The Digital Revolution: threat or opportunity for the audit profession?
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Start
Dear colleagues, we live in an exciting time! The digital revolution is changing the world we live in profoundly and this brings opportunities and challenges to us auditors.

Slide 2
In this presentation, I would like to share some developments in the area of digitisation and datafication with you. I will then explore opportunities and challenges we as the Netherlands Court of Audit see in this respect. I will conclude with some possible future developments.

Slide 3 – digitisation / government
Let's start with looking at digitisation, the main driver for change. A good example of how this changes government services can be found at the Dutch Tax Office. There, the process of filling out your tax form has shifted not only from analog to digital, but also from a time-consuming process of finding all of the necessary information to a pre-filled form. I can assure you, that as a taxpayer, this is tremendously helpful.

Slide 4 – digitisation / private sector
We see this – I should probably say *of course* – happening in the private sector too. If you look at the exponential growth of companies like AirBnb, Uber, and Booking.com – all digital and disruptive versions of older industries – you see how fundamentally the digital revolution is changing the world.

Slide 5 – digitisation / blockchain
Finally, let's look at blockchains. If you are not yet familiar with the blockchain: a block chain is essentially a record, or ledger, of digital events — one shared by different parties. The blockchain is the underlying technology of Bitcoin. What the blockchain does, is adding an extra bit of information – a block – with every transaction, thereby creating a chain. The nice thing of blockchain is that it is extremely difficult to change or remove a block of data from the chain. Once entered, information can never be erased. Thereby, in essence, a block chain is a way of stating the truth and fairness of a transaction. Which is, in a nutshell, what auditors do in expressing an opinion on the truth and fairness of financial statements. The intriguing question then is: will block chains displace auditors? Will the accountant become one the extinct species? And how about SAI's? Or is the blockchain simply an opportunity to involve the public in government spending? Time will tell.

Slide 6 – digitisation / extinction
Looking at extinction, in 2013, Carl Benedikt Frey and Michael A. Osborne studied the impact of computerisation on employment levels. Of the 702 occupations they examined as being susceptible to computerisation, accountants and auditors were judged to have a 94% chance of being at risk. This put chartered accountants and chartered public accountants on a par with tax preparers, data entry keyers, loan officers, bookkeepers, accounting and auditing clerks, cashiers and budget analysts. These are considered the most endangered occupations in the near future. By contrast, jobs with a low risk of being replaced by computers include management analysts, compliance officers, marketing managers, sales managers and CEOs. The authors concluded that, while computerisation has historically been confined to routine tasks involving explicit, rule-based activities, algorithms for big data were now rapidly entering domains reliant upon pattern recognition and could readily substitute for labour in a wide range of non-routine cognitive tasks. Moreover, advanced robots are gaining enhanced senses and dexterity, allowing them to perform a broader scope of manual tasks. This is likely to change the nature of work across industries and occupations. All in all, there is sufficient reason to wonder whether the audit profession, including both private and government auditors, has a future.

Slide 7 – datafication
Let's move on to datafication. Together with digitalisation – our smart devices producing a lot of new data every second of the day – digitisation is one of the main drivers for datafication. Datafication is the process where digital processes basically turn who we are and what we do into data, thereby creating interesting new opportunities and challenges.

Compared to the traditional linear model of information, the current digital model is non-linear and almost real time: it is like a flower with several petals as you can see on the slide. Once information is created, it is almost instantly part of our heritage. This too is a fundamental change.

Slide 8 – datafication
Data is considered by many to be new gold or oil. Looking at the Googles and Facebooks of this world, this is probably true. For governments, however, we might maybe better call it the new oxygen, as it sparks innovation in the public sector.

Slide 9 – opportunities for government
So, how can the digital revolution help governments? I already showed you how the digital tax form helped to improve public services and how important data is for innovation and economic growth. There are two other important benefits that are relevant to us auditors.

Slide 10 – opportunities for government /detect savings
Let's first look at how data can help bring about savings. This slide presents a telling example of how data can inform us on the potential for saving taxpayer's money. What you see here are differences in prescription behaviour of general practitioners in the United Kingdom. Darker means that more expensive medicines are being prescribed. From the map, it is clear that the differences are quite large, up to perhaps more than thirty percent points. It also tells us that, if all GP's would prescribe the same, cheaper medicine, 200 million pounds could be saved. And this is only for one specific kind of medicine! Imagine what the saving potential is if you would look at other types of medicine or government performance as a whole. Data can save money!

Slide 11 – opportunities for government / transparency
Next, transparency. What you see here, is the website of the first digital budget and annual account of the Dutch government. Published just two week ago, on our yearly Accountability Day. For the Dutch government, this is truly an important milestone, as it is the visible start of a fundamental change in how it organises the budget process. But this is just a small step, because by 2020, there will also be a financial data cloud, which will contain standardized financial open data at the transaction level. You can imagine that this kind of open spending will offer unprecedented new opportunities for not only transparency but also for data analytics and for how we can audit government expenditure.

Slide 12 – challenges for government
We should, however, also be very much aware of the challenges that come with working with data. The most important challenge is respecting the privacy of taxpayers. A great deal of the data that government holds on us, has privacy sensitive information on us. The current IT systems probably do not include 'privacy-by-design'. Such a design would make it better possible to exclude privacy sensitive aspects of data from other data. This is related to the second challenge: how can we make data-producing systems 'open-by-design'. Now, whether or not data is open, can be very much dependent on how a civil servant interprets the Freedom of Information Acts. In one of our Trend reports on Open Data, we have included a list we call 'Fifty shades of no', describing many reasons why data should not be open. All of them being not valid.
Other challenges are related to validity and reliability of data. If you work with data coming from different sources, you quickly realise that they differ in terminology and interpretation. Standardisation of simple things, like the name of a government department, would already be very helpful. More in general, data quality, is quite often an issue too. The data we want to use comes in different formats and with differences in quality. There is no easy fix for that, as it is very much dependent on how data is being made. To illustrate: the same Tax Office that is making these nice pre-filled tax form, also deals with legacy IT and the associated problems. It will probably take many years to improve this.

Slide 13 – what does it means for sai's
So, colleagues, what does all of this mean for us? "I (We) have to change to stay the same". This quote of the famous Dutch-American painter Willem de Kooning, and the central motto of our past EUROSAI presidency, adequately describes the challenge for us. We want to remain to be an authoritative voice in a world that is fundamentally changing. This is quite a challenge for organisations coming from, in our case, the 19th century, working with 20th century procedures. Let me show you some of the opportunities and challenge we see for SAI's.

Slide 14 – opportunities for sai's
First, the opportunities for SAI's. I have already mentioned it, transparency in government performance and spending is something that can benefit enormously from especially open data. This also makes it possible for the general public – armchair auditors as we call them – to scrutinise government. Next, data driven audits can provide us with new insights into government performance. Even more if we are able to use advanced analytics, such as data and text mining. This will also open opportunities for more real-time insights at lower costs. The data revolution is also an important enabler for cooperation. Not only between us and the government, but also for cooperation between SAI's. As we speak, colleagues of us are discussing how we can work together in the preparedness reviews for the Sustainable Development Goals. The Sustainable Development Goals themselves being very much data driven, offer a great opportunity for SAI's and the United Nations to make this a global and data-driven cooperation. Very exciting.

Slide 15 – armchair auditor
To illustrate the power of data, I have two examples from The Netherlands. The first example is on natural gas extraction. What you see is the website of an interest group – true armchair auditors – that pulls together data on natural gas extraction, the earth quakes that are the result of that, and the damage done. This is happening in the North of The Netherlands and it has a huge impact on the lives of the people living there. Using this portal and more traditional forms of influencing the government, the people were able to get the government to lessen the extraction of natural gas, and making the province a bit safer to live in.

Slide 16 – armchair auditor
The green line in this graph shows that in a period of about five years, the extraction of natural gas has been reduced by more than fifty percent.

Slide 17 – web scraping and data visualisation
This slide shows you a telling example of how data changes our work. What you see is a network visualisation of the Dutch government. Very much in beta, but it gives a first comprehensive overview of the Dutch government. It is not based on official data from the government, but scraped from the web by one of my colleagues. And now we have the government asking us how we make this. A true game changer!

Slide 18 – challenges for sai's
There are of course also challenges for us. I am sure not all of us are familiar with web scraping or text mining. This means that we should attract auditors (*human ware*) coming from data-oriented backgrounds, but also that we should invest in other hardware and software. Connected to this, is the necessity to invest in our analytical capabilities. When algorithms, blockchains, or artificial intelligence become more important in the public sector, we should know how to deal with this. Otherwise, we will not be able to assess the quality of data, and not able to distinguish facts from alternative facts. Finally, it also implies something for how we work. Traditional clearance procedures might be inadequate if you work with data: how should we clear a R script with the auditee? And how will we publish? Will it only be digital? Or, in the extreme blockchain case, are we to become extinct too?

Slide 19 – the future
I would like to conclude by looking at the future. As I have told you, we think the digital revolution brings us ample opportunities to modernise the work of Supreme Audit Institutions. At the same time, we have to be aware that it will lead us to uncharted waters, where there will also be ample opportunity to fail. But we should not be afraid of that, because we learn from our failures.
As the Netherlands Court of Audit we see three future developments that will further influence our work. First, more and better data will make it possible to make predictive analyses, thereby making it better possible to turn knowledge into action. Second, data will be more real time, making it possible to better synchronise timing with action. And finally, we will do more together with others.
During our second Accountability Hack the NCA will challenge developers to use open data, information regarding financial flows and performance of the Government on new and innovative ways. We will bring programmers in contact with data holders, policy officers and representatives. Co-creation between us, the government, Parliament, and the civil society, such as in the Accountability Hack we organise next week, is necessary to increase public accountability and, ultimately, the public value of SAI's.