Role of government in technology transformation in the public sector

Riccardo Zecchinelli, senior economist at Cabinet Office

GDS leads digital transformation in the public administration and public sector

Government Digital Service

Key responsibilities

- provide best practice guidance and advice for consistent, coherent, high quality services
- set and enforce standards for digital services
- build and support common platforms, services, components and tools
- help government choose the right technology, favouring shorter, more flexible relationships with a wider variety of suppliers
- lead the Digital, Data and Technology function for government
- support increased use of emerging technologies by the public sector

Maintain & improve cross-government platforms e.g. GOV.UK Verify

What about technological transformation in the public sector?

Digital transformation

Digital transformation is the process of using **digital** technologies to create new — or modify existing — business processes, culture, and customer experiences to meet changing **business** and market requirements.

Digital technologies are electronic tools, systems, devices and resources that generate, store or process data. Well known examples include social media, online games, multimedia and mobile phones.

One of the examples of digital transformation is cloud computing. It reduces reliance on user owned hardware and increases reliance on subscription based cloud services.

Technological transformation

Technological transformation is broader terminology and in parts includes digital transformation.

In this cases it refers to other (emerging) technologies that could have disruptive role in the public sector.

These technologies refer primarily to **Automation** and to **Artificial Intelligence (AI)** but also to Internet of Things, 3D printing, Blockchain and Robotics.

‘Growing the artificial intelligence industry in the UK’ Review (2017)

The 2017 independent review, carried out by Professor Dame Wendy Hall and Jérôme Pesenti reports on how the Artificial Intelligence industry can be grown in the UK.

Recommendations to improve access to data

- To facilitate the sharing of data between organisations holding data and organisations looking to use data to develop AI, Government and industry should deliver a programme to develop Data Trusts

Recommendations to improve supply of skills

- Government, industry and academia must embrace the value and importance of a diverse workforce for AI, and should work together to develop public information aimed at breaking down stereotypes and broadening participation.

Recommendations to maximize UK AI research

- The Alan Turing Institute, Engineering and Physical Sciences Research Council (EPSRC), Science and Technology Facilities Council (STFC) and Joint Information Systems Committee (JISC) should work together to coordinate demand for computing capacity for AI research

Recommendations to support uptake of AI

- Government should work with industry and experts to establish a UK AI Council to help coordinate and grow AI in the UK.

HM Government strategy on technology and innovation (2019)

People

- People: having the right skills and culture
- Recruiting, retaining and training technical skills
- Creating data-literate civil servants through world-class training
- Establishing a pipeline of digital talent for all levels of the Civil Service
- Leadership and a culture of innovation

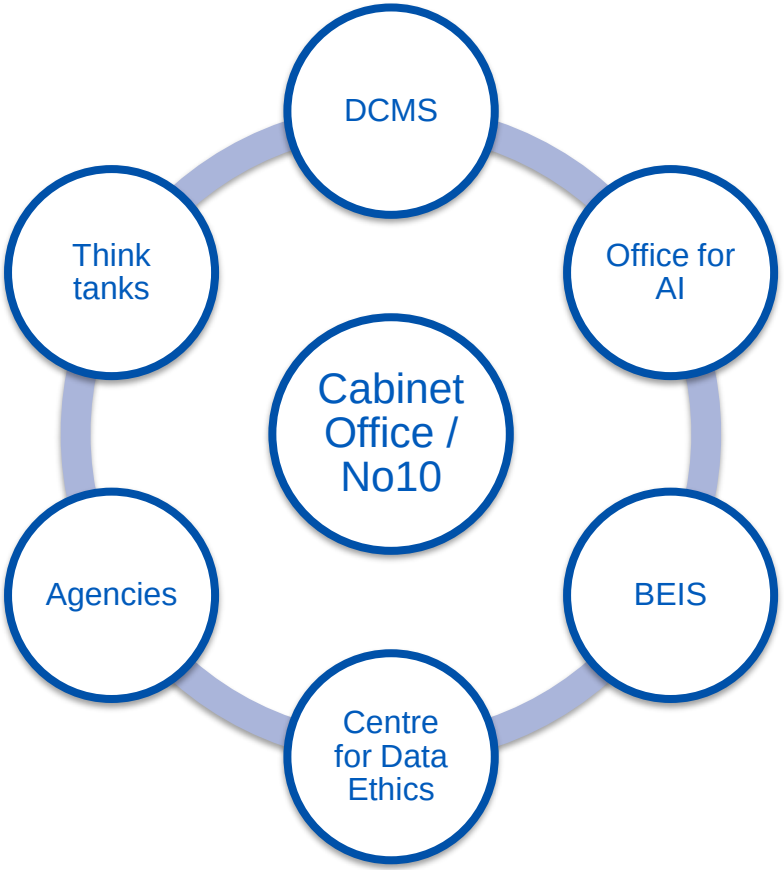
Process

- Process: providing an environment for experimentation
- Funding and scaling technology innovation
- Ensuring our funding processes support innovation

Data and Technology

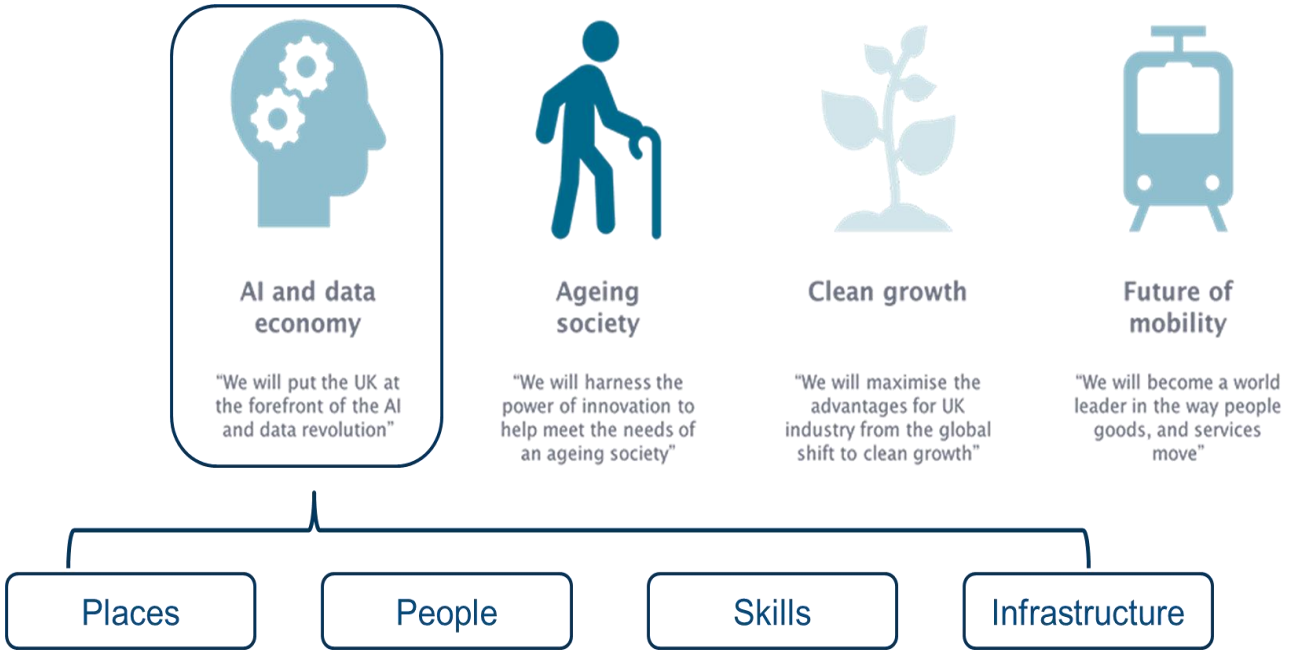
- Data and Technology: structured data and up to date technology
- Harnessing insight from increased access to valuable data
- Taking a coherent and strategic approach to data
- Data ethics, bias and privacy

HM Government on Artificial Intelligence



BEIS

Industrial Strategy – Grand Challenges



DCMS

Digital inclusion is about having the right access, skills, motivation and trust to confidently go online.

UK Digital Strategy sets out how we will build on our success to date to develop a world-leading digital economy that works for everyone.

Building world-class digital infrastructure for the UK – eg. continue our work to complete the roll-out of 4G and superfast broadband by 2020, but we will also implement a **Universal Service Obligation**, giving every individual, business and public premise across the country the right to request an affordable high speed broadband connection.

Giving everyone access to the digital skills they need – eg. establish a new Digital Skills Partnership, to helping people access digitally-focused jobs at a local level, bringing together technology companies, local businesses, local government and other organisations to identify digital job vacancies and take action to help people move into these jobs.

OAI

Office for Artificial Intelligence

Ideas

- *To be the world's most innovative economy*
- up to £20 million in the application of AI in sectors such as legal and insurance through the Next Generation Services ISCF and network of Innovation Research Centers and collaborative R&Dce

People

- *To generate good jobs and greater earning power for all*
- Work with schools, universities and industry to ensure a highly-skilled workforce – eg. invest £406 million in STEM skills, upskill up to 8,000 computer science teachers, creating a National Centre for Computing, and introduce a National Retraining Scheme.

Infrastructure

- To drive a major upgrade to the UK's infrastructure & enhance the UK's existing data
- Establish the Geospatial Commission to determine how best to improve access to geospatial data to a wider range of users, including businesses using and innovating with AI technologies.

Business environment

- To be the best place to start and grow a business
- Experts' formed AI Council will drive action, oversee implementation of AI deals, galvanise industry, and advise government; and other relevant initiatives, such as the GovTech Catalyst.

Places

- *To have prosperous communities throughout the United Kingdom*
- Work closely with key clusters to provide the support needed for AI businesses to thrive, eg. invest £21 million in Tech City UK over 4 years, to become Tech Nation and support regional tech companies and startups to fulfil their potential.

Other public and independent think tanks/ agencies

CATAPULT Digital

The Alan Turing Institute

TECH NATION

Automation Taskforce

Cabinet Office

June 2019. The Prime Minister said:

Late diagnosis of otherwise treatable illnesses is one of the biggest causes of avoidable deaths.

And the development of smart technologies to analyse great quantities of data quickly and with a higher degree of accuracy than is possible by human beings opens up a whole new field of medical research and gives us a new weapon in our armoury in the fight against disease.

Achieving this mission will not only save thousands of lives. It will incubate a whole new industry around AI-in-healthcare, creating high-skilled science jobs across the country, drawing on existing centres of excellence in places like Edinburgh, Oxford and Leeds – and helping to grow new ones.

Government Automation Taskforce

This has been set up to develop and accelerate the Government's ability to harness automation technologies for public services.

It reflects the increasing emphasis on the technology in central government. Early last year the chief executive of the Civil Service John Manzoni said it would make more use of robotic process automation (RPA) and Artificial Intelligence, and the Robotic Automation Unit in the Cabinet Office has reported increasing interest throughout Whitehall.

Emerging demand for automation/AI opportunities

Cabinet Office

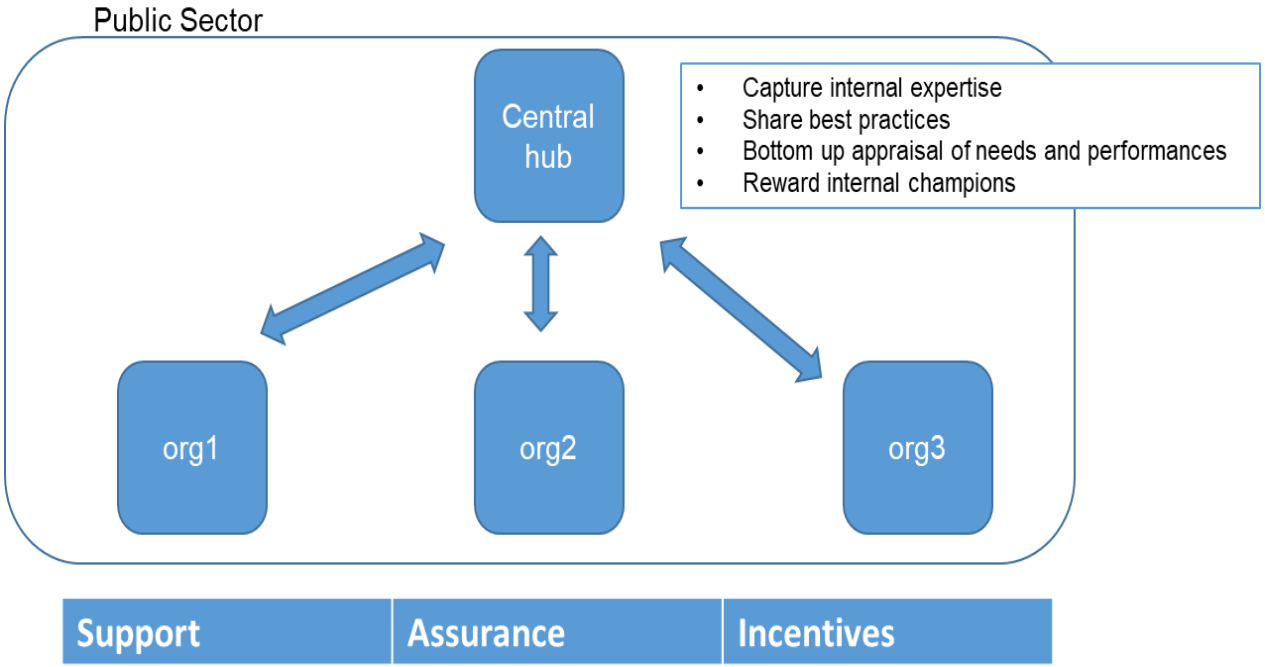
Category	Emerging technology or concept	Description	Using or interested organisations
Automation	Artificial intelligence, machine learning (ML)	A set of rules that allows systems to learn directly from examples, data and experience.	Most central departments, local authorities, civil authorities
Automation	Deep learning	ML method that combines details for more abstract higher level features of the data using mathematical functions.	Cabinet Office (CO), GDS, Home Office, Ministry of Defence (MoD)
Automation	Robotic process automation (RPA)	Software that processes transactions, manipulates data from existing systems, triggers responses and communicates with other digital systems.	Large transactional departments, HM Revenue and Customs (HMRC), Department for Work and Pensions (DWP), Department of Health and Social Care (DHSC), MoD, Department for Education, Ofgem and local authorities
Identification and identity	Distributed ledger technology (DLT)	A decentralised (trust), resilient, immutable transaction ledger (database) that is cryptographically secure.	Defra, Food Standards Agency (FSA), Land Registry, HMRC

Automation/AI case studies to scale up

Cabinet Office

Country	Insights
DVLA	Began by training a program to identify acceptable and unacceptable driving licence photos for online applications – have now expanded to a larger vision for automating key user services.
HMRC	Created a Personal Tax Account (with a Business Tax Account in the pipeline) to facilitate a move to an entirely digital tax system by 2020. By January 2016 paper tax returns were down 21% and telephone contact was down 7% with a halved wait time.
MOJ / DCMS / DFE	Examined the use of Reproducible Analytical Pipelines in the production of key statistics. While there was a training cost for staff, if the pilot was expanded across government it was found there was a potential saving of £149m (with a 90% uptake rate). They also developed an online course for staff training.
DWP	Aimed to use machine learning algorithms to improve fraud detection, in particular by flagging potential fraud in the Universal Credit system. This has contributed to incremental efficiencies, such as cost avoidance, of £39.6m.
BEIS	Used natural language processing to conduct thorough sentiment analysis, including emerging trends and responses to government announcements. Also used this mapping to identify firms capable of scaling up with government support – identified 50% of the firms capable of scaling up in the top 20% of their scoring system.
The Metropolitan Police	Used predictive data analysis to improve deployment to different areas. They are now building a bespoke, in-house system with a focus on reduced discrimination due to the resourcing success of the pilot.
MOJ	Trained a neural network to examine prison reports and create an ‘intelligent search’ tool, allowing staff to rapidly uncover buried information. This facilitated trend identification.
NHS (automation)	Aimed to go paperless with automated recording systems, which was estimated post-trials to save £12.5bn a year in hospital staff productivity and £5.9bn a year in social care staff productivity.
NHS (big data)	The ‘Test Bed’ project created a cloud-based image-sharing system in the East Midlands to train radiology diagnosis algorithms, which are currently being deployed in breast cancer screening trials in a ‘second reader’ capacity.
BEIS (data science team)	Re-allocated in-house resources in terms of technical expertise in order to deliver a variety of analytical automation products. These projects are of particular note as they relied only on existing Civil Service resources.

Possible governance for implementation technology transformation in the public sector



Based on review of national and international best practices

Enablers for a successful widespread technological adoption

Data

- GDS Service Standard, potentially from international evidence consider a Data Standards Authority and a Centre of Excellence for Data Quality Data center

Cloud

- Government as a Platform e.g. Verify, Notify. GDS Service Design

Skills

- Coffee & Coding, Data Science Accelerator schemes, National Retraining Scheme and internationally Canada School of Public Service Digital Academy

Governance

- Central hub for digital and technology (automation) transformation such as GDS and Government Automation Taskforce

Ethics

- Centre for Data Ethics and Innovation, Alan Turing Institute or Oxford Internet Institute

Trust

- OECD Council Public Integrity 2017, Explainable Artificial Intelligence (XAI)

Roadmap for a successful widespread technological transformation