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"Competitive Advantage in an Era of Innovation"

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Thank you, Ann. I am truly delighted to be here today, and so grateful to the Lisbon Council for this opportunity to share perspectives with you.

Today I want to offer three assertions to spark our discussion. I hope to convince you that:
1. Data is the new basis for competitive advantage.
2. A new generation of leaders is building a data-driven future.
3. The EU and the US have an opportunity to lead the world toward public policy that not only promotes innovation, but itself is as innovative as these new forms of technology and business.

1. Data is the new basis for competitive advantage

We are witnessing an unprecedented phenomenon today – the convergence of five disruptive technologies at once: social, mobile, cloud, pervasive instrumentation and Big Data analytics.

It is not a revolution in information. We have been awash with information since the dawn of the Internet 20 years ago. Nor is it a revolution in consumer connectivity -- Facebook, Twitter, smart phones and the like. Those developments are important, but they are just a part of something much larger – a world that has become **instrumented, interconnected and intelligent**, in which computation is being infused into things nobody would think of as a computer.

Let me give you some idea of its scope.

We're all aware of the approximately 2.7 billion people now on the Internet. This number is growing rapidly in every part of the world.

One of the reasons it's growing is the explosion of mobile technology. There are estimated to be more than 10 billion wireless devices out there today – a number that one research firm projects will triple by 2020. And we are truly now a "mobile first" world. In one study in China, 90 percent of users said they have their mobile device within arm's reach 100 percent of the time.

All these people aren't just going to the Internet to read the news or buy things. They're contributing their own thoughts, observations, comments and opinions about their preferences, habits, beliefs even their physical location. By one

estimate, one in four people worldwide, or 1.73 billion, will use social networks this year.

And all of that is just the start. There are also upwards of a trillion interconnected and intelligent objects and organisms – what some call the Internet of Things. There are a billion transistors today for every human being on the planet. Intelligence is now embedded in the systems that enable services to be delivered; physical goods to be made and sold; everything from people and freight to oil, water and electrons to move; and billions of people to work and live.

The result: a planet awash in data, which is growing exponentially. We are creating the equivalent of all the data generated through human history up to 2003… *every two days*.

This is nothing less than the appearance of a vast new natural resource. Data promises to be for the 21st century what steam power was for 18th, electricity for 19th and fossil fuels for 20th – that is, the creator of enormous wealth and progress. The economic, political and societal landscape will change in fundamental ways, as it did in each of those earlier eras. And unlike those previous natural resources, this one is infinite.

IBM began a conversation about this phenomenon almost five years ago. This is what we mean by the planet literally becoming **smarter**.

The question I would ask of us here today is: What will the EU and the US do? Will we seize upon this potential to drive innovation and compete energetically?

Data is flowing freely across the planet, and is creating a new basis for competitive advantage. The question every enterprise, city, school and community needs to ask is: "How do we get the value created by Big Data and a Smarter Planet to flow to *us*?"

Fortunately, many forward-thinking innovators – here in Europe and around the world – are showing the way.

2. A new generation of leaders is building a data-driven future.

We have seen this at IBM in our partnerships with thousands of companies, universities, governments, cities and not-for-profits across scores of industries… in more than 170 countries. For example, in more than 2,000 Smarter Cities engagements, IBM is helping mayors and other urban leaders manage, analyze and use data for economic growth, increased profitability and the public good. And in five years, we have seen much progress.

In more than a dozen smarter traffic management solutions and pilots, cities have realized up to 20 percent reduction in traffic volume, up to 20 percent

reduction in emissions, up to 40 percent improvement in prediction of jams and an average of $500 million in cost savings.

- The London Underground is using predictive analytics to increase the transit system's reliability by 30 percent… and the city of Toulouse is using analysis of social data to improve response time for things like road maintenance – from 15 days to one day.

In working with a score of clients on smarter healthcare – in Russia, Italy, Sweden, the U.S. and more – we have seen a 50 percent reduction in duplicative testing, up to 30 percent reduction in admissions and up to 75 percent reduction in readmissions.

- In Switzerland's Canton of Basel, the city is piloting a single, trusted system for managing patient identity. That's important in a place where more than 30 percent the 192,000 residents are foreign nationals, speaking a variety of languages. When it's up and running, any participating provider across the country will be able to locate patient records for a Basel resident and pick up where a prior clinician left off in developing a diagnosis or administering treatment.

In dozens of smarter crime prevention engagements – from Geneva to Los Angeles, from South Africa to Spain – we have seen an average reduction in crime rates of 27 percent, and an average shortening of response times by police and other first responders of 52 percent.

- In Vancouver, Canada, since the deployment of an investigative Big Data analytics system in 2009, the VPD has been able to spot where crime is headed, and in many cases, prevent it. Property crime rates have dropped city-wide by 24 percent, and violent crime rates decreased by nine percent from 2007 to 2011.

More than a dozen cities have implemented smarter water projects that have achieved an average cost savings of $110 million. Many of you may know of the work we did with the city of Galway in Ireland to create the world's first smart bay. Here's another:

- The Dutch Ministry for water (Rijkswaterstaat) is building a system that analyzes precipitation patterns and data from levee sensors, radar and other devices to predict flooding in low-lying areas where 70 percent of the nation's gross domestic product originates.

Now, who would not want the kinds of benefits these uses of data provide? Clearly, everyone would welcome such results for their enterprise, their city, their country. But what is required to achieve them, and what is critical to their success?

We have learned that the most important gaps and inhibitors fall into a few key areas:

- There is the need for integration, common data standards and the free flow of data across systems, agencies, departments and industries. Without that, no amount of technology will be sufficient.
- There is an equally vital need for outreach and engagement with newly empowered populations of customers, collaborators, employees and citizens. Indeed, one consistent theme across most of our Smarter Planet engagements is the need to build not just technology, but constituency.
- There is the need to maintain investment in research and development, even during difficult economic times. Despite what some enthusiasts believe, the economic and societal value of Big Data will not just happen. As with prior eras' resources, it must be mined and managed.
- Perhaps most challenging of all is the need for new skills – at the leadership level and throughout agencies and organizations. This isn't just a change in tools, it's a change in mindset and culture. Which is also the greatest challenge it poses – the need to "unlearn" deeply engrained professional and leadership assumptions.

The leaders of the cities and companies I've mentioned are finding innovative ways to overcome these inhibitors – new ways to be a doctor… to be a teacher… to be a marketer… to be a mayor

- Police chiefs are fighting crime not with more cops and weapons… but with data and citizen engagement.
- Doctors are drawing on cognitive computing systems to expand exponentially their access to the latest medical research for improved diagnosis.
- Government leaders and politicians are drawing on Big Data, analytics and behavioral science to engage with citizens… not as voting blocs or demographic segments, but as specific individuals.
- And in cities from Miami/Dade County in Florida to Davao, Philippines – mayors are leading not from the proverbial smoke-filled rooms, but from new Intelligent Operations Centers that integrate and visualize data from dozens of city and regional systems and agencies.

The members of this formidable new generation of innovators here in Europe and in America are working hard to bring the EU and the US to the forefront of the 21st century's new competitive landscape.

What can – what must – we do to help them?

3. The EU and the US have an opportunity to lead the world toward public policy that not only promotes innovation, but itself is as innovative as these new forms of technology and business.

I believe it is incumbent on us to enable and equip this new generation, because it is they who will generate economic growth and societal progress in the coming era of Big Data.

To do so, we must get out in front of the crucial policy questions that this new reality raises – from privacy, to cybersecurity, to skills gaps, to investment in R&D. Indeed, we can and, I believe, must come together to lead the world into this new era. As the most advanced and information-intensive societies in the world, we are in the best position to define the rules of the road necessary to protect the world's vital governmental, environmental and societal interests, while unleashing maximum, long-lasting innovation and growth.

Let me cite three areas in particular that align with the chief inhibitors to innovators who are seeking to tap Big Data and build smarter systems.

1. **We must ensure the free movement and open use of data.** In order to capture the potential of this new natural resource and achieve the benefits of a Smarter Planet, enterprises, governments, universities, non-profits and individual citizens need to be able to move and use data responsibly, in real time. Indeed, many European cities and countries are at the forefront of helping their citizens do so.

   In that context, recent news stories and revelations highlight how essential it is that there be honest trans-Atlantic dialogue about government access to data… and how vital it is that we address the issues of individual privacy and the dangers of cybercrime. We need dialogue that balances these imperatives with the societal benefits of data, analytics and the free flow of information.

   One thing is clear: Excessive restrictions on data movement and use will stifle innovation and competitiveness. For instance, it would be counter-productive if protecting one group's privacy wound up making entire markets uncompetitive, unable to access and capture value from this vast new natural resource. And it would be tragic if free trade talks were canceled and harsh new regulations were imposed that stifle innovation, without carefully thinking through this balance.

   Data that remains trapped – in overly restrictive rules or in bureaucratic silos – is data under-utilized. So our policy regimes must allow innovators to embrace cloud, mobile, social, analytics and the Internet of Things.

   Today, we see some danger signs:

   o The proposed European Data Protection Regulation currently being debated could create significant new restrictions to the collection, analysis and movement of data.

o   An overly prescriptive, "check-the-box" compliance regime for cybersecurity – such as we see in some parts of the draft EU Directive on Network and Information Security – can never be nimble enough to keep up with real-world changes. Indeed, it risks encouraging firms to invest only in meeting specific standards or best practices that are outmoded before they can even be published.

2. **We must sustain investment in both long-term research and in near-term development.** At IBM, we understand this well. Our model is continuous transformation – we are an innovation company, and it's why we are here after 102 years. We have sustained R&D investments through good times and bad. Thomas Watson Sr., our founder, doubled the company's R&D budget during the Great Depression… and we have consistently protected our research capability over the decades. This has resulted in earning the most U.S. patents for 20 straight years – and it has spawned high-risk, high-reward breakthroughs such as our pioneering "cognitive" system, Watson, which represents not just a new computer, but a new era of computing – systems that are not programmed… rather, they learn.

As we have seen, the temptation is strong when economic times are tough to cut R&D budgets and science funding. This is as short-sighted in government as it is in business. You're eating your seed corn.

A very hopeful sign, which we warmly commend, is the ambition of the Horizon 2020 program that was launched by Commissioner Geoghegan-Quinn and which the EU is near to finalizing. The commitment to an increased research budget of €70B over the next seven years is a serious sign of intent that whatever the general economic climate, the EU wants to continue to innovate.

3. **We must expect and enable continuous upgrading of skills – among employees and citizens.** The shift to a knowledge-based global economy places a premium on differentiating expertise. And as we've seen in the examples I've cited – and there are countless more – expertise and skills are a moving target. In the era ahead, expertise will need to be continuously updated, because knowledge is continuously evolving. This applies to individuals, as well as enterprises and societies. Gone are the days when you could rely on your university degree or degrees to carry you through a career.

This means that skill gaps will constantly arise – gaps that constrain companies', cities' and nations' ability to innovate. By the way, this presents a challenge not only to universities and governments, but also to enterprises. We must become learning organizations that continuously upgrade and transform our own skills.

In this environment, it is clear that overly strict employment laws and labor market rigidities will inhibit businesses', governments' and cities' ability to remain at the forefront of learning and expertise. This is particularly true in the technology sector, where cost-effective business transformation and continuous upgrading of skills are vital to maintain and enhance competitiveness. The general principle should not be to protect incumbency… but to foster maximum opportunity.

Another hopeful sign is the recent decisions by the European Commission not to pursue a prescriptive Directive on business restructuring, or to review and tighten the EU Working Time Directive. We believe these decisions are very positive. They indicate an understanding that the route to enhanced European competitiveness is not through more restrictive labor laws.

In closing, let me emphasize how much Europe matters to IBM – and to the world. We care deeply about the EU – yes, because of the scale of our business here, but most importantly because of our deep belief in the inevitability of global integration. To us, a globally integrated economy is inconceivable without a healthy, innovative and progressive European Union, and we are committed to active, continuing partnership across European business and society in order to ensure it.

Despite the many challenges we face, I am optimistic. We have at our disposal both a vast new natural resource and the means to mine it for value. And that is unleashing new ways of working and thinking that are more flexible, innovative, democratic, sustainable, collaborative and humane.

Personally, I find this prospect highly appealing – and I expect you do, as well. Our role at this pivotal moment in history is to shape the strategies and policies that will allow this prospect to become reality.

Thank you.