Rapporteur services for consultation on the H2020 WP 2018-2020

Deliverable D1 Workshop Report

Overview of presentations, contributions and discussions at the Workshop including an Orientation Paper

Drawing on the Expert Consultation Workshop, 27 April 2016, in Brussels.

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1. Introduction

1.1. Context and purpose of the report

This report is a summary and outcome of the presentations and discussions at the H2020 SC6 WP 2018-2020 Expert Consultation Workshop held in Brussels on 27 April 2016. However, the scope of interest is not restricted to the 2018-2020 period, but guidance is also sought on developments, challenges and opportunities in the period after 2020 in order to assist thinking and planning beyond H2020 and the Europe 2020 Strategy framework. Thus, the experts were also requested to think longer term and more broadly, whilst firmly anchoring their discussion within the scope of DG CNECT's Public Services Unit and recognising its current and near future requirements and interests. Taking this into account, therefore, this expert consultation was tasked with being ambitious but also realistic in their thinking as one of the inputs to this debate.

The European Commission also provided a Working/Discussion Paper as background to the Expert Consultation.

1.2. Structure of the report

After this introduction, there are three sections in this report:

- Section 2 provides a summary of the presentations made at the meeting by the European Commission, as background to the subsequent discussions.
- Section 3 provides an overview of the contributions and deliberations undertaken by the consultants, including from the group discussions on three possible research and innovation areas:
    1. Open government setting
    2. Government as a platform
    3. Emerging technologies
- Section 4 provides a synthesis and orientation drawn from and building upon the previous sections as a concluding outcome statement.

Finally, an annex lists all the experts who participated in the Workshop.

2. Summary of presentations

Two brief presentations were made by the European Commission to provide background orientation for, but not to determine, the expert consultation. First, an overview of the eGovernment Action Plan 2016-2020 launched recently, and, second, a brief summary of relevant activities in the current H2020 Work Programme as well as of other related initiatives coordinated by the Public Services Unit.

2.1. eGovernment Action Plan 2016-2020

Many enablers, both technical and non-technical, are already in place, or are being put in place, as a result of the eGovernment Action Plan 2011-2015. Research and innovation should now be focused, at least partially, on services, service delivery and service impacts, in order to

complement the new Action Plan. Thus, an important issue is to what extent, and how, are these enablers being used and with which impacts.

The rationale for the 2016-2020 Action Plan is to promote efficient and effective digital public services as important components of the Digital Single Market, and which together enable cross-border public services. To achieve this, the underlying vision is threefold:

- By 2020, public administrations and public institutions in the European Union should be open, efficient and inclusive, providing borderless, personalised, user-friendly, end-to-end digital public services to all citizens and businesses in the EU.
- Innovative approaches are used to design and deliver better services in line with the needs and demands of citizens and businesses.
- Public administrations use the opportunities offered by the new digital environment to facilitate their interactions with stakeholders.

Initiatives to be launched as part of the Action Plan should observe the following underlying principles:

- Digital by default
- Once only principle
- Inclusiveness and accessibility
- Openness and transparency
- Cross-border by default
- Interoperability by default
- Trustworthiness and Security

The policy framework for the Action Plan rests on the goal of opening up the public sector between public administrations, across Member States and between public administrations and other stakeholders. Three policy priorities make up the framework of pillars:

- Pillar 1: Modernising public administration with ICT, using key digital enablers
- Pillar 2: Enabling cross-border mobility with interoperable digital public services
- Pillar 3: Facilitating digital interaction between administrations and citizens / businesses for high-quality public services, for example which are modular for re-use, user-friendly and personalised, as well as for better policies based on opening up.

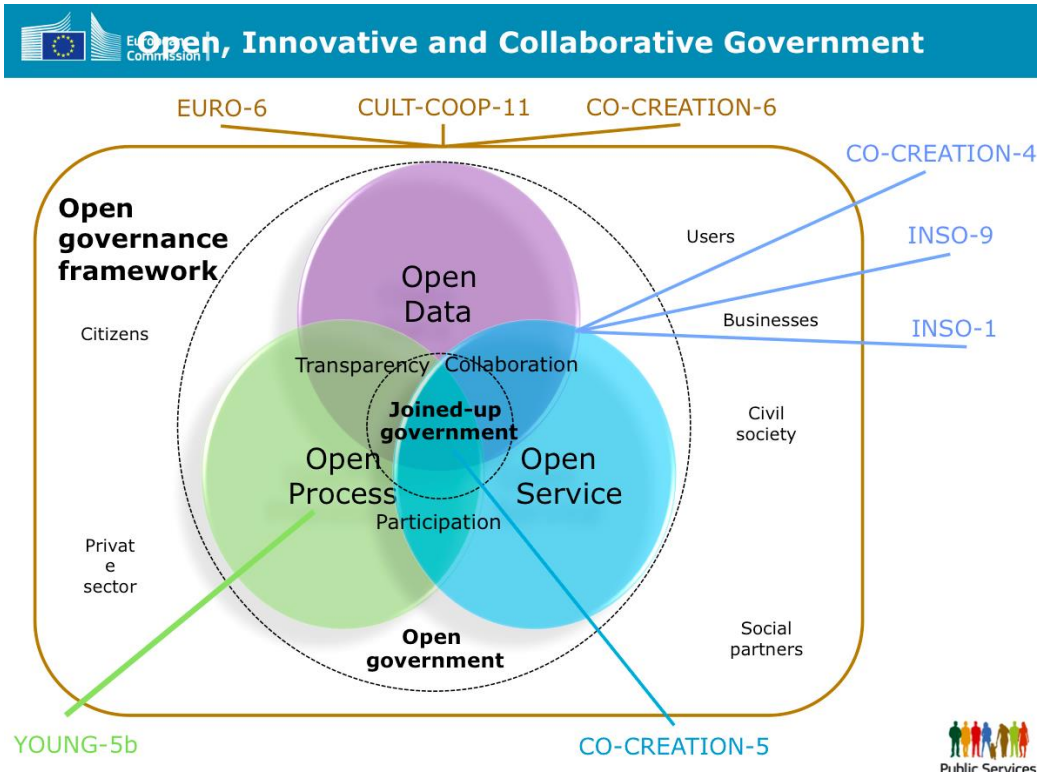
The 2016-2020 Action Plan also contains some new features. In order to remain relevant, up-to-date and to reflect as closely as possible an evolving Europe, flexibility is being built-in to accommodate adjustments over the next five years. The Action Plan is thus seen as a platform and catalyst where new ideas, both for actions in the Action Plan itself as well as elsewhere, can be proposed by Member States or other actors. A monitoring framework is also being introduced to track progress both on individual actions as well as overall using an appropriate mix of indicators.

In support of the dynamic nature of the Action Plan, a stakeholder engagement plan will be put in place, one aim of which is to engage citizen and business interest groups through visits by the European Commission to Member States. It also relies on the use of multipliers, for example the support of other Directorates General through inter-service collaboration and the Regional and Structural Funds. Two related studies are currently being carried out, one on administrative and financial burden reduction for businesses, and the second on open

government enablers, drivers and barriers, as well as on understanding value especially value being created and delivered in different places.

2.2. WP 2014-2017 topics

Societal Challenge 6 (SC6: Europe in a changing world -- inclusive, innovative and reflective societies) is the main vehicle of H2020 supporting eGovernment. The past Work Programmes have been designed around the conceptualisation of an 'open governance framework', as illustrated in the following diagram. This is made up of three components which are open by default, i.e. open data, open service and open process, at the confluence of which is 'joined-up government'. Currently, sixteen eGovernment projects are being supported by H2020 across a number of topics, as shown in the diagram.



The focus of the Public Services Unit is on modelling the public administration in the context of the impact of ICT and other emerging technologies. It does not itself develop new technology but has a strong interest in emerging technologies including those developed in other areas that can be used in the public sector.

3. Overview of contributions and discussions

A *tour de table* gathered each expert's opinions taking the Working Paper as a starting point. An overview of these are grouped below into the following sub-sections in which similar points are combined and summarised:

- Enablers, the back-office and the supply side
- Services, the front-office and the demand side
- Impacts and cross-cutting issues
- Governance issues
- Technical issues
- Application and impact areas
- Group discussions on three possible research and innovation areas.

It is realised that the above categories overlap, as do many of the individual points made, so the grouping is perforce arbitrary and simply deployed as a convenient summarising device.

3.1. Enablers, the back-office and the supply side

Despite recognising that many of the basic enablers are in place or being put in place, this does not mean either that this is the case in all countries or at all levels of government, nor that they are being successfully deployed. The experts point to factors such as the need for a greater focus on business process re-engineering, an architectural restructuring of the whole meaning of the public administration (eGovernment still often reflects only the fast transfer of paper to electronic formats), as well as simplification and innovation in the back-office. An essential component here is to introduce 'standards by design', for example for 'privacy by design', 'inclusion by design', etc., in order to embed minimum performance and quality levels through public service standards and regulations.

What also need to be urgently addressed are soft factors like working culture, a risk averse mindset and resistance to change. As part of this, concerted efforts are required to tap into the potential of civil servants as innovators in their own right who could be very willing to deal with the digitisation challenge given the right incentives and support. A new working environment for civil servants is needed, and there is indeed some evidence that many are ready for this and will be open to appropriate measures. A lot therefore depends on the willingness and knowledge of public administrations and politicians, especially at local level, which in turn requires leadership in digital change, such as is taking place in Estonia, France and some other eGovernment leader countries.

3.2. Services, the front-office and the demand side

The prime focus for future research and innovation efforts should shift decisively towards services, to user-centricity and user-driven approaches, as well as to user benefits. Thus deployment, implementation and societal impacts are key. This requires a 'digital citizen' perspective whilst recognising the continued importance of a multi-channel approach, and greater efforts to reach users on their own terms and to build relationships with them. This can be done both through automatic services that reduce the users' administrative burden (thus continued focus on the 'once only' principle is essential), as well as by deploying highly personal and engaging services where this makes sense.

Where appropriate, public services need to enable people to build on them, through a 'help for self-help' approach. Personal mediators may be needed to underpin this citizen-centric framework, especially where there is a digital divide which remains an important challenge, so that high levels of user-friendliness and increasing digital literacy need to be promoted. Much greater understanding of how citizens actually behave is therefore needed, both in their digital and non-digital lives and how these interrelate. For example, currently Portugal has excellent eGovernment services but with very narrow and low usage, so is also using traditional outreach methods to raise awareness such as a mobile bus and road show. In this context, there needs to be better use of social networks as support mechanisms, and strong emphasis on personalised services down to the individual level.

The use of big and open data is necessary to achieve these aspirations, as is data sharing within the public sector, across borders, with other actors and with individual users themselves. Linking databases between back-office silos is needed to exploit existing data and information which actually helps individuals. In turn, this will also require collaboration on shared services between administrations and with other service providers at multiple levels. Stronger focus is required on how to enable civil society and businesses to co-create and co-design services, for example using open data, given that the demand side is generally weak and that it may not be sufficient simply to make data available. As also outlined below, there are important issues regarding the availability of open data, as well as how and to whom it is made available. For example, big public data sets are being sold in the USA, such as patient data, in support of commercial activities, but also for use by civil non-profit organisations for better outreach, especially to users disadvantaged in some way. The USA is, in fact, the country where most NGOs are using public services to re-develop and re-adapt to support local life, and where many users are prepared to pay for services which in Europe are normally considered as public and paid through taxation.

3.3. Impacts and cross-cutting issues

The next research and innovation programme should focus much more on achieving real impacts in people's lives as well as across society generally. This includes measures of the success of policy-making in achieving public goals, and greater attention to techniques like 'return on investment' and 'social return on investment'. Impacts at the local level need specific focus, especially given that most eGovernment is delivered and experienced locally. Overall, more emphasis on costs and benefits is needed, not just financially but also in terms, for example, of convenience, relationships, social networks, well-being and more fulfilling lives. Many of these impacts are not yet in focus, but citizens especially need to be able to receive, experience and perceive the benefits, and this also involves better understanding of their behaviour. Businesses are generally better served by eGovernment as their focus is more narrowly focused on financial and other 'instrumental' benefits, but also here firms often exhibit different behaviour patterns which are not always readily predictable, so this does require improved understanding.

Much previous research and innovation in the eGovernment area can be wasted when successful initiatives are not followed up. Greater effort is needed to build on and extend successful research and innovation. Generally, it may be necessary to move from experimentation to implementation, or at least to better merge the two in the early stages of innovation to make it easier to achieve impact and extend the life of successful solutions. To

assist this, transdisciplinary research and innovation are needed which also has better representation of stakeholders, such as economists, creative artists and designers. The governance of innovation across society is also being transformed by ICT through better access to data and now very low transaction costs which previously acted as a strong barrier to collaboration.

The generation, presentation, use and analysis of data is a cross-cutting issue as it directly links both back- and front offices, overall governance and technology issues, as well as measurement. What data should citizens give to government and what should they be able to withhold? Certainly, because of national security needs, governments need to know certain things about citizens and businesses, and some of governments' activities must be secret. However, there should be a move to public data being 'open by default', as in Sweden which, even before the use of ICT in government, has had the policy that government must make the case to withhold certain data, and that this can be publically questioned and contested. Thus, an open list of areas where data and information are restricted is made available to promote public discussion, to hold government to account, and to enable legal challenges based on statutory requirements. Open by default provides the data and information required for the 'means to challenge', but what is also needed is the 'right to challenge', for example in relation to regulations and for experimentation. These issues become much more prominent and critical in the age of ICT and big data.

From the government perspective, the increasing importance of data, information and knowledge needs capable staff to handle and improve policy-making capacity, for example how can data best be used by the public sector in an open and transparent manner? There is also a problem of hybrid data, i.e. both paper and digital, making the two compatible, the challenge of legacy systems, as well as management and legal issues. From the user perspective, 'active transparency' around the use of their personal data needs promoting, including the establishment of transparent audit trails to track government's use of individual's data, as in Estonia. How far should users be able to control their own data, and is there a need for greater emphasis on 'smart disclosure' which enables individuals to themselves mash their own personal data with other data held about them both by governments and commercial service providers?

A fundamental issue which requires continuing research and innovation is the need to respect privacy and data protection and to be seen to do so, both in order that government can become more trustworthy and thus trusted, but also to guard against criminality and terrorism. Why is it that citizens seem to trust governments less with their data than they do commercial service providers like supermarkets, Google and Facebook, especially when reflection reveals that consumers themselves become the 'product' when such providers use their data? There is also a continuing tension, and thus the need for continuing research and innovation, between for example the significant efficiency gains arising from the 'once-only' principle if government silos become better at sharing data, on the one hand, and the prospect of a future dystopia in which government knows everything, on the other.

3.4. Governance issues

One main focus area should be the notion of public value in a digital context, broadly defined as the value created by society mediated through governance activities providing services,

laws, regulation and other actions which are, in principle, available to all and which cannot be monopolised by sectional interests. Public value should also reflect public needs and the potential changes digital makes to power and authority, and this also provides a way to better understand public governance.

In this context the role of government is changing, and much of this is mediated and enabled by the use of ICT by government, as well as by the increasing pervasiveness of ICT across all parts of society. Thus, there is a need to re-evaluate the role of government; what is its responsibility is in the digital age, and which other actors have responsibilities in digital governance? Government is becoming a manager of societal assets rather than purely the owner of all of them. It is also becoming an enabler, for example in recognising rights (for example of refugees), making processes clear (for example through design thinking), in home watching of the elderly and patients to keep people at home for longer, etc. There are important ethical considerations here concerning the precise role of government in relation to other actors such as civil society and private enterprises. What is so-called 'good governance' in this context, or 'good enough' governance based on what we should expect as citizens or businesses? One strategy is to use eGovernment to make government more active, another is to make government 'disappear' by providing automatic services in the background. In these and other strategies, collaboration with other stakeholders is important, for example through 'networks for innovation', such as deployed by the MIT in the USA.

Governance is also multi-level, and a big challenge is how to transfer good solutions to all levels. Many good eGovernment solutions exist, but there are many parts of government that are not aware so cannot get the benefits. Especially local level governments have problems given their relative lack of resources and power, but it is also clear that eGovernment is largely offered and experienced at local level, and many large cities are, in fact, already eGovernment leaders. Different levels, like different silos, are needed but must be linked together in order for government to present just one-face to citizens using whole-government, joined-up approaches. What is the role of digital in this and how to succeed over both the short- and the long-term?

3.5. Technical issues

Technical trends and innovations often drive public sector innovation, although governments tend to lag in their adoption and exploitation of technical possibilities. Some trends are starting to become significant but these tend to be in quite specific application areas rather than in changing the fundamental structures of governance. For example, automation is taking off behind the scenes through the creation of base registries, and there are some beginnings in fully implementing the 'once-only' principle based on these registries. Big data is starting to be used in health through eHealth and eCare, as well as in areas like traffic management, but much less so, for example, in education, to support disadvantaged people, or for compliance checking where it has huge potential. Also significantly under exploited is social media and there are steep learning curves for governments in this context. Although these mirror to some extent the learning which companies are also experiencing, government is typically a laggard rather than a leader in social media.

The government culture and mindset often has problems recognising the fact that ICT is, or can be, highly disruptive and will fundamentally transform many existing structures and forms

of collaboration and interaction. The public sector is often intimidated by the continuous stream of new technology always becoming available, so adoption strategies often get overtaken and made out of date before they are completed. There are many potential ways forward, however, for example the use of platform technologies to really transform back-offices and replace government management functions and perhaps completely transform government through blockchain technology; Internet of Things (IoT) for disaster management systems and services; the new cloud initiative across Europe promises a massive storage base exploiting cross border interoperability, also for scientists; and perhaps a 'Google for public administrations' could also be developed across Europe?

3.6. Application and impact areas

As mentioned above, the next research and innovation programme should focus much more on achieving real impacts in people's lives as well as across society generally, and much of this rests on better front-office services offered to citizens and business across a range of specific application areas. In the context of SC6 in H2020, these by and large need to address Europe's main challenges as articulated in the Europe 2020 Strategy and the Juncker Agenda for growth, jobs, fairness and democratic change. They should also reflect the United Nations' Sustainable Development Goals for 2016-2030 to which all European Countries have agreed.

A number of such applications areas were discussed by the experts as possible candidates for some focus, including:

- Support for people in poverty and who are marginalised or vulnerable in society, including refugees, given they typically have multiple needs requiring cross-silo solutions which could be facilitated by both back-office and front-office digital innovations.
- eHealth and eCare solutions, especially through personalised health solutions and remote (tele) care which can become both highly efficient and effective in helping individuals, but also in tackling broader public health issues.
- eMobility, for example through better traffic management including multi-modal solutions, self-driving vehicles, etc.
- Citizen mobility expressed through tourism and leisure where eID modules could be used for instant booking and data mashing.
- Data and information management across the whole of government, which is an old issue but still relevant, for example for refugees in Germany today.
- Schooling, teaching and learning using ICT solutions.
- Priority application areas could also focus on integration, unemployment and well-being.

3.7. Group discussions on three possible research and innovation areas

This sub-section provides an overview of the group discussions on three possible research and innovation areas: open governance setting, government as a platform and emerging technologies.

3.7.1. **Open government setting**

The concept and practice of open government has many perspectives, summarised in the present context by the open governance framework diagram in section 2.2. This depicts the intersection of three components: open data, open service and open process, where each of these is open by default. Experts focused on a number of issues, mainly related to the implications of open government accepting these three components and their relationships as a useful conceptual and operational framework.

Open data is seen as essential for facilitating co-creation, but the barrier is that for many users this is a blackbox requiring new capacities, skills and incentives, so government needs to provide much more support and many more incentives. As noted above, smart disclosure could be a useful way forward so needs much greater emphasis as it strives to enable the user to mash their own personal and private data together with those of one or more service providers, including commercial services from the private sector. This is starting to be an important feature in both the USA and UK, for example in the utilities sector, such as energy, water and gas, as well as mobile phone usage. In both countries, the government provides an appropriate regulatory framework and works with the service providers (which can be other parts of government) to make it as easy as possible for users to see their own consumption patterns, for example via a personal dashboard, and thereby adjust future consumption. The aim is to assist users in reducing waste or over-use and to take account of often highly complex tariffs and service charges from typically multiple potential providers. Users need as much support and advice as possible, but although most examples are still only pilots, they seem to hold much potential for users to take more control of their service use. In this context, however, there are serious issues around transparency in terms of who is seeing and using whose data and whether or not the data owners can correct it? For example, can technical solutions be developed which incorporate privacy by design?

As with open data, there is also a demand-side weakness challenging open services with their generally low or weak take-up, so again incentives, user-friendliness and high impact need to be prioritised. Another important strategy should be to focus strongly on accelerating the development of highly personalised services rather than one-size-fits-all common services. The use of alerts, invitations, prompts, as well as typical life events, user profiles and locations, are all steps towards full personalisation. New forms of interaction need to be devised which draw the user into a co-creative and collaborative relationship, for example in specially designed public spaces and hubs, as well as by deploying living labs methods. Personalisation means departing from the average, so it must be accompanied by minimum, but still high, quality standards. Many services also need to be universally available to all in the target group, given that government cannot say no to a legitimate user, unlike a commercial service provider. This may cause problems when services are outsourced to commercial and other non-public providers, so marketization and who pays also become issues.

In terms of open process, again there is a demand side deficit that needs to be addressed by incentives, simplification and personalisation. There are also issues of the sustainability and adaptability of open processes and economies of scale and scope to ensure that it is efficient as well as effective. Involving all citizens in determining public spending, for example through participatory budgeting, is often a useful approach. Overall, the challenges of open government are immense, technically, organisationally and legally. For example, shared

services will only fully work with semantic interoperability across silos, between levels, cross-border and between service providers whether or not from the public sector. What is the extent to which state-of-the-art solutions from elsewhere should be used, how much should be developed and tailored in-house (which can be much more expensive), and how can governments at the same time prepare for the impact of emerging technologies?

3.7.2. **Government as a platform**

Government as a platform implies perceiving and equipping government to facilitate and assist other actors to use and (co)-create government data, services, assets, etc., for their own legitimate purposes as well as contributing directly to public value. Government, as an actor, does not have a monopoly on creating public value, but supporting others to do so is an important new role for government. In practice this implies that government is seen as a service, not simply as a service provider, particularly in the cloud, for example by enabling the automatic discovery of services. Similarly, government (or at least many parts of it) can be perceived as being an open source creation, perhaps with Linux as an analogy.

Government as a platform also means the provision of building block modules for services, for participation as well as for broader engagement in the processes of government. Examples could include modules for analyzing anonymised and authentication services like Eiol (European Infrastructure for Open Learning). The government platform should be both a virtual and physical meeting place and exploration space for innovation, co-creation and the development of public value in a variety of forms. This should be made available to all other actors, including civil organisations, private companies as well as to citizens.

The best current examples of government as a platform are probably so-called smart cities where digital infrastructures, services and resources interact closely with real people, physical activities and the cityscape as a whole. Such cities are leaders in facilitating co-creation and using open data, often driven by inspired mayors and a political class, but also by innovative start-ups, SMEs, social entrepreneurs and citizen groups.

3.7.3. **Emerging technologies**

As noted above, government is typically one of the largest single users of ICT and other new technologies, but also often the most hesitant. There are arguably understandable explanations for this, but it is also clear that, sooner or later, governments will wish or need to avail of new and emerging technologies. This is not least in order to save resources and become more efficient, but also because the demands on governments for new and better services of all types is growing, including from the Internet generation.

The main emerging technologies which are having, and are likely to have in the future, significant impacts on the way governments are organised and operated, as well as on how governments are perceived and used, were noted by the experts to include:

- Blockchain technology as decentralised databases, e.g. for legitimation, registers, participatory decision-making, automatic taxation, social security, counteracting fraud and corruption, fighting crime, etc.
- The convergence/merging of physical, digital and biological systems: digital fabrication including 3D printing, future of cities/communities, health, agriculture and food, etc.

- Geo-enabled service delivery and geo-related information: for example on ownership, activities, functions, history, etc., for tourism, traffic and business.
- IoT: traffic management, public transport, environmental monitoring, disaster forecasting and management, digital footprint and event monitoring, etc.
- Big data, for example for public sector resource planning and real time management based on real time and archived data, for use by the police, hospitals, fire services, the selection of politicians, staff recruitment by algorithm, etc.
- Artificial intelligence and semantic computing, such as in personal assistance technology, decision support, expert systems, quality management, process and mediation design and monitoring, etc.
- Drones for post, surveillance, climate, environment, the delivery of equipment and supplies, etc.
- Robotics, for care, health, elderly and frail people, cleaning and maintenance, as well as component assembly (including components from digital fabrication)
- Virtual reality, for education, training, meetings, negotiations, remote interventions, etc.

The side effects, risks, shortcomings, unanticipated and even negative consequences of emerging technologies also need to be examined, including social impacts, ethical concerns, uncertainty and lack of transparency of what is happening and who is in control, etc. Trust and transparency are thus important implications as algorithms can become impenetrable blackboxes. Careful and comprehensive technology impact assessments will need to be undertaken concerning such effects, including in relation to security and crime.

4. Orientation and synthesis

4.1. Introduction, context and rationale

Back-office arrangements and continuing efforts on enablers are required to meet and support on-going research and innovation goals, but as a means to the ends of societal impact and the overall strategic goals. However, the major research and innovation focus for the future needs to shift more towards digital services, front-office arrangements and impacts on society, in order to meet the Europe 2020 Strategic goals in tackling the major societal challenges. The innovative use of ICT, and particularly the emerging technologies underpinned by ICT, constitutes important game changers in addressing these challenges. Indeed this is inherent in the 'open governance framework' (see diagram in section 2.2) which is recommended to continue to be the overarching conceptual and operational approach of on-going research and innovation, but re-orientated to take account of new challenges, perspectives and technologies to 2020 and beyond. Similarly, the three proposed research and innovation areas, outlined above, have been validated during the Expert Consultation and are thus recommended as key pillars of the next ICT-enabled public sector innovation research and innovation programme which in turn will contribute to thinking and initiatives beyond 2020.

In this orientation and synthesis section, therefore, each of the three research and innovation areas is further analysed and developed to provide an input to the final decisions Member States supported by the European Commission will need to make. Finally, a short reflection

and conclusion will attempt to summarise some of these deliberations and to put them into the wider context.

4.2. Open government setting

As a summary of the expert consultation workshop outcomes, the open government setting research and innovation area examines open data, open service and open process, within an overarching open governance framework, where each of these three components is open by default. It recognises that, given that government cannot address societal problems on its own, it needs to collaborate openly, transparently and participatively using ICT, both within and across the public sector and with all legitimate external actors. We need greater understanding of how shared services (across government and with non-government actors) can be developed through co-creation, and rolled out in order to improve take-up, personalisation and impact. Standards are required for this, open by default, not only in technical terms such as semantic interoperability, but also to support quality of service standards to ensure universality and cross-border applicability where appropriate, for example through procurement, planning and decision-making. It is not clear how these objectives can be achieved and what specific roles the government should play as compared to the other actors, particularly in the digital context. How to ensure that privacy and security issues are adequately taken into account also needs careful research and innovation.

4.2.1. **Open data: sharing, collaboration and co-creation**

Although there can be significant challenges to an open governance framework approach (see for example in section 3.7.1), it is clear that the public sector can become much more efficient and effective if all parts of it share and pool their data and other assets which each needs. For example, public administrations could share data and employ data analytics to compare and identify similar locations, user groups and/or services through analysing socio-demographics and service use and impact. Government clouds, whether public, private or hybrid, could facilitate this. This will enable each public administration, or groups of them, to take an evolutionary approach to learning and building good practices, what works and what doesn't through shared policy modelling. They will be able to compare, rank and simulate between similar contexts and/or through similar strategies. This might also cover, for example, common service lists, common processes and interactions, shared metadata standards and shared business models. Different parts of the public sector will also be able to collaborate in presenting a common and joined-up face to users and other external actors.

There are already good examples, like the ESD (Effective Service Delivery) network[1] which has a membership of over 23,000 local agencies and authorities in the UK and has developed a range of toolkits and shared services for collaborative working and for evidence-based improvements of locally delivered services. It now has partners across Europe and is fast becoming a new standard for local e-government business models. The ESD network enables local authorities to develop locally relevant services whilst sharing building blocks of functionalities and service types with each other where there are common needs, thereby saving effort and resources. Further, in October 2010, a bottom-up initiative by a number of European local governments launched a pan-European 'Citadel Statement' and the 'Citadel on

[1] http://www.esd.org.uk/esdtoolkit/Communities/DigitalInclusion/ContentView.aspx?ContentType=Content-455

the move' initiative[2], designed to help local governments deliver on the key objectives of the European Malmö 2009 "Ministerial eGovernment Declaration"[3]. The statement covers: common architecture, shared services and standards; open data, transparency and personal rights; citizen participation and involvement; privacy and identification of individuals; and rural inclusion. The European Commission has also launched 'JoinUp'[4] as a collaborative pan-European platform offering services that aim to help e-government professionals share their experience with each other and which also aims to support them find, choose, re-use, develop and implement interoperability solutions.

In addition to sharing data and other assets across government, some countries are starting to make much of their data available publically as so-called open government data (OGD). To date there is still only a limited number of governments which have substantially embarked down this path, and even fewer local and regional governments where the benefits are likely to be greater. In order to maximise the benefits of OGD, it normally needs to be suitably aggregated so individual persons or organisations cannot be identified, and to make this available in machine readable linked datasets which can also be searched, analysed and mashed with other data. Standards for data, quality, licensing, structuring, linking, searching, etc., need to be developed as well as standard tool modules for compiling, analysing and visualisation, with appropriate cloud and other systems to provide the underlying infrastructure and services both across government and between different actors.

At least seven sources of big data (whether real time or archived) can be discerned which can be mixed and mashed with OGD for governments and other actors to create public value:

- ODG itself: data routinely collected by the public sector, whether for administrative, service or public policy purposes
- Physical environmental data: for example from sensors and actuators located in different places
- Data from citizens, for example from social networks such as Facebook: interactions and the social signals and advice which people pass to each other
- Co-production platforms: such as Wikipedia: with the specific purpose of co-producing new knowledge and content
- Crowdsourced data: human input data of different types, including facts, evidence, preferences, opinions, sentiment analysis, data scraped from the web, etc., which can be used in multiple ways.
- Businesses can also be sources of potentially valuable big data for public value, and there can be benefits in mixing such data together and adding data contributed by communities and individuals through for example crowdsourcing.
- Data 'scraped' from the web (automatically extracted from websites), are also sources, including from controversial sources like WikiLeaks.

Europe took an early lead in recognising the potential public value of OGD coupled with other big data, for example in 2003 with the EU Directive on the re-use of public sector information[5] which *inter alia* estimated that there would be an increase in direct business activity up to €40

[2] http://www.citadelonthemove.eu
[3] https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/ministerial-declaration-on-egovernment-malmo.pdf
[4] https://joinup.ec.europa.eu/homepage
[5] http://ec.europa.eu/digital-agenda/en/european-legislation-reuse-public-sector-information

billion per year, plus indirect effects up to €200 billion per year, or 1.7% of GDP. This was followed up in 2011 in Europe's Digital Agenda initiative called "turning government data into gold"[6] and the European Union's own Open Data Portal[7]. As one of the global leaders, the UK provides an interesting example of how the benefits of OGD also typically require a mindset change in the public sector. The Ordnance Survey (OS) has been the UK's premier and still official map maker for over 300 years, and for the last 30 years its main income has come from selling maps on paper and more recently digitally. In early 2011 it was told by government that it must release its data free of charge to the public, awakening great resistance in the organization worried about the consequences on its future financial sustainability. However, within 12 months the OS was generating more income than before given that both businesses and non-profits wish to hire it and partner with it when developing new services. The OS remains, after all, the premier UK expert in collecting, analysing, tailoring, visualising and publishing geospatial data. The OS today sells this expertise rather than the raw data and has, by default, created a new business model around data with clear economic value. Its data is now also used free of charge by many NGOs, charities and social enterprises to support disadvantaged groups in society through better real time targeting.

Other impacts include in Spain, where over 150 companies have already been established based on OGD, whilst a recent Finnish study shows that firms in countries in which public agencies provide basic geographical information, either freely or at marginal cost, have grown on average about 15 percent more per annum than those in countries in which public sector geographical information is priced according to the cost-recovery principle. Another study reports that, when effectively deployed, an open data platform delivers at least a tenfold return on investment. In the beginning, the largest contributors to this return are in cost savings and internal efficiency gains but that this then starts to impact the wider economy. (United Nations 2014). An examination of the studies and sources mentioned indicates that the most productive OGD data sets for growth and jobs are:

- Geospatial (map) data of all kinds
- Weather data
- Environmental data
- Traffic data including timetables
- Crime data
- Base registries like business registers, population, land, real estate, vehicles

However, in comparison with the private sector, the public sector may have specific requirements and responsibility in relation to the provenance, integrity, auditability, authenticity and transparency of the data. There are always issues about data quality and representativeness (for example some crowdsourced data may lead to spurious analytics unless it is balanced by accessing inputs on a sufficient scale and representativeness across the target population), and deliberate or accidental data misuse can occur in the same way as statistics can be misused. On the other hand, releasing incomplete and/or inaccurate data is also a way of improving its quality as users can both correct and enhance it. Over ambitious focus on data completeness and quality should not be used as an excuse not to release public data, as long as this is accompanied by full openness about provenance, methods of collection and guidance about use.

[6] http://europa.eu/rapid/press-release_IP-11-1524_en.htm
[7] https://open-data.europa.eu/en/data/

As described above, different parts of the public sector possess different resources and competences, for example between 'smart cities' and the smaller (often more rural) communities, so support and sharing become important. Similarly, different roles can be played by different levels of government to exploit top-down and bottom-up synergies through federated arrangements for data and knowledge. For example, the top (both at national and European level) should provide federated meta data, registries, standards for sharing and linking, common licensing, shared vocabularies, specialist expertise, etc. The bottom (regional and local authorities) should create, maintain and exploit data sets and act as an 'authentic source' which is also responsible for the maintenance needed to sustain the data set. Overall, the conclusion is that when implemented well, OGD "tracks taxpayers money and provides tools to hold government accountable, increases data quality, improves data collection and maintenance, facilitates data sharing between entities, increases internal efficiencies, and short-term costs are outweighed by long-term benefits." (United Nations 2014)

As noted above, citizens also collectively generate an enormous amount of economically valuable data through interactions with companies and government. Such data is a public sector asset, but the value created does not always go to the benefit of the individual, particularly when third parties (whether governments, businesses or civil organisations) collect and keep it closed. Smart disclosure is a tool that helps provide people with greater access to the information they need to make their own informed choices, for example in health care, education, employment, etc. Traditional open government data focuses on transparency, accountability and decreasing corruption in government. The smart disclosure approach is a step on from this and starts from the premise that people, when given access to data and useful decision tools built for example by governments, can use both their own personal data disclosed by them together with other appropriate data. This can be used to make decisions about their own lives, such as healthcare choices, as well as to self-regulate and be able to hold governments and other actors to account, as well as to cooperate and engage with them.

4.2.2. **Open service: mass customisation and design thinking**

Public services delivered or enabled by ICT need to focus increasingly on user empowerment and creating public value for the user as well as the wider society. One of the main drivers is the trend of mass personalisation for individuals, although a better term is arguably 'mass customisation' as this, in principle, envisages that every service, product, facility, piece of content, etc., is tailored precisely to fit a very specific customer or recipient need, whether individuals, groups, places, etc. One of the main benefits of this, apart from being offered a precisely designed service or product, is that all non-relevant information, processes and materials are stripped away thus making the service as simple as possible.

The notion of mass customisation originally came from Joe Pine (1992) in his observation and prediction that, whilst the 20th Century was in economic terms the era of mass production starting with Henry Ford and the innovation of the production line turning out standardised products within increasingly large top-down organisations, the 21st Century would flip this concept on its head and become the era of mass customisation. Products and even services would only be created once individual customers had decided what they want and placed their order, so there would be no need for large inventory holdings and this would release capital to

cut costs and innovate. All this could only be achieved by using ICT to knit together the value chains in super-fast time so as not to keep customers waiting. The first significant demonstration of this was Dell Computers, established in 1984, which developed an innovative business model termed 'build to order' based on the idea of the 'cash transfer cycle'. This means Dell gets paid upfront by the customer to put together a more or less unique order largely designed by that customer. This is a win-win for all. Dell gets free working capital (one estimate says it gets 32 days to play with customers' money before it has to pay its suppliers – Pine, 2013), and it has no capital tied up in inventory. The customer gets a machine within a matter of weeks perfectly designed to his/her own specification. All this is carried out in smaller, flatter or at least more networked organisations.

Although mass production remains the dominant business model, mass customisation is gaining ground enabled by ICT across an increasing number of sectors and for both products and services. The main challenge is not the technology but organisational adaptability and the mindset that needs to drive this. Joe Pine famously said "customers don't want choice – they want exactly what they want". (Reported in Pine 2013). Seemingly a flippant statement, this is in fact very profound. Of course most customers do not immediately know "exactly what they want". However, this implies that, rather than give them a choice of a few standard off-the-shelf goods or services so they have to confirm to something pre-determined, the producer should enter into an on-going conversation and dialogue with the user to determine and agree what is needed to precisely meet their specific and typically unique requirements. And, when products are leased rather than purchased, this allows them to be adapted in near-real time as the user's needs change, something hardly possible when the user fully owns the product and the producer has no further interest or responsibility for it. In principle, these new business models apply just as much to public services as to computers, and perhaps more so given the multifarious and interrelated needs of each individual across a range of service areas.

According to Millard (2011) mass customisation in public services supported or driven by ICT can result in three types of service as we presently see it. First, ICT can enable government to observe and analyse societal developments right down to individual behaviour using the vast amount of data available to it. Second, citizens or businesses, either individually or in communities, groups or localities, as well as through intermediaries of various types, can be empowered to select or create their own services. Users are likely to be expert in what their problems are as only they possess the fine grained knowledge about what they really need. The third type of service approach enabled by ICT is the emergence of 'everyday' and location-driven services, based largely on mobile smart phones using GPS, although web-based services are also relevant. Such services are offered or created depending on where users are, as well as who they are and what they are doing, and can respond and customise the service in real time. These different service approaches also represent different combinations of push and pull services for mass customisation, i.e. government pushing services to individuals it knows, or think it knows, they want, and/or empowered users pulling services they know, or think they know, they want.

An interesting example of where both push and pull are combined is the Taiwan "e-housekeeper" approach (Linders & Wang, 2013). Here, the responsible public authority pushes services and service combinations to users knowing who they are, whilst users can also pull from a list of a possible 203 services, such as related to employment, getting married, paying taxes, healthcare, etc., after which they are notified by service updates, information, requests,

etc. This takes place mainly on a local level, so both push and pull are largely location-driven and interfaced through an individual's 'life dashboard' and 'life map', also to mobile devices.

Another main driver of open service is the incorporation of behavioural approaches and design thinking into creating, delivering and using services. First, it is important to recognise that users are already dramatically changing their behaviour when accessing and using e-government services. The evolutionary approach to making such services available has been the abandonment of 'many stops' and a move to the 'one stop shop' (typically rather complex) navigation portal, which now dominates. However, studies and early experience show that, rather than using sophisticated navigation, people are increasingly deploying advanced search tools with autocomplete and predictive search results to get direct to the service they want in one or at most two clicks, as for example in Singapore's e-Citizen port[8]. In other words, users are finding and accessing services (whether commercial, personal or public) by sophisticated online search and hardly using expensive government portals. Ben Terrett, Head of Design at the Government Digital Service, in the Cabinet Office for the UK Government, stated that only 15% of UK eGovernment users came through the Direct.Gov portal (now replaced) with most of the others using search engines to get direct to the service they need[9]. In response, governments also need to change their behaviour and improve the quality and impact of e-services, for example by exploiting the full advantages of cloud-based (often co-created) services, big data flowing through all the internets, data analytics, plus social media and mobile. As shown above, a few governments are now moving to the concept of customised push/pull services in and from the cloud. As one of the leaders, the UK provides an early example of such strategies based on a 'whoever, wherever, whenever you are' approach, implemented through, first an alpha and later a beta version of their new portal, both of which were fully open to public scrutiny, and finally fully launched in the summer of 2013[10].

An important and powerful new component of these approaches is the application of 'design thinking' to both traditional and e-services, which is already being adopted in a number of countries. Design-led innovation in government is a holistic approach that attempts to understand the 'full architecture of a problem' from end-to-end. It is neither a wholly new concept and set of methods and tools, nor is it yet a well-established and widespread discipline. Instead it is an evolving and experiential practice pushing the boundaries, learning, experimenting and applying successful approaches as it develops. A number of theorists and practitioners see design thinking as a paradigm shift away from traditional top-down, expert- and often technology-driven service design traditions. Instead, design thinking has become centred around a number of tenets such as the need to constantly challenge the status quo, see everything as an experiment, value the target beneficiary (the citizen or business in the public service context), and the paramount need to be concrete and practice-based. In this context, a growing repertoire of techniques is evolving and being applied in practice, including those borrowed from the ethnographic and anthropological traditions, plus observation (shadowing), contextual dialogue and interview, retrospective review, cultural probing, creative ideation processes, and the visualization and modeling of service prototypes. (Bason, 2010)

[8] www.ecitizen.gov.sg
[9] :http://digital.cabinetoffice.gov.uk/2012/01/19/designing-govuk/
[10] www.gov.uk

Apart from the UK, other countries are also experimenting with design thinking and related approaches for e-services. For example, in the Finnish strategic design approach to public services like health, education and social services[11], and Singapore's Design Thinking Unit, in the Prime Minister's Public Services Division. In principle, all relevant aspects of a user's approach to and use of a service are taken into account in design thinking, for example by the Danish government's Innovation Unit, MindLab[12] where most of the above techniques are deployed[13]. Two of the main techniques employed are building 'personas' as rich archetypal descriptions of specific users that enables a deep understanding of the service demand side, and developing 'service journeys' as a visual map of the individual's actual service interactions over time allowing a clear understanding of the supply side. Matching relevant personas with the corresponding service journey can be a powerful basis for analysing what actually happens and for designing something better. Design thinking can be applied across all channels, including electronic and mobile services. To give an idea of impact, the UK's new eGovernment portal recently won a prestigious design award, normally focused on industrial design, based on such principles[14].

There are also several complementary approaches to design thinking which overlap and are likewise starting to have an impact on service creation, design and use. First, the so-called 'nudge' approach which recognises that, although traditional attempts to change behaviour by regulation are of course important, they just as often fail and may even provoke opposite responses (Thaler and Sunstein 2008). Nudge theory focuses on changing peoples' behaviour without binding regulation or legislation, and has done so with some success. It directly uses the insight that a very powerful influence on an individual's behaviour is linking this to what other people are doing. Nudge theory thus recognises the power of social networks and social norms in behavior patterns. At base, nudge attempts to observe and map how people make their choices and then test small changes in the way choices are presented to them. In this way, people are nudged into leading better lives by reconstructing their 'choice architecture'.

A second complementary approach is 'scarcity' design which proposes developing customised systems around people, especially those with serious shortages of financial and time resources and who thus are often vulnerable individuals in poverty. These systems should be designed to make their lives as easy and as simple as possible so they can focus on solving their own problems of scarcity rather than grappling with a complex system (Mullainathan and Shafir 2013). This approach often involves creating a customized 'cockpit' of information, controls and supports which typically need ICT for coordination and may also become a 'platform' or 'dashboard' if ICT is deployed as the user interface. A well-designed cockpit aims to provide the user with increased mental 'slack', by freeing up their otherwise limited 'cognitive capacity', to make it easier for them to juggle the whole range of public and other services they need, such as education, health, childcare, employment support, paying bills and often simply ordering their daily lives. Mullainathan and Shafir (2013) stress that the vast majority of individuals possess very similar levels of cognitive capacity, both those with plentiful financial and/or time resources and those with few, and that the former if suddenly placed in a situation of serious scarcity perform in the same way as the latter. In other words, most people in poverty are poor not because they are irresponsible or lazy, but because they are frequently

[11] Sitra, the Finnish Innovation Fund: http://www.sitra.fi/en
[12] http://www.mind-lab.dk/en
[13] http://www.ssireview.org/articles/entry/design_led_innovation_in_government
[14] http://designmuseum.org/exhibitions/2013/designs-of-the-year-2013

placed in situations where they need to make decisions in order to survive on a daily or weekly basis regardless of the longer term consequences. Most individuals, both rich and poor, once in poverty will find themselves trapped in a vicious circle with little chance of escape. This research and innovation has very profound implications for public policy and how government should design systems of services and other supports for people in situations of scarcity.

4.2.3. **Open process: touching the whole public sector**

Open process is an important component of the open governance framework in which all legitimate actors are invited to participate in the decisions and policies of government as long as this engagement is itself open and enhances public value. Most research and practice over the last ten years has focused on e-participation as the use of ICT for citizen involvement in political decisions and public policy making at both local and national levels, as well as on the possibilities of e-voting. However, this is a rather narrow view of involving people in the activities of government, being mainly related to e-democracy, i.e. enhancing the democratic process using ICT. Results have so far been mixed and perhaps disappointing overall given the high expectations of even just five years ago. Ironically, this has perhaps led to reduced enthusiasm for e-participation funding at the very time that technology advances in areas like social media and mobile started to overcome the obstacles. It is also now more apparent that the ICT-enabled public sector allows a much wider vision of open process which, in addition to participation in public decision making as part of the overall democratic process, it also encompasses inputs to the processes, workings and arrangements of the public sector and public governance more widely; planning and development issues (for example through participative budgeting and where scarce resources are allocated); dispute and conflict resolution; and in managing societal assets, including data, land and buildings.

An increasing amount of good practice demonstrates that such open relationships between government and citizens is most successful when applied in a joined-up manner across some or all of the above areas and government functions (education, health, transport, law and order, care, environment, etc.), and when intimately integrated with and complementary to non-digital engagement methods. Although most success is still mainly at local and regional level, the evidence shows that open process works best when it becomes a seamless part of a government's broader policy of openness, transparency and collaboration. It should be continuously woven into a citizen's experience of the public sector, built into the fabric of all aspects of the way in which he or she interacts with the authority.

Recent examples include crowdsourcing legislation such as the new Icelandic constitution; the city of Hamburg's transparency law created by citizens/civil initiatives using a public wiki and then adopted by government; and the BundesGIT where all federal laws in Germany are being made available on an open source (code) platform in machine readable format so they can be widely developed by experts as well as citizens leading to legal amendments and new versions. The issue here is does such crowdsourced legislation really lead to better law as well as higher acceptance? Does it improve trust and support anti-corruption and better accountability? Research by the World Bank (2013) provides evidence from a number of examples. A new e-service called *Streetmix*[15] is helping to empower citizens by enabling them to become architects with an easy-to-use street-building platform. Developed by Code for America, the

[15] www.streetmix.net.

site greets users with a colourful representation of a typical street, split into segments of varying widths. Citizens, as designers, can then swap and change each piece into roads, cycle paths, pedestrian areas, bus stops, and other amenities. Citizens can create their own perfect high street or use the exact measurements of their own neighbourhood to come up with new propositions for planned construction work. The Kansas City's Bike Walk KC[16] has utilized the platform to show how new bike lanes could figure in an upcoming study of traffic flow in the region. New Zealand's Transport Blog has presented several alternatives to current street layouts in Auckland[17]. Streetmix's easy-to-use visualization tools help amateurs present their ideas to local authorities in a more coherent way, potentially increasing the chances of politicians hearing calls for change.

In Brazil, *Rio+*[18] is a platform where any citizen can create a project for Rio de Janeiro, to any scope provided it will improve the city. Presently, it has a huge range of ideas listed, from mobile apps to tunnels connecting areas of the city. Rio+ is easy to use, with projects split into categories and not too many details required for each listing. Just enter the idea and go! Once listed, *Benfeitoria*, along with partner organizations, will initiate a feasibility study, selecting the best ideas and identifying resources and partners needed to make it happen. The remaining projects then go to the jury (i.e. they'll be voted for online and by the City of Rio) where people can decide on the best design in each category. Once the winners are chosen, the City is responsible for realising each of the projects, after which they will be monitored so that the impact can be measured, and in the future some may become public policy and be expanded. Singapore's *REACH* project (reaching everyone for active citizenry @ home) is an initiative of the Singapore government, which encourages and promotes public participation in shaping government policies. The government provides a wide variety of traditional and new media channels for citizens who are interested in engaging with the government, such as public forums, dialogue sessions, SMS, telephone, email, Facebook and Twitter. The three key roles of REACH are: gather and gauge sentiments on the ground; reach out and engage citizens; and promote active citizenship through citizen participation and involvement[19].

Kibera in Nairobi, Kenya, is one of the largest slums in Africa. Independent of the city authorities, a team of social activists started to develop the Map Kibera community information project in October 2009 as an interactive grassroots map. This appears to be the first ever comprehensive multifunctional interactive community map (ICM), and took place in a developing country, perhaps because acute need drives the people involved to innovate in entirely new ways which could be termed an example of inclusive or frugal innovation. Although many civil organisations and international development organisations had been present and active in Kibera for many years, it had largely remained a blank spot on the map. This lack of openly available geospatial data and other public sources of information about the slum led a group of social activists to create Map Kibera. The underlying idea is that without basic geospatial knowledge, it is impossible to conduct an informed discussion on how life conditions in Kibera can be improved. The Map Kibera team demonstrated that the provision of such information rapidly facilitated better coordination, planning, and advocacy efforts within the community, and between the community and the government. In the first stage of its operation, the Map Kibera team recruited volunteer community mappers who reside in

[16] http://bikewalkkc.org
[17] http://transportblog.co.nz/tag/auckland-transport/
[18] http://riomais.benfeitoria.com
[19] www.reach.gov.sg

Kibera to map “points of interest” in the slum, using simple GPS devices and uploading the collected data to OSM. The mappers collected data about the location of clinics, toilets, water points, places of worship, and more. On top of this basic geospatial information, the mappers added a “storytelling” layer, capturing personal accounts, stories, and news of Kibera residents. As part of the second stage, Map Kibera deepened its coverage of life conditions in the community, and collected more contextualized information in the areas of health, security, education, and water/sanitation. At this stage the city authorities saw the importance of what was happening and started to use the map and to cooperate with residents for further enhancement. The Map Kibera team also introduced the Voice of Kibera website—an online news and information-sharing platform for the Kibera community. (World Bank 2012)

Because open process is a relatively new concept, especially as enabled by ICT, a good approach for government and other actors is to make many small experiments with existing tools. This is much better than a few big initiatives which if they fail waste resources and reduce motivation. It relates to the need for bottom-up, user-driven engagement. For example, what are the drivers and incentives for citizens to engage in open process? Immediate feedback to citizens from government might be an incentive to get citizens more engaged but there are likely to be others. Design thinking could also be deployed in this context.

4.3. Government as a platform

To summarise the expert consultation workshop deliberations, the government as a platform research and innovation area can be seen, in one manifestation, as an open source service platform in the cloud providing government services, data and enablers as building blocks. This needs a concerted research and innovation effort, as it promises significant increases in both efficiency and effectiveness. Research and innovation need to examine both digital and non-digital platforms, as well as their inter-relationships, to support the creation of public value through co-creation with other actors, so better understanding is needed as to how government can adapt its roles as facilitator and orchestrator, to provide appropriate tools and supports including big open and linked data (BOLD), to better manage assets, and to ensure sustainability and balanced public value. Experience has shown that it is often at city level that governments are successfully experimenting with these new roles especially enabled by ICT, so research and innovation need to examine how such practices can become more widespread at a variety of governance levels and across different national, political and cultural contexts. Again, taking due account of privacy and security issues needs focused research and innovation.

As demonstrated above and although the public sector can in principle create public value on its own, its potential to do so is greatly enhanced and extended by direct cooperation with other actors, especially citizens and businesses, or by facilitating public value creation by other actors on their own. In other words, the public sector does not have a monopoly on public value creation, but it does have in most situations the prime role in ensuring that public value is created. Existing and new ICT is transforming the ability of government to act in these ways. This also demands that the public sector adapts its roles and relationships to address both the global challenges it and society faces as well as to cooperate more extensively and deeply with other actors.

To achieve this, the public sector needs to start acting as a broad open collaboration platform supported by ICT, at least for some of its functions. In this context a 'platform' means an open environment and ecosystem with clear frameworks, guidelines, resources and supports which invites all actors to collaborate in producing public value as well as value which directly benefits the actors individually. These actors include citizens, communities, civil society organisations, groups and individuals, companies and SMEs, as well as hackers, designers and artists. This is already happening in some places, for example the San Francisco City government is one of the leading proponents of government as a platform, promoting 'government as a launch pad' in its 'a start-up called government' initiative (San Francisco 2013). To enable this collaboration to happen, the government should pool and share its infrastructures and processes. It should encourage collaborative use through hackathons, discussion fora, blogs, consultation, support and advice, brokerage, good practices, arbitration, workshops, events, etc. It should provide standardised modules for basic functionalities which are cross institutional so that external actors do not have to contend with unnecessary differences, but which can easily be used, re-used and combined in new ways to address specific needs.

By providing this enabling platform, government can support a range of actors to collaborate with each other, as well as with government itself, to generate public value. Using ICT, groups can easily and freely form, cooperate, act and dissolve: the platforms are free and the costs are essentially zero. Citizens, communities, civil groups, as well as businesses, are themselves changing from passive consumers of data and knowledge to active producers, i.e. to become 'pro-sumers', both producers and consumers, of digital content. For example, citizens share more and more with each other on social media platforms and tend to consult other citizens, rather than the government for advice – they increasingly use the 'social signal' and 'social search' to organise and improve their lives. A similar trend is now also being seen in the physical world, where the rapidly growing 'makers movement' sees people exchanging, adapting and personalising digital designs for the fabrication of physical objects, often as unique bespoke products for highly specialised purposes, using 3D-printers and related equipment (Anderson 2012). Government thus needs to recognise the value of collaboration and crowdsourcing which citizens and others can contribute as 'co-creators'. Although government should mobilise its own resources and talent better, there is always more relevant talent outside any organisation (including government) than inside. Just as a new vision in business sees everyone as (in part) an enterprise, part of the new vision in government sees everyone potentially as a resource with assets to contribute in creating public value.

The public sector as a platform facilitating public value creation in the most efficient and effective way possible will support an ecosystem of actors with changing roles and relationships. There are already numerous examples, including where other actors have 'usurped' the erstwhile role of government using ICT. For example, 'Fix-My-Street' in the UK developed by the civil society organisation MySociety not by government[20]; noise measurement around Amsterdam Airport in the Netherlands undertaken by residents in the flight path[21]; Microsoft's 'health vault' storing citizens' health records in the cloud[22]; and the website 'Patients know best' which is a service provided by a social enterprise enabling

[20] https://www.fixmystreet.com.
[21] http://www.sensornet.nl/english
[22] https://www.healthvault.com

patients to control their own medical data when negotiating with public health authorities about their treatment[23]. An example from the 'makers' world uses digital technologies to open new perspectives for locally manufactured and very cheap products for people who otherwise have no chance of being helped. For example, using the Internet to send algorithms for 3D printed prosthetic limbs designed for war victims in developing countries for local production and use[24]. These are examples where citizens, civil society organisations and other actors have seen gaps in what government is doing and stepped in without always being invited to do so.

For the 'government as a platform' approach to succeed, at least four types of role and relationship changes are needed, and some are already starting to be seen, as outlined below.

4.3.1. Government as facilitator and orchestrator

By establishing collaboration platforms at many levels, government's role changes to one of enabler and facilitator, as well as arbiter, coordinator, and regulator for the activities of others in delivering public value. Government is there to ensure public value is created by the most appropriate means in terms of what works best in a given context and for given needs. As described above, this may involve government having a major direct role or a minor one in creating public value, but even in the latter case government needs to be a facilitator and orchestrator to ensure that it does.

4.3.2. Government as provider of tools, guidance and incentives for co-creation

The second new role for government is to provide tools, guidance and incentives for collaboration. It is clear that although the participatory, bottom-up co-creation of services can create more effective and personalised experiences, the process can increase the burden on citizens to participate. It has often been noted that e-government, when leading to user self-services, is a way of outsourcing some of the work government had previously done itself to the user. Co-created, or even fully user created, services takes this much further. Making more efficient, cost-effective public services must mean more than assuming citizens will contribute time and other resources to create their own services. Instead, government should provide structured guidance within which service co-creation can happen. 'Guided' support for co-creation will reduce the burden on citizens of participating in this way whilst maximising the return for public administrations and citizens alike. Government should also provide incentives by highlighting the benefits citizens will derive from the co-creation process, giving them more power to make decisions about these services in adapting them to their needs, and supporting them with relevant data and other resources.

4.3.3. Government as manager of societal assets

Third, government has an increasing role in managing societal assets. Especially in the context of Europe's pressing global challenges, there is a need to identify and deploy all the assets and resources available in society but which are often not used or are under-used. Such existing assets, including government's own, can for example consist of finance, people's time and expertise, organisational structures and competences, networks, data, knowledge, content, capacity, service building blocks, things, places, buildings, spaces, vehicles, infrastructures, etc.

[23] https://www.patientsknowbest.com
[24] http://3dprintingindustry.com/2014/12/08/3d-life-print-3d-printing-prosthetics/

The role of government in using the power of ICT, perhaps in collaboration with other actors, is to identify, broker, match, orchestrate and coordinate assets which can be shared and converted into public value impacts, instead of, if unused, go to waste. There are already many non-government actors launching mainly bottom-up and small scale examples of ICT-based platforms which undertake such a role, often as part of the so-called sharing and collaborative economies, for example the civil society organisation *Shareable* based in the USA[25] (Gansky 2010). However, government has in many cases greater power and scope to do this linking across other actors as well as sharing its own assets internally and this is both a growing challenge and opportunity. This would involve widening the scope of ICT-based content management systems to become asset management systems.

4.3.4. **Government as guarantor of public value over the longer term**

Fourth, as outlined above, the purpose of seeing the public sector as a platform is to ensure the appropriate creation and deployment of public value. However, just because government collaborates increasingly with other actors in producing public value, this does not necessarily imply that government becomes just one actor amongst many as it still needs to fulfil roles which other actors normally cannot. These include taking responsibility for overall quality standards and mechanisms for resource sharing and legal frameworks, even when these are statutorily delegated to other actors. Accountability for services and performance, and responsibility especially if things go wrong, is a critical issue. Others are likely to include data protection and security.

In this context, it should also be remembered that innovation and change in the public sector is not the same as in the private sector, as government cannot pick and choose its customers and government services cannot afford to 'fail' in the same way as in the private sector. Given that government is the only institution democratically accountable to the whole of society, it alone can ensure sustainable and balanced public value where all segments of society benefit and where trade-offs are seen as fair and proportionate. This means that the general sustainability of the governance system is important. Government provides longer term stability and continuity which other actors cannot do, and this is necessary to enable people and communities to live stable lives, as well as for the market to have confidence that unpredictable governance changes will not upset their own innovation and investment decisions. A governance system with a short-term horizon encourages short-termism in business and an unstable society. The public sector is becoming, instead of always the sole actor, one player amongst many albeit with unique responsibilities in new forms of open and collaborative governance.

4.3.5. **The role of the citizen and the reconfiguration of transparency, participation and collaboration**

As described and exemplified above, open governance gives critical roles to the whole range of non-government actors, and especially citizens. At the same time that government is changing and needs to change much more, citizens are also increasing their awareness and leverage on government but it is not yet clear whether their future partnership with government will be a positive one. Although they need strong support from a pro-active government as examined

[25] www.shareable.net

above, citizens should be ready take more responsibility and become more constructively critical and productive in their own right, but this is in many ways the biggest challenge of all. Members of the upcoming 'net generation' are already acting in this way in their private and working lives enabled by digital technology, and are starting to demand that their relationships and dealings with the public sector should take place on the same basis (Tapscott 2009). The challenge is whether government can and will respond to these demands, and this depends a lot on the adoption of appropriate policies, structures and mindsets, as well as the education and incentives for citizens to support this. Critically, it depends on government changing its roles in the ways described above.

Since President Obama launched the open government movement in early 2009 with his focus on transparency, participation and collaboration, making the USA the first country to explicitly do so, there have been clear developments in how these three pillars are perceived and are playing out in practice, particularly vis à vis citizens. First, transparency has increasingly become the *sine qua non* of the successful development of open governance systems but is also becoming better understood. It is clear that total transparency is not the goal given that citizens, public employees and politicians all have areas of legitimate privacy, the former in terms of the protection of their personal data and the latter two as they need confidential spaces for dialogue and brainstorming as long as decisions themselves, as well as the evidence and rationales for them, are transparent. Limits to transparency also need to be set by legitimate interests, the potential for the misuse of information, slander, dis-respect, etc., but the nature of such limits and their definitions need to be clear and open to debate. However, robust transparency is clearly necessary as this is the basis for accountability and for tackling corruption in government as well as in the rest of society (European Commission 2014, OECD 2014).

Second, the understanding of participation in open governance is moving towards a broader notion of engagement in open processes. The latter sees citizens and other actors being invited to engage in all legitimate aspects of public sector activities, not just decision making which, in Europe at least, has tended to be the focus of e-participation. In some ways therefore, participation perceived like this only requires a re-active citizen, whilst engagement is more mixed and can — through transparency and accountability — imply that citizens are more pro-active and take into their own hands activities which traditionally have been purely public sector responsibilities.

Third, collaboration is starting to be exemplified through co-creation and innovation, as discussed above, and especially in the context of new forms of open, social and inclusive innovation. The current market and governance systems are becoming extremely good at 'sweating' assets on the supply side, so that commercial and public producers are incentivized to squeeze to maximum extent their financial, human and other assets and thereby increase productivity and performance. However, on the consumption and demand side, there is huge waste resulting from the widespread practice of exclusive asset ownership. In the last decade this is starting to be challenged by a new sharing economy growing from a small base, in which mainly individuals share with others an increasing range of their assets. These include time, skills, competences, tools, buildings, spaces, vehicles, facilities of all types, organisational capacities and even financial resources, much of which is enabled by ICT developments like crowdsourcing and crowdfunding. The sharing economy is starting to supplement exclusive asset ownership with new forms of common, collective and collaborative ownership. The

sharing movement started as mainly non-profit activities but is now spreading to the entrepreneurial and profit sector with examples like ZipCar and Airbnb for renting out shared cars and accommodation space respectively, and which have since grown into global market leaders. In turn, this is threatening incumbent market and public actors, current legal and regulatory systems as well as the frameworks of trust and ethics we wish to maintain and build. Beyond the sharing of existing under-used assets, a new important trend is their use for the collaborative creation, innovation and production of new products, services and other assets. This collaborative economy is already underway starting with 'pro-sumers' (individuals who are both producers and consumers) mainly in the digital sector, but is now rapidly expanding into the collaborative innovation of physical goods and services, as discussed above. (See also Rifkin 2014)

An important underpinning of both the sharing and collaboration economy is the trend towards co-creation, originally conceived as a business strategy for identifying new forms of customer engagement, it is being increasingly applied in other environments including in the public sector and by non-profits and citizen groups. Co-creation is understood as the active flow and exchange of ideas, information, components and products across society which allows for a better understanding of, as well as participation, engagement and empowerment in, policy development, creating and improving services and tackling societal challenges. Co-creation encompasses co-innovation, co-configuration, and co-production of products, services and content through modularisation and digitisation, the role of social entrepreneurs in these new processes, and creating platforms for creative organisations, for example around 'standard toolboxes' for niche needs or markets.

4.4. Emerging technologies

As a summary of the expert consultation workshop discussions, the emerging technologies research and innovation area should focus on the likely impact and take-up of emerging technologies, on the roles and operations of government, as well as of the public sector more generally. Many of these emerging technologies have potentially profound implications for the way governance for the future is configured and experienced, for example:

- Block chain distributed databases (see below)
- Artificial intelligence (AI) and machine learning is the intelligence exhibited by a machine as a flexible rational agent that perceives its environment and takes action to maximize its chance of success in achieving a specific goal. Big data is typically a major input mediated by advanced algorithms. According to the Work Economic Forum[26], AI systems are now able to make many decisions, both routine and complex, which should improve the efficiency and quality of decisions in the public sector, but thereby also threaten middle management and even senior jobs.
- Robotics are automating much physical work across all sectors. In the public sector, this includes, for example, routine maintenance, fabricating spare parts or specialised components for machines, as well as accessing difficult and dangerous environments (as in disasters, fires and floods). Robots are also starting to be deployed in human-interface situations, such as in caring and supporting older, disabled or ill people,

[26] http://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond (retrieved March 2016).

although such use is proving controversial in some contexts and also raises potential ethical issues.

- The Internet of Things (IoT) is the network of physical objects and devices, vehicles, buildings and other items that are embedded with electronics, software, sensors, and network connectivity enabling them to collect and exchange data and thereby also to interoperate. It can optimise the use of physical objects, constructs and systems, such as buildings, electricity grids and utility systems, ensuring efficient performance and reducing the carbon footprint. IoT can enable the public sector to better control and deploy its assets in real-time, such as vehicle fleets, buildings, supplies and equipment, as well as for example manage and direct traffic flows and other unfolding situations.
- Drones are unmanned aerial vehicles (UAVs) utilised to transport packages, food or other goods, as well as provide real-time surveillance of unfolding situations. They can be used in the public sector to facilitate the delivery or collection of small items, such as post, medical equipment and spare parts. Drones are highly flexible and manoeuvrable vehicles that are indispensable for low-height monitoring of natural disasters and dangerous situations, as well as for example in traffic and security related incidents.
- Digital fabrication, i.e. the use of 3D printers, laser cutters and sinterers and other equipment, to fabricate one-off or small production runs of unique, typically relatively small objects using specifically designed algorithms. A variety of materials is used, including metals, ceramics, plastics, glass, and increasingly organic matter such as food and living tissue. This enables the public sector, for example, to drastically reduce its stock of equipment and components, given that these can be fabricated only when required to highly precise and individual designs. Applications in the health sector which are already significant include the decentralised fabrication of personalised prosthetic limbs as well as of dental replacements and implants, and in the care sector of customised meals for people in hospitals or care homes who have specific dietary needs.

An examination of potential side-effects and likely unintended consequences of these and other emerging technologies is also required.

This short orientation paper is not the place to explore possible impacts of the emerging technologies outlined in sections 3.5 and 3.7.3 above. However, some consideration is given in the following to blockchain technology which is a relative new, and still largely unknown, concept, particularly in the public sector, given that its main applications to date are in financial technologies, for example as the basis of the 'Bitcoin'. The impact of blockchain technology in particular on governance systems could be profound and lead to the end of governance as we have known it for millennia to be replaced by, in effect, an autonomous and independent system which everyone can contribute to and benefit from, but which no one controls. There might be immense 'democratic' benefits arising from such a scenario, but also dangers inherent in the fact that blockchains are, in effect, an impenetrable black box. [27]

[27] This brief analysis is partially based on the Wikipedia entry for blockchains (accessed 24-4 -16) and the Nesta blog of 24-3-16 "Why you should care about blockchains: the non-financial uses of blockchain technology" related to public (permissionless) blockchain: http://www.nesta.org.uk/blog/why-you-should-care-about-blockchains-non-financial-uses-blockchain-technology.

A blockchain is a distributed database that maintains a continuously-growing list of data records hardened against tampering and revision. It consists of data structure blocks which hold exclusively data in initial blockchain implementations, as well as both data and programmes in some of the more recent implementations, with each block holding batches of individual transactions and the results of any blockchain executables. Each block contains a timestamp and information linking it to a previous block. The blockchain is seen as the main technical innovation of Bitcoin, where it serves as the public ledger of all Bitcoin transactions. Bitcoin is peer-to-peer, so every user is allowed to connect to the network, send new transactions to it, verify transactions, and create new blocks, which is why it is called 'permissionless'. This original design has been the inspiration for other cryptocurrencies and distributed databases.

In essence, therefore, blockchain technology can be seen as a programmable distributed trust infrastructure. Transactions are the content which is stored in the blockchain. Blocks timestamp, record and confirm when and in what sequence transactions enter and are logged. Blocks are created by users known as 'miners' who use specialized software or equipment designed specifically to create blocks. Every user in the decentralised system has a copy of the complete blockchain. This avoids the need to have a centralised database managed or controlled by any party. Thus, blockchains can be summarised as distributed databases but they exhibit new and significant properties, including:

- Autonomous: no one person, group or organisation is in charge
- Permanent: no one can delete or tamper with the data
- Secure and cryptographically auditable: security has never been broken and it is claimed that it is mathematically certain that entries cannot be forged. This property signals a shift in thinking about security from one based on closed systems to one based on security through transparency.
- Open: anyone can develop services and products on them, control their own data and audit the code.
- Whole and complete, i.e. cannot be fragmented or divided up: fragmentation is open to fraud.
- Trustworthy: the above properties and the fact that blockchains are open source means they are also 'trustless', i.e. not reliant on any human agency but instead on the consensus of the whole network.

In terms of applications, apart from financial such as in Bitcoin, blockchain technology can enable both the Internet of Things and supply chains to function efficiently, effectively and securely, as well as ensure highly secure identity. In the public sector and governance context, blockchains could, for example, protect critical infrastructures, register and protect assets (such as intellectual property, health, pension and other data), tackle tax and benefit fraud, and ensure that public spending is transparent and traceable.

4.5. Reflection and conclusion

4.5.1. **Conclusions**

The concept and practice of open government has many aspects, summarised in the present context by the open governance framework diagram in section 2.2. This depicts the intersection of three components: open data, open service and open process, where each of

these is open by default. Experts focused on a number of issues, mainly related to the implications of open government accepting these three components and their relationships as a useful conceptual and operational framework.

Open data is seen as essential for facilitating co-creation, but the barrier is that for many users this is a blackbox requiring new capacities, skills and incentives. Most users, whether citizens, businesses, civil organisations or communities, will need help and support in getting involved, so an important role for government is to curate the demand side. As noted above, smart disclosure needs much greater emphasis as it strives to enabler the user to mash their own personal and private data together with those of one or more service providers, including commercial services from the private sector. There are also serious issues around transparency in terms of who is seeing and using whose data and whether or not the data owners can correct it?

A similar demand-side weakness as seen with open data is also noted in relation to open services with their generally low or weak demand, although this has been growing in recent years in many countries, particular those deploying 'digital by default' strategies which, in effect, oblige users to go online given the lack of other channels for an increasing number of services. However, it should also be noted that some of this relative low demand may be a consequence of promoting automatic services to reduce the administrative burden, as well as the fact that many public services only need to be infrequently used, like completing tax forms, changing address or applying for permissions and licences. Automatic services are, in essence, also an attempt to 'reduce unnecessary contact' between government and the user, and this will inevitably result in less direct usage of eGovernment but in the greater impact of eGovernment.

Another important strategy should be to focus strongly on accelerating the development of highly personalised services down to the individual level, including alerts, rather than one-size-fits-all common services. The use of alerts, invitations, prompts, as well as typical life events, user profiles and locations, are all steps towards full personalisation. Fully personalised services are much more likely to be directly attractive and useful for users as they specifically address their unique needs, removing the generalised information and clutter which does not apply to them, thereby making the service simple and effective, as well as open to new forms of interaction which draw the user into a co-creation and collaborative relationship. Design thinking, behavioural and nudge approaches should be strong features in research and innovation on open and personalised services. Personalisation means departing from the average, so it must be accompanied by minimum, but still high, quality standards. Many services also need to be universally available to a specific target group, given that government cannot say no to a legitimate user, unlike a commercial service provider.

Given that service providers also need to optimise efficiency, service personalisation is most readily effected by deploying a modular approach using data, building blocks and widgets in the cloud. To this end, the service provider can share costs with other providers and both personalise packets of building blocks tailored to specific user needs, as well as cooperate with other providers and/or with the user her-/himself in doing so. The user may also order 'self-assembly' or 'automatically composed' personalised services by submitting their data and requirements to the service provider, a trusted-third party and/or a platform. Again, this draws the user into a closer collaborative and trusting relationship with the service provider, as well

as maximising the personal benefits the service brings. Thus, shared services with other providers, and with users as 'pro-sumers' of highly personalised services, is the goal. This can also encompass non-ICT service channels where ICT, in addition to being an important channel direct to the user, can also help knit the different channels together and with providers in cases where there is more than one.

In terms of open process, again there is a demand side deficit that needs to be addressed by incentives, simplification and personalisation. Engaging people in the business of government is essential for open governance in an open society. Trust in government, which is potentially increased if the government is trustworthy, as well as governments trusting citizens in order to engage them, is essential but challenging. There are also issues of the sustainability and adaptability of open processes and economies of scale and scope to ensure that it is efficient as well as effective. Involving all citizens in choosing public spending, for example through participatory budgeting, is often a useful approach.

Seeing government as a platform is one, albeit a very important and perhaps the main, operational expression of open government in the present context. It provides a practical way forward but one which requires significant research and innovation, as described above. In particular, both the open government setting and the government as platform operationalization are currently conceived in the context of presently available ICT technology. The emerging technologies, also outlined above, have the potential to radically shake up these notions; perhaps by reinforcing them but also possibly by completely altering our thinking about the future of government and of governance.

4.5.2. **Barriers and caveats**

The evidence and analysis presented in this orientation and synthesis section also needs to be subjected to some caution and caveats, as this also needs to be subject to future research and innovation. There are at least three main types of barrier to developing the open governance framework and the sharing and openness this implies. First, lack of technical, semantic and organisational interoperability between government organisations as well as with non-government organisations, so that it is not possible operationally to share or exchange data. Second, management tends to be reluctant to share data and other assets as this may be considered as risky and giving up own control, and where the necessary individual as well as organisational skills, awareness and attitudes are not in place. Third, the need to balance sharing, openness and transparency with privacy, data protection and security where there are potentially huge threats.

In changing and adapting the roles of government and other actors as described above, there are also real concerns that such changes will result in new types of risk, for example related to loss of control and blurred accountability of services (by whom to whom?). Quality standards are more difficult to determine and maintain with many active designers and suppliers of services, and not least new digital divides as the already better endowed and more competent segments of society are able to reap the benefits of openness and of ICT more readily than others. There are also dangers in putting too much faith in using OGD, and indeed big data in general, as issues like representative, mis-use or even corruption are ever present, as is the need to apply a common sense test to algorithm-driven decisions and policies. Data should always be put in the context of 'soft data' like values, ethics and responsibility.

Despite these caveats, however, government as the only institution backed by democratic accountability, is best placed to address these risks and will need to retain basic roles including setting overall quality standards, providing mechanisms for resource sharing, and determining legal frameworks.

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6. Annex: Members of the Expert Consultation

The following experts participated in the Expert Consultation on 27 April 2016 in Brussels:

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