Distr.
GENERAL

WP.10
11 April 2011

ENGLISH ONLY

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE (UNECE)
CONFERENCE OF EUROPEAN STATISTICIANS

EUROPEAN COMMISSION
STATISTICAL OFFICE OF THE EUROPEAN UNION (EUROSTAT)

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD)
STATISTICS DIRECTORATE

Meeting on the Management of Statistical Information Systems (MSIS 2011)
(Luxembourg, 23-25 May 2011)

Topic (ii): From local to corporate perspective (industrialization and standardization)

Information Management Transformation Program: Towards a Statistical Industry

Invited Paper

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I. Introduction

1. Once in a generation revolutionary change is needed. In the 1970's the opportunity for change presented itself – the ABS pioneered computing infrastructure for the Australian Government and so demonstrated the efficacy of computing. The ABS has often been at the forefront of innovation in information provision within the Australian Government sector. For example, our decision, in 2006, to allow free access to public sector information was some years in advance of the declaration of open Government (Gov 2.0).

2. The 21st century is presenting new challenges. The opportunities of the Information Age are sweeping aside the organisational and operational paradigms of the past. Infrastructure is aging and the global financial crisis is limiting access to new funds. In response to these challenges, we are now a year into our Information Management Transformation Program (IMTP), an ambitious multi-year change program to position the ABS to continue to be the statistics provider of choice for Australia.

3. Networking and information sharing are no longer enough to meet the challenges – we need a new approach. We need to adopt international standards and be actively engaged in their advance. We need to harness the expertise and enthusiasm of our peers. A number of National Statistical Institutions, including the ABS, have formed a Statistical Network to work together with pace to better meet our societies' information needs while driving down costs. The network aims for co-design and co-development, not mere reuse. The Statistical Network has also committed to working together to develop a Generic Statistical Information Model (GSIM), drawing heavily from DDI-Lifecycle (DDI-L) and SDMX, to complement our use of the existing Generic Statistical Business Process Model. This paper recaps the case for change, touches on our collaborative efforts and discusses our experiences in progressing IMTP.

II. The need for change

4. The world is at a point where powerful trends are driving the need for change in National Statistical Institutions. These trends include the convergence and ubiquity of digital technologies and mobile devices, the rise of the Millennial Generation as information and entertainment consumers, and the accelerating pace of technical and social innovation. The increasingly digitised world, where it seems everyone is connected 24/7, has created a data deluge. It has also created an environment where people expect to find the information they want NOW. Many organisations are publishing statistics, sometimes more frequently and in competition with official statistics.

5. Governments, businesses and individuals wanting to make informed decisions need access to accurate and consistent information. They rely on NSIs to provide a coherent base of information with accurate measurement of change from diverse data sources. Statistics play a critical role in evidence based policy development. Statistics assist in ensuring that Government programs and initiatives are appropriate, viable, achieve their intended outcomes, and can be evaluated for effectiveness. In Australia the government and statistical community‘s appetite for information has become increasingly more urgent and complex. Some current examples of the demands on Australia’s statistical system include: sustainable population and communities, climate change, community wellbeing, productivity, performance reporting and regulatory reform.

6. We need to respond more quickly, making sure frameworks and classifications and official statistics reflect the contemporary world. For individual organisations with aging infrastructure and full work programs, existing approaches will no longer yield the required outcomes. However governments are generally not willing to invest heavily in approaches to enable NSIs to respond rapidly to new challenges. NSIs need to exploit opportunities to ‘pool resources’, to work together as a community of organisations, in order to proactively position ourselves to continue to be the statistics providers of choice for our stakeholders. This international community of producers of official statistics, in which active, practical collaboration and sharing across NSIs becomes an increasingly prominent feature, will continue to benefit also from leadership, co-ordination and facilitation provided by international statistical agencies such as UNSD, OECD and Eurostat.

7. Recognising the need and urgency for radical change, the ABS considered the capabilities which might be needed to meet these challenges. These include:

(a) moving from publication of information products to the provision of information and information services – recognising that information becomes more valuable the more it is used and shared, allowing stakeholders to mine information to find the answers they need;
(b) supporting an exponentially higher volume of incoming data;
(c) being able to rapidly incorporate new issues and views of data into standards and classifications – while supporting international standards and classifications, we operate in different environments with some different areas of key concern and we have to be able to rapidly incorporate new issues and views without perturbing the base;
(d) developing a ‘rapid response’ capability, understanding better our current data holdings and being able to re-purpose that information and supplement it with new collections to answer new questions;
(e) increasing the inter-operability of processes and data; and
(f) maximising the use (and reuse) of active (e.g. machine actionable) metadata to make processes and data use more efficient and effective.

8. In February 2010, the Australian Statistician announced the establishment of the ABS’s Information Management Transformation Program (IMTP). The Program will progress and align the ABS’s agenda of process improvement and information management reforms. The 5 key phases of the program are shown in Figure 1.

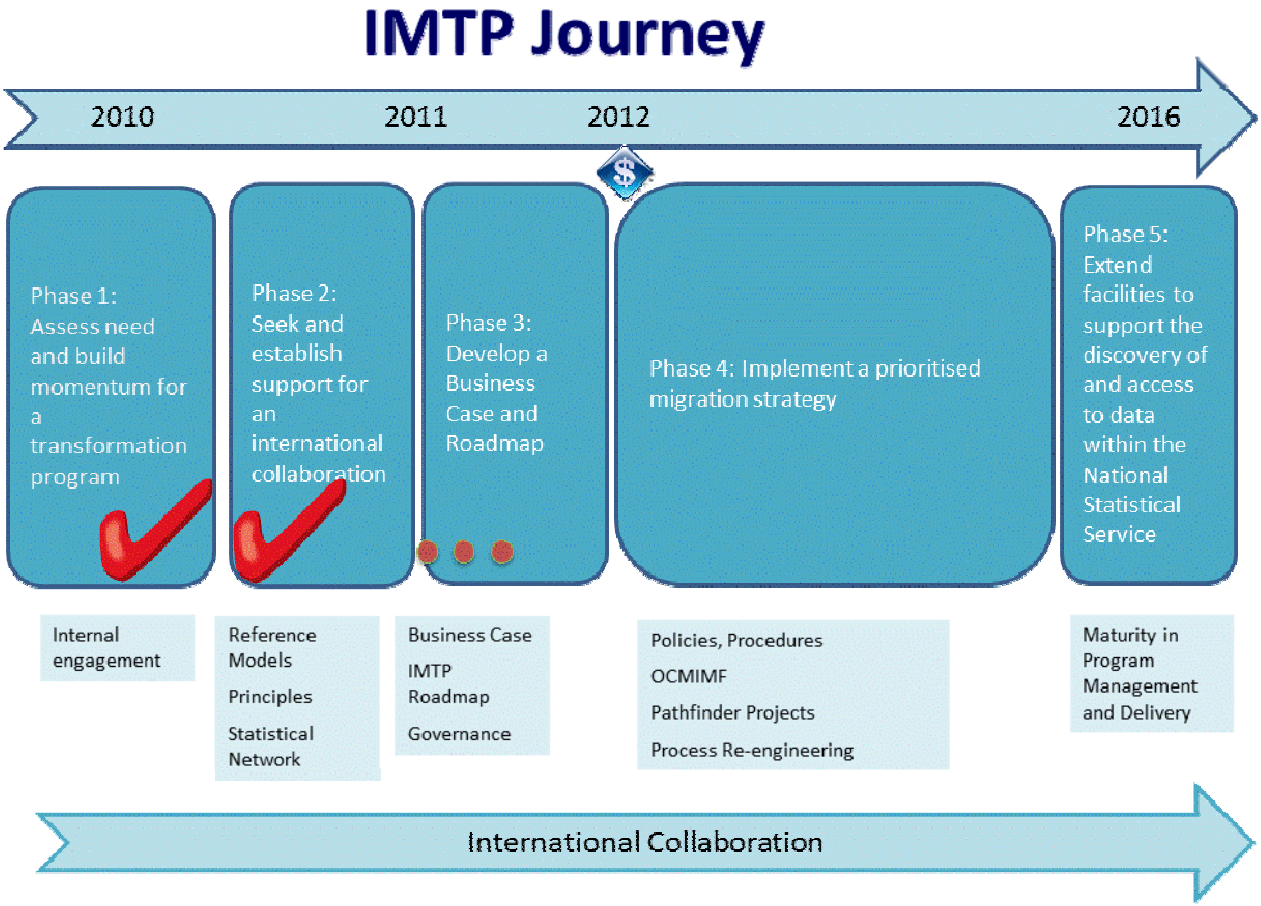

Figure 1: The IMTP Journey

9. For Phase 1, the need for a transformation program has been recognised at ABS senior management level and work is underway to build the momentum within the organisation.

10. Related to Phase 2, ABS is part of a Statistical Network of 6 NSIs. The purpose of the Statistical Network is to work together with pace and passion to better meet our societies' information needs while driving down costs. While early collaboration has commenced by participating NSIs on these initiatives, it is recognised that these collaborations do not exist in isolation and NSIs have many other collaborative work / partnerships. As an example, Figure 2 shows the ABS's involvement in international statistical collaborative forums.

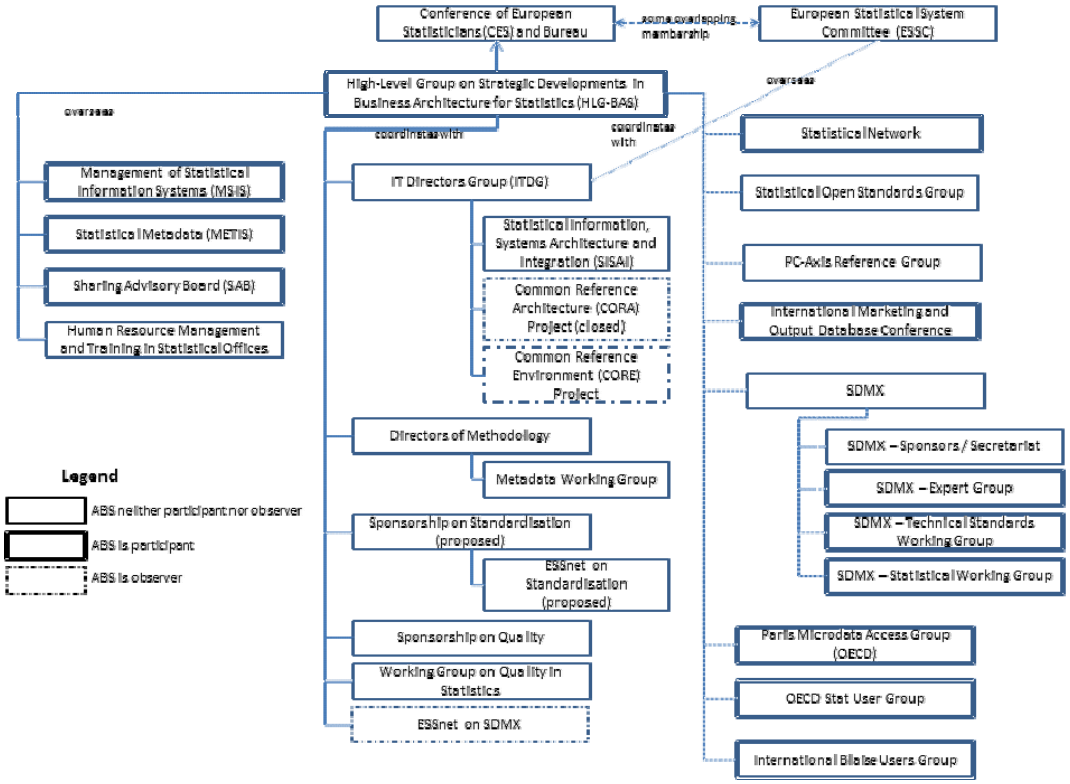

Figure 2: ABS involvement in International Statistical Collaborative Forums

11. The IMTP program is currently developing Phase 3, a Business Case and Roadmap for change. Future work will deliver phases 4 and 5 – these are discussed in more detail in the Future Directions section of this paper.

III. The Statistical Network

12. The Statistical Network jointly developed the framework shown in Figure 3. The members agreed that each organisation would participate in the development of the opportunities most related to their existing work programs and priorities. The lead organisation for each opportunity was agreed.

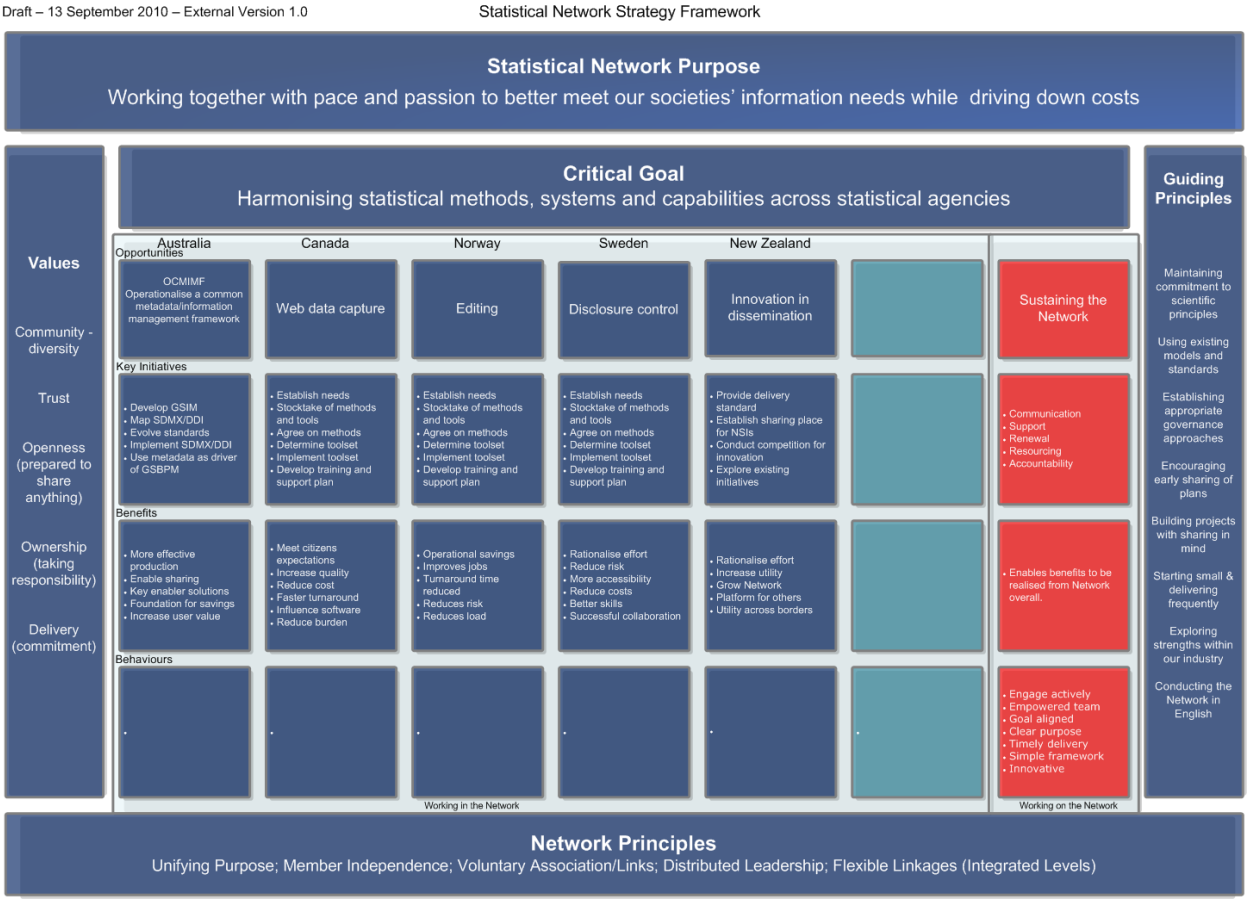

Figure 3: Statistical Network Strategy Framework

13. A number of principles have been adopted to maximise the chance for success:

(a) maintaining commitment to the scientific principles underlying the statistical business;
(b) adopting standards and reference models (such as the GSBPM, DDI-L and SDMX) and contributing to their evolution;
(c) leveraging existing investments;
(d) collaborating as we go – within organisations and across partner organisations – NSIs and private organisations with expertise to share;
(e) building projects with sharing and reuse across the whole statistical community in mind;
(f) taking a staged approach – starting small, learning, sharing and making informed decisions about the next steps;
(g) exploring the strengths of all disciplines within the statistical industry; and
(h) enhancing the prospects for data linking and interoperability.

IV. Information Management Transformation Program (IMTP)

14. IMTP is an important springboard to our future. The IMTP Vision is for an environment in which Australian Governments and the Community can easily find, access, and combine statistical information which can then be used confidently as an evidence base for policy, to target service delivery and to inform decision making. Figure 4 illustrates this vision.

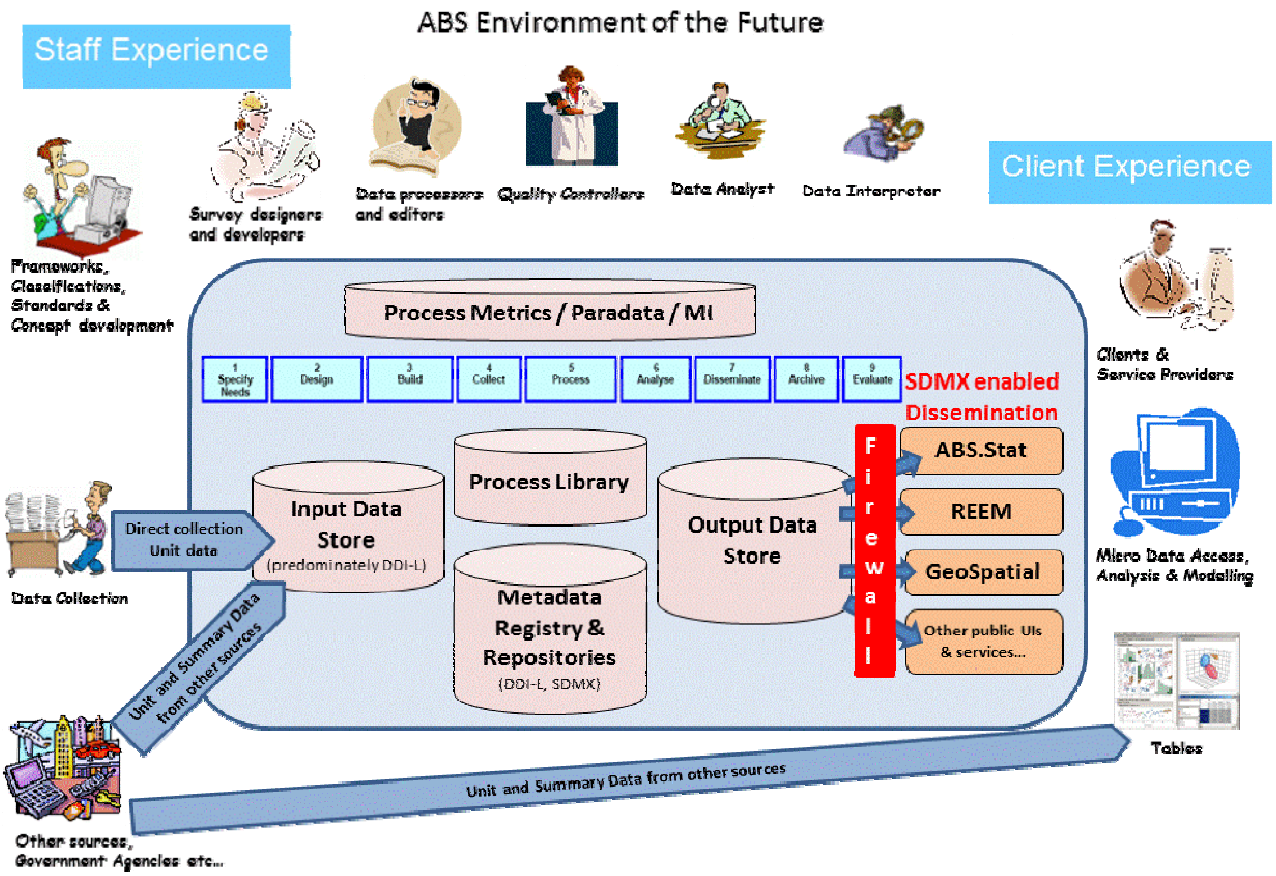

Figure 4: ABS Environment of the Future

15. IMTP is a multi-year program of work positioning us to respond to the challenges we face by:

(a) harnessing the value of our strategic information assets;
(b) leveraging our expertise across whole-of-government;
(c) supporting our staff through improved and easier to use practices and processes; and
(d) increasing the agility of our business systems.

16. IMTP aims to support, as shown in Figure 5:

(a) a client environment where statistics are readily available, and can be easily integrated with data from other sources;
(b) a statistical production environment that is highly productive, and satisfying for staff to use;
(c) a statistical development environment that is nimble; and
(d) a systems environment that is built around standard models and supports shared collaborative development, across boundaries and borders.

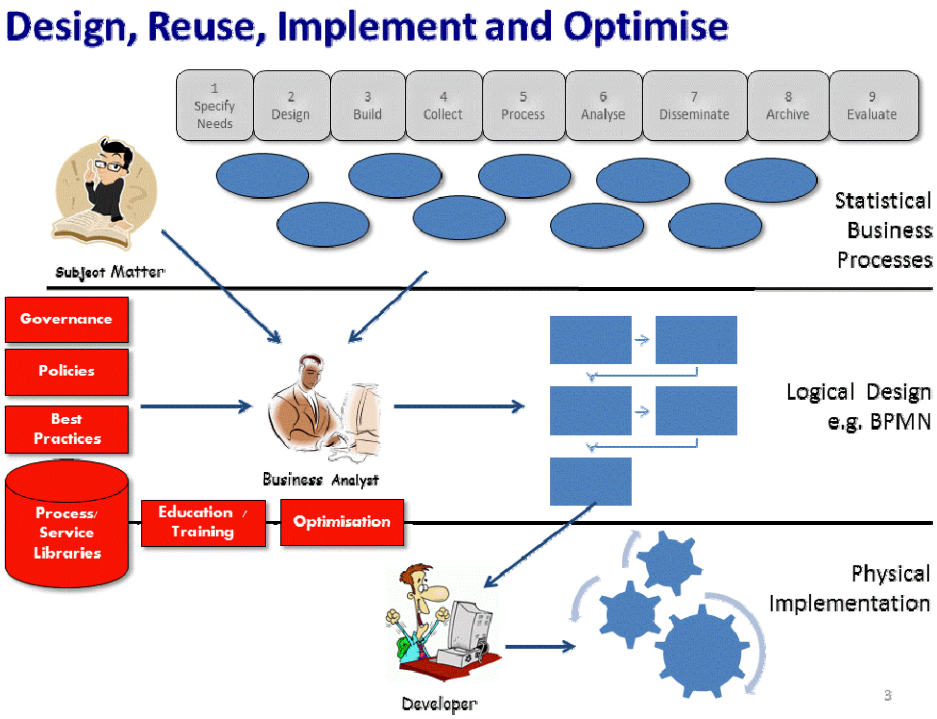

Figure 5: Integrated Top-to-Bottom Statistical Processes

17. IMTP is subject to strong governance, including an external quality advisor, to guide and monitor core IMTP project, pathfinder projects and significant business-as-usual projects. It's a long journey and we have made some critical steps forward.

V. Operationalise a Common Metadata/Information Management Framework (OCMIMF)

18. OCMIMF is a critical sub-program of IMTP. It is also the 'common name' for the collaborative effort we are leading within the Statistical Network. The key deliverables from OCMIMF are:

(a) a Generic Statistical Information Model (GSIM) including a mapping from GSIM to DDI-L and SDMX;
(b) an ABS Information Management Governance Model which we hope will be useful to fellow NSIs;
(c) ABS Information Management Practices which can be 'ported' to other organisations; and
(d) core metadata infrastructure including an active metadata repository, linked to a business process management system, which will drive consistency in our statistical processes within the framework of the GSBPM. A proof of concept is due to be completed in June 2011.

19. Over the next 3 years, OCMIMF's successful implementation will mean we will have a base on which to harvest benefits from more effective production of statistical information and services, a greater ability to share information and processes, a platform which enables us to be more responsive to change and improved user value. In addition, a number of pathfinder projects will have demonstrated the benefits of this approach.

20. Over the years, we have standardised processes, methods and tools along survey lines (e.g. business surveys, population surveys) and made major investments is existing data and metadata holdings – one of our critical organisational assets. We are now adopting standards such as DDI-L and SDMX. And we are investing in new metadata infrastructure, keeping a keen eye on sharing and reuse across our survey lines and across partner NSIs.

21. We recognise that new standards emerge and existing standards both overlap and evolve. So we are taking a pragmatic approach by defining a conceptual model to describe the meaning of our information, extending this with a canonical form providing an agreed common language. DDI-L and SDMX will both inform the development of the canonical model and be mapped to the canonical model. And we will map our logical models (new and existing) to the canonical form. As the logical models link to physical models and physical data holdings, we will be able to trace items from the conceptual level to physical data holdings. And we will have a mapping between our holdings and international standards. This future proofs our data holdings against changes in international standards while retaining strong traceability between our holdings and international standards. This is illustrated in Figure 6.

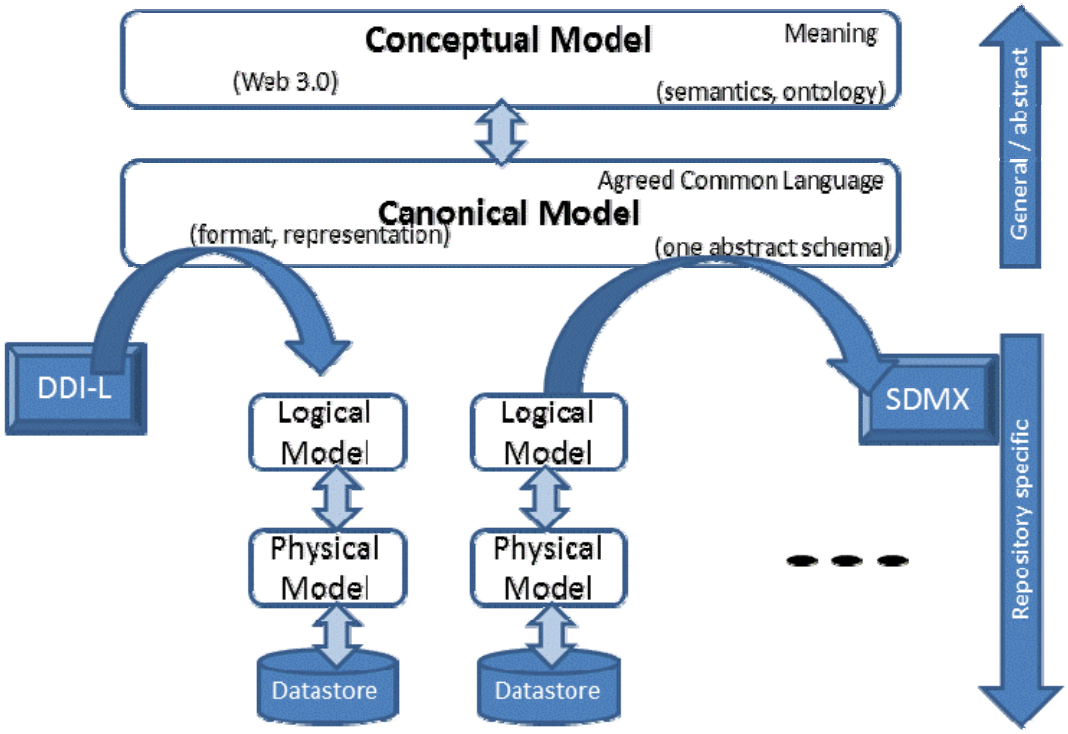

Figure 6: Information Management Layers and Relationships

22. DDI-L is "an effort to create an international standard for describing data from the social, behavioral, and economic sciences" extended to document and manage data across the lifecycle. Some parts of DDI-L are more relevant to statistical processing than others. We are investigating which parts we will use and how we will use them – we have done sufficient exploration to realise that DDI-L is fit for some purposes. Similarly we've found SDMX is fit for some purposes. We are working through which is fit for which purpose and what enhancements might be needed to expand both standards to be fit for more purposes. We are sharing our findings through the relevant forums, such as METIS and the DDI Alliance.

VI. Key findings to date

23. The scope of IMTP is vast and is difficult to communicate simply. In fact IMTP is becoming a brand within the ABS, representing the strategic direction and encompassing the organisational change needed to achieve a successful future. But other programs of work cannot stand still while IMTP is underway. Strong governance, leveraging existing boards supplemented by IMTP specific bodies, is needed to ensure that other initiatives are, where appropriate, being harnessed to advance the objectives of IMTP.

24. Examples of where we are harnessing existing work to advance IMTP are REEM and ABS.Stat:

(a) Remote Execution Environment for Microdata (REEM) allows specification & population of tabulations 'on demand' from microdata, described using DDI-L with aggregate tabulations described using SDMX; and

(b) ABS.Stat is our implementation of the OECD.Stat platform and is due for basic implementation in June 2011 with further phases planned. Support for SDMX, including web services, is one of our key considerations.

25. Our IMTP team is a multi-disciplinary team, bringing together expertise from a range of statistical areas, ICT, external advisors and partner organisations. The dynamic which can be created with such a team has been demonstrated by an 'extreme development week' where a team of people was 'locked away' to develop a working prototype demonstrating a common 'simple' interaction between two functional components. We realised the interaction wasn't that simple – many business rules were needed to be fleshed out, it involved working with new technologies, made the team think about integration and the team also discovered roadblocks, some of them were small while others were quite substantial. The extreme week allowed the team to encounter issues and barriers they would normally discover later in the development cycle. It blocked out many distractions which facilitated a speedier development environment. The team only achieved about 90% of the working scenario but more importantly we have a clearer picture on how the systems integrate, function and how to better tackle some of the development work that lies ahead. Management has a better understanding of skills and capabilities. Management has also learnt that there was much more to the development than previously realised as new processes and business requirements became apparent. It is also understood that a dedicated web server will need to be acquired for development purposes, which is a change on how the ABS currently runs development.

26. Enterprise Architecture is key – it provides a framework against which work initiatives can be mapped. We are able to identify and focus our resources on architecturally significant projects essential to delivering components needed for IMTP.

27. We are identifying and pursuing a pilot approach, taking small steps to ensure workability – or the need to abandon an idea which is not going to be successful. We are working with pathfinder projects in a collaborative and coordinated way – not dictating, rather working together to achieve more than the sum of the parts. In the ABS, this way of working is revolutionary and is proving beneficial, engaging with stakeholders to map and take the journey rather than just informing them of the destination.

28. Undertaking a program like IMTP presents its own challenges. Even though IMTP is a multi-year program, the timeframes are ambitious. Having a clear roadmap which identifies interim achievements is helping us to see progress that has been made. We have to:

(a) ensure our staff have sufficient practical understanding of the adopted standards to continue to effectively perform their work;
(b) effectively communicate our key messages to ensure all our people and partners understand the vision and their role in making it a reality;
(c) continuously look for opportunities to standardise practices and processes – where it makes sense.

29. Collaboration brings new ideas, expertise and opportunities but there are practical challenges to be overcome:

(a) time zones, public holidays and annual leave patterns present logistical challenges in organising discussions – collaboration spaces are helping to support effective communication;
(b) local vocabularies, ontologies and information architectures are different – mapping to conceptual and canonical forms is important;
(c) legislative and policy frameworks vary across jurisdictions – identifying issues early provides opportunities to resolve issues before they compromise outcomes;
(d) differences in technology platforms provide challenges in co-design and co-development – taking standards based approaches are important; and
(e) investments in existing systems must be leveraged as greenfields development is not possible – service oriented approaches can assist in the inter-operability of existing and new components.

VII. Future Directions

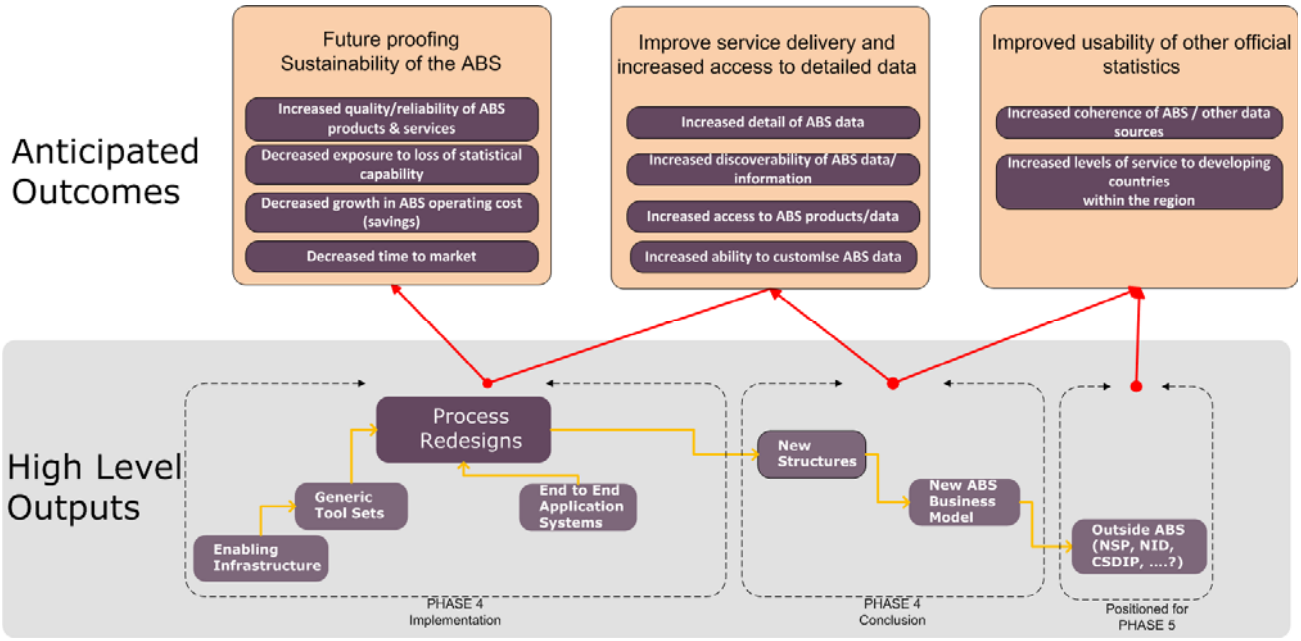

Figure 7: Phases 4 and 5 Delivering for IMTP

30. Phase 4 of the IMTP journey involves implementing a prioritised migration strategy. This will involve developing future capabilities in line with our IMTP roadmap, migration of data holdings and, more importantly, 'migration' of our workforce and processes to the world of the IMTP vision. Bringing our workforce and other stakeholders with us is a vital part of the transformation.

31. Phase 5 will enable us to extend the capabilities and facilities delivered in Phase 4 to the National Statistical Service – the community of government agencies, at all levels of government, which is building a rich statistical picture for a better informed Australia.

VIII. Summary

32. The challenges of a digital age are real and will only keep expanding. The effort required to innovate, update business models and develop strong foundations to react to and embrace change is significant and will take years to achieve. But don't lose sight of the end-game because that is what keeps us relevant.

33. Keys to success are:

(a) Collaboration – with parts of our organisations, with fellow NSIs and with vendors and private businesses – is a vital means of ensuring returns on investments;
(b) A staged approach, allowing early wins and early identification of 'dead ends' is critical; and
(c) Communicating the vision picture – leading the change and managing change is essential.

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