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Topic (i): How IT can contribute to changing organizational culture

A Case Study - How IT is contributing to changing the ABS culture

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I. Introduction

1. Like other NSO's, the use of Information and Communication Technology (ICT) in the Australian Bureau of Statistics (ABS) is integral to its business. ICT is fundamental to the ABS achieving its mission of leading a high quality, objective and responsive national statistical service.

2. Few organisations can truly claim to have been in at the start of a new era, but this is true of the ABS with the introduction of computing in Australia. This year (2014) marks 50 years of computing in the ABS with the establishment of a Data Centre at Head Office in 1964, and satellite computing servicing major State offices.

3. Moreover, Statisticians tend to be comfortable and capable users of ICT. Indeed, they have shaped future directions of the Bureau and its business through a sometimes aggressive pursuit of new and advance ICT applications. This has proved both beneficial in providing a receptive environment for the innovative application of new technologies; and a challenge in framing these within the context of a sustainable technology environment that contains cost and complexity.

4. There are of course many internal and external forces that shape and change the culture of an organisation. Technology is but one factor, albeit a significant contributor and sometimes a disruptive catalyst for transformational change. The innovative application of technology often has a profound and influential impact on all aspects of an organisation – structure, processed, products and services, work and skills, culture, and interactions with customers, stakeholders and across government.

5. In the ABS, examples of technology application to date such as the knowledge management and collaborative working environment; workforce mobility, mobile devices and applications; and digital data and information management shape not just the Bureau's processes and way of working but increasingly, the culture of the organisation.

6. Whilst there has been a long history of innovative ICT adoption and application, NSO's to date have often been characterised as slow moving and resistant to more fundamental business and cultural change; valued more for their stability and consistency. Technology investment traditionally has been expected to last a long time. The new paradigm is for more agile, flexible and responsive NSO's, transformed business processes and information centric, enterprise capability ICT investment. Cultural impacts and changes entailed in moving to this new paradigm are profound.

7. This paper examines some of the ways in which ICT is contributing to changing the ABS culture - opportunities, challenges and approach – using work underway for the 2016 Population Census as a case study. The focus is not so much upon the technologies themselves but their impacts upon the core cultural characteristics of the Bureau.

II. Context and Background

A. Business Transformation

8. National statistical organisations are confronted with a range of challenges driven by client demands for new and innovative statistical products, improved data quality, delivered faster and at less cost. Equally, there are demands to reduce the costs of information provision and potential for new, vast sources of information to be tapped. These expectations, demands and opportunities are brought into sharp relief by a background of on-going budget constraints. These challenges facing national and international statistical systems are well - documented: 1, 2, 4, 5, 6, 7.

9. Like other NSOs, the Australia Bureau of Statistics (ABS) is looking to meet these challenges through transformation of its business. The ABS is radically transforming the way it collects, manages, uses, re-uses and disseminates statistical information 3. It will drive a standards based, enterprise approach to transformation through investment in its statistical information infrastructure and the re-engineering and unification of business processes. Technology solutions and services are a critical enabler for this transformation.

10. Developing the capabilities within an organisation to successfully deliver organisation transformation on the scale envisaged is, in itself, a significant challenge. Supporting capabilities and change management initiatives to enable the transformation include: new governance structures and investment processes, comprehensive change management and communication strategies, partnerships between business and ICT teams, and a new approach to development and support of enterprise solutions, underpinned by Enterprise and Service Oriented Architecture principles and Agile development methodology.

11. Delivering this business transformation program entails profound cultural change.

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[1] [1] Brian Pink, Jenine Borowik & Geoff Lee, *The case for an international statistical innovation program –Transforming national and international statistics systems*, Statistical Journal of the IAOS: Journal of the International Association for Official Statistics, IOS Press, http://iospress.metapress.com/content/2h5764574t6318r4/
[2] http://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.50/2011/wp.10.e.pdf
[3] http://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.50/2012/15_Australia.pdf
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B. Whole of Government Strategies

12. In September 2013 a new Australian federal government was elected with a new ICT policy on E-Government and the Digital Economy. Objectives included accelerating the digital economy through enabling infrastructure and on-line engagement, smarter ICT investment and leadership to reduce costs, lift productivity and deliver better services. There is a focus on 'Digital First' or Digital by Default', utilisation of cloud computing, shared ICT services, utilisation of 'big data' and shared data sets.

13. At the same time the government established a National Commission of Audit as an independent body to review and report on the performance, functions and roles of the Commonwealth government. The Commission has a broad remit to examine the scope for efficiency and productivity improvements across all levels of Commonwealth expenditure. The Commission is due to report to the Prime Minister, Treasurer and Minister for Finance early in 2014.

III. 2016 Australian Census of Population and Housing

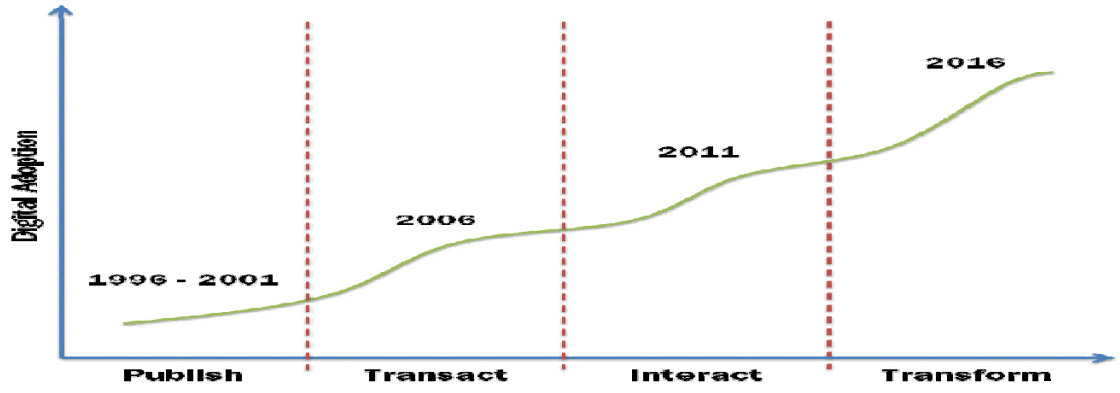
14. The 2016 Census will be the first truly Digital Census, laying the foundation for a more sustainable, more effective and more efficient social and population statistics program. The initial Digital Census vision was articulated by the Australian Statistician in 2011, starting our journey towards a very different Census in 2016.

15. Significant change away from the traditional census model, which has formed the basis for enumeration over the past hundred years, is required in order to address challenges in recruiting field staff, maintaining relevance with Australian society, taking advantage of technology advancements and establishing a foundation for innovation across the whole ABS statistical program.

16. The Census in 2011, whilst integrating a range of electronic channels, was conducted using a traditional Census model of starting our count from scratch, geographically blocking the country and managing these blocks with a hierarchy of field officers. The use of technology was orientated around digitising current services, like the eForm or the Census Manual, not on re-engineering.

17. The Census in 2016 will be the first Digital Census; the first Census built 'digital first', a transformation where we rethink the business model to be orientated around data. The Digital Census starts with a national register of dwellings (a list of addresses) rather than a blank sheet, and then data collection operations populate this register with characteristics of the dwelling and the people that reside or are staying in them.

Figure 1: Digital adoption by Census of Population & Housing

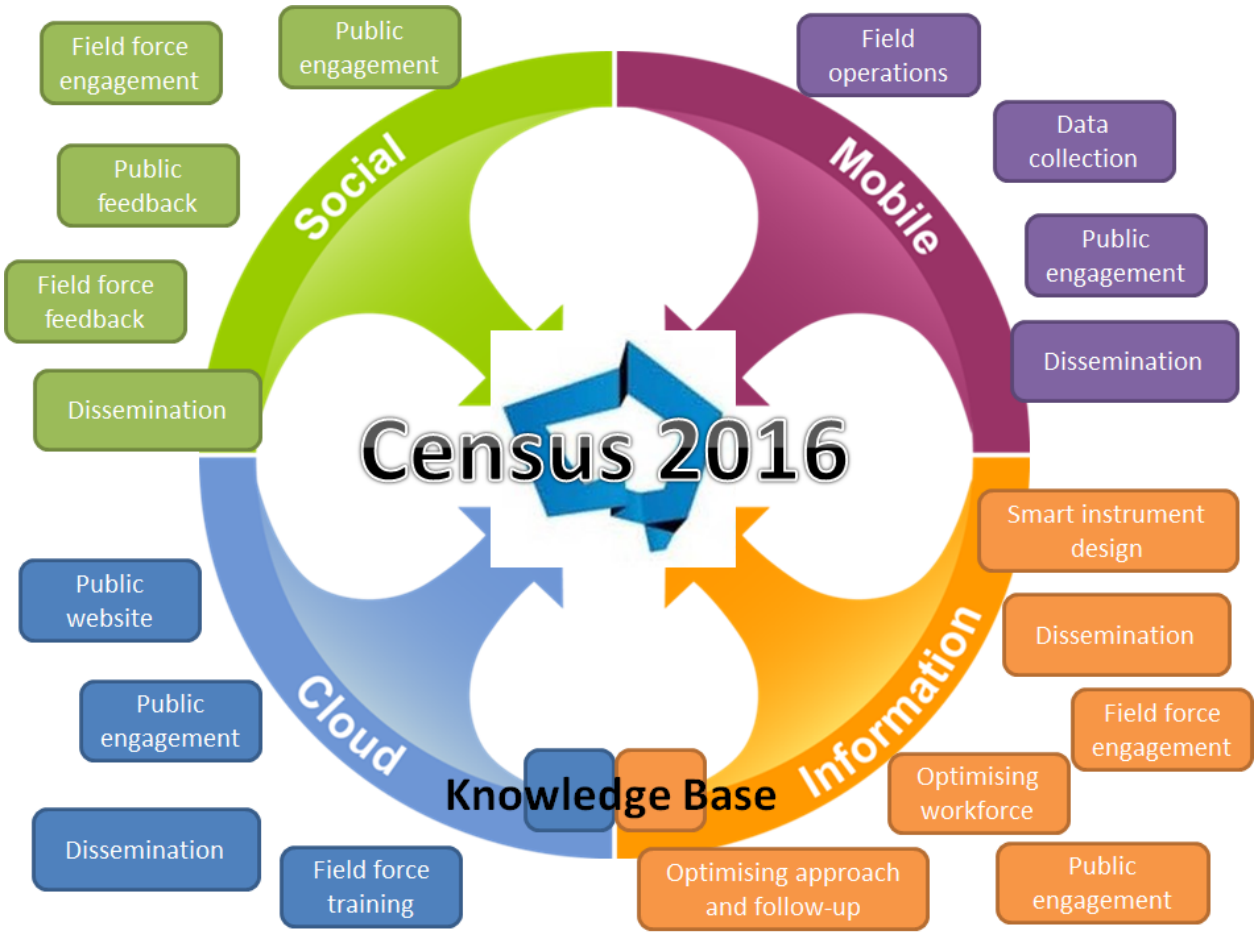


18. The 2016 Digital Census will have numerous methods to approach and follow up households (advertising only, unaddressed mail, addressed mail, field officer contact, self-registration), and these methods will be selected based on an existing understanding of the dwelling (geographic-based demographics and past behaviour, e.g. 2011 eCensus take-up rates), gained insights (tracking of customer contact and real-world events) and macro-priorities (impact of this dwelling on sub-population counts). The most common method is expected to be approaching and reminding households using addressed mail, with follow up by field officers where required, however all methods are likely to be used at different times or in different locations.

19. A Digital Census does not mean a completely automated Census, nor does it necessarily mean a complex Census. What is clear however is the significant investment in technology that will underpin a fundamental change in approach – not just for the 2016 Census but across the whole ABS statistical program – and drive significant cultural change internal and external to the ABS.

20. The 2016 Digital Census will take advantage of the emerging mega-trends of information analytics, mobile, cloud and social in all aspects of the operation. The Digital Census will also develop and heavily utilise geo-spatial infrastructure in the design, operations and outputs of the program.

Figure 2: Digital Census using Mobile, Social, Cloud and Information



21. The 2016 Digital Census aims to:

- optimise field workforce deployment based on real-time data;
- shift all parts of the population into being willing, online respondents;
- deliver a richer data set through targeted respondent prompts;
- provide analytics-driven, relevant and personalised data dissemination;

22. The Digital Census also has a focus on ***enterprise solutions***; to design and deliver, as well as test, the foundations of the corporate capabilities (processes, methodologies, infrastructure, skills) that the ABS will need for its digital future including provider management, event and operations management, address register, geospatial services, eCollection and field force management.

23. More broadly, the 2016 Digital Census aims to contribute to:

- positioning the ABS as a leader in digital government within Australia in line with expected incoming government priorities;
- the opportunity for the ABS to relaunch itself as the Digital ABS and information managers and deliverers of insight, rather than as a survey organisation;
- leadership on exploring the retention, integration and access of data by the ABS and ensuring that any changes here maintain public trust and support;
- assisting ABS to contribute to the whole of government geospatial community and promote the statistical spatial framework; and
- maintaining and building our leadership role as a national and international statistical organisation.

24. The Digital Census is on track to meet its milestones. Field tests have increased confidence of our ability to have compliant, digitally-willing households participate in the Census for minimal cost, but highlighted the need to improve our plans for those that are less digitally-willing or compliant. Our ability to meet our coverage and efficiency targets will not be assessed with confidence until the August 2014 Test.

25. The increasing adaption, integration and reliance on technology brings with it new challenges for the enabling ICT infrastructure – in performance, availability, resilience, disaster recovery and security. In particular there are more risks of catastrophic failure, rather than local incidents, and these risks need to be successfully mitigated. Planning for a second data centre is underway to address the requirement for redundancy and failover in enumeration processing.

26. Finally, ***partnerships*** are critical to the successful delivery of the 2016 Digital Census. Multiple areas in the ABS working in partnership, and with external vendors and service providers over the next three years will be critical not only for the conduct of the Census, but in ensuring that the Census has an enduring, positive impact on the transformation of the Digital ABS.

IV. How IT is contributing to Cultural Change

27. In examining the 2016 Digital Census as illustrative of the way in which IT contributes to changing organisational culture it should be noted that many other examples of technology application, indeed many other forces, are shaping cultural change. Taken together, these represent a powerful combination of forces – although they may not always be directionally aligned, consistent or complimentary.

28. What is ‘organisational culture’; what forces shape and change it; and how may change be successfully managed? There is a significant body of research and plethora of material on these and related questions and this paper does not seek to revisit this ground. As a framework for discussion this paper examines the contribution of IT to change across some core cultural characteristics (themes). [This is not an exhaustive list]:

- Agility and flexibility
- Dynamic, real time decision making
- Partnering and external collaboration
- Organisation structure and responsibilities
- Strategic Leadership
- Technology management

A. Agility & Flexibility

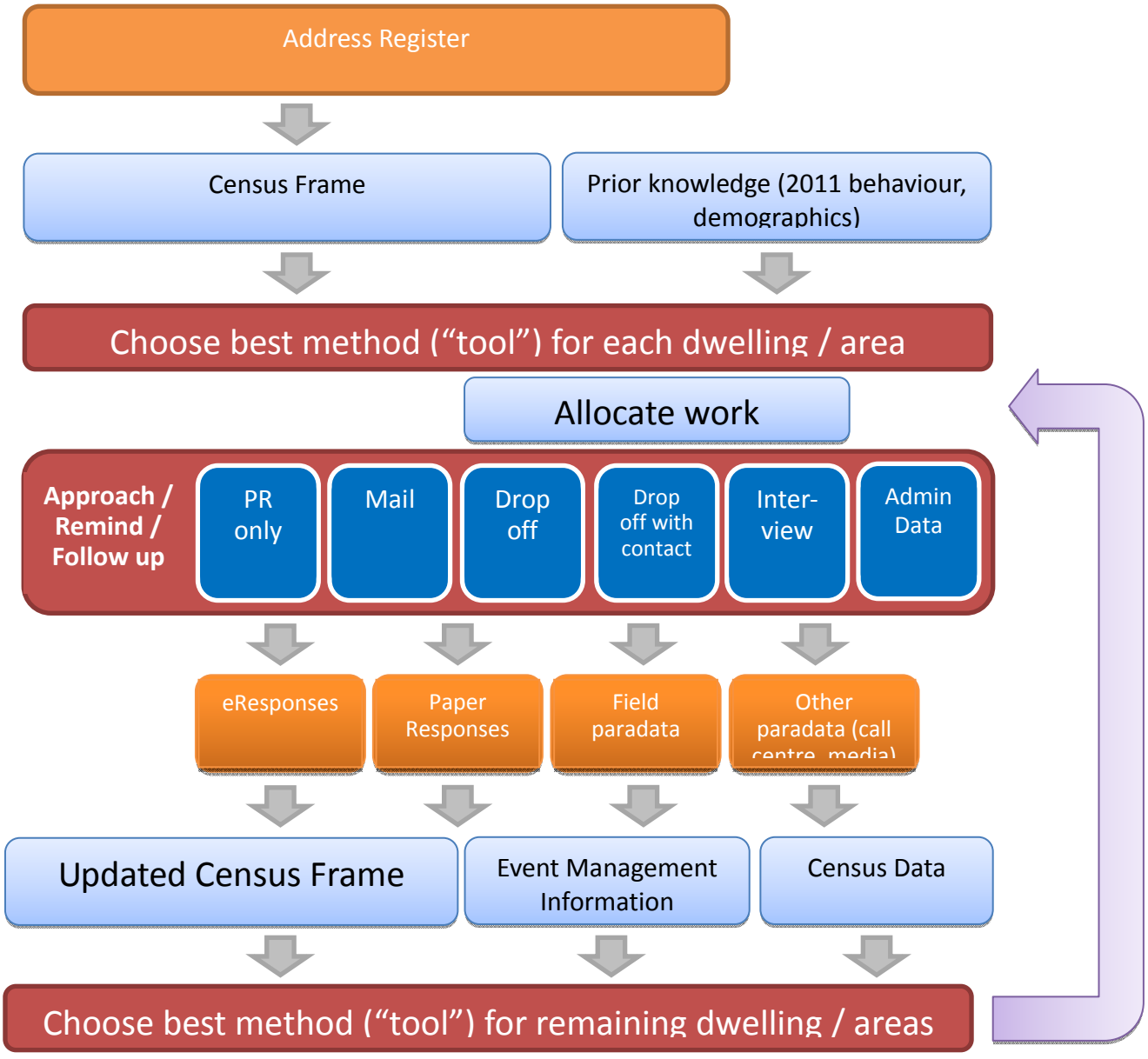
29. Advancements in ICT either have had, or have the potential, to significantly disrupt the way in which NSOs consider strategies for engaging with survey respondents. In particular, it challenges the rigidity required in current engagement models opening up the opportunity for a far more flexible approach.

30. Using the Australian Population Census as an example, traditionally the approach to engaging with citizens has been restricted to a small number of well-defined mechanisms, with the primary engagement model the manual drop-off and collection of a paper Census form to the vast majority of households across Australia.

31. The sheer volume and size involved with conducting a population Census means that manual processes can quickly become unwieldy or unsustainable. This dictates that processes be kept simple, streamlined and consistent, resulting in a "one-size-fits-most" strategy for enumerating the population. By the rigid adoption of consistent, simple processes for engaging with the majority of the population, complexity can be minimised. This is essential in being able to successfully handle the volume of Census data through these manual processes.

32. The 2016 Digital Census presents a significant opportunity for the ABS to embrace a far more flexible model in engaging with the Australian public. The opportunity to leverage significant advancements in ICT systems and technology will enable a tailored approach, not just in the enumeration phase, but in the entire model for engaging with citizens. This flexibility is critical to maintaining and improving the quality of small area data from the Census, whilst at the same time become more efficient and responsive in its operation.

Figure 3: Framing citizen engagement in Census enumeration



33. Figure 3 above illustrates how the use of a range of data sources will influence the decision in how the Census will best interact with any particular individual or group as part of the Census enumeration phase. Where previously a Census field officer would have been the primary method of engagement with any citizen, there will now be a number of channels, including online, traditional mail, telephone and face-to-face that will be considered. The flexibility in approach is completely driven by the availability of a range of data and para-data to support decision making, enabling high response rates whilst maintaining operational efficiency

34. Aside from driving a flexible approach in the enumeration phase of the Census, advancements in ICT are also having a profound impact upon the flexibility of how citizens engage with the ABS more broadly. Examples include:

- A number of additional channels for raising awareness and educating the population as to the importance of the Population Census (Facebook, Twitter, YouTube, ABS website, iPhone/iPad games)
- An increased number of options for citizens to contact the ABS with a question or request in regards to the Census (Interactive Voice Response systems, online provider portal, telephone based call centre)
- In addition to traditional Census publications, the ability for users of Census data to tailor their own data sets via the Census Tablebuilder application.

35. The examples given above in how the 2016 Census is becoming increasingly flexible in its approach to both operations and engagement with citizens are applicable in a number of other areas across the ABS with the increased take-up of online responses enabling new thinking of how we can be flexible in the allocation of resources. The opportunities for significant disruption to the traditionally rigid processes and models prevalent within an NSO are being driven by the constant advancement within ICT. The ABS 'culture' of how we interact with the public and our stakeholders is being changed to a much more flexible, agile and customer centric approach and embedded in the design and delivery of business processes and technology solutions.

B. Dynamic Real Time Decision Making

36. Many of the opportunities for increased flexibility in statistical operations are also underpinned by the enablement of dynamic, real time decision making. This capability has been driven through improvements in ICT, specifically the ability to harness information and data from a range of sources in order to make real time operational decisions that maximise efficiency and quality of statistical processes.

37. Using the Population Census as an example, the process for deciding which households a Census field officer needs to visit has been radically changed for the upcoming 2016 Census. The traditional model of breaking up Australia into geographical parcels, and then allocating these across the field officer workforce has now made way to a far more flexible and dynamic model.

38. The new approach to conducting the 2016 Census is predicated upon the notion that the ABS will not send a field officer to every dwelling to both drop off and collect a Census form. In fact, a large percentage of dwellings will receive their online eCensus code via mail, and will complete their Census form online, meaning that a field officer never need visit their dwelling.

39. Under the 2016 Census model, data received from a number of sources, including the call centre, interactive voice response system, online Census system, and field officers' mobile devices will be used in order to determine in real-time the engagement mechanism required for any given dwelling in Australia.

40. The process of allocating dwellings to field officers will now be driven dynamically, rather than the traditional model of allocating a fixed geography (and the dwellings contained within that geographical parcel) to each field officer. Further, technology solutions provide options such as calculating the shortest-path-route for each officer's daily workload, and providing this information to each officer in real-time via a hand-held device.

41. The advancement in ICT is also providing opportunities for the ABS to respond in real-time to intelligence coming from the field. Field officers will have the ability to use a mobile device to relay back information regarding the status of a particular dwelling (eg. Whether it is unoccupied, or whether it even exists). This information was traditionally collected via paper and only processed towards the end of the enumeration period, or perhaps even after it was completed. Under the new model, this intelligence will be used in real time to better understand areas of non-response.

42. Information from the eCensus will potentially be available immediately upon submission, meaning that a significant amount of data will be available in real-time regarding response rates (by area and/or other demographics). Anomalies in response rates that would traditionally only be discovered in the weeks following the Census can now be discovered and addressed during the enumeration period.

43. The advent and impact of social media is another example where the Population Census has leveraged ICT to increase dynamic and real-time decision making.

44. During the Australian 2011 Population Census, the ABS monitored public response to the Census on social media in addition to traditional media channels. In addition to being able to publicly respond in real time to questions and/or misinformation about the Population Census, the ABS was able to combine social media data with information from other media channels in order to gauge public sentiment and awareness of the Census, enabling rapid response in communications and operations.

45. Whilst the examples mentioned above are in reference to the Census, the capabilities underpinned by these advancements in ICT are already having a broader impact across statistical operations within the ABS and introducing more immediacy and responsiveness into our approach and behaviours.

C. Partnering and External Collaboration

46. Whilst the ABS has been well served by technology services for many years and recognised as leader in the efficient use of technology for business benefit, the approach to technology has predominantly been one of self- sufficiency and introspection: in house provision and management. Further, the development of applications has mirrored and supported a separate and siloed business model to individual surveys and statistical products. The current application portfolio consists of a large number of in-house developed silo applications.

47. There are a number of powerful forces that are inexorably driving change in this space, including:

- The ABS 2017 Business Transformation Program, with a focus on enterprise solutions and utilisation of Commercial Off The Shelf (COTS) and Government Off The Shelf (GOTS) products, solutions and services;
- Sourcing the capabilities to deliver transformation, recognising that organisational capacity and capability will need to be strengthened and supplemented through strategic partnerships;
- The goal to deliver increased capability in statistical infrastructure, especially in data acquisition, integration and dissemination as a Whole-of-Government resource;
- A more responsive approach to the demands of statistical users, especially greater and faster access to ABS data and in particular micro-data for evidence-based policy making and evaluation;
- Whole-of-Government strategies for e-Government and the Digital Economy, including utilisation of cloud computing, shared ICT services, utilisation of ‘big data’ and shared data sets; and the audit of performance, functions and roles of the Commonwealth government.

48. The Census has long recognised the critical nature of strategic partnerships and collaboration – in addition to the essential process of consultation in designing the Census. Building upon a successful partnership with IBM as a strategic vendor to deliver the 2006 and 2011 online Census, the ABS is looking to further leverage the capabilities of strategic partners in delivering the 2016 Census. This could include: Interactive

Voice Response capability, security and penetration testing, load and performance testing, cloud based delivery of non-sensitive Census media (website, multimedia content), the online Census solution – and extend beyond the provision of technology services, for example call centre capability and procurement/partner relationship management.

49. The 2016 Census also looking to leverage the capabilities of Open Source Software to fulfil key requirements, rather than the traditional approach of developing bespoke solutions, and to deliver enterprise solution capabilities. Some examples could include: Recruitment (NGA.net cloud based service), Learning Management System (possible use of Open Source product 'Moodle'), and a Content Management System (use of open source product 'Drupal').

50. Effective engagement with a broad range of Stakeholders continues to be both an important challenge and an opportunity. An active role in influencing and participating in whole of Government Technology Strategies and initiatives is both critical and expected. At the same time, it is essential to progress opportunities for collaborative development and re-use of technology infrastructure and solutions across the federal and state governments and the research sector to deal effectively with the requirements for data integration and analysis. Progressing opportunities for GOTS has a strong international connetations.

51. Across the ABS there is a discernible shift in culture to a more open, responsive and participatory approach with key stakeholders and stronger collaborative partnerships.

D. Responsibilities

52. The business of providing official statistics is now significantly reliant upon ICT, to the point where knowledge and understanding of core ICT principles is becoming a critical factor in organisational governance and decision making for NSOs. As a result, the line between where business responsibilities end and where ICT responsibilities begin have become increasingly blurred, resulting in a change in culture for managing the development of new statistical capability.

53. With business and ICT now far more intertwined in the design, delivery and operation of systems, there is an imperative for both business and ICT leaders to wear an "enterprise hat" when considering the impact upon the organisation of developing new or enhanced statistical capability. This is particularly true when enterprise capabilities are developed and do not fit the traditional ownership model of belonging to a single line of business within the organisation.

54. Using the upcoming 2016 Population Census as an example, many of the capabilities being developed to support the new enumeration model are being developed as "enterprise solutions", with Census taking on the responsibility for developing these capabilities on behalf of the broader organisation. This is a significant change in focus and culture for the organisation, where historically a particular line of business would own and develop the systems and capabilities specifically for their own purpose.

55. The ABS has taken a Service Oriented Architecture approach in delivering enterprise solutions, underpinned by articulating an enterprise architecture that consists of a number of broad, high level statistical capabilities, which are themselves constructed from a number of more specific capabilities. This approach, enabled by SOA and web services, may result in a particular statistical capability being developed by one part of the business for an immediate purpose, however the enduring responsibility and ownership of the capability may sit with a different business area.

56. This situation necessitates a far greater level of engagement and teamwork between not just business and ICT areas, but in fact all stakeholders who may either use, or own, the statistical capability and service that is being developed. In order to effectively manage the more complex relationships between those areas of the business tasked with developing a capability and those ultimately responsible for managing and owning it, a far more disciplined approach to project management and stakeholder communication is required.

57. Using the 2016 Population Census example referenced above to illustrate this point, the Census business area has been tasked with developing Collection and Enumeration Management capability, which consists of a number of sub-capabilities and services that will be ultimately owned as enterprise solutions by other business areas within the ABS. In order to ensure that the developed capabilities meet a wide range of enterprise requirements, a high degree of ongoing engagement, communication and collaboration has been required between ICT, Census and other ABS business areas.

58. Another example of IT solutions driving culture change can be seen through the opportunities to centralise decision making based on real-time data. The traditional model saw each state manage its own field officer workforce to address local area issues with data collection. This model enabled each state to be more responsive to any particular local area issue concerning data collection, but also increased the risk of in-consistency across states. The digital Census now presents opportunities to use real-time data from both online responses and also Census field officers (via hand-held devices) that enable the centralisation of real-time management information and centralisation of management operations.

E. Strategic Leadership

59. National Statistical Organisations have long recognised the critical and integral value of ICT adoption to provide high quality, secure, relevant and timely statistical products and services. This year (2014) marks 50 years of computing in the ABS. Moreover, Statisticians tend to be comfortable and capable users of ICT. Indeed, they have shaped future directions of the Bureau and its business through a sometimes aggressive pursuit of new and advanced ICT applications. Business leaders recognise the need for technology literacy.

60. Similarly, ICT groups within organisations provide best value if technology strategies and directions are inextricably linked to business goals and objectives, and technology solutions and services are assessed, delivered and measured against clear business value outcomes. ICT leaders recognise the need for an in-depth understanding of the business.

61. Ongoing examples of large, high profile ICT project failures and consequent advice; and project management frameworks continually emphasise the need for strong governance and effective ICT/business partnerships. There has been a continued evolution in the processes, governance and culture of the organisation to facilitate such partnerships. The ABS Census project has been an exemplar of strong and successful partnerships, governance and engagement between ICT and the Census business team.

62. There is increasing recognition of the value of ICT skills and experience as a base for leadership. The ICT group in ABS has long been an exporter of technology leaders into business positions. It is interesting to note that the current Senior Executive heading the 2016 Census project was previously the Head of Technology Infrastructure in ICT. The current Chief Operating Officer as well as the immediate past Australian Statistician were both CIOs at the ABS.

F. ICT Management

63. Advancements in ICT and the way in which ICT has now become part of “the way we do business”, has demanded a shift in culture for how we manage technology as a statistical organisation.

64. Subjects such as ICT investment, governance, project management and business value are no longer the sole purveyance of the CIO or CFO, but instead they are owned and considered by the broader executive management team alongside the statistical work program of the organisation.

65. Additionally, ICT is now seen as a key enabler of driving further organisational efficiency, and as such is often relied upon to realise business outcomes in reducing operational costs and “doing more with less”. The impact of this is that ICT projects are no longer simply assessed on a relatively straight-forward technical

outcome, but instead are measured against clearly defined business value outcomes. Of course, benefits realisation is not a new concept, however the pervasive nature of ICT in almost all projects across a statistical organisation has now meant that these disciplines are critical to ensuring organisational sustainability into the future.

66. In addition to considering the development of enterprise capabilities and solutions, ICT and business leaders have also been required to re-consider their roles in how ICT is best leveraged to drive organisational outcomes. Traditionally a business area would define their requirements based upon a statistical or operational process that was designed to achieve a specific outcome. ICT would then work to implement a technical solution to fulfil the specified requirements. However, the increasing pace of change with respect to technology has meant that opportunities to leverage a specific ICT capability often enable new possibilities in statistical and operational processes. It is no longer simply business requirements that drive an ICT solution, but sometimes ICT opportunities can drive organisational directions to leverage increased capability and enhanced efficiency.

67. This change in dynamic has led to a shift in culture, and in particular a shift in the engagement between ICT and business groups from a service provider/customer relationship, to one where ICT and business work in partnership to deliver organisational outcomes.