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To the Vice-President of the European Commission
Viviane Reding

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Europe's Sputnik Shock - A Large-Scale European ICT Strategy Is Urgently Needed

Dear Vice-President of the European Commission, Viviane Reding,

I have recently been asked to provide input for a report on foresight modeling. In the appendix of this letter, I am giving a short summary of some relevant activities and trends. *To summarize my assessment, Europe is years behind and needs to make major investments.* This is particularly concerning in view of Moore's law, according to which the processing power of computers is doubling every 18 months and the storage capacity every 12 months, which makes it extremely difficult to catch up.

Most of the information and communication technology (ICT) hardware is now produced in Asia, while most software and data giants are located in the US. However, where is Europe on the global ICT landscape? With Skype and Nokia, Europe has just lost some of its most innovative ICT companies to Microsoft. Europe urgently needs to catch up in the area of ICT. This is particularly critical at times where our society is in the middle of a transition from a service to an information and knowledge society. Information and communication technologies have the potential to change most of our traditional institutions - the way we educate (massive open online courses - MOOCS - and personalized education), the way we do research (Big Data analytics), the way we move (google cars) or transport goods (drones), the way we go shopping (take amazon and ebay), the way we produce (3D printers), but also our health system (personalized medicine), and most likely politics (citizen engagement) and the entire economy as well (with the makers community, the emerging sharing economy, and prosumers, i.e. co-producing consumers). Financial business, which used to be the domain of banks, is increasingly replaced by algorithmic trading, Paypal, Bitcoins, and google wallet. Moreover, the biggest share of the insurance business is now in financial products such as credit default swaps.

In my view, the NSA affair is just one symptom of the challenges of the digital age to come. It is Europe's wakeup call and sputnik shock. Considering also that efforts to establish a no-spy agreement have failed, Europe must now take all required steps to build an information and

communication infrastructure it can rely on. Europe can do this. For this, I recommend to build on three pillars: (1) the emerging "Internet of Things", (2) Open Data, and (3) socially oriented, value-sensitive ICT. Such a large-scale, concerted ICT effort would also create many new jobs, thereby countering Europe's unemployment crisis.

The "Internet of Things" is just about to emerge, giving Europe a second chance to establish leadership in some area of ICT - namely collaborative data creation and data analytics. Communication standards for sensor networks are now being developed. Based on the Internet of Things, Europe could build a new, trustable, transparent, participatory and privacy-respecting Web that is better protected against cyberwar and cybercrime than the communication systems of today. Building and running this as a Citizen Web would avoid large infrastructure costs for European states. Establishing the principle of a Personal Data Purse would give users control over their personal data.

Europe could also produce the hardware and software to establish a Planetary Nervous System, allowing one to measure the state of the world in real-time, thereby enabling better-informed policy and business decisions. Building a Universal Reputation System, together with a number of other measures, would help to promote responsible data use and decision-making.

Furthermore, Europe could follow an Open Data strategy, to unleash the full power of data for everyone - politics, business, science, and citizens. Openness has many advantages: (1) data accumulate more quickly, (2) everyone can benefit from them, (3) quality standards of data algorithms rise by competition, (4) transparency creates trust and helps to reduce the level of misuse. McKinsey has just published a report enumerating the economic value of Open Data with 3-5 billion dollars annually. Europe could get a big piece of this. Combining this with the Innovation Accelerator strategy worked out by the FuturICT initiative would accelerate progress in research and development.

If the right kinds of decisions were taken, a European or even global-scale team could quickly be set up - the concept is ready to go. The European Institute for Innovation and Technology (EIT) could play a central role in driving such a large-scale concerted effort. This would create international visibility, while enabling new approaches to tackle some of our most burning questions: global warming, the financial crisis, and the transition towards renewable energy system. So, why don't we start this today?

Thank you very much for your kind consideration.

Sincerely yours,

Short summary of international foresight activities and ICT trends:

The foresight activities in the USA are certainly the most advanced. Besides those performed by the various secret services, there are also a number of relevant companies, such as [Recorded Future](#) or [Palantir](#), which are aimed at predictive intelligence, sometimes phrased as a "crystal ball" (for a discussion see the book [Das Ende des Zufalls](#)). Furthermore, [Sentient World](#) is a project aimed at creating a mirror world. It is claimed by some people that the project feeds personal data into massive agent-based simulations to run simulations of the real world with personalized agents on a global scale, i.e. involving billions of simulated individuals. This may be viewed as a kind of war game at grandest scale, but for all kinds of applications, including business-related ones, which are fed with Big Data of all kinds.

The [FuturICT project](#) was often perceived as a European copy of the above kinds of projects. However, it has a number of important distinguishing features such as the focus on ethical and privacy-protecting information and communication technologies (ICT) and the creation of transparent, trustworthy and participatory platforms to unleash the power of the information age. Many FuturICT ideas have recently been copied by a number of countries, including Japan, China, and Russia. In this connection, I have been repeatedly contacted by research teams and public media, particularly TV.

The Qatar Computing and Research Institute, with the full support of the Qatar government, currently looks for a world-class Research Director for their Social Computing department to lead a research group of up to 50 people and work with "unlimited access to funds and data".

In the USA, Prof. Chris Barrett from Virginia Tech is involved in a center spending 50 million dollars annually on social simulation. This is just one of the large-scale social simulation activities run in the US. There are other activities around Joshua M. Epstein and at the Los Alamos National Laboratory, and a number of IARPA projects.

To anticipate upcoming developments in industry, it is worth focusing on google's activities, which encompass more than 50 software platforms. Google has probably all the intelligence of the NSA. Moreover, within just one year, they have announced the self-driving [google car](#), heavily invested into [robotics](#), and started a [google brain project](#) to turn the Internet into an intelligent creature. Google has also just invested 3.2 billion dollars into the "Internet of Things", buying Nest Labs. Furthermore, google has started a large-scale research effort targeted at [immortality](#). Google is furthermore financially connected with Recorded Future and with [23andMe](#), a company dedicated to collecting personal genetic and health data. Moreover, [google X](#) is reported to work on about 100 secret projects.

IBM, in comparison, has decided to invest 1 billion dollars into their Watson computer, which understands spoken language and comes so close to human intelligence that it is already used for [phone-based customer service](#). The company [Enterra Solutions](#) goes a step further by combining Watson's capabilities with common sense anthologies and at least 100 Petabytes of Big Data to create something that may be called a reasoning machine or inference engine.