Reinhard Mohn Prize 2017

Smart Country – Connected. Intelligent. Digital.

Speeches at the Award Ceremony

BertelsmannStiftung

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Foreword

Dear Readers,

Within the framework of the Reinhard Mohn Prize 2017, the Bertelsmann Stiftung carried out a global fact-finding mission exploring the topic "Smart Country – Connected. Intelligent. Digital." Building on a tradition of over 25 years, the Prize honors innovative solutions to challenges that are of vital importance to Germany's readiness for the future, also in the European context.

This year's recipient, Toomas Hendrik Ilves, is recognized for his role as a pioneer and visionary of digital transformation in Europe. As President of Estonia, he decisively shaped his home country's path to becoming a world-renowned "smart country" for more than ten years. However, awarding the Reinhard Mohn Prize to Toomas Hendrik Ilves is not merely a tribute to his past achievements, but marks as well a call for action to decision-makers in Germany and around the world: Let us learn from Estonians' positive open-mindedness towards digital technologies and treat the latter both as an opportunity and a challenge in shaping our social, political and economic systems.

In his acceptance speech, Toomas Ilves underlined that digitalization is an analog process that means much more than submitting your tax returns electronically. Unambiguously and with pioneering spirit, he demonstrates the inextricable connection between programs, algorithms and apps and the cornerstones of liberal democracy. He highlights that the greatest obstacles to change have their roots in people's minds, in decision-makers' lack of capacity for dialogue and readiness to act as well as in a plethora of redundant laws, regulations and lengthy decision-making processes. Toomas Ilves lists digital identity verification, the development of advanced data protection systems as well as the deployment of broadband infrastructures as the most important prerequisites for a successful digital transformation of the public sector.

The laudatory speech of Jan Gulliksen, professor at the Stockholm Royal Institute of Technology, emphasizes another key aspect of the digital revolution: In order for digital transformation to succeed, all members of society, from the infant to the pensioner, must possess the necessary skills and competences. Understanding participation as a key instrument to unlocking the intriguing potential of digitalization, Gulliksen envisions an ambitious and bold education agenda that comprises kindergartens as well as academic and vocational training institutions.

Digital transformation, which affects spheres of life as varied as the workplace, health services and social security systems, is an unstoppable, but not an inalterable process. A feeling of powerlessness or an attitude of denial only delay necessary adaptation processes and, in the long term, inevitably lead to an isolation from key developments in many areas of life.

Apart from a healthy ability for reflection and critical faculties about existing conditions, readiness for the future requires courage, open-mindedness and curiosity. The two speeches in this booklet provide an overview of the essential building blocks needed to facilitate the inclusive digital transformation of our societies.

I hope you find this volume an interesting and enjoyable read.

Yours,

Dr. Brigitte Mohn

"How we tackle this Brave New Digital World is not a digital solution, it is an analog task. It comes down to three things: policies, laws and regulations. None of those are digital. Those are things done by human beings and only human beings can do them."

Toomas Hendrik Ilves (June 2017).


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Acceptance Speech at the RMP 2017 Award Ceremony

Toomas Hendrik Ilves

I am deeply honored to receive the Mohn Prize for 2017.

What Estonia has accomplished in the past quarter century is the work of many people. I did outline back then what, at the time, was considered a quirky and impossible vision, but so many smart people took to the idea that soon Estonia and Estonians were racing ahead on their own. It took a spark to light a torch that in turn was carried by many. Call it the Zeitgeist, one of the few German words English-speakers know.

At times, when good ideas ran up against silly, old-fashioned or ill-informed policy, I did my best to unblock the path for those ideas to move forward and to prod those opposed to give it a chance. When bright ideas needed encouragement, I always recalled how hard it had been in 1995 to talk about digitization to a skeptical if not hostile public and, yes at times, an unconvinced government. This is hard to imagine today, when regardless of which parties are in office, e-Estonia has overwhelming public support. So thank you to all those courageous and creative people who have done so much to make Estonia what it is today.

I should begin with a cautionary note. Recently, the digital world has become far more frightening than it was. We read daily of hacks, stolen data, invasions of privacy, massive malware attacks. We see our very own democratic systems under attack, in ways thought inconceivable or impossible a decade ago. The Bundestag, Emmanuel Macron's campaign and the Democratic National Committee servers were broken into and private correspondence stolen. These are posted on line, at times in altered form, generating fake news. Robots or bots on social media rebroadcast these fake or falsified

stories and hoaxes to millions of accounts, which are then rebroadcast by people. Social media itself allows Big Data analytics companies to profile and then target individuals in ways never done in the past. And finally (at least at the time I wrote this), voting rolls are hacked, voters' data stolen by a foreign power. To what end? We don't know yet.

All of these disruptions to democracy I just mentioned make us worry. Some, the Luddites, want to stop and turn back the clock to a paper age. Others, for different reasons, instead want to increase "security" by restricting our freedoms and privacy. And then there are those who do not wish to take the steps needed to guarantee both our electoral democracy in the digital age or our security, all because of a lack of understanding.

Let me be clear: security in the cyber age does not and cannot come at the cost of fundamental, pre-digital freedoms. Estonia, my country, is proof of this. Last week, the UN's International Telegraph Union, nowadays better known as the ITU, which is the UN body responsible for internet issues, published its survey of cyber-security around the world. Estonia ranks first in Europe, better than any other country on the continent, where the number two is Norway, a country not in the EU.

Internet security in Estonia, however, has not come at the expense of freedom. In its survey, Freedom House ranks and has continually ranked Estonia as number one in the world in internet freedom. Internet freedom in Russia, on the other hand, which is number one in the CIS survey on cyber-security, ranks as 65th out of 88 countries surveyed. So that gives you some idea of the contrast between security and democracy and how different solutions worked.

Of course cyber-security can be obtained in a number of ways. As I mentioned, Russia is number one in cyber-security among the CIS countries, which is all the more

reason to look at other measures, such as internet freedom in order to assess the interaction between security and freedom, something that unfortunately governments even in Europe too often say are a trade-off, that you have to give up some freedom for security.

I disagree.

What these two studies – taken together – most clearly show is that there is no necessary trade-off or contingent relation between security and freedom. You can have both. This is especially important to keep in mind amidst the barrage of proposals across the democratic West that in the internet era it is necessary to compromise on freedom in order to guarantee security. The UK government, the US Attorney General and EU Justice Commissioner Věra Jourová all want to mandate „backdoors" to get into encryption keys that guarantee the security of communications, backdoors that would allow someone or government to get into your private mails. These backdoors would be held in the hands of governments (or the EU Commission). There are a number of such proposals right now all over the West.

Of course, this recourse to backdoors is a result of a spate of terrorist attacks in Europe and the United States, where it is asserted that terrorists used encryption to thwart authorities from listening in on their communications. Never mind the series of embarrassing revelations that authorities had been given advance warning about concrete, known terrorists (in the Brussels, Berlin and recent London attacks). Backdoors wouldn't have helped there, it would've been better to listen to allies. But politicians nonetheless continue to demand backdoors.

Rarely are such proposals reasoned. For one, even if backdoors are installed on one or another "app," nothing prevents one from using a different encryption system. The only ones who would be subject to backdoors would be those

who have no terrorist intent but value their privacy which, as we know, is not guaranteed either in the case of telephony or text messaging.

Secondly, and I think much more importantly, as soon as a government, or even more preposterously, the European Commission adopts a backdoor, it becomes the Holy Grail of all hackers across the world. What could be more enticing either for prestige or financial gain than to steal the Keys to the Kingdom? Would we really entrust the European Commission – or any other national government for that matter – to hold the keys to all encrypted communication? When even the CIA has been hacked with a series of zero-day exploits and stolen malware, which we now experience, most recently with the WannaCry ransomware that also inter alia brought down the UK's National Health System, they can hack anything.

Nor should we fear just hackers. As NSA employees Edward Snowden and just recently Reality Winner have shown, there are "insider" threats from someone inside who, because of personal disgruntlement, ideology or money, can simply steal the keys, simply steal that Holy Grail. The effect, though, is the same as a hack: Someone will obtain the keys to all encrypted communications, except for those who really want to use encryption and will use alternatives anyway.

What to conclude from this? First, there is an appalling lack of thought about the implications of government mandated "backdoors." It strikes me, as a former political leader, that my colleagues don't really understand what they are proposing, the impossibility and the impracticality of such proposals.

To understand this issue, I have to go back to Estonia, and a lesson I've learned over and over and shown empirically

in the World Bank Development Report, Digital Dividends, which I helped to coproduce and which was mentioned in the film here.

The lesson is this. Tackling this Brave New Digital World is not a digital solution, it is an analog task. It comes down to three things: policies, laws and regulations. None of which are digital. These are things done by human beings, and only human beings can do them.

This is where a third study comes in. Yes, Estonia has the greatest internet freedom in the world, and it has the best cyber security in Europe but a third study, this one by the European Union's Digital Economy and Society Index 2017, rates Estonia as first in provision of online public services.

In other words, in this Hobbesian world of the internet, Estonians are both more secure and enjoy greater freedom, because we have taken care to offer our citizens security where it matters and let them be free where there is no need to force a fake security.

Let me briefly tell you what I think is needed and what we have done in my country over the past 25 years.

1. *You need a strong digital identity that is guaranteed by the government, in Germany's case, either by the Länder or the federal government. Today, bad actors can enter your life not physically but online. In the physical world, governments demand and also issue passports in order to know who is who, and who crosses your borders.*

   But in the digital world, we don't generally do this. In Estonia we do. Because in the digital world your borders are crossed by electrons and not by people. As we have seen over and over, and are seeing currently all over the world with the latest malware, they don't have to cross your border physically to do damage, even physical

damage. In a digital world where there are no borders, a digital identity is your passport; and you have to be your own border guard by using that.

Or to put it a little differently, in the world there are 4.2 billion people using the internet. Former Vice-President Al Gore talked about the information highway, so we have now an information Autobahn with 4.2 billion people driving it, but only the cars owned by Estonians have a license plate.

2. *To get the benefits of digitization or digitalization, you need to give this digital identity legal status, that is, to make a digital identity something that can offer a legal signature, equivalent to a physical signature. All transactions requiring a physical signature must be possible with a digital signature if we want all of the things that we do today on paper to also work in the digital world.*

   In Estonia there are actually only two transactions that must be done physically, requiring a physical signature (and also the presence of witnesses) – when you get married and when you get divorced. Everything else you can do strictly digitally. But to have a legal digital signature, and here is the hard part, you must tie the digital identity to a national registry, just as your passport is tied to a national registry. The German Personalausweis, for example, lacks that feature, which is why you don't have a legal digital signature in Deutschland. Otherwise you have all the infrastructure in place. It is an analog and a political decision. That's why I say: it's not simply a digital issue, you need a political decision to do that.

3. *A digital identity must be mandatory and universal. This is much more a by-product of social-economic motivation. Why must you make the digital ID mandatory and universal? Practice shows that if a digital*

ID is optional, optimally 15-20% of the population will take it. Look at it, though, from the perspective of the private sector or even a government. Imagine only 15% of the population can possibly use a service, say digital prescriptions, which we have in Estonia. Why would the government or the pharmacies bother spending the time and money to develop the service digitally when 85% of a population can't even use it? From a corporate or government policy perspective, though, our practice shows that if you develop it, they will come. Estonia went in four months from single users of digital prescriptions to +98% of prescriptions being issued digitally. That was simply because the service was created, people discovered it and they started to use it. Because they discovered a new use for their digital ID card, an immensely convenient use.

4. *Use the power of the ID to transform bureaucracy, thereby dramatically cutting costs and, more importantly, saving time. Bureaucracy in the world is about 5,000 years old. One thing in bureaucracy, however, has never changed. It has always been a serial process. One step, followed by another, followed by another. A document, be it hieroglyphs on papyrus 5,000 years ago or even today as an attachment in an email, will go to one office, where it is approved, then to the next office, one after the other and so on. Serially. With a digital ID, all the necessary searches and steps are done in parallel.*

This is also why in Estonia we have a "once only" regulation, the government may never ask you for information it already has. This is also why you can register a company in Estonia in 15 minutes and all of the same checks and controls used by the rest of the EU for establishing business are followed in Estonia. Because we are not serial, but do it in parallel, it is done quickly.

5. *Interactions with an identity must be highly secure. I shall not go into the details, but let me just say that all our communications are at RSA 2048, which is a level of encryption no one can break at this point. Someday, they will be able to do it, but right now no one can, and we will have to do something new before it is cracked. It must also be secure from the government. We know our system can work if and only if the citizen knows the government cannot look at his or her data.*

   This is why I mentioned backdoors – if the EU adopts a backdoor that includes Estonian citizens' encrypted data, our system will collapse. It is all based on trust. Trust that the government is not going into your private data without your permission and that all data remain private.

6. *Finally, you need the proper architecture of what people call the back end, the backbone of the system – what goes on when you log on to the system, where all the connections are made. We use something called a distributed data exchange layer, which means every interaction is directly between the user and a server, and it is authenticated each time to prevent anyone getting in who shouldn't.*

   It also means once you get in you see only what you are authorized to see, and you also can see who has been looking when they are permitted, as in the case of, say, public property records. Which means one can't steal other people's data. Let alone an entire database, as we have seen happen in last several years.

All of these solutions are technological and digital, but all these solutions require the analog: policies, laws and regulations. That is the hard part, the technology is easy. Technology is everywhere and it is, if you think of its power, amazingly cheap. Any government or state can get

the technology. Not every government, however, has the courage to adopt a policy or the right kind of laws.

Moreover, the technology Estonia used mainly was all available 25 years ago. What is innovative and what Estonia has done is to develop the policies, regulations and laws that enable us to use what actually is, by digital era standards, old technology.

That is really the difference. It's not that what Estonia does is technologically so advanced, as sometimes is the case in Brussels where people will go up to an Estonian and say "Oh, you are Estonian, can you please fix my computer?" It's not quite like that.

So what is it then that explains the huge difference between countries, even within Europe? It is the willingness of policymakers to make policy, lawmakers to enact laws and regulators, who have the backing of the laws, to regulate.

Technology is digital, societies are analog. Unfortunately, they have for far too long been considered disparate realms. The two worlds stand isolated and apart.

Let me to go to the philosophical side of this for a bit. I'll give you two examples.

The first one dates to when the iPhone had just come out. I discovered an app that I could download to find out where I have been. I downloaded this app, and on my screen appeared a map with a big fat line between my home and my office, and then smaller gray lines to places of my country I had traveled to less frequently. I looked at it and thought: Someone can collect the data of where I have been and no one has asked if they may do so. Some geek simply thought this was a great idea. It probably is a great idea, but no one ever asked for my permission. So the technology side is proceeding without thinking about the fundamental assumptions of a liberal democracy.

The experience dates from when I gave a talk in the European Parliament in 2014 on the digital single market, Estonia's big idea for its presidency, which begins on this Saturday.

I told the audience that Moore's Law – that is, the idea that a chip doubles in power every one and an half years – means that the next time you have your election in four and a half years, that'll be three iterations of Moore's law. This means that your computer will be two to the third power more powerful than today. And someone in the audience of the members of European Parliament just called out: "What is two to the third power?" That is sixth grade mathematics. If the people in the parliament making our laws do not understand even something as basic as that, then how do we put these two worlds together? How do we do that?

Back in 1959, a British physical chemist at Cambridge, C.P. Snow, who was incidentally also a literary novelist, who coined the expression "the corridors of power," published an essay titled, "The Two Cultures" about these two worlds.

His metaphor to describe these two cultures was the dining club of his college in Cambridge. As a physical chemist, he could sit with the physicists and with the chemists and discuss quantum mechanics. And then he could go drink with the poets and novelists at the other table, because he was a novelist. But he was the only person in this entire college who could walk between the two tables and have a discussion.

People on the literary side or humanities side had no interest in or idea of what the physicists are doing. And the physicists felt exactly the same towards the people in humanities.

When he wrote this essay, he was describing the university. It didn't really apply to society at large at the time because technology in science was something that people did not

experience directly. It was passive: You could watch the television, but it couldn't watch you. You could talk on the phone, but if you left your phone and walked outside, it didn't know where you were. It was a passive relationship. Today, all of our technology is intrusive, two-way and it can come back and look at us. Which means what we really have to deal with far more seriously in the issue of the two cultures is not just to think of it as a problem of university but as a problem of society today. This is what obligates us, if we are on the law side, to understand technology and just as importantly, the technologists must understand what is appropriate in a liberal democracy and what is not appropriate in liberal democracy.

So I will end with this: a plea for policymakers to learn what technology is about and a plea for the geeks, those who devise the programs, algorithms and the apps that we use, to understand what a liberal democracy is, what the fundamental rights and freedoms are, when something intrudes upon the rights and freedoms of the people using the technology that you develop. It's important to understand that liberal democracies stand on three pillars: free and fair elections, the "Rechtsstaat" or "rule of law," and fundamental rights and freedoms guaranteed constitutionally, and they must be preserved in this new digital age.

This is the real challenge of this brave new digital era: to maintain our democracy in the face of exponential change. That is a matter of policy, not electrons.

Thank you.


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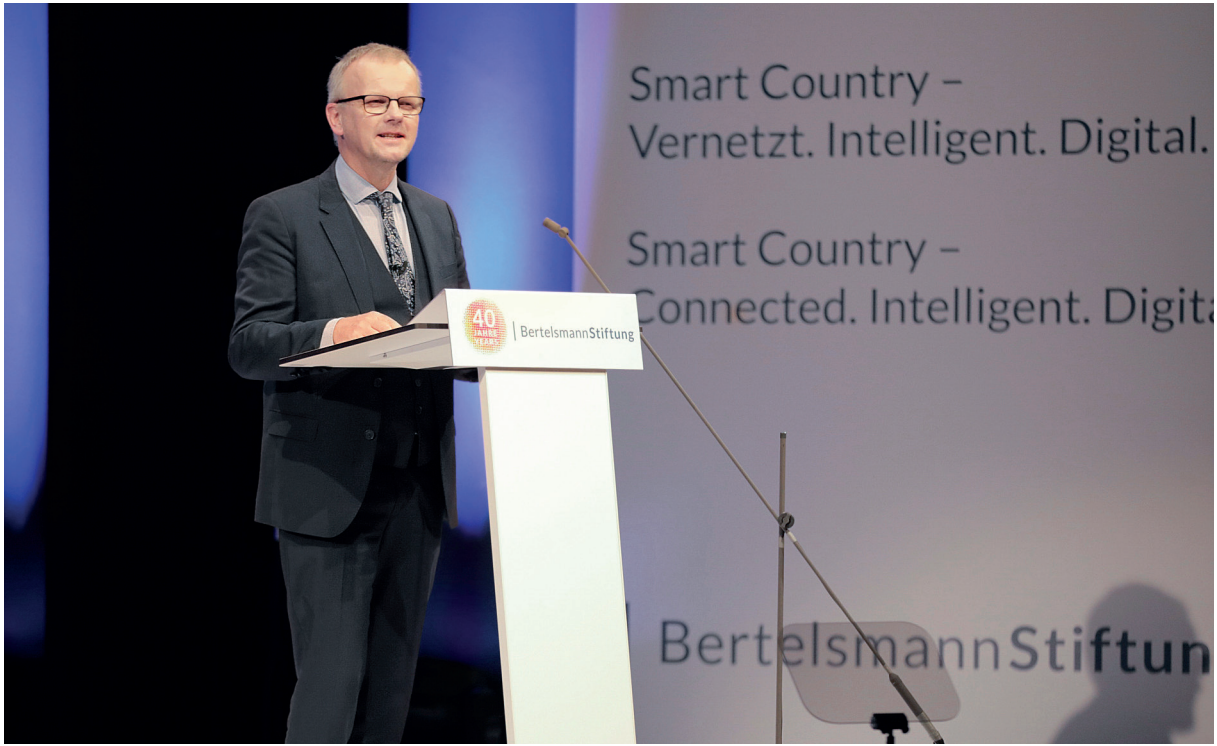
"Our ability to be a part of our digital society, to make use of all the services, support and help that digitalization can offer, will be one of the major factors contributing to the quality of life in our future society."

Professor Jan Gulliksen (June 2017).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The Transforming Powers of Digitalization
Laudatory Remarks

Professor Jan Gulliksen

Digitalization is the most important societal transformation factor of our time – since industrialization. The internet has given us the opportunities to do things in completely new ways, and even to do entirely new things. Old businesses, without the ability to transform, have been defeated by completely new actors on the market. New values have come into play that make us value different things in development, and particularly the UN sustainability goals provide a challenging and inspiring motivation to keep developing.

Northern Europe is among the regions in the world that are most developed when it comes to digitalization. We have seen early on investments into both soft and hard infrastructure that has provided the opportunity for development. We have a relatively high level of education and low illiteracy levels. We have a good climate for innovation and start-ups. The opportunities for development are among the best in the world. Estonia, in particular, has showed an impressive development since the country was formed, setting high ambitions, funding the right initiatives, investing in digital skills and competence, but above all, showing political leadership for digitalization. And this is quite rare. Barack Obama showed great courage and wisdom when stating in a famous speech to young kids before a hackathon "Don't just use a computer game – make one." Canada's prime minister was able to speak about the importance of quantum computing in an unprepared questioning session. Toomas Henrik Ilves has showed equally important leadership, leading his country to become one of the most developed countries in the world by using digitalization. Estonia is one of Europe's leaders when it comes to Digital Public services, according to the European Union's Digital Economy and Society

Index. None of this would have happened without digital leadership. But digital leadership is needed at all levels, not only in politics but in companies, in public authorities, in municipalities, hospitals and schools. The chain isn't stronger than its weakest link.

I believe that the single most important factor when it comes to developing our future digital society is digital skills or maybe better expressed as "Skills for the Digital Society." Our ability to be a part of our digital society, to make use of all the services, support and help that digitalization can offer, not to mention all the entertainment and social opportunities that digitalization has to offer, will be one of the major factors contributing to the quality of life in our future society. Robots are becoming social and appearing in our homes as support for our elderly, as teachers for our children or just as support for routine tasks. Artificial intelligence provides great opportunities for developing the richness of our future. Digitalization and automation makes hard, dirty or monotonous job tasks disappear and provides opportunities for new job tasks through digitalization.

According to a recent study from Oxford university, almost half of the currently existing jobs will disappear in the next coming years due to digitalization. The jobs that will be most highly affected are routine jobs such as retail sales persons, machine operators, office clerks and truck drivers, just to give a few examples. Those that will be the least influenced are jobs that require people skills, such as psychologists, priests, teachers, managers, politicians, etc. The jobs that are disappearing are mostly middle skilled jobs and most of those that are laid off in this process risk taking jobs that require less skill instead, such as taxi driving, restaurant staff, cleaning personnel, etc. If we instead could develop our society in such a way that those who lose their jobs would make use of skills development to instead reskill themselves to a labor market in which there is a shortage of staff, we would move to a stronger

and much more sustainable situation. Although there are no scientific studies, the estimate is that the European Union has a skills shortage within the IT sector of almost 1.5 million people. IT is a labor market that has "negative unemployment." One of the major goals of the European Union is to reduce unemployment, to make the area grow, and develop economically as well as from a societal point of view, by using the opportunities of digitalization.

One of the organizations that faces the biggest challenge when it comes to digitalization are our higher education institutions. Universities and polytechnics are not as development-oriented as society is demanding and we are possibly facing a crisis in higher education if we do not start developing and changing our organizations to meet these new challenges. Digitalization offers new opportunities to develop our teaching: strategically, organizationally as well as pedagogically. Higher education needs to transform with the help of digitalization, such as bringing in "flipped classroom pedagogies" in which the lectures are made publicly available online and the classroom is used to apply the acquired knowledge, rather than the opposite. It can have the ability to provide universal higher education accessible to everyone, regardless of physical location, functional limitation or economic circumstances. It has the opportunity and obligation to show its value for lifelong learning, something that requires a change in the views and perspectives on how higher education institutions are run, are mandated to do what they do, are funded and what role they play and could play in society.

Digitalization affects the entire population, from young kids who can barely walk to the elderly. According to a recent Swedish study, 72% of two-year olds are online, which is a very good thing as digital tools are an excellent source for knowledge and for learning. Mobile digital tools are a natural part of every child's upbringing from very early on, and a majority of children get their first mobile phone quite

early. In their pocket, they thus have an updated book of knowledge within a few clicks. Unfortunately, this resource is not used in schools or for education today, as it in many cases is considered a discipline problem, or because it is not uniformly distributed among all children. It is in many cases more important that the education is equal than effective and updated.

In Sweden, 93% of people over 18 years of age are using computers, broadband and internet. The figures seem to have landed at that level and we have not seen any increase in the last few years. Naturally, the big drop in ICT users are the elderly. Many elderly people do not have access to the digital society and cannot make use of all the services, knowledge and up-to-date news that is there, and when they were asked, in the survey, the reason for the majority was that they did not see any purpose in using it. However, I think that there are ways of overcoming these problems. Many of the elderly could potentially make great use of the tools, but they never get the chance to try. I tried one approach in Sweden – to propose to have one day every year that all citizens should engage to help one of their relatives or friends that currently are not digital to come online, to show them the benefits. As an example, I did it myself. I gave a tablet computer to my mother-in-law, who is soon turning 80. She hated computers and had made very little use of computers at her work as a psychologist before retiring, so she had not worked up the habit. She did not want help from her children, but as it turned out, she went to her grandchildren to get the help and support needed, and a few weeks later, when I visited her, I could see that she had become very digitally active. She was buying theater tickets online, she was buying food and wine online, she was Skyping with her grandchildren, and she was Word feuding with her friends. I told her "But, you have always said that you hated computers?" and she responded and said "Computers, yes, but this is an IPad..." In the era of Internet of Things or ubiquitous computing,

people may use computers without actually knowing that they do.

IT affects our work environment as almost all of the work we do is done using some form of digital support, thus our digital work environments need to be developed based on the human being. In the Western world, we have a well-developed legislation when it comes to the work environment, trying to avoid work environment problems and minimize problems and sick leaves due to the work environment. The legislation is quite firm and the regulations about what you are able to do and whose responsibility it is, is quite specific. But this mainly concerns the physical work environment and, in some cases, the psychological or social work environment. The digital work environment is a new concept that is yet not recognized to the extent that it deserves. In a country like Sweden, almost 98% of all people that work do so using some form of digital technology, and more than half of the working population uses computers more than 50% of their working time. Doctors spend half of their working time in front of a computer. One should note that the work environment legislation still applies for the digital work environment, but people do not see it that way. Has anybody reported an office software as a work environment problem? Have work environment requirements ever been considered in the public acquisition of a new software system? Has a work environment audit ever considered digital tools as a potential work environment hazard in the analysis of a work situation? It is time that we start to view the importance of digital work environments and put sufficient requirements on digital working tools from a work environment perspective.

Finally, a few words about the future development of research. We have over the last decade seen a tremendous development of the different research projects that have been funded and conducted. Research is no longer done

by the single talented individual, disconnected from the rest of the world, but the most profound development happens in large teams of researchers, often separated in time and space, who use digital tools to collaborate synchronously or asynchronously. Research has gone from being multidisciplinary, in which researchers from different scientific fields work with their own research problems, but in the same project, to being transdisciplinary, in which the researchers need to come to an understanding of each other's research areas. The impact of research has become much more important, and I am not referring to the scientific impact measured by the publications and citations of researchers or international ranking of the universities. I am talking about the societal impact that the research may have on important problems that the world faces today. Many people refer to the Sustainable Development Goals adopted by the United Nations as one unifying goal that can foster collaboration. Of course, this is great, even though one many times feels that the research conducted only vaguely relates to such goals. Personally, I am very much in favor of the action research methodology in which researchers actively participate in big collaborations to solve real world problems in context, at the same time studying and trying to derive the generalizable knowledge that can be drawn out of such interactions. As a researcher, of course, you have stakes in the results. You are eager that the change should be a successful one and therefore you re-plan your projects based on what is happening in the project. But by using the action research approach, you can explicate your personal stakes and make it an asset in the project. The actual change in practice is of equal importance to the publications it leads to. In the future, researchers must be more creative in coming up with methods and tools to support transdisciplinary collaboration, with the purpose of contributing to actual change, to help the process from research to innovation and to be sustained in the research project, and still be clear about your ethical principles and your quality criteria.

But despite all tremendous development within research, it is the education conducted that is the greatest impact universities contributes to, all the excellent and innovative students that exit from the university to take their ideas further, to contribute to jobs be created, to growth and development, to a better society for all. Education and building skills for a digital society becomes more important than ever before. To be able to meet the challenges of the future, we need to embrace the opportunities of digitalization and meet the development through change and agility, we need to rapidly make use of the transforming powers of digitalization. So, if you want to move towards a more prosperous world, digitalization is the area to focus on. And for that, we need to develop skills for a digital society broadly and support the development of digitalization. To be able to do that, a focus on developing and modernizing our higher education institutions is needed – a digitalization of higher education – as well as a focus on developing digital skills and lifelong learning.

Thank you for the opportunity to make the case for this in honor of one of the true digitalization pioneers, who has shown how digital leadership can help move a country to the forefront of the digitalization competition. Let's all focus on how we can take digital leadership one step further and make the best possible use of the transforming powers of digitalization in the future.

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