National Commission of Audit – Terms of Reference
Joint Submission
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Executive summary

Over the past decade, the internet has created a major shift in the Australian economy, and going forward, its transformative impact could be equivalent to the advent of electricity. By bringing together consumers and business, technology has ignited an explosion of economic activity – lowering barriers and increasing efficiency for business and irreversibly tipping the balance of power in favour of consumers.

With the economy undergoing structural change, Australia facing the national challenge of improving productivity in order to maintain living standards, and government facing significant budgetary pressure, now is an appropriate time to consider the role of government. Government, across all levels, represents one third of economic activity and increasing its productivity to match the private sector would yield significant benefits.

In order to meet this challenge, Government must itself adapt and transform, for the internet is also driving a decisive shift by empowering citizens. There is a widening gap between the expectation of Australians to access services when and where they want them – online – and what government provides. This gap also presents a huge opportunity. Government can harness technology to simultaneously reduce its cost of doing business while increasing the quality of public services, fostering innovation and lifting national productivity.

This transformation will require a complete service redesign to put digital at the centre of government. Digital services will need to be exceptional so that citizens and businesses will actually choose to use them. The focus of government activity should be on driving innovation through service redesign to improve consumer experience and drive economy-wide efficiency.

Digital in government can reduce the amount government spends on ICT procurement, reduce transactional costs government incurs to deliver public services, lift the burden of complying with regulation and foster broader innovation and economic growth in the private sector. The Government's *Policy for e-Government and the Digital Economy* recognises this opportunity.

Government will need to invest in new technology to completely redesign its operations in order to make the most of the efficiency and cost reductions available. It is not necessary for solutions to be expensive bespoke projects in the traditional mold; rather, change must reinvent not retrofit. The guiding principles are:

- **Embrace open innovation**—government does not have to solve public sector challenges alone. It can outsource innovation, and the risk of failure, through open data and open innovation markets to encourage external innovators to contribute new ideas.
- **Open public data**—stimulate economic activity and productivity across the private and public sectors by opening up data held by governments to make it available online in open formats. Government should also make use of data internally to innovate.
- **Rethink procurement**—reform procurement processes to promote low cost applications that encourage innovators and smaller businesses to interact with government using a test and learn approach.
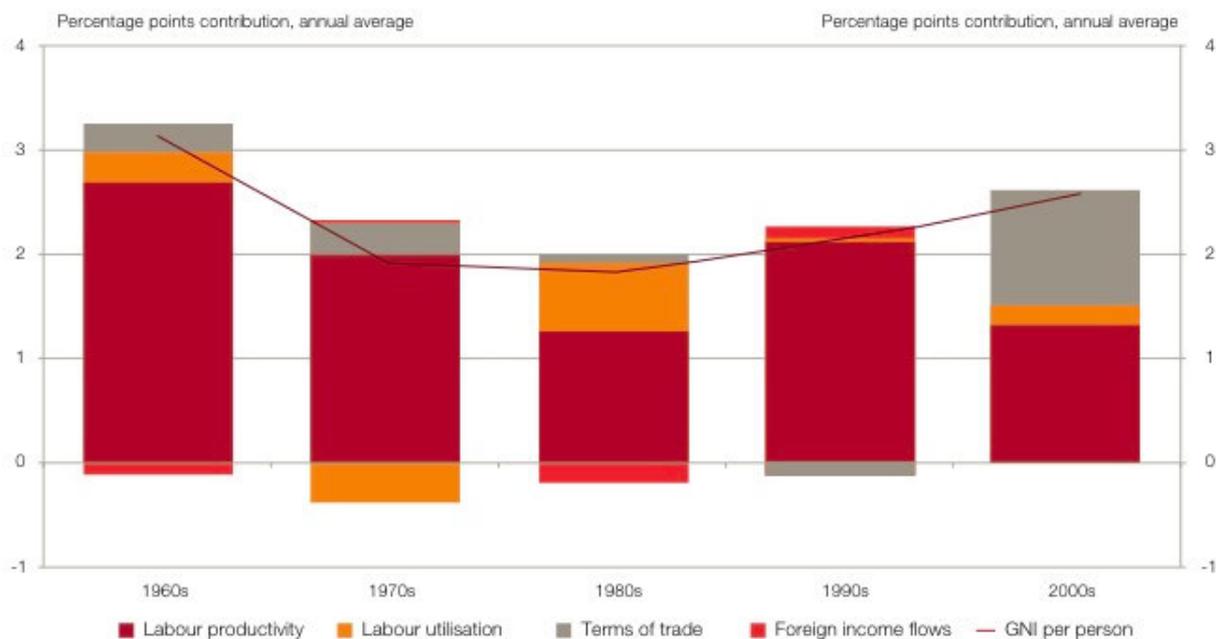
We need to move beyond the concept of "e-Government" as something separate and new – it is simply "Government". Australian citizens and businesses already have this expectation. To do otherwise risks positioning technology as a sideshow rather than a transformational opportunity.

1. Role of government in the digital age

A. Issue – budgetary pressure

Australian governments are forecast to continue to face significant budgetary pressure

After 22 years of continuous economic growth, Australia now faces the risk of falling incomes and increasing government debt. Our next decade of economic growth is unlikely to come from better terms of trade or foreign income flows (see figure below for recent contributions to economic growth). There is a need to lift Australia's national productivity.

Note: Data for the 2000s are for the twelve years to 2011-12.
Source: Treasury calculations based on ABS Catalogue Numbers 5204.0, 6202.0 and unpublished ABS data.

PwC estimates that, based on the current patterns of government activity, the combined annual deficits of Australian governments will rise:[1]

- from $27.4bn (1.9% of gross domestic product [GDP]) in 2011-12 to $213.5bn (3.5%) by 2039-40 and to $583.1bn (5.9%) by 2049-50.

And our governments' debt levels as a proportion of GDP will rise:

- from 12.1% in 2011-12 to 32.9% by 2039-40 and to 77.9% by 2049-50.

These trends are unsustainable as the population ages. Australian governments risk not being able to meet the key needs of our community, combined with a further slide into debt. Further, higher debt at the Commonwealth level might mean that another shock like the GFC could see total debt climb to 30% of GDP by 2025-26.

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[1] www.pwc.com.au/tax/tax-reform/.

B. Opportunity – changing consumer expectations

Consumer expectations around the use of technology to access information and services continues to accelerate

Internet technologies have changed the way people communicate and participate in the economy. Consumers expect online services to be easy to use and available when and where they want them.

Australians, in particular, are embracing technology at a world-leading pace – we have the sixth highest smartphone penetration in the world at 65% of adults and the third highest tablet penetration at 31%.[2] Google research shows smartphones are the backbone of Australian's daily media interactions[3] while ACMA reports that 480,000 Australians have fully substituted phone and fixed internet services for mobile only, growing at 70% year on year.[4] Yet only a fraction of websites and web applications are mobile optimised.

The scale and pace of change driven by the internet only continues to accelerate.[5] Technological advancements in processing speed, data storage and bandwidth have long been characterised by exponential growth, going back to the surprisingly accurate 1970's 'Moore's law' predication that the number of transistors on circuits would double every 2 years.[6] The rise in internet use has driven unforeseen technological innovations and advancements in computing, and has led to new generations of interconnected web services, applications, consumer devices and infrastructure.

By putting essential information at consumers' fingertips, the internet has forced organisations to shift from a product-centric to a consumer-centric mindset. The scale and pace of change is creating an ever growing myriad of opportunities, which consumers have been quick to seize, and some businesses have been quick to recognise. Early adopters in the business world have experienced substantial growth as consumers flock to their offerings.

Overall, the consumer experience with technology has raised expectations of all other services and products to be far higher than the ability of most organisations to meet. These rising expectations from technology innovation have created a 'consumer experience gap'. From the graph below, it is clear to see that consumers have led businesses in the adoption of new technology since 2007.

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[2] Google, Mobile Planet, http://goo.gl/4bYxrW.
[3] Google, The New Multi-Screen World: Australia, www.google.com.au/think/research-studies/new-multi-screen-world-australia.html
[4] www.acma.gov.au/theACMA/engage-blogs/engage-blogs/Research/Reseach-Snapshots/
[4]Mobile-only-Australians-top-over-3-million.
[5] BCG, 'The 4.2 Trillion Dollar Opportunity', March 2012, p3, http://goo.gl/jSMoS.
[6] Intel, 'Moore's Law Inspires Intel Innovation', accessed January 2012, http://goo.gl/PH1EA.

Customer experience gap
Gap between the rate of customer technology adoption and the rate of businesses adopting the new technologies.

Business

Technology

1980   1990   2000   2005   2010   2015   2020
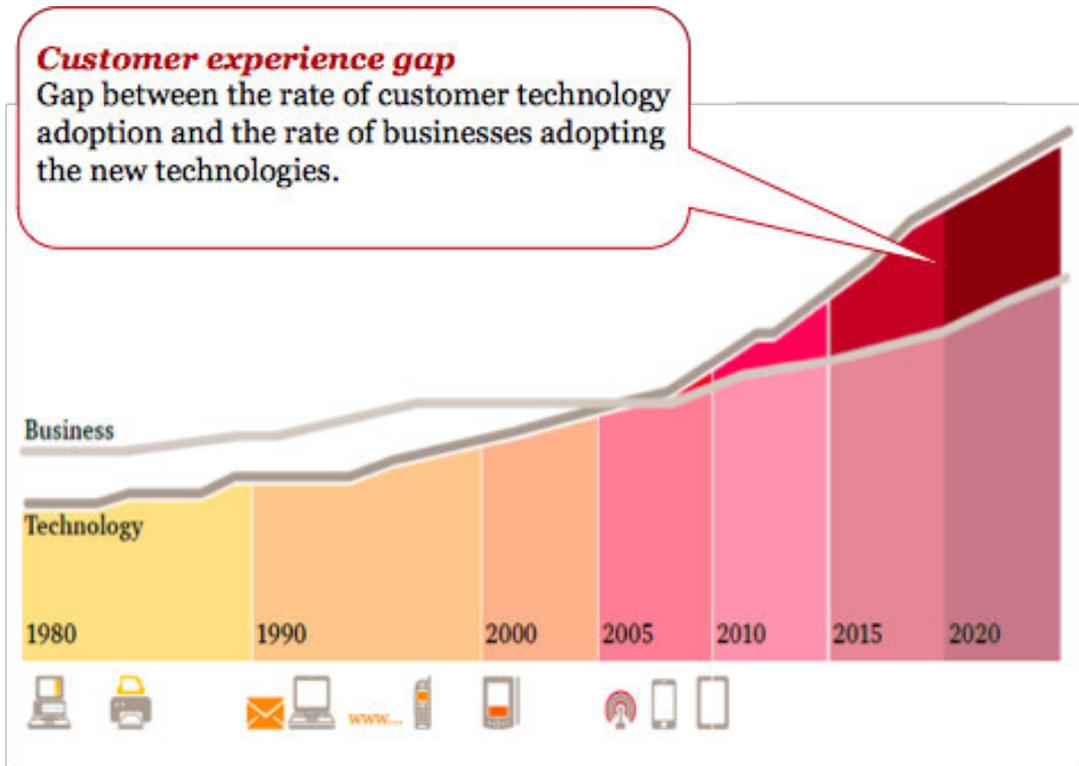
In Australia, this gap has worsened in recent years with respect to government. The percentage of Australians who used the internet for recent interactions with government actually declined between 2009 and 2011 according to AGIMO data.[7] This decline is unique among other OECD countries, where online engagement with government increased over a similar period.[8] Yet, there is still a huge expectation from Australians to be able access government services online, with a 2011 survey finding it was one of the ten most popular online activities.[9]

Continuing to innovate at a rate sufficient to reduce the consumer experience gap is a key challenge for all organisations, but particularly so for government. The trend of a widening gap between consumer expectations and available services online continue as broadband speeds increase and the amount of innovation available in the market from consumer products accelerates. As the amount of advanced technology in Australian homes rises, people will continue to call into question why interacting with government is not as simple as equivalent private sector services.

C. Challenge – transforming government

Government must itself transform and harness the power of technology to simultaneously reduce its cost of doing business while increasing the quality of public services and fostering innovation

Government should take a leadership role and lead the transformation of Australia into a more productive, digitally enabled economy. The Government's *Policy for e-Government and the Digital Economy* acknowledges that many of government's "programs are impossible to execute without

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[7] AGIMO, 'Interacting With Government – Australians' Use & Satisfaction With e-Government Services', 2011, p15.
[8] OECD, 'Government at a Glance: Ways of Delivering Public Services', Paris, 2011, p172, shows that between 2005 and 2010 no other OECD member recorded a decline in online engagement with government.
[9] http://digital.vic.gov.au/ict-strategy/strategy/changes-in-citizen-expectations-and-ict-use/.

effective use of ICT" and that government should provide leadership through the delivery of public services.

Online interactions save money while providing a better consumer experience for citizens. The UK Digital Efficiency Report suggests that transactions online are 20 times cheaper than by phone, 30 times cheaper than by post, and as much as 50 times cheaper than face-to-face.[10]

There is significant value to be gained from increasing the role of technology in the delivery of government services. In the UK it is estimated that around £5.1 billion in government expenditure could be saved:

- The Government Digital Service has estimated potential annual savings of more than £1.8 billion from moving offline transactions to online channels.[11] Today, only half of all government services are available online, leaving significant scope for additional savings.[12]
- Local Governments in the UK are estimated to be able to save up to £421 million by digitising transactions.[13]
- The UK National Health Service estimates it could save £2.9 billion by increasing their use of technology in existing processes.[14]

To realise these gains it will often be necessary to invest in ICT to redesign public services and transform government. In 2010, the incoming UK Government faced a budget crisis, but was able to achieve gains through investing in ICT. That this supposed paradox was possible is highlighted by three statistics at the time: public sector ICT spending was £25 billion, the world's highest per capita; 70% of which went to just seven companies; and the government maintained 750 individual websites.[15] The government was also spending an estimated £4 billion each year on providing non-digital transactions.[16]

While smarter spend of ICT dollars will be important, there is a greater opportunity for government to take a leading productivity position.

2. Service redesign with digital consumer at the centre

Government should focus on redesigning services with the digital consumer at the centre. This will accelerate the transformation to a more digitally enabled government and improve consumer experience and drive efficiency throughout the economy.

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[10] UK Cabinet Office, 'Digital Efficiency Report, 2012', publications.cabinetoffice.gov.uk/digital/efficiency/.
[11] http://publications.cabinetoffice.gov.uk/digital/strategy.
[12] www.economist.com/news/britain/21569716-new-attempt-reform-public-services-through-data-efficiency-transparency?fsrc=scn/tw_ec/efficiency_by_transparency.
[13] http://www.go-on.co.uk/files/2113/5237/0908/The_Booz_Report_Nov2012.pdf.
[14] Digital First—The delivery choice for England's population, NHS, 2012,
http://digital.innovation.nhs.uk/dl/cv_content/32200.
[15] See Chris Yiu and Sarah Fink, 'Smaller, Better, Faster Stronger', Policy Exchange, 2013; Rohan Silva, Senior Policy Advisor to the British Prime Minister, 2010-13, eloquently makes this point in the foreword.
[15]*Note – factoring in the expenditure of States and Federal Governments, Australia spends more per capita on ICT than Britain (which only has two levels of government).
[16] https://www.gov.uk/government/news/government-publishes-costs-of-transactional-services-for-the-first-time

Technology allows us to completely rethink the way services are delivered. Current supply chains for the provision of goods and services were largely developed when communication at scale was less efficient.

Communication through websites, social networks and email have enabled new models of organising activity. These communication tools encourage the review of existing supply chains to rethink how the desired outcomes of the supply chain can be achieved.

Services can be completely redesigned reducing the role and cost of government involvement:

- The NSW government is currently piloting Timebanking as a way to rethink the delivery of volunteering services. Timebanking connects volunteers directly through an online social network. It helps build support networks in communities by increasing connections through the sharing of time, care, skills and knowledge. This has the potential to reduce the burden on government to directly fund the administration of volunteering services.[17]
- The US Patent and Trademark office teamed up with Google and Stack Exchange, a Q&A site for coders, in late 2012 to use crowdsource analysis of patents to reduce the patent application backlog and improve the services.[18] Rather than increase the burden on the public sector workforce, a more innovative and collaborative approach to solve the problem was used.
- An E-Learning Ontario initiative operates in Ontario, Canada with a range of digital resources to enable a flexible educational plan for students. Online assets include an 'educational resource bank' with a range of teacher developed resources; an 'online learning management system' and one online community for teachers and school boards. These assets allow teachers to more efficiently design suitable lesson plans and have been particularly useful for rural or remote schools with more limited resources.[19]

Technology can be applied to existing processes within government to reduce overall expenditure and decrease the cost of administrative tasks:

- A review of the UK NHS suggested that nurses spend up to 10 hours a week on administrative tasks, one third of which are unnecessary.[20] The review authors suggested that *"Tackling this burden requires smarter systems, proper admin support, well designed technology and better data sharing. Without these improvements, many nurses tell us they struggle to maintain patient care due to low staffing levels and the burden of national and local bureaucracy".[21]*
- In one Florida, USA school district teachers were given hand held devices to record details of the class experience. This allows for more reliable and efficient reporting of class performance. It had been estimated that previously teachers took up to a week to prepare documentation for student progress reports.[22]

Delivery of services can be moved towards digital channels for significant cost savings:

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[17] http://www.volunteering.nsw.gov.au/volunteers/timebanking.

[18] http://www.wired.com/threatlevel/2012/09/patent-busting-crowdsourced/.

[19] http://www.edu.gov.on.ca/elearning/pdf/BrochureELO.pdf.

[20] http://www.nhsconfed.org/.

[21] www.telegraph.co.uk/health/healthnews/10462858/NHS-doctors-spend-10-hours-a-week-on-bureaucracy.html#!.

[22] http://www.innovations.harvard.edu/cache/documents/5534/553487.pdf p24.

- Based on a review of 19 local authorities in the UK in 2009, PwC estimated the cost to serve of the key delivery channels available to government. On-line transactions averaged £0.08 where face-to-face (£10.53); telephone (£3.39); and post (£12.10) were considerably higher.[23] Clearly there are opportunities for savings through increasing the use of the digital channel.

Digital services need to be so exceptional that consumers will actually choose to use them. The recent UK experience highlights this. There are "only a handful [of services] where a large majority of people who could use the online option do so",[24] with the country being held back by "in part by poorly designed websites."[25] Well designed services will drive uptake, starkly demonstrated by the fact the 74% of people in the UK buy car insurance online but only 51% renew car tax online.[26] If government online services are not well designed then citizens will simply elect not to use them or continue to be frustrated.

To quote George Osborne, British Chancellor of the Exchequer, "...it won't do to just replicate the same old processes, with new technology."[27]

3. Delivering the benefits

Identification of the areas with potential productivity gains is a necessary but not sufficient condition to realise benefits from a more digitally enabled government. Just like the private sector, government also needs to develop approaches to fast track attempts of new ideas and concepts. Innovation in the public sector needs to accelerate.

Technology should play a key role in accelerating public sector innovation. Technology has reduced the cost to reach consumers and to test the value of new programs, products or services. Technology has also enabled consumers to provide feedback with unprecedented ease through the use of social networks and other digital channels (e.g. online reviews, email, bulletin boards). Consumers are more informed and empowered than ever before.

This improvement in communications capability has enabled a new approach to developing new programs, products and services. Prototyping solutions and testing with consumers through rapid 'test and learn' cycles has been embraced in the private sector as the way to increase returns from innovation. The public sector has potential to also make significant gains in efficiency and effectiveness from embracing new approaches under the guiding principles of:

- **Embrace open innovation**—government does not have to solve public sector challenges alone. It can outsource innovation, and so the risk of failure, through open data and open innovation markets to encourage external innovators to contribute new ideas.
- **Open public data**—stimulate economic activity and productivity across the private and public sectors by opening up data held by governments to make it available online in open formats. Government should also make use of data internally to innovate.

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[23] http://www.parliamentandinternet.org.uk/uploads/Final_report.pdf p51.

[24] https://www.gov.uk/government/news/government-publishes-costs-of-transactional-services-for-the-first-time.

[25] www.economist.com/news/britain/21569716-new-attempt-reform-public-services-through-data-efficiency-transparency?fsrc=scn/tw_ec/efficiency_by_transparency, quoting Richard Sargeant, UK Cabinet Office.

[26] http://publications.cabinetoffice.gov.uk/digital/strategy/foreword/.

[27] See Chris Yiu and Sarah Fink, 'Smaller, Better, Faster Stronger', Policy Exchange, 2013; foreward by Rohan Silva, Senior Policy Advisor to the British Prime Minister. http://yiu.co.uk/digitalgov/.

- **Rethink procurement**—reform procurement processes to promote low cost applications that encourage innovators and smaller businesses to interact with government using a test and learn approach.

A. Embrace open innovation

Government should not undertake this transformation journey alone. Technology has enabled a revisiting of the role of government in the service delivery supply chain. There is great potential to achieve better outcomes more quickly by encouraging external innovators to work with government to solve public sector challenges.

Redesigning public services for the digital age is hard. Given the huge scale of government, there is no simple off-the-shelf digital solution. Rather, a unique set of technologies, systems and processes will have to be developed and deployed over several years.

To redesign and implement services will require an increase in the level of innovation. Given the complexity involved, it is highly likely that some of these efforts will not turn out as planned – and some may fail. This presents a key challenge as government has an inherently low tolerance to 'failure' as it is spending taxpayer money, and consequently, government can have a perceived low tolerance for innovation.

Therefore, government should both seek to re-define what constitutes 'failure' and should tap into the potential of open innovation. The tech sector has a saying: "fail fast and iterate."[28] It might sound counterintuitive, but innovation and failure are intimately intertwined. Any innovation is essentially a market experiment and as with any experiment, it carries considerable risk and high failure rates. Innovators outside of government are well placed to operate in this environment and assume the 'risk of failure' for government.

This will require government to embrace open data and open innovation markets. Combined, this will lower the cost of innovation in government while increasing interoperability between government held data, as it will facilitate communication between siloed systems and data sources in different government departments.

Examples:

- The NSW Transport agency (TNSW) worked with PwC to run probity compliant, open innovation processes to enable third party developers to create real time public transport apps.[29] Over a two day 'App Hot House' selected teams created prototypes of consumer-products for mobile phones, which they had to pitch to a panel of judges.[30] Winning teams received access to the real time data feed, the opportunity to collaborate with TNSW stakeholders and promotional support from TNSW.
- The customer relationship-management software system or '311' phone service operating in a range of cities (e.g. New York, Baltimore, Chicago) speeds up the inquiry process directs callers to the appropriate agency and then logs, tracks and monitors the inquiry to

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[28] Many successful products have been created out of a process of continual iteration to get to the right outcome. See Susan Wojcicki, Senior Vice President, Google, 'The Eight Pillars of Innovation', http://www.google.com.au/think/articles/8-pillars-of-innovation.html.
[29] http://www.131500.com.au/plan-your-trip/Info-on-the-go/apps.
[30] http://www.digitalpulse.pwc.com.au/open-innovation-tfnsw-app-hothouse/.

the end. Within 10 seconds of placing the call a consumer service representatives picks up, and that representative is able to deal with the inquiry 85% of the time. Callers are communicated with until to the issue is resolved.[31] A key benefit for the city from this service is from the analysis of the data collected, services can be redesigned and resources allocated in response to patterns of behaviour identified through the 311 service.[32]

- Code for America is a US not-for-profit organisation that runs programs to help local governments use technology to drive efficiency. Code for America believes that *'instead of cutting services or raising taxes, cities can leverage the power of the web to become more open and efficient.'* Supported by a range of foundations Code for America has a fellowship program which embeds developers with local governments, an accelerator program to assist civic startups and a 'brigade' program to encourage software developers to volunteer time to build software for governments.[33]

- In Australia a not-for-profit foundation, Open Australia Foundation, builds software tools to simplify access to publicly available data. One tool, OpenAustralia.org, provides a searchable, copy of the Hansard to enable people to keep track of what politicians are doing and saying on our behalf in Parliament. Another, PlanningAlerts.org searches planning authority websites for development applications in your area and then emails you their details.[34]

- With information provided by U.S. federal and state governments, the Google Civic Information API allows developers to build applications that display civic information to their users.[35] For any U.S. residential address, you can look up who represents that address at each elected level of government. During supported elections, you can also look up polling places, early vote location, candidate data and other election official information.

i. Solving government problems

In order to achieve results from open innovation approaches, government needs to give innovators need strong signals about the problems worth solving in the public sector in order. Existing open data activity suggests that there is a challenge in delivering value. Government asks the market to "tell them what data they want", the market tends to say "show us what you have and we will figure out what to do with it". If value is going to be created there is a need for government to be more transparent about the challenges it is facing and to communicate with the market more clearly.

Examples:

- In August 2013 Queensland public transport operator Translink held an 'Open Data Showcase' for interested community members and software developers and other innovators to demonstrate their technology roadmap with regards to real time transport data. At the event Translink staff demonstrated existing technologies and engaged with the community about alternative solutions to their challenges around opening up their information.[36]

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[31] http://www.innovations.harvard.edu/cache/documents/5534/553487.pdf.

[32] http://radar.oreilly.com/2011/03/nyc-smart-government.html.

[33] http://www.codeforamerica.org/programs/.

[34] https://www.openaustraliafoundation.org.au/.

[35] https://developers.google.com/civic-information/.

[36] http://translink.com.au/news-and-updates/data-showcase.

- New York City's big apps competition has evolved to include 'Big Issues' which, for the 2013 competition, were four key issues facing the city where the government wanted to find innovative solutions. Private sector partners sponsored the issues of Healthy Living, The Cleanweb, Jobs & Mobility and Lifelong Learning. Prize money and mentoring was focused around these areas.[37]

ii. APIs for public services

A key enabler of open innovation is the development of application programming interfaces (API's), which are protocols by which computer systems can interact. APIs make data available to outside organisations in a controlled and monitored manner. In the private sector they are increasing in use as a way to enable greater open innovation.

APIs in industry

Google makes information accessible in contexts other than a web browser and accessible to services outside of Google.[38]

The Google Data Protocol provides a secure means for external developers to write new applications that let end users access and update the data stored by many Google products. External developers can use the Google Data Protocol directly.

A number of Google products, such as Calendar and Spreadsheets, provide APIs that allow developers to write client applications that give end users new ways to access and manipulate the data they store in those Google products. For example, calendar apps that are not made by Google, but will allow an end user to securely access data they have stored in their Google Account.

B. Open public data

To encourage growth in economic activity and productivity and to enable open innovation for public services there is a need to accelerate the opening up of access to data held by government.

i. Encouraging economic growth

Public sector information, data held and maintained by government has the potential to deliver economic growth through improving existing services or allowing the development of new services.

It is a natural resource that is funded by taxpayers and making it openly available online for free use represents a tremendous opportunity to foster innovation and stimulate economic growth. Globally, McKinsey estimates that seven sectors could generate in addition of $3 trillion a year as a result of open data.[39]

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[37] http://nycbigapps.com/bigissues.

[38] https://developers.google.com/gdata/docs/directory.

[39] www.mckinsey.com/insights/business_technology/open_data_unlocking_innovation_and_performance_with_liquid_information.

The value is already very real. There are estimates that open data currently delivers €140 billion annually across the EU.[40] A recent UK National Audit Office (NAO) report estimates that public data currently contributes £16 billion annually to the UK economy and points to academic research suggesting that if all public information that is currently traded was made available without charge could potentially add economic value in the region of £1.6 billion to £6.0 billion a year in the UK.[41]

The public sector should generally view itself as a 'wholesaler' of information, whose role is to release it without expending significant resources to process data or add value. This allows government to better tap into innovation from various stakeholders and to leverage private sector investments online platforms, such as cloud computing, for broad scaleable distribution.

Data must be released in open, interoperable and machine readable formats. Data needs to be structured so that it can be easily machine digested – some government data sets are structured in complex ways making this difficult.

Appropriate open licensing or permissions to facilitate use of data in the internet age is critical. Government needs to facilitate the use of data through derivative works, reuse and resharing. Many datasets are subject to restrictions that limit their use in online apps and in data-driven innovation. For example, Creative Commons licenses are designed for copyright content like books and photos and are often not suitable for data as their terms can require significant interpretation when applied to information like transit data.

An additional challenge is seeing the value in open data. For the particular agency that holds the data, its collection, analysis and publication are all tangible costs, the data may also have internal value and can be sensitive. The benefit from data-driven innovation is not the inherent value of a particular dataset itself, rather it is from relating that data to other data to draw meaningful conclusions.[42] Data themselves do not possess inherent, measurable value until compared to other data, visualized in context or analyzed for significance.

Examples of government uses are:

- The Open Data Institute in the UK has provided a focus for innovators using public sector data to create value.[43] Early examples of new firms exploring new markets include Spend network which provides a service to public sector suppliers and buyers with benchmark data about products and services procured by the public sector in the UK.[44] Place provides data–as–a–service in the transport sector to other application providers as well as consumer facing applications with transport information.[45] Locatable provides an information service to property buyers and generates revenue from generating leads for the property industry.[46]

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[40] http://goo.gl/wmSW4u.
[41] http://www.nao.org.uk/wp-content/uploads/2012/04/10121833es.pdf.
[42] Jess Hemerly, Google, 'Public Policy Considerations for Data-Driven Innovation', *Institute of Electrical and Electronics Engineers Xplore*, 0018-9162/13.
[43] http://theodi.org/about-us.
[44] http://theodi.org/case-studies/spend-network-0-case-study.
[45] http://theodi.org/case-studies/placr-case-study.
[46] http://theodi.org/case-studies/locatable-case-study.

- A study of public transit ridership in Chicago has been able to do some preliminary linkage of real-time transit updates along routes via their own real–time system to modest increases in ridership.[47]
- Geospatial technology like maps, satellite imagery, GPS and other location data, are major drivers of the US economy.[48] Extended impact on the broader economy is huge with geospatial services delivering efficiency gains valued at many times the size of the sector itself. Across industries and firm sizes, a wide sample of US managers and executives assess that geospatial services drives $1.6 trillion in revenue opportunities and $1.4 trillion in cost savings, representing 15-20 times the size of the geospatial services industry itself.

ii. Enabling open innovation for public sector

There is significant scope for government to make better use of its own data internally. Data-driven innovation is growing in importance as an essential factor of production across all sectors and functions in the economy. Colloquially known as 'big data', it involves deriving insight through the rigorous analysis and interpretation of many discrete sets of data, to solve problems in new and often unexpected ways.

For government, data-driven innovation represents a huge opportunity to reduce costs to taxpayers while increasing the quality of services to citizens. This is particularly true with respect to healthcare, the largest growing area of government spending and a looming future challenge.[49] In the US, McKinsey found more effective use of data in health could provide as much as $300 billion in value.[50] In Australia, equivalent measures would generate $6 billion in value each year.[51]

What makes data today so 'big' is the challenge of taking the many various resultant forms of data—operational data, process data, statistical data, aggregated data tables, linguistic data from documents, ethnographic data, and metadata—and linking them together to derive meaningful insight.[52]

Government needs facilitate internal data sharing within government in order to enhance services to citizens and gain the greatest efficiencies. For one agency's data to have maximum value, it will often need to draw on the data of another agency. The same challenges noted above for the public release of data, such as interoperable formats, also inhibit fellow government agencies from innovating with government information.

Examples

- Data collected and analyzed by the US National Highway Traffic Safety Administration has enabled safety improvements that target specific problems identified through data analysis. Combining multiple sources of municipal data across agencies and with other datasets – –

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[47] http://www.sciencedirect.com/science/article/pii/S0968090X12000022.

[48] www.oxera.com/Oxera/media/Oxera/downloads/reports/What-is-the-economic-impact-of-Geo-services_1.pdf.

[49] Grattan Institute, 'Game Changers', June 2012; Productivity Commission, 'Australia's Productivity Performance: Submission to the House of Representatives Standing Committee on Economics', September 2009.

[50] McKinsey Global Institute, 'Big data', 2012, http://goo.gl/Yu0NJ.

[51] Back calculated from McKinsey findings – Federal health expenditure of $52.8 billion in 2012, assuming a similar costing saving of 8%, this equals to AUD $4.2 billion; applying a 50% increase on cost savings gives a total value of AUD $6.3 billion.

[52] Jess Hemerly, Google, 'Public Policy Considerations for Data-Driven Innovation', *Institute of Electrical and Electronics Engineers Xplore*, 0018-9162/13.

such as constituent posts on Twitter – can help local governments develop public health policies that include as factors such health determinants as neighborhood air pollution, traffic collisions and availability of fresh foods.[53]

- New York City's open data initiative makes data available in reusable formats, cataloging them to enhance discoverability.[54] In New York City, data have become fundamental to improving city services via predictive analytics, or "preemptive government." According to city data analyst Michael Flowers, this strategy has resulted in a "five-fold return on the time of building inspectors looking for illegal apartments" and increased "the rate of detection for dangerous buildings that are highly likely to result in firefighter injury or death."[55]

- The City of Palo Alto in California, USA operates an open data platform with the aim to make their government more inclusive, transparent and provide more connectivity to the community. The platform provides data in demographic, geospatial, and economic form. It includes an 'open budget' tool to enable citizens to better understand the city's financial information as well as an 'open permit' data set for development application information.[56]

- There is huge scope to better use data to evaluate the effectiveness of government spending programs. Writing for the Atlantic, two senior officials from the Bush and Obama administrations estimated that "less than $1 out of every $100 of government spending is backed by even the most basic evidence that the money is being spent wisely."[57] They went on to note that "less than $1 out of every $1,000 that the government spends on health care this year [2013] will go toward evaluating whether the other $999-plus actually works." And that "since 1990, the federal government has put 11 large social programs, collectively costing taxpayers more than $10 billion a year, through randomized controlled trials ... Ten out of the 11 ... showed 'weak or no positive effects'." Clearly, improving the data collected on government spending programs could vastly improve the impact of taxpayer dollars.

C. Rethink procurement

The cost of procurement is a significant deterrent to accelerating innovation in the public sector. Innovation using a test and learn approach requires low cost procurement processes that encourage innovators to interact with government.

The challenge in Australia is lengthy tender documents, multiple forms and stringent business requirements (e.g. size of insurance, workers compensation certificates), which create high compliance barriers that make it hard for tech startups to compete with large, established tech companies.

Many of today's government procurement and technology planning processes were put in place before web services and broadband access. Updates are needed to make procurement more efficient and enable innovative new solutions to compete on a level playing field with incumbents.

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[53] Ibid.

[54] https://nycopendata.socrata.com.

[55] Jess Hemerly, Google, 'Public Policy Considerations for Data-Driven Innovation', Institute of Electrical and Electronics Engineers Xplore, 0018-9162/13.

[56] http://www.reichental.com/?p=551.

[57] Peter Orszag and John Bridgeland, 'Can government Play Moneyball?, The Atlantic, 19 June 2013, www.theatlantic.com/magazine/archive/2013/07/can-government-play-moneyball/309389/.

Government needs to design better procurement processes to ensure it can obtain value for money, while not placing too onerous a burden on providers. Currently, the balance is very conservative. Total Australian Government procurement contracts added up to approximately $41 billion in 2012, with only 39% of contracts awarded to small and medium enterprises (0-199 employees). The impact of improving the ability for Australia's small and medium sized business sector to participate in government procurement is significant given they represent is 2/3 of GDP.

Countries with well implemented digital procurement systems have relatively higher small business participation. Korea's sophisticated procurement system supports 41,000 public entities, 191,000 registered suppliers and over $50 billion in activity – with far great SME involvement. The estimated savings to government and suppliers are over $6 billion each year.

Bringing procurement processes online improves transparency and increases competition for services. It also improves efficiency through faster, more standard processes and reduced transaction costs. Online procurement processes can scale easily across agencies within a government, enabling more effective oversight and dramatic cost savings:

- Deutsche Bank analysis suggests moving procurement online could save €10-15 billion per year in the EU in operational costs, and another €40-60 billion as a result of price reductions achieved through competitive bidding on online auctions.
- In Austria the Federal Procurement Agency reported savings of €178 million against a procurement volume of €830 million.
- In the UK the Buying Solutions site reports savings frequently exceeding 10% (and up to 45%) by using online Auctions to negotiate supplier prices.
- Since Spain's Basque government implemented online procurement, the number of companies that take part in tenders has increased by 14%.[58]
- During the first two years of their on-line reverse auction use in procurement, Brazil's federal government is estimated to have saved up to US$1.5M.[59]
- During the first three years of their online procurement system, Romania achieved €150 million in direct price savings – a 24.5% reduction in cost.[60]

Beyond online procurement systems it is also possible to explore the use of 'event based' procurement to encourage greater participation of the small business sector (particularly tech businesses). This approach uses a competitive 'trade show' type event to allow businesses to pitch their idea direct to potential purchasers in a controlled and probity compliant manner. This approach was used in the PwC Transport for NSW 'app hot house' events looking for the provision of real time public transport information for commuters.

[58] http://unpan1.un.org/intradoc/groups/public/documents/un/unpan048064.pdf pp. 131.
[59] www.unpan.org/DPADM/EGovernment/KnowledgeBaseofEGovernmentPractices/tabid/1264/mctl/Study_View/ModuleID/3535/CaseStudyID/192/language/en-US/Default.aspx.
[60] http://www.unpan.org/DPADM/EGovernment/KnowledgeBaseofEGovernmentPractices/tabid/1264/mctl/Study_View/ModuleID/3535/CaseStudyID/128/language/en-US/Default.aspx.

4. What to do first

A. Data

i. Accelerate open data

Australia has a positive policy framework for open data, but progress making data available has been slow. For example, compare the 540 data sets available at the Australian Government's data.gov.au to the 88,161 at the US Government's data.gov and 12,678 at the British Government's data.gov.uk.[61]

The Government's focus on executing policy and delivering outcomes in the *Policy for E-Government and the Digital Economy* to "accelerate Government 2.0 efforts to ... provide expanded access to useful public sector data" is welcomed.

The challenge that remains is for agencies to release information with the objective of outsourcing and encouraging innovation, not because of an obligation. There is a strong tendency within government to only release data once it has been extensively curated and vetted. This approach drastically reduces the amount of data that is publicly available while increasing the cost of the amount that is made available (while delivering minimal added value).

> The priorities for open public data should be:
>
> - First, to make data available in raw form, in beta if necessary, in real time, with any appropriate caveats. Data must be in open, interoperable machine readable formats and under open licensing that allows online uses. Government should refocus its role to concentrate on surfacing data as the platform.
> - Second, to provide APIs to allow people to build web services on the data to showcase and surface the data in different ways, such as mobile apps and maps. Concerns about the veracity of data are significantly mitigated when the data is surfaced through an API as the data can be dynamically posted and updated.
> - Third, if government has resources, it can value add to provide a more 'retail' service experience, however, this shouldn't delay the release of raw data.

ii. Data-driven innovation

Data-driven innovation, or big data, represents a huge opportunity to reduce costs to taxpayers while increasing the quality of services to citizens by boosting government's analytical ability to enable it to make better decisions.

> Apply data-driven innovation within government to derive insights on the effectiveness of all government programs. Set aside 1% of the expenditure of every program to gather data to analyse the program's impact.

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[61] http://data.gov.au/dataset; http://data.gov.uk/data/search; http://catalog.data.gov/dataset (accessed on 29 November 2013).

iii. Data policy

Data policy is the next frontier in technology law, and the ecosystem and the economic activity it generates require flexible and adaptive policy to grow. Data-driven innovation is growing in importance to the economy and rigid regulations on data collection, storage and use hamper this evolving area.

For the benefits of data to be fully realized, policymakers need to understand its power, embrace its utility and carefully address the challenges it raises without sacrificing any of the potential it offers. Data-driven innovation raises some important questions that challenge traditional regulatory notions of privacy, ownership and transfer.

The application of traditional approaches to personal data can create problems where overly broad definitions of what is personal data have unintended consequences through blurring the line with non-personal data. The traditional concept of notice and consent to inform users also requires additional flexibility. For example, in the EU a case involving non-personal fishery data fell into the definition of personal data when used in a way that created value for the environment and economy – prohibiting its use.[62]

> Consider more flexible approaches to existing regulation to ensure the ability of the government, scientific community and industry to capitalise on the economic and social benefits of data-driven innovation, striking a reasonable balance with the privacy needs of individuals.

B. Reducing red tape with open innovation

i. Easing compliance burdens

Reducing the administrative burden of dealing with government (red tape) is a key policy of this government.[63] Removing regulation is not the only way to increase productivity. The overall goal is to reduce the time citizens spend on these administration tasks. There is significant potential to use technology to drive this cost closer to zero through more effective use of digital channels to reduce the cost of compliance.

Examples of the areas where technology could play a role in reducing red tape include:

- Reducing the regulatory burden of Australian universities reporting to government. Each university operates with a compliance department of approximately 15-20 staff.[64] Increasing the automation of reporting of information is a key area where technology can deliver benefits.
- Increasing the transparency, accountability and efficiency of regulators also has potential to be solved through the application of technology.[65] These processes are largely information flows that lend themselves to technological solutions.

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[62] H. Hinz et al., "Confidentiality over Fishing Effort Data Threatens Science and Management Progress," Fish and Fisheries, 22 May 2012; http://onlinelibrary.wiley.com/doi/10.1111/j.1467-2979.2012.00475.x/abstract.
[63] http://www.liberal.org.au/boosting-productivity-and-reducing-regulation.
[64] http://www.joshfrydenberg.com.au/guest/SpeechesDetails.aspx?id=225.
[65] ibid.

ii. Greater use of open innovation

To improve the efficiency of the regulatory system government should look to greater use of open innovation techniques, enabled by APIs. Government should provide APIs for government services, and allow the private sector to build products that allow citizens to securely access the data they have stored in government services in new and innovative ways.

The Government's *Policy for e-Government and the Digital Economy* notes that "government's role should be more constrained... preference for private rather than public ownership and provision and competitive markets." Creating API's for government services that will allow authorised developers to create apps for those services is an achievable way to outsource innovation. Government should see its role as providing the core service, but take advantage of opportunities to outsource tech innovation to the market. This will lead to a far better consumer experiences.

> Create APIs for government services that will allow authorised developers to create apps for those services and provide them to the public.