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29 July 2016

The Manager
Data Availability and Use
Productivity Commission
GPO Box 1428
Canberra ACT 2601

ACS Response to Productivity Commission's Issues Paper – "Data Availability and Use"

Dear Sir/Madam,

Please find attached the ACS response to the Productivity Commission's Issues Paper – "Data Availability and Use." You will see that our response is in the form of providing answers to those questions posed in the Issues Paper which we see as most relevant to the ACS membership and our core objectives.

If you require any further information regarding this submission, please contact Athol Chalmers, ACS Director, Policy and Public Affairs

Yours sincerely

Andrew Johnson
Chief Executive Officer

This submission excludes responses to the following Inquiry areas:

Questions on access to private sector data

6. Would such voluntary arrangements raise competition issues? How might this change if private sector information sharing were mandated? Is authorisation (under the Competition and Consumer Act 2010 (Cth)) relevant?

8. How can the sharing and linking of private sector data be improved in Australia? What lessons or examples from overseas should be considered?

Questions on consumer access to, and control over, data

3. Are there other ways to encourage greater cultural acceptance amongst businesses of consumer access to data about them?

4. What role do third party intermediaries currently play in assisting consumers to access and use data about themselves? What barriers impede the availability (and take-up) of services offered by third party intermediaries?

5. What datasets, including datasets of aggregated data on consumer outcomes at the product or provider level, would provide high value to consumers in helping them make informed decisions? What criteria should be used to identify such datasets? What, if any, barriers are impeding consumers' access to, and use of, such data?

Questions on resource costs of access

2. To what extent are data-related resources in agencies being directed towards dealing with data management and access issues versus data analysis and use?

3. What pricing principles should be applied to different datasets? What role should price signals play in the provision of public sector data?

Questions on privacy protection

4. Are further changes to the privacy-related policy framework needed? What are these specific changes and how would they improve outcomes? Have such approaches been tried in other jurisdictions?

5. How could coordination across the different jurisdictions in regard to privacy protection and legislation be improved?

6. How effective are existing approaches to confidentialisation and data security in facilitating data sharing while protecting privacy?

Questions on other restrictions

3. Is there need for a more uniform treatment of commercial-in-confidence data held by the Australian Government and state and territory governments?

AUSTRALIAN COMPUTER SOCIETY

Productivity Commission Issues Paper

"Data Availability and Use"

Submission by the

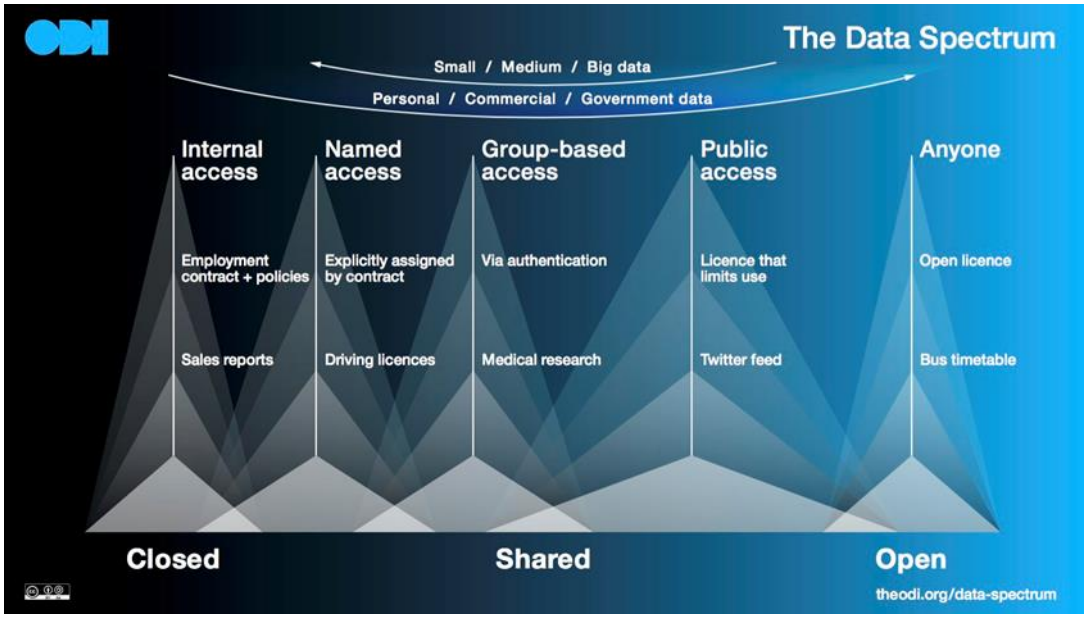
Australian Computer Society Inc

29 July 2016

SECTION 1 – EXECUTIVE SUMMARY

With the global and accelerating digitalisation of social, business and economic activities, flows of re-usable public and private data are such that the implications for economies and society are considerable. They hold the promise of helping us address some of our biggest national challenges by facilitating research and the development of new products, processes, organisational methods and markets – a phenomenon known in the OECD as 'data-driven innovation' (DDI).[1] This should result in greater productivity across the economy. Available evidence suggests that firms using DDI have raised productivity faster than non-users by around 5-10%.[2]

But not all data are the same, or open. The UK's new **Open Data Institute** (co-founded by Sir Tim Berners-Lee) has clearly shown the types of data available across the spectrum of organisations, their characteristics and 'openness'.[3]



The true value of data is highly context-dependent and multiplies when it is shared and linked with other data sets. DDI can help address social and global challenges, including climate change and natural disasters, health and ageing populations, water, food and energy security, urbanisation, and issues of public governance. But DDI raises considerable challenges. It is difficult to measure, thus making cases for its adoption difficult to prove. In Australia the estimated economic benefit of open government data (OGD) alone ranges from $500 million to $25 billion per annum[4] causing policy makers significant issues when arguing for regulatory and legal light-touch regimes to facilitate more open data. Australia's performance in the OGD stakes is mixed. A July 2015 report

1 DDI refers to the use of data and analytics to improve or foster new products, processes, organisational methods and markets. See short address for this page: http://oe.cd/bigdata

2 OECD STI Policy Note, *DDI for Growth and Well-being*, October 2015, page 1. http://www.oecd.org/sti/ieconomy/PolicyNote-DDI.pdf

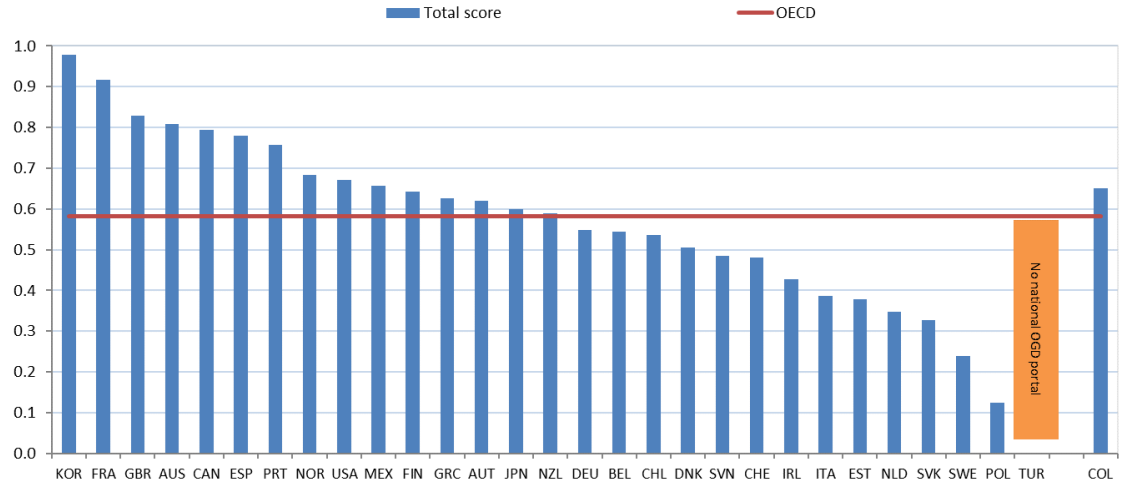
3 The Open Data Institute. www.theodi.org

4 Australian Government Bureau of Communications Research, *Open Government Data and why it matters now*, February 2016, page 36 – Conclusion. https://www.communications.gov.au/departmental-news/open-government-data-and-why-it-matters-now

from the Department of Prime Minister and Cabinet notes that in relation to available data sets - *"Australia lags the US and the UK in releasing public data for business, and lags NZ in the application of data to policy design. All three countries made an upfront investment to drive data policy with a top-down mandate from Ministers"*.[5]

However, in terms of overall usability of released data, a 2014 OECD report ranks Australia fourth amongst OECD countries. See Table 1 below:

Table 1 – OECD *OUR D*ata Index - Open, Useful, Re-usable Government Data (2014)



Source: OECD Report – *Government at a Glance 2015* – (page 151)

Nevertheless, there is no doubt that more needs to be done in Australia to overcome inherent risk aversion in the public sector, misunderstanding about the extent of privacy risks, and improving and enlarging the pool of skilled data analysts. In this context, Australia has committed to joining 69 other countries in the Open Government Partnership[6] (OGP). One of the required commitments of OGP is to deliver a country action plan. Consultations in Australia commenced in November 2015, however any resulting action plan[7] has yet to be released.

The growing use of data will accentuate questions of privacy and security, and the impact of technology on jobs. New concerns will arise, for example around automated decision-making, data-driven discrimination, and a likely shift in power derived from a new "data divide," based on who owns, collects and analyses the data.

Commentators argue that spill over impacts of data access and the consequent DDI will be optimal for the economy. But some of the spill-overs of data cannot be easily observed or quantified (for

5 Australian Government Department of Prime Minister and Cabinet, *Public Sector Data Management Project*, July 2015, page 5.
https://www.dpmc.gov.au/sites/default/files/publications/public_sector_data_mgt_project.pdf

6 http://www.opengovpartnership.org/country/australia

7 https://ogpau.govspace.gov.au/introduction/

example, socialisation and behavioural change, cultural and scientific exchange, or greater levels of trust induced by transparency).

If rigorous policy support is not developed for these issues, governments risk under-investing in data and data analytics and may end up giving access to data for a narrower range of uses than socially and economically optimal. This risk undermines our capacity to innovate, because data and its analysis have become a form of capital, a fundamental input to innovation, akin to Research and Development.

To ensure the sustainability of the open agenda, the emphasis on open data should be additional to, not a replacement of, the existing information initiatives at multiple points including social, organisational and jurisdictional. We need to assure that the open data agenda does not negate or overtake Freedom of Information.

ACS makes a number of recommendations aimed at significantly improving the open data regime, and in so doing helping to drive better national outcomes, including addressing pressing and significant national challenges.

A major impediment to the greater access to data or data sharing within government is the lack of regulatory/legislative clarification. Several of the recommendations in this document speak to this challenge.

ACS recommends;

1. **Establishing stronger leadership in the public sector** to drive change from the top-down. This means reviewing the Prime Ministerial Statement of December 2015 to enforce a *mandatory requirement* on Departmental Secretaries to publish data or as part of the public sector's performance framework.
2. **The Federal Government appoint an Open Data Evangelist** to oversee strategic and operational progress. This Evangelist could also perform an advocacy role in supporting the rights of individuals around their own information, hence ensuring a co-ordinated message. The function of Open Data Evangelist may be performed by an individual, or a collective in the form of a Council.
3. **Implementing a national education and awareness raising campaign** which helps form a new social contract with citizens around open data and its implications and benefits. An important broader agenda here is to enable people to understand the value of their own data, and hence empowering consumers on issues of access to and control over data concerning them.

4. **Encouraging and establishing partnerships** between the private sector and the research community to enable early optimisation of data release
5. **Greater collaboration with the education sector** to increase the pool of skilled data analytics specialists
6. **Increased investment** in infrastructure resources (i.e. national broadband network) to facilitate innovation and the development of more open data based products and services
7. **Reviewing relevant regulatory and legislative settings** to ensure they align with, and are not barriers to, a world leading open data regime. Australia should have a goal to be one of the leading OECD countries in terms of number, type and quality of data shared. Achieving this will require, amongst other things, adopting a regulatory culture which asks "if not, why not?"
8. **Developing a framework** that supports anonymisation of valuable data sets, incorporating processes to deal with the 'mosaic' effect. This will in turn facilitate wider sharing. Failure to protect individuals or organisations from exposure will result in reduced up-take of DDI.
9. **Developing a framework** to provide data sets to the Australian research community
10. **Standardising and releasing government-held** spatial data sets as open source, encouraging geo-coding of all information wherever possible.
11. Developing a nationally accepted definition for **Personally Identifiable Data (PID)** and recommended methods for de-identifying PID from other data.
12. Developing an **Accounting Standard for Data** – In the Digital Economy, data should be considered a primary factor of production. Unless the value of data can be estimated in an accounting sense, data will be undervalued as a factor of production in the Digital Economy. Open data is nothing less than a fundamental building block of competitive advantage – a form of capital on par with financial and human capital. It is estimated that 84% of the market value of S&P 500 companies comes from intangible assets, including patents, software and data. The term "data capital" fulfils the literal definition of economic capital: a necessary input for producing goods and services. It is an economic factor of production.[8]

[8] Paul Sonderegger. The Rise of Data Capital, http://www.oracle.com

SECTION 2 – INTRODUCTION

The Australian Computer Society was formed in 1966 and is Australia's peak body for ICT professionals with over 22,000 members and a national footprint. Like all professional bodies, a core function of the ACS is the assessment and accreditation of its members as Certified Technologists or Certified Professionals. Assessments are conducted against an internationally accepted framework called Skills for the Information Age (SFIA). To retain professional status ACS requires certified members to undertake ongoing professional development activities. For more information about the ACS, please see www.acs.org.au.

ACS also conducts research-based advocacy on behalf of members on ICT and skills related issues, and is increasingly starting to work more with Australian workplaces (public and private) to help them with their ICT workforce planning and training needs.

ACS is responsible for the professional accreditation of ICT degrees in Australia. It has accredited 950 education programs at a range of Australia universities and a number of registered training organisations (RTOs) that provide higher education degrees in ICT. ACS works closely with the Tertiary Education Quality Standards Agency (TEQSA) to align courses with national standards. It also works with the Australian Council of ICT Deans in the accreditation process.

SECTION 3 – ACS RESPONSES TO SELECTED QUESTIONS

This Section outlines the ACS response to those questions posed in the Commission's Issues Paper which we consider most relevant to the ACS membership and our organisational objectives.

QUESTIONS ON HIGH VALUE PUBLIC SECTOR DATA

1. What public sector datasets should be considered high value data to the: business sector; research sector; academics; or the broader community?

Firstly, to consider value, datasets are best considered a product – an extract, commonly a point in time extract – usually from an operational information system of some type. Hence there are a range of issues around context buried in the dataset production such as data element syntax and semantics.

Datasets are assumed to exist when they are in fact a made artefact. They require that the appropriate quality standards are embedded in the system from the beginning, and are dependent on information management standards and skill sets. Retrofitting or 'cleaning' datasets is not really a sustainable approach.

In an environment where government(s) increasingly contract manage rather than provide direct services, the information about services can reside with outsourced private providers. Ensuring specification of data quality, data set provision, in addition to the recordkeeping, information management and access requirements in contracts becomes a vital part of infrastructure to perform government as well as to be transparent about government.

PwC[9] has estimated that sectors with the highest value-creation opportunities are those industries with high potential growth paths, those with already existing competitive advantages, and those who have a high relative size and contribution to our GDP.

Based on their own modelling, the PwC results outlined in Table 2 suggest health, mining and retail have the highest potential for high value creation after datasets from these sectors are analysed, used and re-used. Other data-sets that have been the most sought after in global jurisdictions as well as Australia are:

- Meteorological and environmental (natural resource)
- Geo-spatial, statistical and legal
- Social, cultural content
- Economic, traffic, transport
- Tourist and leisure

Table 2 – PwC's Value Capture Index of Australian Industries

Industry	Innovative and learning culture	Technological adeptness	Access to skilled persons	Volume of stored data	Value Capture Index
Health Care and Social Assistance	1	5	5	4	15
Mining	5	5	1	4	15
Retail Trade	4	1	5	5	15
Transport, Postal and Warehousing	1	4	4	5	14
Wholesale Trade	4	4	2	4	14
Arts and Recreation Services	5	2	3	1	13
Electricity, Gas, Water and Waste Services	2	5	1	3	13
Professional, Scientific and Technical Services	5	4	1	3	13
Information Media and Telecommunications	5	3	3	4	13
Public Administration and Safety	4	4	5	2	13
Accommodation and Food Services	1	5	2	1	12
Manufacturing	3	2	2	5	12
Administrative and Support Services	3	3	1	3	11
Financial and Insurance Services	4	1	1	5	11
Construction	1	3	4	2	10
Education and Training	3	2	2	2	9
Other Services	2	2	4	1	9
Rental, Hiring and Real Estate Services	3	1	3	1	8
Agriculture, Forestry and Fishing	2	1	3	2	8

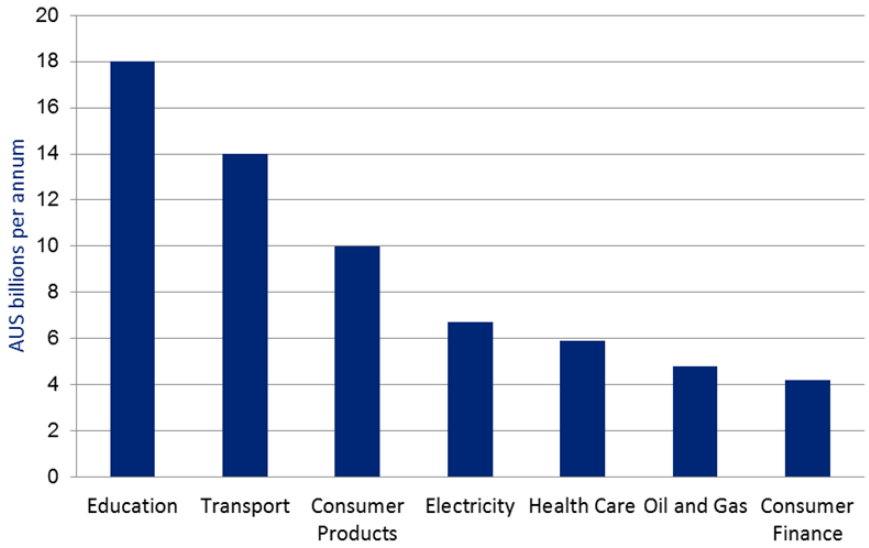
Source: PwC Report – *Deciding with Data – How data-driven innovation is fuelling Australia's economic growth* – September 2014 (page 26)

Access and re-use of public sector data by the private sector (including scientific and research users) will be a clear stimulus to DDI through the economic value created by the private and scientific sectors. Not all data has the same value potential. The Bureau of Communications

9 PwC, *Deciding with Data: How data-driven innovation is fuelling Australia's economic growth*, September 2014 - http://www.pwc.com.au/publications/data-drive-innovation.html

Research quotes a different study that suggests education, transport and the consumer product sectors will unlock the most value if open data is increased[10]. See Chart 1.

Chart 1 – Estimated potential benefits of open data, by sector, Australia



Source: Gruen et al. analysis of data from McKinsey Global Institute (2013) *Open data: Unlocking innovation and performance with liquid information*. New York

The most valuable data sets for researchers are often those that are most sensitive. The ability to harness a wide range of large, constantly evolving and highly personalised data sets is a strong driver of productivity and supports the creation of new, high value services.

Spatial data sets also have some of the greatest potential for economic impact supporting use cases from improving transport and logistics to helping resolve property disputes. The number of use cases for spatial data have increased dramatically as more services come to include a spatial component. All data "happens" somewhere and so the spatial component of data associated with services, vehicles, machines, buildings, infrastructure, livestock, weather and people brings added richness to new service creation. Just as we once debated the need to develop a single standard railway gauge, the multiple frameworks for recording spatial data should be harmonised under one national standard. Further, data from the various Australian state and federal data sets should be released under an open source licence. Australian spatial data is more likely to create value for Australia than any other data sets.

10 Australian Government Bureau of Communications Research, *Open Government Data and why it matters now*, February 2016, Conclusion. https://www.communications.gov.au/departmental-news/open-government-data-and-why-it-matters-now

2. What characteristics define high value datasets?

Value in datasets is a function of how it is used – to spark innovation, improve business processes, and inform decision making among other uses. Criteria for value may differ according to discipline and considering who the intended audience is. Generic characteristics include:

- **Uniqueness** – to what extent are there no other sources of this information?
- **Maintenance** – is this data set going to age quickly? (twelve months may be a good indicator of minimum viability)
- **Reusability** – was the data collected with general purpose or limitations on the initial collection and format
- **Contributes to transparency** – for example election details, budget, staff costs, contracts
- **Clear target audience** – for example part of a remit to educate a specific community.

Characteristics such as easy access (interoperability, standards and minimum regulation), integrity (are the data "true") and price (no more than marginal cost of allowing access) will be key to innovative use of open government data.

In addition, assumptions are made as to the useful life of public sector data – commentators place it at *no greater than five years.* It may help to place a 'use by' or 'best before' date on all public sector data. This will define a useful lifetime for that data and offer privacy protection on the data in its retirement, and participating agencies will be more comfortable knowing that liability is limited.

3. What benefits would the community derive from increasing the availability and use of public sector data?

Gaining access to anonymised versions of significant, national data sets is crucial to understanding and addressing significant national challenges and helping drive increased national productivity and growth. By making the most of its data, the Federal Government could grow the digital economy and improve people's lives by transforming how policies and services are delivered. Benefits will include:

- Citizen empowerment in decision-making
- Better service delivery and transparency/accountability from government
- Performance measurement inside government
- New business creation leading to innovation, job creation and tax revenues
- Better service delivery from the private sector
- Improved public debate

Example: Data challenges in the Health Sector. This sector, including provision of aged care services, overtook the Retail Sector in 2011 as the largest employer in Australia and yet it continues to struggle with growing challenges in health service delivery. Despite the estimated spend of $147 billion in 2012-13, the sector faces long term challenges including the changing case mix driven by Australia's ageing population, and substantial increases in levels of chronic disease.

Three significant developments over the past five decades make this a major public policy and economic challenge: firstly, the developments within our healthcare system to address all types of

diseases with interventions and pharmaceutical support to reduce their impact on quality and life expectancy; secondly, lifestyle changes dominated by the rise in chronic health conditions such as diabetes, cardiac conditions and their resultant negative impacts on health and workforce productivity; and finally, increased life expectancy of an aging population with more than one chronic condition.

Bridging the gap between innovation and adoption will be critical to addressing this growing challenge. "Health Care" is such a complex system of systems that modelling and simulation – the flow of patients through the health care system, changes to payment systems, the introduction of new technologies or treatment procedures, and construction of new hospitals – are critical components of future planning, similar in many ways to clinical trials. Datasets and knowledge are the foundation to ensure that we are focused on the most critical and valuable interventions to transform delivery.

At the same time, such data requires the greatest level of security. In many cases, it can be linked back to individuals, research institutes, hospitals, GP practices et al. The opportunities for misuse by industry (pharma, insurance) must also be a consideration.

A "Citizen centric", integrated care system is the current focus of the countries with a commonwealth system. This requires the joining of available data sets to ensure that trial and error is not the basis of change. The data sets which would drive the greatest change include:

- Health Workforce data
- Medicare and PBS data
- Public and private hospitals data
- Health insurance claims data
- Disability data
- Mental health data
- Residential aged care data
- Community aged care data
- Data on key health and aged care

These data sets are the most valuable in addressing the challenges in Health in the sense that they would allow modelling and simulation trials to test new forms of service delivery, including the impact of telehealth.

QUESTIONS ON COLLECTION AND RELEASE OF PUBLIC SECTOR DATA

1. What are the main factors currently stopping government agencies from making their data available?

The barriers to greater data sharing within and across public bodies can be administrative, legal and cultural. In the past it was essential to respond to high-profile losses of data by strengthening measures to ensure its safe storage and transfer. This has, however, led to public bodies becoming increasingly risk averse with respect to data leaving their direct locus of control. While this may

have been a well-intentioned attempt to reduce risk it has also compromised the benefits of sharing data.

Currently, the Federal Government's capacity to fully derive value from public sector data is constrained by competing priorities and the lack of an overarching strategy. A common practice is for agency to agency negotiated memoranda of understanding. This can be inefficient and labour intensive, and are reflective of the absence of an overarching strategy. Developing such a strategy is not necessarily straight forward. We need to be aware of the fragmentation in the information governance space, and the need to knit a framework together across agencies such as the National Archives and Office of the Australian Information Commissioner.

There is no clear mandate for the Federal Government to use and release public sector data. There are barriers (perceived and real) to sharing data within the Federal Government and with jurisdictions to improve policy and service delivery.

There may be insufficient incentives, skills and organisational arrangements within the Australian Public Service (APS) to fully capitalise on its data. There is not a strong culture of publishing data to foster economic opportunities. A number of factors are at work here, including:

- Risk averse culture, organisational and institutional challenges such as:
    - Where resources are actually located with outsourced providers, and the need to proactively identify and safeguard information.
    - Technology with large files, bandwidth, formats, and data locked in proprietary systems.
    - A culture where information is not necessarily viewed as an asset resulting in data not being valued.
    - No assigned responsibilities.
    - Risk aversion to publishing where data isn't 100% correct.
    - Risk aversion meaning it is easier to do nothing, and resulting in use of the privacy act to push back.
- Low skills base
- Policy constraints
- Regulation, licensing and privacy concerns
- Costs and budgetary constraints
- Lack of interoperability and standards to ensure consistency
- Low demand signals
- National security
- Absence of incentives to encourage sharing and developing frameworks to appropriately make more datasets open.
- While some work[11] has commenced, there is a general absence of cross agency co-ordination around sharing best practice and harmonising approaches.

[11] Victorian Privacy Commissioner on sharing personal information
https://www.cpdp.vic.gov.au/images/content/pdf/privacy_guidelines/CPDP_Information_sharing_guidelines.pdf

As an example, the Department of Human Services collects and uses a wide range of personal, health and sensitive information in order to deliver services, payments and carry out their mandated functions. Information is also used for planning, funding, administering, monitoring, evaluating, integrating and improving services and functions. Where appropriate and practicable, the DHS removes identifying details from information used for these purposes.

DHS collects information directly from individuals or third parties (family members, other government agencies or private organisations) where necessary. When the DHS collects personal information, it must be reasonably necessary for, or directly related to, the payments or services that they deliver. The type of personal information collected will depend on the kind of payment or service that being delivered, and the legislation under which the payment or service is provided. The collection of personal information may be specifically required or authorised by law, operating under 14 major Commonwealth Acts ranging from the Australian Hearing Services (Act 1991) to the Medical Indemnity (Act 2002).

The DHS privacy policy states that:
"Your personal information will not be shared across our service areas unless you have given your consent, or the sharing of your information in this way is authorised or required by or under law or the use is otherwise permitted by the Australian Privacy Principles.

We conduct data matching activities in accordance with legislation and legally binding guidelines issued by the Office of the Australian Information Commissioner. We comply with a Programme Protocol for each of our data matching programmes in accordance with guidelines issued by the Office of the Australian Information Commissioner."

In practice this means that services which could be created and be extremely valuable to citizens, are currently not possible due to legislative limitations on data sharing. The ability to identify "trigger points" in the lives of DHS clients would be facilitated by the ability to share personal data much more widely within government.

In this context, the Productivity Commission's June 2016 Research Paper "*Digital Disruption: What do governments need to do?*"[12] provides valuable insights in relation to government regulation and how best to align that regulation with the pace of change in the digital economy. In particular, ACS supports Findings 4.1, 4.5 and 4.9 listed below:

12 Australian Government Productivity Commission Research Paper, *Digital Disruption: What do governments need to do?*, June 2016, http://www.pc.gov.au/research/completed/digital-disruption/digital-disruption-research-paper.pdf

FINDING 4.1

The pace of change has implications for how governments undertake regulatory functions. Some regulations and regulatory approaches are explicitly preventing the development and efficient adoption of technologies. In principle, governments should:

- adopt a 'wait and see' approach to new business models and products rather than reacting quickly to regulate what may be unrealised risks. However, policy to act should be defined within a maximum timeframe to ensure progress.
- where relevant regulations already exist
  - adopt fixed-term regulatory exemptions, without compromising privacy, for innovative entrants that maintain overarching regulatory objectives (as recommended by the *Business Set-up, Transfer and Closure* inquiry)
  - use the opportunity of disruption to reform markets where there have been undue regulatory restrictions by removing restrictions that impose a competitive disadvantage on incumbents rather than extend existing restrictions to new business models
- where regulation is needed to manage negative externalities, take a proportionate approach (that is, balance the benefits and costs) and regulate outcomes not technologies
- take an evidence-based approach drawing on Australia's scientific agencies in making assessments of the risks to the community from new technologies
- regularly review regulations affected by digital technologies, especially where an increasing share of activity is mediated through digital platforms
- assign the responsibility for reporting to the parties best able to comply at least cost, and design transparent mechanisms for dealing with complaints.

FINDING 4.5

Digital technologies allow for more pervasive collection of data on individuals and firms and can be a medium for harassment and security breaches. This may change what is needed in order to:

- protect individual's privacy
- prevent the unlawful use of information
- maintain the integrity of digital networks.

The case for government action in these areas relies on ensuring that the likely benefits of any restrictions outweigh the costs of restrictions to the community.

FINDING 4.9

Governments (particularly at a subnational level) have already made increasing use of digital technologies in on-the-ground service delivery. Some adoption of technology in regulatory processes is also evident. There remain, however, issues that governments need to confront before the benefits of digital technologies can be more widely realised.

- A risk averse culture in the development of policies that are wide-reaching within the relevant jurisdiction could be assuaged by measures such as: greater use of policy trials, relying on precedents from other jurisdictions; and drawing on recommendations and advice of independent agencies.
- Skill sets within the public service need to evolve in tandem with technological change. The capacity of agencies to recruit staff with relevant skills and shed those with inadequate skills could be enhanced by more flexible performance management and termination conditions in agency enterprise agreements.
- A sharing of data and cooperation between agencies would improve capacities to solve complex problems that do not fit neatly into the competencies of a single agency.
- Governments need to find ways to:
  - exploit, in their program delivery and policy making processes, the increased transparency that comes with digital technologies.
  - avoid locking in details of policy responses at early stages without scope for genuine re-evaluation 'en route' to the end objective.

2. How could governments use their own data collections more efficiently and effectively?

Australia's capacity to remain competitive in the digital economy is contingent upon its ability to harness the value of data. A leading edge "open data" policy has the potential to dramatically impact the performance of government itself as agencies are substantial producers and consumers of an enormous variety of data, a great deal of which is relevant to more than one agency. As a simple example, the Department of Education knows where the schools are and needs to know where the students will come from in future. The Department of Human Services knows where the students are coming from and needs to know where the schools are. Both departments collect data on both.

One possible solution is to use a "clearing house" approach to receive data from agencies, check it for standards compliance and provide a central cloud base for its retail and end user distribution or sale. It would be far easier and more palatable for agencies to work with another agency, and much easier for business and the public to work with a single agency, rather than dealing with multiple agencies for data.

Action is needed to meet the Government's 2013 election commitment to increase access to useful public sector data.[13]

- Make the transfer of data between different parts of government more efficient, less costly and more transparent so that evidence of benefits can be seen internally – this leads to better awareness of those benefits and a more sharing 'culture'
- Re-engineer budget constraints to allow more access and sharing between departments, and align budget funding with agencies to promote open data publishing
- Improve skills in the public sector about accessing and analysing data sets
- Develop common data access programs, and generate awareness of what programs exist
- Re-engineer internal procedures
- Benchmark and measure success or failure/report it
- Allow public servants to create new apps themselves (foster competitions and awards to generate productive interest and 'buzz')

***Unleashing the Potential*, Open Data White Paper. UK, 2012**

"But it is not enough to simply push out data and then absent ourselves from the debates and conversations that follow, not least because we cannot always predict with any degree of certainty how data is being used in all cases or how it is stimulating growth and innovation.

As with all government digital services, we need to demonstrate a relentless focus on user need. As well as promoting better, flexible and more intelligent IT systems, supported by transparent contracts, we need to have a clear engagement strategy with those third parties that are often our primary data users.

Individual developers, SMEs, citizens, academics and large companies will all be users of government data and we need to ensure that we have robust engagement models in place to allow two-way conversations to happen. This way, a primary user can tell us what datasets they would like to see released as a matter of priority, inform us when there are anomalies or mistakes in our data to help us to serve them more efficiently, and keep us abreast of usage which in turn builds into our body of research." [14]

13 http://www.malcolmturnbull.com.au/assets/Coalitions_Policy_for_E-Government_and_the_Digital_Economy_(2).pdf

14 HM Government, *Open Data White Paper – Unleashing the Potential*, June 2012, page 17. https://data.gov.uk/sites/default/files/Open_data_White_Paper.pdf

3. Should the collection, sharing and release of public sector data be standardised? What would be the benefits and costs of standardising? What would standards that are 'fit for purpose' look like?

The rationale for the Australian Government's provision of open data is strongest for raw data. Raw government data is likely to exhibit the strongest public good characteristics, and hence the broadest benefits from its release. In general, net public benefits will be greater if significant value adding (beyond provision in machine-readable form) is left to the market, as the market sector will generally have more informed insights in identifying what value-add is of benefit to the users. The private sector, especially in developed industries such as ICT, generally have a more established capability and capacity in transforming raw data into products and services that could be introduced in the market.

A set of Australian Standards which builds a framework of "Trust" with data sharing would enable much wider sharing. This necessarily requires considering what constitutes standards including international practices to inform and provide a base to build upon. For different data sensitivity levels, the framework must support preservation of privacy, describe appropriate governance and support practical data sharing. This must include:

- Establishing the right eco-system for access is essential and standardising all aspects of collection and management of data is key to the business model of data in the public sector
- Using open, globally accepted standards
- Starting to design new datasets with public access in mind
- Posting full data sets on public websites in open source
- Improving ICT infrastructure
- Ensure de-identification systems are not compromised through the 'mosaic' effect
- Providing ideally a single point of access, such as a usable portal
- Computer-readable data using rich site summary feed (RSS) and common metadata to support descriptions of datasets
- Commence 'use cases', so that a successful pilot project proves the value of open data. Low-hanging fruit cases would be the best pilot projects. ACS acknowledges that PM&C's project team are developing such projects now
- Be prepared to accept failure.

The Productivity Commission has recognised optimum conditions for standardisation.

> *"Governments do not necessarily need to be involved in the development of standards, but where standards are mandated (as a form of technical regulation), following good regulatory principles would mean that standards:*
>
> - *are the minimum necessary to achieve regulatory objectives*
> - *maximise interoperability*
> - *follow international standards where practicable and relevant, unless use of standards based on Australian technology would deliver higher net community benefits*
> - *are developed in consultation with the private sector.*

In negotiating international standards, the interests of the Australian economy rather than individual businesses should be of primary consideration."[15]

4. What criteria and decision making tools do government agencies use to decide which public sector data to make publicly available and how much processing to undertake before it is released?

All data sets which do not include personally identifiable information should be made public. A significant challenge to this statement is that there is not yet a nationally accepted, unambiguous test for the presence of personally identifiable information in a data set (or set of data sets). Recommendation 11 speaks directly to this challenge.

5. What specific government initiatives (whether Australian Government, state, territory or local government, or overseas jurisdictions) have been particularly effective in improving data access and use?

The NSW State Government's initiatives regarding Open Data demonstrate the right direction (2016 Open Data Action Plan[16]). The Queensland Government's partnership with the ODIQ (first Australian-based node of the Open Data Institute[17]) is also a positive initiative.

QUESTIONS ON DATA LINKAGE

1. Which datasets, if linked or coordinated across public sector agencies, would be of high value to the community, and how would they be used?

The most valuable data sets for researchers are often the most sensitive. When linked, they become even more sensitive due to the potential to identify individuals. Whilst there is value in sharing "open data" widely, there is value in sharing data with research institutes to explore issues of subtlety and complexity for non-commercial purposed. Providing a framework under which research organisations can gain access to anonymised versions of significant, national data sets is crucial to understanding some of the most significant national challenges including health, the implication of an aging population and national productivity.

Agencies that hold large volumes of data, collected through administration of services and programmes, and surveys, such as ATO, the Australian Bureau of Statistics (ABS), the Department of Human Services (DHS) and the Department of Social Services (DSS) could benefit through richer analysis of linked data (for example, longitudinal analysis to understand intergenerational mobility).

However, privacy and secrecy concerns (real and perceived) often constrain the ability to link or publish this data. Perceived barriers in the privacy and security areas must be clarified, addressed and removed. Some land and spatial data are restricted due to licencing and more could be done to link science data with government administrative data. For example, geocoded national address data has been made openly available to enable innovation and assist with planning and address validation.

15 Productivity Commission, *Digital Disruption: What Do Governments Need to Do?,* Research Paper, Finding 4.2, page 9

16 https://www.finance.nsw.gov.au/ict/resources/open-data-action-plan

17 http://statements.qld.gov.au/Statement/2016/7/26/open-data-partnership-to-create-new-opportunities

It is important to highlight that privacy, security and access to data concerns are a social conversation. Expectations change overtime – it is naturally all about trust. We can see the importance of a social conversation in the current debate concerning identified census records, and how easily trust can be threatened even for a well-respected public institution.

2. Which rules, regulations or policies create unnecessary or excessive barriers to linking datasets?

Progress on open data has been slow within the Federal Government, with policy responsibility spread across various portfolios. Multiple policy documents in areas such as big data, cloud computing, and open data together with various legislative enactments are restricting the use of data to the purposes for which it is collected. These include:

- Privacy Principles, various differing state privacy Acts
- Commercial-in-confidence applications in public sector
- National security enactments, which may be over applied and then provide no mechanisms to automatically revert to lower security status

A major impediment is the lack of regulatory/legislative clarification – the government sector is one of the greatest curators and consumers of data in Australia. The regulatory complexity posed by Federal and State Privacy legislation highlights the challenges associated with greater sharing of government data. It is far too easy to read "not allowed" into existing regulations at one or more levels and so effectively prevent opening up of government data. Clarifying regulations associated with the release and use of government data will help encourage different government agencies to open up and share data. Efforts have been made at both Federal and State levels, however adoption of a more proactively open data policy which asks "if not, why not?" framed within the scope of existing legislation would go a long way to providing the necessary clarity many agencies need to open up data sets.

3. ***How can Australia's government agencies improve their sharing and linking of public sector data? What lessons or examples from overseas should be considered?***

The Federal Government is not capitalising on data to evaluate and improve services because the data is often not shared between agencies or with third parties. For example, when individuals move from one departmental programme to another (such as the Department of Defence to the Department of Veterans' Affairs, or DSS to the Department of Health) there are instances where data and client history is not transferred.

Government programmes, such as health and employment initiatives, are often evaluated but the results are rarely shared with third party providers, such as not-for-profit organisations.

Overall, the lack of data sharing prevents feedback on policy and hinders the potential for data to improve future service delivery. Possible solutions include:

- Appoint Open Data 'evangelist' across APS
- Change culture from the top down

- Ministerial mandate of 'presumption to publish' and accountability reportable by Departmental Secretaries
- Start to design new datasets with public access in mind
- Post full data sets in public websites in open source
- Improve ICT infrastructure
- Clarify who owns datasets
- Improve skills of public servants and provide supporting incentives

Case study: How the UK government is building data analytics capabilities

As part of its digital transformation, the UK Government is building data analytics capabilities through four strategies:

1. build the right environment by replicating private sector culture;
2. get the right people in by hiring high-profile experts from the technology/private sector, with an expectation that they would 'bring in' other experts;
3. embed policy staff alongside the makers and 'doers' in 'dream teams' of policy officers, data analysts and visualisation experts; and
4. make bureaucrats accountable for progress through a Minister-chaired Board which provides Ministers with means to assess and direct the civil service as it progresses.

Organisations such as the Open Data Institute (UK)[18], the Sunshine Foundation (USA)[19] and Privacy By Design (Canada)[20] provide principles for proactive disclosure, which also seek to maximise individual privacy. In this area, Australia has an opportunity to adopt the good work done by these international organisations.

QUESTIONS ON HIGH VALUE PRIVATE SECTOR DATA

1. What private sector datasets should be considered high value data to: public policy; researchers and academics; other private sector entities; or the broader community?

PwC modelling indicates that the Mining industry is enjoying the greatest rewards from data-driven innovation, with economic value between $6.1 billion and $9.1 billion[21] (refer Chart 2 below). This is to be expected given the sheer size and capital intensity of its operations. Individual resource projects can cost over $5 billion – even a one percent efficiency dividend would lead to savings of $50 million.

The Financial and Insurance Services industry is not far behind, with the value of data-driven innovation to the economy estimated to be between $4.8 billion and $8.4 billion in 2013. The Manufacturing industry rounds out the top three industries by value of data-driven innovation,

18 See organisation website for more information https://theodi.org/about

19 See organisation website for more information including "proactive disclosure" principles http://sunlightfoundation.com/opendataguidelines/

20 See organisation website for more information https://www.privacybydesign.ca/

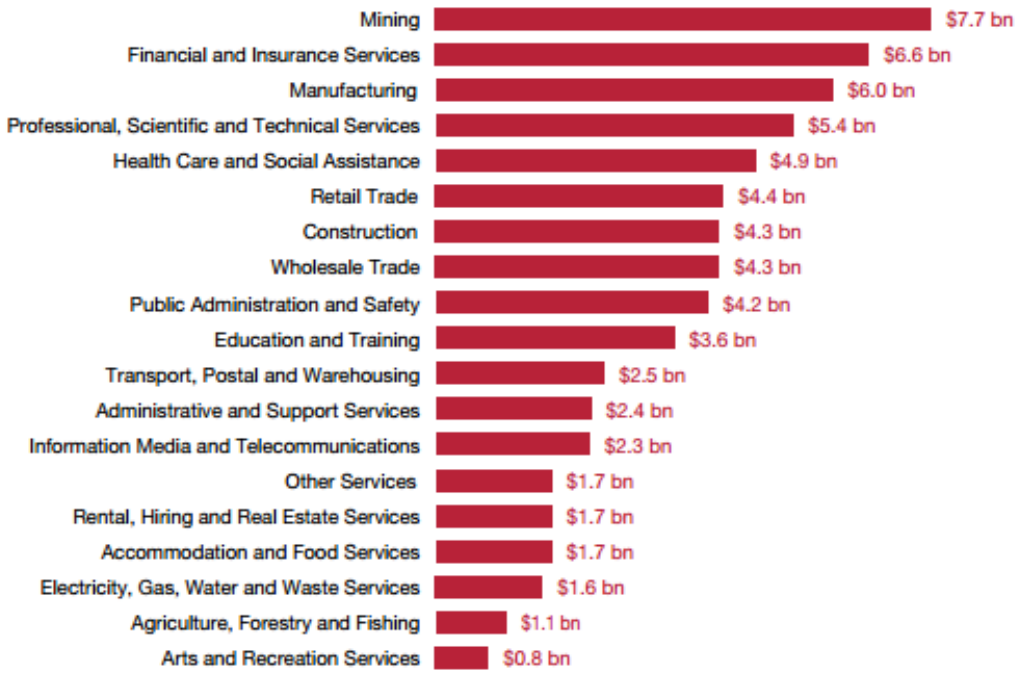
21 PwC, *Deciding with Data: How data-driven innovation is fuelling Australia's economic growth*, September 2014 (page 15) - http://www.pwc.com.au/publications/data-drive-innovation.html

with estimated GDP impacts of between $3.9 billion and $8.2 billion in the same year. Most data users and the community will benefit from access to these plus other datasets as below:

- geological/mining/resources
- finance
- traffic movements from road tolls
- retail habits
- consumer credit
- communications data

The benefits of data-driven innovation crosses economic and social boundaries, delivering value for consumers through products tailored to their needs and with more efficient production systems creating savings that can be passed onto consumers. Similarly, improvements to health services through data-driven innovation would result in lower health care costs.

Chart 2: Industries that are extracting value from data-driven innovation
Estimated Economic contribution of data-driven innovation in 2013 by industry (gross value added)



Source: PwC Report – *Deciding with Data – How data-driven innovation is fuelling Australia's economic growth* – September 2014 (page 15)

2. In each case cited, what characteristics define such datasets?

All datasets, to be useful to innovators, must be characterised by integrity (they must be 'correct'), affordable price, and reliably available and accessible.

3. What would be the public policy rationale for any associated government intervention?
Government intervention would be when there is a need to address market failures, setting up the optimal policy framework to allow the market to function, then allowing the private sector to operate without heavy regulation.

Public policy rationale for government intervention would be to ensure private sector datasets are properly secured, and that companies have adequate cybersecurity protection particularly for any data pertaining to individuals. Secondly, when data private sector data is shared and would normally contain personally identifiable data, it must first be anonymised before sharing.

4. What benefits would the community derive from increasing the availability and use of private sector data?
Data driven innovation, new businesses, job creation and better and life enhancing products and services will be key benefits the community. The community also benefits from knowledge spill-overs which occur as data-driven innovators exchange ideas, learn from others or build on other's innovations. There are also environmental benefits. As an example - data can be used to optimise freight networks and reduce the number of truck kilometres travelled.

QUESTIONS ON ACCESS TO PRIVATE SECTOR DATA
1. Are there any legislative or other impediments that may be unnecessarily restricting the availability and use of private sector data? Should these impediments be reduced or removed?

Key impediments restricting the use of private sector data include;

- Overlapping state and Commonwealth Privacy legislation requirements.
- Constraints in state legislation which allows for "Research exemptions" for the use of personally identifiable data and not for implementation of services delivered which are informed by the same personally identifiable data.
- Contractual and associated confidentiality constraints.
- Legacy IT architecture which in many cases does not allow capability to scale to the levels needed to enable DDI.
- Diversity of jurisdictional approaches to privacy, and in the absence of a clearly articulated framework private sector data access will be conservative.
- Privacy is largely misunderstood and not embedded in information management practice in organisations across the board.

In addition, many enterprises often do not understand the value of the data they hold, and so are not turning it into potential competitive advantage.

Some of these issues can clearly be addressed by organisations themselves, while others fall within the realm of government policy and legislation.

2. What are the reasonable concerns that businesses have about increasing the availability of their data?

Key concerns may be as follows:

- Potential loss of market advantage
- Brand and reputational damage if privacy is breached, or perceived to be breached
- Findings of Privacy Act breaches and the consequential penalties
- Customer concerns
- Commercial-in-confidence constraints

3. What principles, protocols or legislative requirements could manage the concerns of private sector data owners about increasing the availability of their data?

There is a view that privacy principles and data breach notifications could be modified where data can be shown to provide a public benefit due to factors such as increased innovation and efficiencies. For this to be successful would require a very clear and firm definition of public benefit. A pragmatic approach would be to seek:

- Better attention to opt in, opt out
- Greater capability to operate at granular (individual preference) level
- Improved education throughout the workforce on individual privacy and data ownership rights.

Ultimately, we would foresee a move towards mandatory breach notifications. This will improve transparency and the broader public's understanding of benefits and risks associated with personal data and privacy. Data breach laws enhance the public good with industry likely to react faster, patch holes, and prevent more breaches.

There will be likely hesitation from the private sector moving towards mandatory breach notices due to costs, potential brand and reputation harm, and the fear of the unknown comparing results to competitors. A phased implementation starting with the largest corporations before moving down the supply chain over a period of years will improve awareness, and assist expedite Australia's transition to a data fuelled economy.

4. Should the collection, sharing and release of private sector data be standardised in some way? How could this be done and what would be the benefits and costs? What would standards that are 'fit for purpose' look like?

At a practical level, the wide variety of private sector platforms would make standardisation complex and difficult. In addition, businesses use differing revenues models (such as advertisement, freemium, subs, licenses, fees) and this may lead to value attribution issues if standardisation is attempted.

Were some level of standardisation to be pursued, it could potentially be done by supplying agreed data to a central access point on a highly secured cloud platform, government built and based in Australia to avoid sovereignty of data issues (avoiding the storing of data on cloud platforms based in other countries). As a general comment, greater cloud services based in Australia would assist alleviate security and privacy concerns of Australian citizens. Attracting foreign investment to build

local infrastructure in this area would be a welcomed focus when coupled with a focus on creating an environment that incentivises the further development of the local cloud ecosystem.

At a market level, the private sector will generally only consider moving to a standardised approach if there is a perception that to do so would create some competitive advantage. ie market forces will be the key driver.

5. To what extent can voluntary data sharing arrangements — between businesses / between businesses and consumers / involving third party intermediaries — improve outcomes for the availability and use of private data? How could participation levels be increased?
The general principle is that the private sector will only act when there are clear business benefits in the market and/or appropriate incentives are provided. So voluntary data sharing is only likely to occur in instances where these conditions apply.

7. What role can governments usefully play in promoting the wider availability of private datasets that have the potential to deliver substantial spill over benefits?
Governments, directly and indirectly, can encourage economic growth and change by providing the right mix of incentives to innovate with data while balancing regulation and rules. Government can help by ensuring the free flow of data across nations and organisations, including provision of high-speed domestic broadband connectivity (this remains a significant barrier to DDI in Australia), open internet platforms, data portability and interoperability. Much of the activity associated with data in value chains is captured in international trade – trade in data-intensive services and trade in embedded ICT services.

Governments can help by:

- Reducing regulation on cross border data flows in domestic markets
- Establishing the optimal policy ecosystem in all trade agreements
- Facilitating data movement and re-use – creating an environment where data collectors feel confident that they can set up across countries, are across the regulatory environments and be efficient with data warehouse location and use.

9. Who should have the ownership rights to data that is generated by individuals but collected by businesses? For which data does unclear ownership inhibit its availability and use?

Protecting value and ownership rights to data involve balancing acts between the many vested interests, including the interests of the 'purported' owner, the 'custodian', the interests of competing third parties, and the interests of the public to access and use data.

Ultimately, whether ownership analogies are appropriate in the world of data would depend on the nature, context and characteristics of the data itself.

With the pervasive use of computer technology, a rapidly growing percentage of our data is created automatically from the use of Internet of Things (IoT), sensors, systems collecting transactional data and other devices. Data also includes public and private sector data, and data

concerning personal individuals. As most of the data collected comprise factually-based information, it is unlikely that they would be protected under our traditional intellectual property laws.

For the most part, traditional intellectual property laws and related rights have proven to be inadequate. These limited interests in data leave out several important rights, which are pertinent in the world of data, including the right to control access, disclosure and use.

The debate on data ownership rights has intensified as the use and control of data assets become more and more critical to our future economies and our ability to innovate — requiring re-balancing of the many commercial, private and public interests in data, and not least, privacy concerns.

This matter should be high on our legislative agenda. However, we should tread with caution, as there are layered complexities and issues pertaining to the granting of ownership rights in all data— especially data not currently embraced by our existing laws in relation to copyright, patent, confidential information and trade secrets.

QUESTIONS ON CONSUMER ACCESS TO, AND CONTROL OVER, DATA

1. What impediments currently restrict consumers' access to and use of public and private sector data about themselves? Is there scope to streamline individuals' access to such data and, if there is, how should this be achieved?

The Australian Prime Minister and Cabinet's July 2015 *Public Sector Data Management* report[22], at page 32, notes that UK and NZ research shows the public is cautious but supportive of open data research where it improves people's lives. The public trusts governments to hold their data, but has concerns on how it is used.

In Australia:

- Government is more trusted than most private enterprises, however people are less likely to trust government than their friends, family and local councils;
- Australians are often reported to be generally happy to provide personal information in exchange for a service. This is a contested view however with contrarians arguing that terms and conditions are too detailed and containing legalese that may not be fully understood, hence questioning whether a choice has actually been made akin to privacy 'consent';
- 60%-70% of people worry about organisations accessing personal information. The older (65-69) and younger (18-24) are most concerned; and
- People are most reluctant to share information on their financial situation.

Specifically in terms of impediments, key ones are:

- Confusion about ownership together with the individual's inability to insist on removal of personal data held on them;

22 https://www.dpmc.gov.au/sites/default/files/publications/public_sector_data_mgt_project.pdf

- Lack of awareness and education about the collection and storage of all data; and
- Fear of data 'leaks' in sensitive data sectors such as health and credit.

Overall the Government needs to build a better understanding of community trust toward public sector data, including perceived values, risks, and attitudes towards privacy and confidentiality. This could be informed by initiating a new ABS survey on community trust.

For Government to make effective use of data, it is crucial that there is public trust. It needs strong assurances about data privacy and security based on rigorous adherence to protocols and demonstrated value. A careful, phased approach to progressing the public data agenda is also needed to ensure that any issues or concerns are addressed along the journey.

Engagement should be targeted to key age groups and involve:

- a clear narrative and talking points detailing the purpose, value and role of public sector data and clearly explaining what data will not be released;
- an engagement champion to promote benefits and raise awareness;
- a dedicated website explaining the agenda, showing success stories, acting as a central point linking to a secure domain, data catalogue, analysis tools;
- social media pushing out key messages; and
- targeted articles on data's role in the digital economy, benefits and myth busting.

Overall, there is a responsibility to ensure a consistent and connected set of rules, principles and requirements for information management, recordkeeping, access, security, and data management that is coherent, understandable and under one framework.

2. Are regulatory solutions of value in giving consumers more access to and control over their own data?

Regulatory approaches will be a critical component. It must also be supported by targeted education programs to raise awareness about what consumers can expect from data collection and also what powers they have in relation to control over their own data.

Added capability to expand the My Gov type structure (with better data security) to enable individually controlled accumulating record of interactions with government over time, under complete control of the individual, would be a positive initiative.

Further health and social welfare practitioners on the ground are already managing in an environment acknowledging individual rights in data and information about them. Finding mechanisms to support and extend that understanding beyond the 'sensitive' health arena would be useful.

QUESTIONS ON RESOURCE COSTS OF ACCESS

1. How should the costs associated with making more public sector data widely available be funded?

Generally, 'user pays' should be the guiding principle. However, given that different levels of government collect significant amounts of raw data in the course of its usual operations — for example the provision of public transport services and education — much of the cost associated with data collection is already incurred. Where this is not the case, a variable pricing structure is amenable but only for a breakeven basis -- business and the general public will accept breakeven pricing but have great difficulty in accepting prices based upon making profit by public sector agencies.

Net public benefits of open government data are likely to be maximised by pricing at zero or, at the most, the incremental cost of provision reflecting its public good characteristics. The OECD recommends[23] non-commercial use at zero pricing and reduced pricing for commercial use will significantly increase the use of open government data.

4. Is availability of skilled labour an issue in areas such as data science or other data specific occupations? Is there a role for government in improving the skills base in this area?

The demand for ICT skilled workers and graduates -- especially in the fields of big data and cybersecurity -- is only going to increase. *Australia's Digital Pulse 2016* notes that the ICT workforce in Australia is expected to increase to around 695k by 2020, up from 628k in 2015, while new graduates currently only represent 1% of the ICT workforce -- meaning we are already suffering a skills shortage.

Government can improve this by promoting STEM at school, generating interest in ICT roles as career pathways for university, retrain current educators in schools and universities with ICT-based skills, and retrain current the workforce with relevant ICT skills. One demographic currently under-represented and a viable source of new ICT skilled workers are women.[24]

The report *Tomorrow's Digitally Enabled Workforce*[25] notes the implications for Australia:

- Education and training for a digital future has become more important than ever before
- New skills will be required for new types of jobs and roles not as yet realised
- Digital literacy is as important as numeracy and literacy in schools
- STEM is more important than ever before (associated with 75% of the fastest growing occupations) to prepare young Australians for a digital future, and yet participation rates have been in decline

Monash University noted in 2015 that "we have created 90% of the world's data in the last two years alone."[26] We are rapidly transitioning to a data-driven society and economy, and servicing

23 OECD, *OECD Recommendation of the Council for Enhanced Access and more effective use of Public Sector Information*, April 2008, http://www.oecd.org/sti/44384673.pdf

24 ACS report, *Australia's Digital Pulse 2016* -- http://www2.deloitte.com/au/en/pages/economics/articles/australias-digital-pulse.html

25 ACS report, *Tomorrow's Digitally Enabled Workforce* -- https://www.acs.org.au/__data/assets/pdf_file/0018/95103/16-0026_DATA61_REPORT_TomorrowsDigiallyEnabledWorkforce_WEB_160128.pdf

26 ACS report, *Australia's Digital Pulse 2016* -- http://www2.deloitte.com/au/en/pages/economics/articles/australias-digital-pulse.html/

this future requires full government and industry support in the education and promotion of data-driven roles.

Tomorrow's Digitally Enabled Workforce recognised that there will be continued exponential growth in data identifying six jobs of the future, two of which were specifically data related; 'Bigger Big Data Analysts' and 'Complex Decision Support Analysts'. The global trends on digitisation point clearly to the need for data science, data analytics, cyber security professionals, information management professionals. If Australia is to successfully position itself for the knowledge economy of the future, these are skills that need to be developed, harnessed and directed to Australia's competitive strengths. As a major employer of Australian citizens, government has a role to play developing this expertise and supporting transference across the broader economy.

PwC have estimated that lack of skills in data analytics will be the single factor compromising global growth of DDI. Data-driven innovation leans on the combined skills of statisticians, computer scientists and storytellers to extract insights from the mountains of data available. To lead the way in data-driven innovation, Australia must invest more heavily in human capital.

PwC 2014. Deciding with Data

"Clearly, the appetite is there – PwC's 2014 Global Digital IQ survey results show that 44 percent of business owners globally intend to spend more on data collection and analysis, making data the biggest priority for strategic technology across almost every industry. Data experts will be a scarce and valuable commodity. According to Gartner, 4.4 million IT jobs globally will be created to support big data by 2015, but only one-third of those jobs will be filled. In Australia, the lack of skilled persons is cited as the number one barrier to innovation for all Australian businesses."

The Productivity Commissions' recent research paper Digital Disruption: *What Do Governments Need To Do*? identified a number of important findings on the skills issue. That paper noted that education systems must now go beyond STEM skills to support the understanding of human behaviour and social systems, because both qualitative and quantitative reasoning are needed to enhance the sense of responsibility of future data-informed decision makers.

Simply increasing the share of STEM graduates is unlikely to resolve the low rates of adoption of digital technologies by firms. Given the relatively high underemployment of STEM graduates and apparent underutilisation of STEM skills, the current approaches are not delivering the problem-solving skills needed for technology rich work environments. Beyond delivering a high competency in literacy and numeracy at the school level, initiatives could include reviewing teaching methods, increasing flexibility of university degrees and improving information on employment outcomes for students to help inform student choice.

QUESTIONS ON PRIVACY PROTECTION

1. What types of data and data applications (public sector and private sector) pose the greatest concerns for privacy protection?

While health, credit and finance data are considered the most sensitive data sets, the obligations associated with handling of such data sets are very clearly laid out within State and Commonwealth legislation. A much greater challenge exists with the unambiguous identification of personally identifiable information within non-health or non-financial data sets. There is not yet a nationally accepted test for the existence of personally identifiable data. This leads to the challenge of authorised actors not knowing their full responsibilities when handing data sets, or the inadvertent release of personally identifiable data.

2. How can individuals' and businesses' confidence and trust in the way data is used be maintained and enhanced?

There needs to be a focus on better education and awareness programs which alert individuals and businesses to protections available. As a general principal, an increase in transparency as to how data is used within government and transparency on data sources, data provenance and business rules applied to data for decision making purposes.

Additionally, provision of all reference material (acts, policies, guidelines etc.) at a central site for use by all stakeholders and the public would assist.

3. What weight should be given to privacy protection relative to the benefits of greater data availability and use, particularly given the rate of change in the capabilities of technology?

Privacy protection is important, however will vary from individual to individual. The balance and weightings can be expected to alter over time depending on what benefits or otherwise consumers experience and the extent to which they know these benefits are attributable to data sharing technology and analysis.

7. What lessons from overseas jurisdictions can Australia learn from regarding the use of individuals' and businesses' data, particularly in regard to protecting privacy and commercially sensitive or commercially valuable information?

The UK, in its report *Unleashing the Potential*, advised proceeding with caution whilst setting ambitious goals. This should involve including privacy at the beginning of all discussions concerning new dataset releases; appointing a privacy expert; and ensuring robust frameworks are in place to manage privacy concerns and data protection. Successful open data jurisdictions operate from the premise that 'if it can be published, it should be' and top-down commitment from the government is essential to ensure risk-averse officials do not use privacy as an excuse.

8. What are the benefits and costs of allowing an individual to request deletion of personal information about themselves? In what circumstances and for what types of information should this apply?

There will be increased trust in open data if individuals know they can delete personal information. If the notion of co-creation or shared responsibility of personal data is followed through, then the

individual should have rights to destroy. However, those rights should be balanced against the role of data and records into the future for holding people to account. This is very much an issue at present for those affected by out of home care, forced adoption, in detention among other issues. An Information Advocate is needed to articulate the pros and cons.

9. What competing interests (such as the public interest) or practical requirements would indicate that the ability to request deletion should not apply?

Individuals do not currently have the right under the Australian Privacy Principles to delete information about themselves. However, the Principles do require entities holding personal information about an identifiable individual to destroy and de-identify such information when it is no longer required for a specific purpose. If it is proposed that an individual be granted an absolute right to request deletion of personal information, the issues and practical requirements militating against such a right would include;

- Vexatious applicants - rights' advocates may compromise entities' data holdings with constant and vexatious requests
- National security issues – certain entities retain data for national security purposes
- Data compromise – the rigour of data holdings may be weakened if entities are required to delete parts of them on request
- Cost – entities will face continuing costs of administration to deal with requests

Other considerations include the process by which data deletion requests are managed – for example, how an individual finds the right agency and responsible party for the data set, particularly when it may have passed through various revisions and agencies.

QUESTIONS ON OTHER RESTRICTIONS

1. Having regard to current legislation and practice, are further protocols or other measures required to facilitate the disclosure and use of data about individuals while protecting privacy interests? What form should any such protocols or other measures take?

ACS suggests a Ministerial mandate of 'presumption to publish' with departmental accountability attached to performance against this mandate. Further, ACS suggests appointment of an Open Data 'evangelist', with expertise in the field.

Additionally, better education and awareness programs which alert individuals and businesses to protections available are needed. As a general principal, an increase in transparency as to how data is used within government and transparency on data sources, data provenance and business rules applied to data for decision making purposes.

3. Are there merits in codifying the treatment and classification of business data for privacy or security purposes? What would this mean in practice?

Yes, this approach would be welcomed. All data can be codified for privacy or security considerations, and should be. What may start as business data, may end up in public or transferred to another party. Codifying doesn't have to be onerous, it can be as simple as automatically classifying data when its added, however it's vital to ensure data is monitored for

legal and contractual obligations to be met. Ensuring data is tracked with privacy and security in mind is vital for governance and public confidence.

QUESTIONS ON DATA SECURITY

1. Are security measures for public sector data too prescriptive? Do they need to be more flexible to adapt to changing circumstances and technologies?

ACS is not of the view that security measures for public data are too prescriptive. It's important there are guiding principles which are strictly adhered to, however the policies that implement these principles can and should be flexible. It is inevitable that the landscape will change over time.

To ease understanding and adoption, a small set of clear overriding principles that are broadly accepted and the public is aware of are required in order that a member of the public can know confidently what is happening with their data, for example when filling out a census. This is one of the most important features of data policy if public and private trust is to be built.

2. How do data security measures interact with the Privacy Act?

There should always be an interaction between the two, preferably overseen by an independent body or individual, such as the Privacy Commissioner, who can ensure data security is appropriate and being implemented in a way to meet privacy obligations.

It's vital to understand that privacy obligations cannot be abandoned because the problem of aligning security with privacy might be complex. The oversight must be also independent, it cannot be done by those looking after data collection, for obvious reasons.

3. How should the risks and consequences of public sector and private sector data breaches be assessed and managed? Is data breach notification an appropriate and sufficient response?

The strong trend towards increasing digitisation of services described throughout this paper is premised on confidence in the security of the underlying technology and of the data used to drive those services. Building confidence in new technology and approaches comes from honest declarations of when things have gone wrong.

To that end data breach notification is certainly appropriate, but not sufficient on its own. It's important to ensure any data sharing provisions aren't used as a way to bypass breach notification. Responsibility for data must be transferred when data is transferred – that is, if a company is responsible for ensuring data is not breached, and shares that data with another company, the second company has the same responsibility to that data. If the second company cannot be bound by that responsibility, the data should not be shared. Additionally, in this example, if a breach happens the second company is bound to report it – that is, responsibility cannot be avoided by sharing data with a third party who may be bound by different restrictions.

It's important to understand the value of data does not exist in a vacuum. Individually, one data set may not prove that useful if breached. If however, it is paired with another set of breached data set, profiles of individuals may be able to be built – leading to fraud, identity theft, and so on. This can

be true even if the individual data sets had been de-identified: on their own they remain anonymous, combined they enable identification.

The field is growing and there is a need for flexibility with regards to privacy, and so an annual review of policies would be advisable. Most important of all, however, is transparency both in process and with the private sector itself – companies must be clear on their responsibilities to the public. For example, if a company *is* sharing data with another company that has reduced responsibilities with regards to security and privacy, this must be made aware to the public. There is a real threat that data can be breached – and fuel cybercrime – when the responsibility for that data is invisible as it changes hands.

Data breach notification is necessary to ensure companies take responsibility for managing personal data. This is more than notifying the market place and government agencies. Where breaches involve personally identifiable data, it is essential individuals are notified as well. A culture of responsibility has to be engendered to ensure appropriate action is taken rather than sweeping breaches under the carpet.

When some states in the US (such as California) introduced mandatory data breach laws it galvanised the cybersecurity industry. Companies start spending a lot more ensuring data was properly secured, if only to avoid the embarrassment of breach or to prevent stock market losses from a breach. Rather than be an incentive to avoid reporting breaches, which is what currently happens, mandatory data breach laws reward good practice while poor practice is made visible, which in turn results in change to prevent future breaches.

Political leadership is required to ensure both public and private interests are protected through implementation of mandatory data breach laws and in turn the economic prosperity of Australian business.

SECTION 4 - CONCLUSION

The need for a shift in public culture and practice to make government and private data more accessible and usable and create a government and business sector that is more efficient and consultative has long been identified as a priority by the Australian Government. Access to open government data in Australia is economically important, as confirmed by multiple theoretical and empirical studies, with varying estimates of its net positive benefit. Some of these benefits include innovation, new data-driven products and services, increased operational efficiency in both the public and private sectors, and improved engagement from the public. Key industry players such as Google, Microsoft and Intel have made significant investments in making government data more accessible. Governments across the world, from the United Kingdom to India, are running open government data initiatives.

Despite Australia's recent Prime Ministerial statement on open data policy, more needs to be done to overcome inherent risk aversion in the public sector, misunderstanding about the extent of privacy risks, and improving the skills of data analysts.

But for some government and indeed private sector data, legal, security and privacy issues need to be considered. These include licensing conditions which act as a mechanism to balance access to government data and protect intellectual property rights, legislative requirements, accessibility support, and consideration of whether data contains sensitive information (for example, national security). These factors have limited the extent of, and depth of, data that is made available, and the timely release of data.

Costs associated with addressing these (sometimes imagined) constraints, and balancing these costs against the benefits of opening up access to data (which do not necessarily accrue to the parties incurring the costs—that is, the government), must be considered in an overarching government strategy.

Any cost/benefit mismatch reduces the incentives for governments to devote resources to opening access to data over its core operations, and sends poor messages to the business sector about re-using its own data. It is possibly the biggest challenge faced by the public sector in devoting funds to making data available, despite the wider economic benefits of doing so.

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