television
HIE	Health Information Exchange
HON	Health On the Net Foundation

IANA	Internet Assigned Numbers Authority
IC	Integrated Circuit
ICANN	Internet Corporation for Assigned Names and Numbers
ICT	Information and Communication Technologies
IDS	Intrusion Detection System
IETF	Internet Engineering Task Force
IERC	European Research Cluster on the Internet of Things
IFRC	International Federation of Red Cross and Red Crescent Societies
IM	Instant Message
IMF	International Monetary Fund
IoE	Internet of Everything
IoT	Internet of Things
IP	Internet Protocol
IPR	Intellectual Property Rights
IPS	Intrusion Prevention System
IPTV	Internet Protocol Television
IPv4	Internet Protocol Version 4
Ipv6	Internet Protocol Version 6
IFRC	International Federation of Red Cross and Red Crescent Societies
ITU	International Telecommunication Union
ITU WRC-15	ITU World Radiocommunication Conference 2015
JSON	JavaScript Object Notation
LEED	Leadership in Energy and Environmental Design
LLU	Local Loop Unbundling
LOD	Linked Open Data
LTE	Long Term Evolution
MBA	Master of Business Administration
Mbps	Megabit per second
MHz	Megahertz
M2M	mobile-to-mobile
NAT	Network Address Translation
NISD	Network and Information Security Directive
NFS	Network File System
NGA	Next Generation Access
NGO	Non-Governmental Organization
NTIA	US National Telecommunications and Information Administration
OECD	Organisation for Economic Co-operation and Development
OFDM	Orthogonal Frequency Division Multiplexing
OFDMA	Orthogonal Frequency Division Multiple Access
OODA Loop	'Observe-Orient-Decide-Act'-Loop
OTT	Over The Top
PCAST	President's Council of Advisors on Science and Technology
PDF	Portable Document Format
PKI	Public Key Infrastructure
PLC	Power-Line Communication
PMR	Private Mobile Radio Networks
PPP	Public-Private Partnership
PSI	Public Sector Information
PV	Photovoltaic

Q&A	Questions and Answers
QoS	Quality of Service
RDF	Resource Description Framework
RFID	Radio-Frequency Identification
ROI	Return On Investment
RTD	Research and Technology Development
R&D	Research and Development
SaaS	Software as a Service
SCOS	Smart City Operating System
SDN	Software-Defined Networking
SGSM	Scuola Grande of San Marco
SIEM	Security Information and Event Management
SIM	Subscriber Identity Module
SME	Small and Medium-sized Enterprise
SMS	Short Message System
SOAS	School of Oriental and African Studies, London
STB	Set-Top Box
SWOT	Strengths, Weaknesses, Opportunities and Threats
UAV	Unmanned Aerial Vehicle
UHD	Ultra High Definition
UK	United Kingdom
UN	United Nations
USA	United States of America
US	United States
VAT	Value Added Tax
VCHS	Venice Connected Health System
WHO	World Health Organisation
Wi-Fi	Wireless local area network
WSIS	World Summit on the Information Society
XaaS	Everything as a Service
XML	Extensible Markup Language
3G	Third Generation
4G	Fourth Generation
5G	Fifth Generation

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