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Government 3.0 – Next Generation Government Technology Infrastructure and Services

Roadmaps, Enabling Technologies & Challenges

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To my dear wife, Lauretta, and our beautiful children Seun, Ore, Jimmy, Jojo and Benny. Also to my parents Julius and Mary, my father-in-law George and to the loving memory of my mother-in-law, Beatrice.
Adegboyega Ojo

To my loving wife and lifelong friend, Inger Marie, who keeps me happy and sane when deadlines converge, and to our wonderful children Simon, Teresa and Peter, who together keep me on my toes intellectually and well and truly grounded.
Jeremy Millard

Preface

Policymakers and academics largely recognise the need for a fresh vision for public sector innovation and the use of technology in government given the challenging and turbulent contexts in which most public administrations operate. In response, recent studies have sought to better understand the forces that will shape the future evolution of the PA environment. For instance, in a report on Future Trends in European Public Administration and Management, some megatrends that are already shaping the future of PAs were identified (Pollitt 2014). These changes include demographic change, climate change, economic trajectories, technological developments, public trust in government and changes in the political environment.

Historically, technological change has had a significant effect on the locus of administrative activity, the costs involved, the nature of administrative tasks, the skill sets needed by officials, rules and regulations and the types of interactions citizens have with their public authorities (Pollitt 2014). In 2007, Frissen et al. (2007) identified some disruptive technologies with strong potentials to transform government functions, including mobile devices; intelligent agents (and robotics); sensors; language processing technologies; semantic technologies; serious games; RFID and biometrics; ICT infrastructures such as WiFi, WiMAX and broadband; Web 2.0 technologies (social software); and grid infrastructure. While mobile devices and Web 2.0 and ICT connectivity technologies such as WiFi have had a transformational effect, some of these technologies are yet to have any major impact in the government space. Unfortunately, we are yet to fully understand the reasons for this very slow adoption of these technologies.

A recent study by the European Commission on 'Powering European Public Sector Innovation: Towards a New Architecture' (EC-DG Research and Innovation 2013) has also identified new technology paradigms considered as enablers of innovation and core to the delivery of public services or the design of public policy. These technologies include the following:

- *Social* – social networking offers new ways to deliver public services and to enable citizens to participate.

- *Analytics* – big data and predictive analytics offer new service opportunities for citizens and businesses.
- *Mobile* – the advent of the smartphone enables citizens to access public services from anywhere at any time.
- *Cloud* – cloud-based solutions, both public and private, can transform interoperability and service provision.
- *Open and big data paradigm* – new public services, transparency/democracy, economic growth potential.
- *Sensors and Internet of Things* – harnessing an enormous amount of data generated from everything around with an Internet address for better decision-making and problem-solving.

Among these new technological paradigms, open and big data stands out regarding attention by policymakers. It is widely believed that big data will enable hitherto slow-moving public services to move much faster and to treat citizens on an individual rather than a categorised basis.

However, despite these exciting possibilities, many questions remain unresolved: Can these new technologies deliver the radical innovation needed for the 'entrepreneurial' and 'directing' (Pollitt 2014) state? How should governments (at different levels) reconfigure their relationships with citizens, the social sector and businesses to effectively leverage these technologies to deliver public outcomes effectively? To what extent can open data enable greater transparency that can increase social capital and public trust in the government? How can the public sector effectively tap into the 'data tsunami' already engulfing us due to the explosion of social media and the introduction of new low-cost data gathering tools that effectively make every citizen with a smartphone a data source? What are the new data gathering trends most likely to impact public services (Millard 2013)? What kind of capabilities must the government develop to leverage these technologies? Finally, what are the negative consequences (such as an exacerbation of the digital divide or threats to citizen privacy) that the adoption of these technologies may present and what strategies are available to mitigate undesirable effects?

This book attempts to answer some of these questions. Specifically, this book will shed some light on the question about the next steps of e-government initiatives and public sector innovation. This next generation public sector innovation is what we have labelled 'Government 3.0'. Technology policymakers should benefit from the visions created by the various roadmaps in the first three chapters of the book which describe some of the common strategies of the European Union member states in the areas of open data and services, open processes and the use of digital technologies in policymaking. The book also discusses in its fourth chapter some of the issues associated with existing models for tracking progress in e-government development and highlights how some of these shortcomings could be addressed. Examples of emerging innovations in the areas of process engineering and open innovation in the government domain based on linked open data are described in chapters "Techniques for Reuse in Business Process Modeling in Public Administration, Capability Development in Open Data Driven Organizations, Water

Analytics and Management with Real-time Linked Dataspaces, Fostering Citizens' Participation and Transparency with Social Tools and Personalization, The 6 – Values Open Data Business Model Framework, Technology Innovations in Public Service Delivery for Sustainable Development, and Blockchain as a Next Generation Government Information Infrastructure: A Review of Initiatives in D5 Countries". One of the new developments highlighted in chapter "Fostering Citizens' Participation and Transparency with Social Tools and Personalization" is how new generations of open data platforms are addressing the weak exploitation of available open data resources through explicit support for social interactions among community members of common interest on the platform. Given the increasing centrality of United Nations (UN) Sustainable Development Goals (SDG) for governments in different parts of the world, chapter "Technology Innovations in Public Service Delivery for Sustainable Development" examines how ICT can be deployed to assist in the design and delivery of innovative public services in support of sustainable development around the world. Chapter "Blockchain as a Next Generation Government Information Infrastructure: A Review of Initiatives in D5 Countries" discusses early adoption of blockchain and distributed ledger technology, a next-generation information infrastructure in the Digital 5 (D5) countries. Chapter "Governance, Transparency and the Collaborative Design of Open Data Collaboration Platforms: Understanding Barriers, Options, and Needs Discusses the Barriers and Design Options for Next-Generation Open Data Platforms". The book closes in chapter "The Privacy/Transparency Balance in Open Government" with a critical analysis of how to balance the transparency goals and privacy needs of citizens in the open government era.

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Adegboyega Ojo is senior research fellow and head of the e-Government Unit at Insight Centre for Data Analytics, National University of Ireland, Galway (NUIG). His expertise is in the areas of open data strategies and infrastructures, data-intensive public services, e-government services, e-participation infrastructure and governance of smart cities. He is currently principal investigator on a number of EU Horizon 2020 projects in the area of open data platforms and co-creation of data-driven public services. He has served as expert advisor to different UN organisations such as the e-Government Branch of the United Nations Department of Economic and Social Affairs/Division for Public Administration and Development Management on the use of open and big data for integrating Sustainable Development Goals (SDG2030). Adegboyega also led the development of technical paper for the Open Government Partnership on how to benchmark initiatives from participating countries. While at the United Nations University as research fellow and academic programme officer at the Centre for Electronic Governance in Macao SAR, Adegboyega led the development of National e-Government and IT Strategies for countries in Asia and Africa. He has served as programme and track chair and programme committee member in well over 70 international conference editions in the domains of e-government, smart cities and formal software engineering. He currently serves as editorial board member for Elsevier's *Government Information Quarterly* journal and *International Journal of Public Administration in the Digital Age*. He was elected secretary of the Digital Government Society (DGS) in December 2016. Adegboyega obtained his doctorate in computer science from the University of Lagos, Nigeria, in 1998.

Jeremy Millard director of the non-profit consultancy Third Millennium Governance, senior research fellow at Brunel University (London) and senior policy advisor at Danish Technological Institute, has 40 years[1] global experience working with governments, development agencies and private and civil sectors in all parts of the world. In the last 20 years, he has focused on how new technical and organisational innovations transform the government and the public sector. Recent assignments for the European Commission include studies on administrative burden

reduction and on developing business models for ICT and ageing. He also recently led an impact assessment of the European e-Government Action Plan and a large-scale Europe-wide survey and analysis of participation and developed the e-Government 2020 Vision Study on Future Directions of Public Service Delivery. He has worked on the European e-Government annual benchmark since 2009 and has assisted the EC in planning their research programme for ICT for governance and policy modelling between 2008 and 2012 and then in designing inputs to the Horizon 2020 research work programme (2014–2015) on ICT-enabled public sector innovation. He is currently leading the EC[1] Advisory Group providing inputs to the Horizon 2020 work programme for 2016–2017, including public governance and new economic models, and is a member of the EC[1] Digital Entrepreneurship Forum. Jeremy has also worked since 2008 as an expert for the UN on their successive global e-government development surveys and has undertaken work adapted from the UN approach in Oman, Georgia, China and Russia. He also provided inputs to the UN[1] debate on the post-2015 development agenda in relation to governance issues and how these can be measured and to the World Bank on digital public sector services. He recently led the assignment for ReSPA on the Western Balkans Comparative e-Government Study, as well as a survey for the OECD on back-office developments in support of user-centred e-government strategies. In the Gulf, he assists Oman develop their e-government services, prepared an e-government strategy for the six nations of the Gulf Cooperation Council and has supported the development of the Bahraini e-government strategy. Currently, he is undertaking a study for ESCWA on integrated service delivery across the Arab Region. He also provides e-government support services in India, Malaysia and Brunei.