



A Smarter Planet for a Sustainable Future

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The IBM Summit at Start, Lancaster House, London, United Kingdom,
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Good afternoon. I am honored and pleased to be here with you today.

My colleagues have been briefing me on your discussions over the past eight days, and it is clear that this event has been quite extraordinary. His Royal Highness the Prince of Wales put it best: We confront possibly the greatest challenge humanity has faced... and that presents us with possibly our greatest opportunity for progress.

However, in order to seize that opportunity, we must understand this moment in which it is occurring. I believe we stand today at a historic inflection point. To see why, and to see what this moment holds, we need to step back from the details, and trace the underlying patterns.

This first decade of the 21st century has been remarkably eventful—indeed, disruptive.

- We entered the new century with a shock to our sense of security on 9/11.
- We have become aware of the vulnerabilities of global supply chains—from food to medicine to toys.
- We have witnessed the environmental and geopolitical issues surrounding energy. Our eyes have been opened to threat of global climate change.

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- We have seen growing competition for scarce resources—from fuel to food to water—as the world’s population expands, middle classes emerge and urbanization accelerates.
- And today, we are working our way out of a global financial crisis.

Is there anything common to this series of seemingly unrelated crises? I would suggest that they are all manifestations and consequences of a single major shift. In brief, our world has become globally integrated—not only economically, but also in all the ways that human society intersects with the natural environment. The digital and physical systems of the world are merging.

Fortunately, something else is happening, as well. As we have heard over the past week, intelligence is being infused into the way the world literally works—the systems and processes that enable services to be delivered... physical goods to be developed, manufactured and sold... everything from people and freight to oil, water and electrons to move... and billions of people to work and live.

That is, when we at IBM say that the world is becoming “smarter,” it isn’t just a metaphor, much less an advertising slogan.

You have heard how our world is becoming instrumented. Today, there are nearly a billion transistors per human, each one costing one ten-millionth of a cent. There are 4 billion mobile phone subscribers, and 30 billion Radio Frequency Identification tags produced globally.

Because of their increasing sophistication and low cost, these sensors and devices give us, for the first time ever, real-time instrumentation of a wide range of the world’s systems—natural and man-made.

You have heard how our world is becoming interconnected. Very soon there will be 2 billion people on the Internet. But that’s just the beginning. Systems and objects can now “speak” to one another, too. According to a recent report, there are now 5 billion devices plugged into the Internet—and that is expected to rise by a factor of four in just a decade. And that’s only the devices. Think about the prospect of a trillion connected and instrumented objects. And then think about the amount of information produced by the movement and interaction of all those things. It will be unprecedented.

Finally, all things are becoming intelligent. Thanks to advanced analytics and ever more powerful supercomputers, we can turn mountains of data into insight. And that intelligence can be translated into making our systems, processes and infrastructures more efficient, more productive and responsive.

From a smart bay in Ireland, to smart power in Malta, to smart telecommunications in India, to smart food tracking in Norway... companies and institutions are applying technology in new ways.

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It wasn't so long ago—back in the 1990s—that many believed the Internet would solve all of our problems. And without question, we have seen the benefits of greater connectivity across economies, business flows, supply chains and energy grids. But now, experience has taught us that connectivity is not enough.

Have you noticed how often during the last several years... despite all this hyperconnectivity... we have heard the term “systemic breakdown?” Well, at IBM, we know something about systems. Over nearly a century of work with businesses and governments, we have designed, built and managed systems—from social security systems in countries around the world... to modern electronic banking... to retail... to transportation and more. And we have been working with cities and nations around the world over the past several years to improve many kinds of systems and make them smarter.

As we have done so, we have validated that the key to smarter, more sustainable systems is not the network... or the data center—or the sensor or router. It's not even the software, per se.

It's the data.

Thanks to a planet that is increasingly instrumented and interconnected, we're capturing data in unprecedented volumes. In just three years, IP traffic is expected to total more than half a zettabyte. (If you haven't heard that term before, it's a 1 followed by 21 zeroes.)

We're receiving these enormous streams in real time, and they are coming in multiple forms—from text to rich media... embedded sensors and RFID tags to cell-phone cameras. And we're capturing data from just about every kind of system or event imaginable—supply chains, traffic flows, weather patterns and billions of individuals using social media.

But the most important point about this is not how much data there is. The important point is what it could tell us. To capture that, you need to dive deeper—to move from “big data” to smarter data.

That's why we devoted a full day this week to analytics—the sophisticated mathematical algorithms that can detect the patterns, spot the correlations and see the context of all this



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data. Because a data point by itself is just about useless. You need to see what it relates to—and you need to see that in real time, not after the fact.

Thanks to advanced analytics, where once we inferred, now we can know. Where once we interpolated and extrapolated, now we can determine. We can do so with regard to the systems humans control. And we can do so with regard to how those systems interact with the Earth's ecosystem. That's the promise of a smarter planet.

Now, what does all this have to do with sustainability? I think it has everything to do with it—if we broaden our understanding of the term.

If you take a systemic perspective, you understand that sustainability is not just about the natural environment. Sustainability is a key dimension of all systems—economic, political and societal systems, as well as natural ones. In systems theory, the term is “resiliency,” but it's the same thing. It is the quality of any complex system to grow, adapt and survive.

“I firmly believe that any organization, in order to survive and achieve success, must have a sound set of beliefs on which it premises all its policies and actions. Next, I believe that the most important single factor in corporate success is faithful adherence to those beliefs. And finally, I believe that if an organization is to meet the challenges of a changing world, it must be prepared to change everything about itself... except those beliefs... as it moves through corporate life.”

Let me repeat that last statement: “be prepared to change everything about itself except those beliefs.” That statement, and the values it expresses, have been essential to IBM's own sustainability through decades of change—indeed, through a period of near death as a corporation twenty years ago.

I would argue that ability of any complex system to survive and thrive through change—to be sustainable—is a function of being grounded in a set of core values... of knowing fundamentally who and what you are... staying true to that... and being able to change everything else.

Thus understood, the concerns about our natural environment are not opposed to the concerns of our economies and our societies—they are one. This three-dimensional view of sustainability—environmental, economic and operational—is grounded in a deep understanding of who you are as a company, as an institution or as a country. And it becomes clear that it is impossible to optimize any of them without optimizing all of them.

This is a historic shift. In the Industrial Age, the needs of nature and industry were often opposed. In the post-industrial age that we have now entered—that is, in the global economy and ecosystem of a smarter planet—the relevant struggle is not nature vs. industry, but systemic vs. fragmented.

Don't misunderstand me. At IBM we are deeply committed to environmental sustainability, and we practice it in our own operations... in our work with clients... and as a participant in global dialogue and policy formation, here in the UK and around the world. It is no accident that our company is a lead corporate partner with His Royal Highness on the Start initiative.

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IBM's first corporate environmental affairs policy was issued 1971. As a result, today we operate a global environmental management system that addresses all of IBM's environmental intersections—including research, development, manufacturing, product stewardship, energy conservation, climate protection, real estate and supply chain management.

We manage our environmental responsibility in a systemic way as a strategic imperative, setting voluntary goals and achieving measurable results—such as saving 5.1 billion kilowatt-hours of electricity between 1990 and 2009... through energy conservation and avoiding associated 3.4 million tons of CO2 emission. We also sent 76 percent of our hazardous waste for recycling last year. In these and many other ways, we take the reduction of our greenhouse gas emissions and our environmental stewardship very, very seriously.

But my key message to you today is this: Do not look at this as a demonstration of corporate virtue. We are not doing this as an act of philanthropy or as a traditional form of “corporate social responsibility.” We are doing it, rather, because it is integral to everything we mean by building a Smarter Planet. That's where we see our future growth lying, because it's where we see the future arena of commerce and society taking shape.

And the same goes for our clients. All around the world, businesses and governments are using smarter approaches to make their systems at once more prosperous in the near term, and more sustainable over time:

- Consider Stockholm. With more than half a million cars travelling into the city every day and commuting rates rising, the City of Stockholm decided to implement a congestion-charging system—not just to reduce traffic, but also to improve its public transport system and alleviate environmental impact. Their smart traffic system has reduced peak period congestion by 18 percent... increased public transit use by 80,000 passengers a day... and cut vehicle CO2 emissions by 14 percent in the inner city.
- Consider Kika\Leiner, a nearly 100-year old Austrian furniture retailer that operates throughout Eastern Europe, Russia and the Middle East and offers the most widely recognized line of sustainable furniture in Europe. The company takes a green approach to its stores, its products and even its IT—based on a new kind of data center—energy-efficient, scalable and modular—that reduces electrical consumption by up to 40 percent and even takes advantage of natural weather cycles. During colder months, the ambient temperature in the data center is controlled by allowing outside air to flow inside. Only in warmer weather is the building's cooling system switched on.
- Or take Cosco, a global shipping firm in China. This forward-looking company reduced its distribution centers from 100 to 40, lowering its logistics costs by 23 percent and reducing its CO2 emissions by 15 percent while maintaining service levels for clients. It did this by collecting and analyzing operating data, and by applying the results to facilitate decision-making and optimize usage.

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Any system can become smarter and more sustainable. And it is happening all over the UK:

- Hildebrand, a UK technology consulting company, scaled up its energy monitoring service to collect, store and analyze detailed energy usage data from 3 million homes in real time. By providing consumers with information on how their households or individual appliances consume energy, Hildebrand enables these customers to make better decisions about efficiency.
- The University of Aberdeen applied a smart analytics solution to create a unified, campus-wide view of all its assets—classroom, computing and printing. By understanding usage patterns holistically, it has reduced energy and maintenance costs 30 to 70 percent... eliminated logjams at computer stations... and now keeps printers loaded and ready to go, without paper waste or shortage. The school can even apply historical data to predict future needs for wireless support and computer use campus-wide.
- And the City of Peterborough is working actively to transform itself into the leading sustainable city in the UK. Its new online platform will monitor and analyze data on energy, water, transport and waste systems... and then apply this to produce an integrated, real-time view of the city's environmental performance—for both residents and city officials.

This list could go on. In city after city, country after country, forward-thinking leaders are seizing upon the new capabilities available to us, and applying their ingenuity and coalition-building skills to drive transformative change.

Now, it may be surprising, coming from an IT guy, but I'll tell you that the most important factor in achieving this kind of progress is not technology. It's leadership. Because just as complex, interdependent systems demand new kinds of technology, they also require new forms of management. I want to close by seeking your help in four key areas.

First, a smarter, more sustainable planet will enable—and require—far more collaboration. I'm not just talking about the familiar idea of private sector-public sector "cooperation." A diverse, multi-stakeholder world requires true collaboration—all the parties actually working together, shoulder-to-shoulder, on a daily basis. Very much the way we have been here over the past week.

Yes, we all have particular responsibilities—to citizens, to partners, to regulators, to customers, to shareholders. But in today's world, fulfilling those responsibilities requires that we also fulfill our responsibilities to the system as a whole. That will be transformative. But it will also require change.

Second, we must establish data standards for all our critical systems—here in the UK and across the world. And as we do, it is essential that those standards be open. That's the only way to interconnect processes and data sets across a whole system—or multiple interconnected systems. If there is one thing that the environmental movement has taught us, it is that the world has become a system of systems. And you can't manage systems without standards.

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Third, we need to build in sustainability from the start—by design: In anything as complex, dynamic and fluid as the 21st century ecosystem, the qualities we seek—security, reliability and especially sustainability, in all its dimensions—cannot be “bolted on” after the fact.

Finally, policy and ethics: The most crucial challenge we face as leaders of complex societal systems is the support of the general public. Part of that is about more effective engagement of our fellow citizens. That is the genius of His Royal Highness’s idea for Start—to make sustainability accessible and appealing.

But it also means that we must come together as leaders around clear guidelines for how to manage our organizations and institutions from an ethical and societal point of view.

Consider the issue of privacy. Cameras here in London, in Stockholm and in Chicago can help manage traffic and help alert police and other first responders to emergencies far faster and more precisely than ever before. That saves lives. But some citizens have expressed discomfort at living in... not a safer society, but a “surveillance society.”

You may have read an article a few years ago that reported that the London flat in which George Orwell wrote “1984”—and introduced all of us to Big Brother—has 32 closed-circuit cameras within 200 yards, scanning every move. They weren’t put there to watch his flat, of course. They’re scanning traffic and providing security for businesses. Still... the irony—and the potential concern—are self-evident.

And then there are concerns about security. Companies and governments are excited about the competitive, economic and environmental advantages of smart infrastructure—smart grids, smart rail, smart sewers and smart buildings. But does that mean that our essential infrastructure is only as secure and reliable as a website?

These are serious issues. And they will require serious consideration across all the stakeholders of society. To achieve true, systemic sustainability, we need to build more than technological and business systems. We must build constituency. If we don’t come together around policy frameworks that protect the individual’s privacy and the security of our communities, people may say “stop.” And they should.

Let me conclude by returning to my message of optimism.

A smarter, more sustainable planet is not some grand, futuristic ideal. For one thing, the examples I’ve mentioned are real, and more are being deployed right now, by businesses and governments around the UK and around the world.

For another, a smarter, more sustainable planet is practical because it is refreshingly non-ideological. Yes, debates will continue to rage on many contentious issues—from healthcare, to energy, to security, to economics. But no matter which viewpoints ultimately prevail... the systems that result will have to be smarter—more transparent, more efficient, more accessible, more innovative... more sustainable.

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To get there, I believe those of us in this room, and our peers across the public and private sectors, must take a leadership role. And here's the good news: We do not have to wait for national governments... or international agencies... or anyone else.

We can just come together and, well... start.

Someone is going to put in place the key building blocks for smarter energy and renewables. Someone is going to institute standards, accomplish cross-segment connectivity and break down the silos across governments at all levels. Someone is going to unleash—and scale—the expertise and creativity of local communities. And someone is going to build the capacity to identify the key patterns in all this data and knowledge.

That someone is going to drive incredible progress in their region... and the UK... and across the world. That someone is also going to unlock economic growth and profit.

I suggest that someone should be you.

The key precondition for real change now exists: People want it. And they are hungry for leadership. Such a moment doesn't come around often, and it will not last forever.

So ask yourself this: In hindsight, when the circumstances that cry out for change are gone, when things have returned to "normal"—don't we always wish we had been bolder? More ambitious? Gone faster... gone farther? Did anybody ever wish they had done less?

Despite the litany of challenges we face, I am confident that business and government will do what leaders do—lead. I'm convinced we can build smarter, more sustainable economies and societies. I'm convinced we can build a smarter planet.

I hope you share my excitement about the opportunity before us, and that you will join with us in this pioneering journey.

Thank you.



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