

A Collaborative Framework to Support a National Land Information Infrastructure in Australia

by

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Abstract

As a federated country, Australia's land administration systems are state and territory based. These systems record information pertaining to land ownership, land tenure, land use and land valuation and have supported, and continue to support, the requirements of the respective states and territories. Australia's federated system of government however has evolved since federation in 1901. Many responsibilities that were previously the sole responsibility of the state and territory governments are now shared with the Australian Government. To support policy development and operational requirements for issues such as climate change, water management, fiscal and monetary policy, the Australian Government now needs access to this jurisdictional based land information. An increasing number of businesses operating nationally also often require access to this key land information.

This has created a situation where considerable duplication of effort is occurring as a result of many Australian Government departments and agencies individually acquiring land information from the respective jurisdictions to meet their particular requirements. Given the effort to conflate the information, issues relating to data currency, quality and consistency become apparent. A national approach to service the requirements of national users of land information such as the Australian Government is required.

The jurisdictional based land administration systems however potentially provide a sound basis on which to build a national land information infrastructure. All have taken advantage of the available technologies over the past decade to move to on line service delivery and are delivering effective services within their respective jurisdictions. What is now needed is a collaborative national framework that can build on the jurisdictional achievements to deliver a national approach to land administration information and services.

This thesis considers the drivers for a national land information infrastructure within the context of Australia as a federated country and the main elements of the collaborative framework necessary to deliver this national view of land information. The key success factors necessary to implement and sustain this framework are identified through a number of case studies involving collaborative ventures both in Australia and overseas.

The key success factors identified through the research are:

- The existence of a major client / investor
- Active jurisdictional support
- A shared understanding of the problem and the desired outcome
- An extensive monitoring and review process
- A commitment to standards

Using these key success factors as a guide, a framework for a collaborative national land information infrastructure for Australia is proposed.

Declaration

This is to certify that:

- i. the thesis comprises only my original work towards the Master of Geomatic Engineering,
- ii. due acknowledgement has been made in the text to all other material used,
- iii. the thesis is less than 50 000 words in length, exclusive of tables, maps, bibliographies and appendices.

Brian Keith Marwick

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List of Acronyms

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ANZLIC	Australian and New Zealand Land Information Council
APS	Australian Public Service
ASDI	Australian Spatial Infrastructure
ATO	Australian Taxation Office
AURIN	Australian Urban Research Information Network
CGNI	Canadian Geospatial National Infrastructure
COAG	Council of Australian Governments
DCDB	Digital Cadastral Database
DRET	Department of Resources, Energy and Tourism
G-NAF	Geocoded National Address File
GST	Goods and Services Tax
ICSM	Intergovernmental Committee on Surveying and Mapping
INSPIRE	Infrastructure for Spatial Information in the European Community
MDBA	Murray Darling Basin Authority
MOU	Memorandum of Understanding
NCF	National Collaboration Framework
NECDL	National Electronic Conveyancing Development Limited
NECO	National Electronic Conveyancing Office

NEXIS	National Exposure Information System
NGO's	Non-Government Organisation's
NITICI	National Topographic Information Coordination Initiative
NMC	National Mapping Council
NSW	New South Wales, Australia
NT	Northern Territory, Australia
NWI	National Water Initiative
OECD	Organisation for Economic Co-operation and Development
OSDM	Office of Spatial Data Management
OSP	Office of Spatial Policy
PEXA	Property Exchange Australia
PLRA	Property Law Reform Alliance
Qld	Queensland, Australia
RBA	Reserve Bank of Australia
RRR's	Rights, Restrictions and Responsibilities
SA	South Australia, Australia
SDI	Spatial Data Infrastructure
Tas	Tasmania, Australia
VAR	Value Added Reseller
Vic	Victoria, Australia
WA	Western Australia, Australia

Chapter 1 Introduction

1.1 Background

Australia was established as a federated country in 1901. The constitution set down that the majority of the existing functions would remain with the respective state governments. The newly established Commonwealth Government (i.e. now known as the Australian Government) was responsible for the functions of a national nature at the time such as defence, foreign affairs and postal telecommunications. Increasingly over the period since federation, many functions previously the domain of the states and territories have developed a more national focus such as water management, taxation, housing, major urban infrastructure, etc. As a result, the Australian Government now plays a key role in many of these functions. New responsibilities resulting from issues such as monetary and fiscal management and environmental issues have also evolved with a strong national focus.

The increased national focus of various functions has also extended to the business community as shown by the 70% growth in businesses operating across state borders between 2003 and 2007 (OECD, 2010). This was acknowledged when in 2009 the Council of Australian Governments (COAG) initiated the concept of a seamless national economy (COAG Reform Council 2009). This resulted in some 27 projects aimed at reducing regulation that was impacting the efficiency of doing business in Australia.

One of the outcomes of this focus on the management of these activities at a national level has been an increasing demand for information relating to land at a national level. This information includes land ownership, land tenure status, the value of the land parcels and their use. Given land administration still remains the responsibility of the respective state and territory governments, this information must be sourced from eight state and territory based systems. Whilst each of these systems meet the individual requirements of the respective state and territory governments, obtaining land information at a national level remains a significant challenge for those organisations seeking it.

The requirement for land information at a national scale has long been recognized as evidenced by the establishment of various collaborative initiatives between all the governments of Australia over the past 60 years. Notwithstanding some success in developing national data sets across some elements of the required land information, there is currently no infrastructure in place to deliver land information at a national level in Australia.

1.2 Research Problem

As a federated country, land administration in Australia is the responsibility of the eight state and territory governments. Issues such as climate change, the national economy, water management and disaster management however transcend the jurisdictional boundaries. Over the past several decades the Australian Government has become increasingly involved in these issues of national importance both from a policy and funding perspective. To meet these requirements, the various Australian Government departments and agencies source much of the land information required for these initiatives from the eight jurisdictions. This results in considerable duplication of efforts and often relatively poor quality data, particularly in terms of currency. In essence, there is no current and complete national view of land information in Australia.

Given this situation is there a better way to achieve a national view of land information based on information held by the jurisdictions? Can a collaborative framework based on the existing jurisdictional systems provide a national view of land information in Australia?

1.3 Research Aim

To develop a collaborative framework using the existing jurisdictional based land administration systems capable of meeting Australia's national land information requirements.

1.4 Research Objectives

Using these research questions as a guide to pursuing the research aim of investigating the utilisation of the existing jurisdictional land information systems to support a national land information infrastructure, the following objectives were determined:

1. To *identify* the need for a national land administration information infrastructure in Australia as a federated nation.
2. To *document* some of the current uses of jurisdictional land administration information within Australia at a national level
3. To *document* relevant existing collaborative arrangements within Australia's land administration infrastructure and relevant examples from overseas federated countries.
4. To *determine* the key success factors in establishing collaborative national land administration infrastructure

5. To *develop* a collaborative framework capable of supporting a sustainable national land information infrastructure

1.5 Research Questions

The pursuit of the above research aim necessitates a number of key questions to be answered. These include:

1. Why is a national land information infrastructure required in Australia and who are the major beneficiaries?
2. Does the existing theory on land administration support the value of a national land information infrastructure to the economic prosperity of a country?
3. Are there examples in Australia and overseas which clearly demonstrate that the existing jurisdictional based systems can successfully meet the requirements of a national land information administration whilst continuing to fulfil the ongoing requirements of the source organisations?
4. What are the key issues to be addressed to ensure the successful implementation of a collaborative national framework?
5. Is there a collaborative framework best suited to facilitating a national land administration infrastructure?

1.6 Research Methodology

The case study methodology underlies the approach used to develop the collaborative land information framework arising from this thesis. Five different case studies each involving a collaborative approach between different levels of government are examined. Three case studies from Australia and two beyond Australia are used to assist in better understanding how these initiatives came into being and most importantly, the key success factors that have enabled them to attain their current status.

The methodology also required the following:

- Formulation of the research problem, objectives and questions
- A comprehensive literature review of areas pertinent to the research including the nature of Australia's federated system of government, land administration and collaboration.
- Evaluation of the material collected in the context of the research problem

- Development of the collaborative national land information framework taking into account the key success factors identified in the case studies and the evaluation of the previous research.
- Formulation of implementation guidelines and identification of areas for further research.

Whilst the information collected through the literature and case studies was instrumental in providing the basis for the development of the research, there is no doubt that the involvement of the researcher over the past 40 years in the collection and management of land information in Australia has also influenced the outcome of the research. During the past eighteen years, the researcher has been directly involved in the integration of land information at both a state and national level and this has led to a keen interest in the requirement for a comprehensive national view of land information. The most recent experience over the past decade with PSMA Australia has provided evidence of the tremendous value to Australia that can be derived from national spatial datasets. As a result, insight gained from this experience is reflected in the assembly of the research used to support this thesis and its conclusions.

The research methodology is closely linked to the chapter structure of the thesis. This is represented in figure 1.1 below.

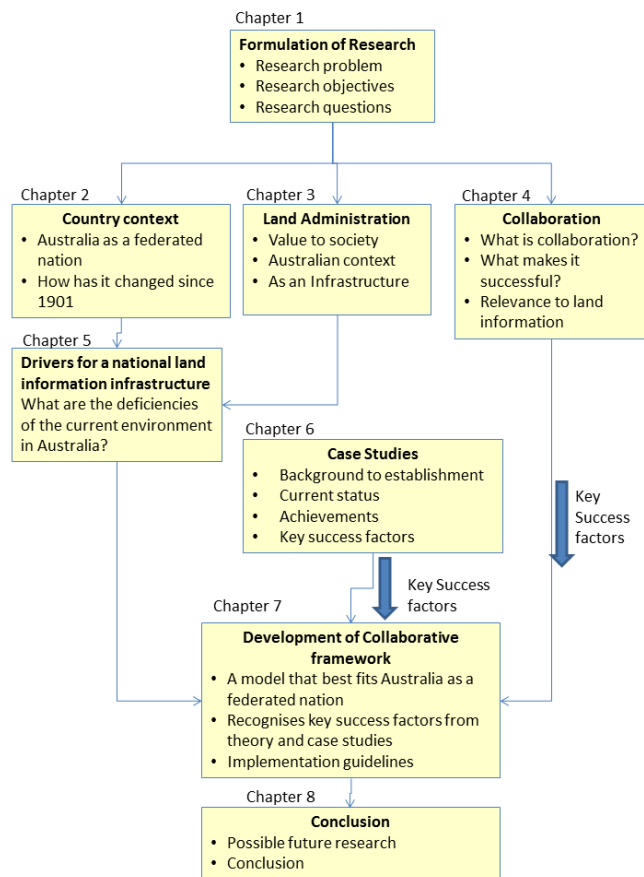


Figure 1.1 Approach to Research

1.7 Thesis Outline

Following on from the methodology, an outline of the structure of the thesis is provided below.

Chapter 1: Background to the research problem and the aim and objectives of the thesis

Chapter 2: An overview of Australia with particular focus on its governance as a federated nation. Some of the challenges arising from its federated structure are discussed, particularly as they relate to the requirement for land information.

Chapter 3: Reviews some of the land administration research relevant to the thesis. The relationship between land information and spatial information is discussed together with concept of land administration as an infrastructure.

Chapter 4: Discussion of the concept of collaboration in general and some of the research relevant to this thesis. The work undertaken on collaborative framework to support multi

government initiatives in Australia is outlined. Research on collaboration specific to land and spatial information is also reviewed and considered as an input to this research.

Chapter 5: Identification and examination of the use of land information by the Australian Government as the major user of land information at a national level. The Australian Government's role as both a provider of land related information and, most importantly, as a user is outlined. The efforts to establish a national approach to land information over the past sixty years are also discussed.

Chapter 6: Five case studies from both Australia and overseas where collaborative frameworks have been established to deliver land information collected at lower tiers of government to a higher level (eg State, National, European Union). Background to each of the initiatives is provided together with an assessment of the key success factors.

Chapter 7: Combination of the findings of the preceding chapters to support the design of a collaborative framework applicable to Australia's requirements.

Chapter 8: Reexamination of the research aims and objectives and recommendations for further research. Finally some concluding remarks including reference to the importance of recent initiatives of the Australian Government and ANZLIC with regards to the implementation of a national spatial framework.

1.8 Chapter Summary

This chapter provided an overview of the research problem and the aims and objectives of this thesis. The approach to be adopted in developing an understanding of the research problem and achieving the aims and objectives are outlined. A brief overview of each of the chapters shows the scope of the research.

Chapter 2 Australia - A Federated Nation

2.1 Introduction

As outlined in Chapter 1, this research examines the requirement for a national land information infrastructure in Australia based on a collaborative framework utilising the land information held by the jurisdictions comprising this federated nation. The land administration systems in Australia that generate this land information play an important role in the governance of the country, as in many other countries. The World Bank for example, recognises land administration systems “as a basis for generating economic development, social coherence and environmental sustainability” (Enemark, 2004). Given this value to Australia’s development as a nation and the federated system of government, it is important to fully understand the governance of Australia and in particular how it has evolved.

This chapter therefore provides an overview of Australia as a federated nation and how the nature of this federated system has changed over the past century. In the past decade in particular, there has been growing recognition of the value to the nation in achieving a more harmonised approach to the manner in which issues common to all the states and territories are managed. To a significant degree this has been driven by the opportunity to gain efficiencies in both business and government operational processes. Issues such as water management and climate change have also been factors in the adoption of a more national approach to policy development. Many of these shared issues require land information to assist in the development and implementation of policies at the respective levels of government.

An overview of the respective roles of the various levels of government in Australia is provided. The manner in which both the relationships between the respective levels of government and their responsibilities have changed since federation is also examined.

2.2 Australia

2.2.1 A Federated Nation

Australia became a federated nation on 1 January 1901 with the passing of British legislation allowing the six Australian states to govern in their own right as the Commonwealth of Australia (Australian Government, 2012b). This British Act of Parliament (i.e. the Commonwealth of Australia Constitution Act) brought into being the Australian Constitution. This Constitution created a federal system of government where the powers are shared

between the central or commonwealth government and the six former colonial governments which became the state governments. Each of the state governments has their own constitutions, as well as a structure of legislature, executive and judiciary.

Specific powers given to the Australian Government included:

- taxation
- defence
- foreign affairs
- postal and telecommunications service.

The states were responsible for matters within their own borders including:

- police
- hospitals
- education
- public transport.

In essence, the parliaments of the respective state governments are allowed to pass laws on any matter not controlled by the Australian Government under Section 51 of the Australian Constitution (Australian Government, 2012a). This includes laws related to land administration.

The wording of the constitution is such that in some cases the responsibilities of the Australian Government and state governments are unclear which has led to conflicts over the years (Australian Government, 2012b).

What is clear however, is that the responsibilities of respective governments have evolved over the years particularly with regard to economic policy impacting Australia. This is certainly reflected the levying of taxation. At the time of federation, the states levied all income taxes. After taking over responsibility for the income tax process in 1942 the commonwealth retained control. This retention of the income tax by the Australian Government was supported by the High Court.

The implementation of the GST by the Australian Government in 2000 also changed the manner in which taxes were collected and returned to the states. With these many changes since federation the situation now exists where the commonwealth collects 73% of all taxation in Australia (Williams, 2012).

Other High Court decisions have also changed the powers of the Australian Government relative to the states such as native title. The signing of international conventions has also influenced the powers particularly in relation to the environment (The Library and Information Service of Western Australia, 2012). Two referendums have also resulted in the transference of jurisdictional powers to the Australian Government. These were power over social security payments, student allowances and health services in 1946 and power over Aboriginal affairs in 1967 (Curriculum Corporation, 2013). These changes have resulted in an increased sharing of responsibilities between the Australian Government and the state and territories. This in turn has brought about an increased need for land information as this often influences policy development in these shared areas of responsibility. These changes are discussed in further detail in the following sections.

2.2.2 Australian Government

The central government in the federation is the Australian Government, also known as the Commonwealth or the Federal Government, which passes laws affecting the country as a whole. As indicated above, the role of the Australian Government has changed significantly since its establishment in 1901 when most of the public sector functions were assigned exclusively to the states. Many of these functions are now shared with the Australian Government (Grewal and Sheehan, 2003).

The breadth of the functions now covered by the Australian Government is shown by the extent of the various Australian Government departments (Australian Government, 2012d)

- Attorney-General's Department
- Department of Agriculture, Fisheries and Forestry
- Department of Broadband, Communications and the Digital Economy
- Department of Climate Change and Energy Efficiency
- Department of Defence
- Department of Education, Employment and Workplace Relations
- Department of Families, Housing, Community Services and Indigenous Affairs
- Department of Finance and Deregulation
- Department of Foreign Affairs and Trade
- Department of Health and Ageing
- Department of Human Services

- Department of Immigration and Citizenship
- Department of Industry, Innovation, Science, Research and Tertiary Education
- Department of Infrastructure and Transport
- Department of Regional Australia, Local Government, Arts and Sport
- Department of Resources, Energy and Tourism
- Department of Sustainability, Environment, Water, Population and Communities
- Department of the Prime Minister and Cabinet
- Department of Veterans' Affairs
- The Treasury

The number of departments and the scope of their activities is a far cry from those established at the time of federation. Many of these roles overlap functions carried out at state and local government levels (Grewal and Sheehan, 2003). As a result, these departments often require information collected and maintained at the lower levels of government including information relating to land. This information is required to support policy issues related to areas such as transport, water management, civil contingency and emergency management, natural resource management and more (Lawrence, 2011).

2.2.3 State and Territory Governments

As outlined above, the Australian constitution established the six States however the Australian borders includes areas not claimed by one of the six states. These are the Territories of Australia and currently there are ten territories. The territories can be administered by the Australian Government or they can be granted a right of self-government which allows them to establish its own government in a manner similar to a state. Both the Australia Capital Territory (ACT) and the Northern Territory operate in this manner (Australian Government, 2012a).

As a result, the second tier of government in Australia comprises the six states namely:

- New South Wales (NSW)
- Queensland (Qld)
- South Australia (SA)
- Tasmania (Tas)
- Victoria (Vic)
- Western Australia (WA)

and the two territories namely:

- Australia Capital Territory (ACT)
- Northern Territory (NT)

Figure 2.1 below shows the six states and two self-governed territories. The proximity of several of the other territories is also highlighted.

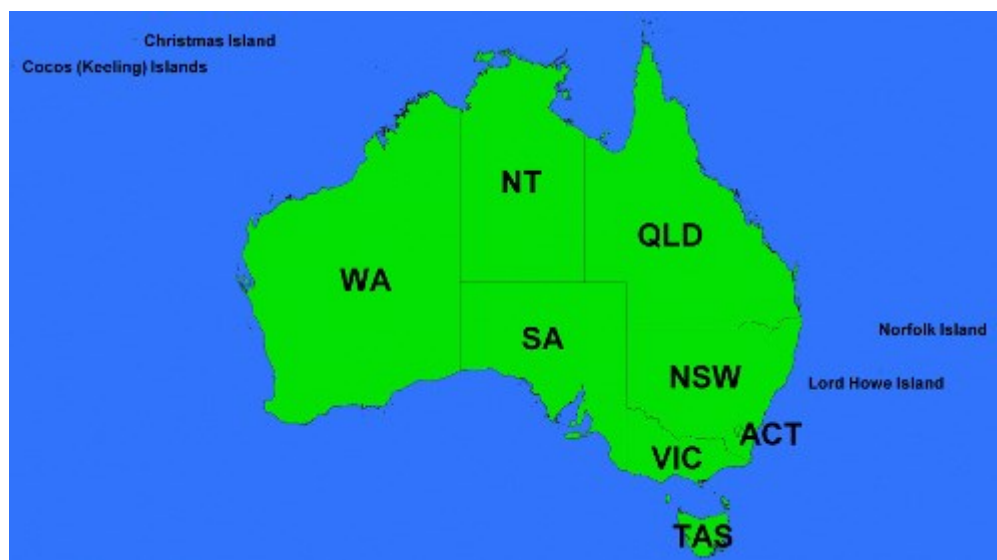


Figure 2.1 States and Territories of Australia (PSMA Australia, 2013a)

The states derive their revenue from the levying of a range of taxes, plus revenue from various sources and funding provided by the Australian Government. In 2006-7 the revenue sources of state governments were:

- State Taxes: \$49 billion (this include land tax of \$5 billion)
- Own sources revenue \$36 billion
- GST Revenue: \$40 billion
- Specific purpose payments \$29 billion

(Commonwealth of Australia, 2011a)

As can be seen from these figures, some 45% of state funding is via the Australian Government. Of particular concern to the states was the drop in GST following the Global Financial Crisis (i.e. GFC) with the slump in retail spending as they cannot change the rates of the GST which is controlled by the Australian Government.

The list of state government departments in Victoria provides an overview of the scope of functions carried out at a state level (State Government of Victoria, 2012).

- Department of Premier and Cabinet
- Department of Treasury and Finance
- Department of Business and Innovation
- Department of Education and Early Childhood Development
- Department of Health
- Department of Human Services
- Department of Justice
- Department of Planning and Community Development
- Department of Primary Industries
- Department of Sustainability and Environment (DSE)
- Department of Transport (Victoria)

Within Victoria responsibility for land administration lies with the Department of Sustainability and Environment (Department of Sustainability and Environment, 2012). The Department of Planning and Community Development has responsibility for the planning and development of land (Department of Planning and Community Development, 2013). Through various acts and regulations, often involving local government, these departments collect and store information related to land. This information is used by state and local government to assist in the governance of a wide range of activities. It is this information which is often sought by the various Australian Government departments.

2.2.4 Local Government

Each state government has established local governments and there are currently 563 local governments across Australia (Productivity Commission, 2012). This has created a third tier of government in Australia. The role of local government was traditionally to provide for the establishment and maintenance of local roads however over the years their responsibilities have progressively shifted into areas such as the delivery of community social service and promotion of local economic development such as tourism (Productivity Commission, 2012). This change is also evidenced by involvement of the Productivity Commission in reviewing the role of local government in the enforcement of regulations (Productivity Commission, 2012). The areas specifically being focused on the Productivity Commission are:

- building and construction
- parking and transport
- food safety

- public health and safety
- environment
- planning, zoning and development assessment.

Local government fund the majority of the expenditure through their own source revenue with rates levied on properties making up 45% of this in 2005-6. In 2006-7, local government raised some \$9.4 billion through rates on properties.

Through its responsibilities for planning and development at a local level, building construction and the collection of rates and charges on land, local governments are a significant collector and maintainer of information related to land. The land information collected by local governments often feed into state government systems as an outcome of the legislative processes related to land development. It is also another source of land information for the Australian Government.

Whilst local governments were established by state governments and operate under state legislation, increasingly over the past years local governments have engaged directly with the Australian Government. In 2007 the Australian Government established the Council of Australian Local Governments to provide a forum for Australian and local government issues. Various programs were established to channel funding directly to local governments to support various activities (Megarrrity, 2011).

Further evidence of the changing role of local government is also reflected by the Australian Government appointing in 2011 an expert panel to assess the community's attitude to the Australian constitution including recognition of the role of local government (Australian Government, 2012c).

2.2.5 Council of Australian Government (COAG)

The three tiers of governments together with the strong centralised theme since federation have brought about a high level of sharing of responsibilities across many areas. This situation and a desire to make federalism work better has resulted in new forms of collaborative initiatives emerging (Productivity Commission, 2005).

One such initiative established in 1992 was the Council of Australian Governments (COAG).

The members of COAG are the Prime Minister, the Premiers from the states, the Chief Ministers from the territories and the president of the Australian Local Government

Association. COAG is chaired by the Prime Minister. The role of COAG is to promote policy reforms that are of national significance, or require coordinated action by all Australian governments (Commonwealth of Australia, 2012a).

Whilst sometimes the COAG reforms involve either the Australian Government or state and territory legislation, the reforms usually involve intergovernmental agreements signed by all heads of government committing each jurisdiction to the agreed initiatives.

COAG is assisted in its processes through the operation of:

- 12 standing councils which are ongoing and address issues of national significance;
- 7 select councils which are reform-focused and time-limited; and
- 5 legislative and governance fora which oversee responsibilities set out in legislation, intergovernmental agreements (IGAs) and treaties outside the scope of standing councils.

(Commonwealth of Australia, 2012b)

The diverse range of areas covered by these Councils demonstrates the breadth of the intergovernmental collaboration across all levels of government. For example, the extent of the collaborative scope of COAG is shown in the National Partnership Agreement in support of the Seamless Nation Economy. This partnership involved 27 projects covering reforms including a national electronic conveyancing system and a national property security register (COAG Reform Council, 2009).

The impact COAG is having on the roles and responsibilities of the various levels of government in Australia is summarised by Griffith in his paper titled “Managerial Federalism - COAG and the States” where he states:

“If COAG is the key intergovernmental institutional player in this scheme, responsibility and accountability are the guiding concepts.” (Griffiths, 2009, p. 3)

He goes on to say

“what has emerged over the past decade or so, its trajectory steepening over the last few years, is a form of ‘managerial orientation, concerned with the effective and rational management of human and other resources, rich in policy goals and objectives, in which the States play a creative and proactive part but are, to a substantial degree, service providers

whose performance is subject to continuous scrutiny and oversight. Typically, the financially dominant Commonwealth Government plays the manager's role, as controlling as it can be empowering. The constitutional implications are many and varied, not least for the Parliaments of the States.” (Griffiths, 2009, p.3 – 4)

These changing relationships and responsibilities across the various levels of government in Australia impact on the manner in which policy and operational requirements of all levels of government in Australia are being undertaken. It is of relevance to the thrust of this thesis that the approach adopted to improving performance in governance for Australia through COAG has involved the establishment of a collaborative institution.

2.3 The Challenge of Federalism

The establishment of COAG clearly demonstrates there are considerable challenges facing the governance of Australia particularly from an efficiency perspective. As can be seen by the scope of functions of the departments at the Australian and State levels of government, there is considerable overlap and / or sharing of responsibilities. In 2006, the Business Council of Australia summed it like this:

“These weaknesses and inefficiencies come at a cost to Australia. Duplicated administration and inefficient service delivery impose additional costs on governments (and hence taxpayers). Overlapping regulations and poorly coordinated approvals processes impose unnecessary costs on business.” (Business Council of Australia, 2006, p. 2)

These duplicative systems at state level are often quoted as being barriers to business. This is particularly so as more and more businesses operate at a national level (OECD, 2010). In the past few years there have been efforts made to address some of the inefficiencies brought about by national approach to a number of activities. One of the major efforts was initiated by COAG in 2008 under the banner of the Seamless National Economy (COAG Council, 2009). Another initiative was the establishment of Infrastructure Australia to ensure Australia's needs as a whole with regards major infrastructure were properly considered. This independent body reports to COAG and looks beyond individual major projects to provide national strategic assessments and make recommendations as to “how infrastructure can improve Australians' lives” (Infrastructure Australia, 2012a). A third initiative directly relevant to land administration was identified by the Property Law Reform Alliance (i.e. PLRA) which is comprised of private sector organisations and representatives. This is the implementation of a national approach to the Torrens land registration system and the implementation of uniform

laws in this regard (Property Law Reform Alliance, 2012a). The PLRA has been advocating this for some time as they see it as a means to bring about improved efficiencies in property issues. This issue is yet to be accepted by governments at either the national or jurisdictional levels.

The scale and scope of these three initiatives are quite different however they demonstrate the efforts being made at all levels to bring about a more national approach to the manner in which Australia operates. Each of these initiatives is presented in more detail in the following sections and all, to varying degrees rely on the availability of a national view of land information for their success.

2.3.1 The Seamless National Economy Partnership Agreement

In 2008, the governments of Australia through COAG signed a partnership agreement to undertake 27 projects each of which would assist in achieving significant national regulatory reform (COAG, 2009). This partnership agreement was to drive Australia towards a more seamless national economy. In an OECD review of regulatory reform in Australia focusing on the seamless national economy, one of the key messages was that globalisation presents particular challenges for the Australian federation. This was a result of inconsistent or duplicative regulatory regimes between jurisdictions causing a loss of competitiveness for businesses (OECD, 2010).

The 27 projects identified covered a broad range of areas and included:

- A national electronic conveyancing system
- A national personal property security register
- Environmental assessment and approvals processes
- Land development assessment

It is interesting to note the different approaches taken across the 27 projects. In some cases, the state and territories would no longer operate independent systems at a state level in lieu of a national system operated by the Australian Government.

In the case of the national electronic conveyancing system however, each state would continue to operate their own land registration systems and they would all adapt their individual processes. This change would allow the required information to be available to support the operation of a national electronic conveyancing system. In other words, the land registration

processes for each state would remain individual processes but the conveyancing component would be a national system (COAG Reform Council, 2009).

Another project which is part of the national regulatory reform agenda and closely allied to land administration was the review of the development assessment process in each jurisdiction (COAG Reform Council, 2009). This review was intended to improve development assessment processes across all states and territories. This in return would provide greater certainty and efficiency in the development and construction sector nationally. The review included a process conducted by the Productivity Commission to benchmark performance in the development assessment processes across Australia. The benchmarking will result in *“the development of national criteria for capital city strategic planning systems, the housing supply and affordability reform agenda, and reforms of development assessment processes to reduce the costs of development”* (Productivity Commission, 2010, p.3). This national reform project again shows the drive towards a more national approach to the management of land and its development.

2.3.2 Infrastructure Australia

Infrastructure Australia is a statutory body established under the Infrastructure Australia Act 2008 to advise governments, infrastructure owners and investors on a wide range of issues relating to infrastructure (Infrastructure Australia, 2013). Established in 2008 it was given the specific charter to change the way in which Australia invested in infrastructure (Infrastructure Australia, 2012a). It notes the following challenges facing it in carrying out its role as:

- Deliver better governance.
- Create competitive markets.
- One nation, one set of rules
- Better use of existing infrastructure
- Climate change
- Supporting our cities
- Boosting exports
- Supporting Indigenous communities.
- Supporting rural communities (Infrastructure Australia, 2012b)

These challenges are certainly broad and many of these reflect the fact that Australia is a federated nation with responsibility for the planning and development of cities resting with

state and local government. They contend also that “inconsistent rules, legislation and regulations governing markets impede productivity and create unnecessary costs” (Infrastructure Australia, 2012c). Infrastructure Australia believes that Australia’s economic prosperity demands best practice planning and decision making and that this can be achieved through improving linkage between jurisdictions and shifting decisions about infrastructure from a jurisdiction by jurisdiction approach to a one focused on achieving national objectives.

Like the seamless national economy agenda initiated by COAG to minimise the inefficiencies brought about by the state based legislation, Infrastructure Australia was established by COAG to bring about a more cohesive and national focused approach to the building infrastructure in Australia.

2.3.3 Water Reform

Water like many other resources in Australia has traditionally been a role managed by the individual states and territories (Matthews, 2011). In 1994, COAG in recognition of the need to improve the efficiency of the water sector, implemented a framework of initiatives to be undertaken over a seven year period. These initiatives were:

- water pricing reform based on the principles of consumption-based pricing and full cost recovery;
- elimination of cross subsidies and making other subsidies transparent;
- clarification of water property rights;
- allocation of sufficient water for environmental purposes;
- facilitation and promotion of water trading;
- rigorous assessment of new rural water projects; and
- reform of the water industry institutions

(Willett, 2009)

In 2004, COAG agreed to refresh its water reform program and developed a new program called the National Water Initiative (NWI). This initiative was signed by all the states and territories as the agreed national policy blueprint to improve the way Australia manages its water resources (National Water Commission, 2012a). The National Water Commission is required to report on progress of the NWI. These assessments were undertaken in 2007, 2009 and 2011 and the reports published (National Water Commission, 2012b).

Notwithstanding the support from all the governments of Australia, the NWI remains uncompleted after eight years. In a speech given by Ms Kerry Olsson from the National Water Commission on 30 May 2012 she remarked

“...Given that water has been a highly contested issue during this period of both wet and dry extremes, it's remarkable that all governments and key stakeholders have stayed the distance in support of this reform blueprint. It has survived because even though the agreed timelines for its detailed actions have largely passed, its key principles are still highly relevant...” (Olsson, 2012, p. 3)

The difficulties of achieving national reform also evident in the paper by Matthews (2011) where he states that

“Yet another impediment to successful water reform is the often disappointing performance of the various governments involved. Intergovernmental decisions remain slow, the states continue to be hampered by resource constraints, and there is still much bickering between the Commonwealth and the states and between various states...” (Matthews, 2011, p. 480)

He also highlights the changing nature of roles in water reform in Australia.

“...the increasing role of the Commonwealth as a significant player in Australian water management is a positive development. Five or six years ago, the Commonwealth was not a significant actor in the field of water management, but that is certainly no longer the case. As a consequence, we are witnessing many institutional adjustments as the Commonwealth moves into this space.” (Matthews, 2011, p.480 - 481)

The above statements clearly demonstrate that implementation of national reform in areas where the states and territories have historically had sole responsibility is not easy. With the correct framework and principles in place however, the necessary reforms would appear to evolve. Of relevance to this research is that access to land information across all states and territories must underpin the development of the policies in water management. This requirement is covered in greater detail in Section 5.4.1 which discusses the role of the Murray Darling Basin Authority.

2.3.4 Nationally Uniform Land Registration

The Property Law Reform Alliance (PLRA) is a coalition of legal and industry associations committed to bringing about uniformity and reform of property law and procedures in Australia (Property Law Reform Alliance, 2012a). To this end, the PRLA has been actively promoting the concept of a national Torrens system for many years in the belief that it would improve the efficiency of land registration at a national level. With each state and territory having individual systems which are similar in many ways but different enough to cause inefficiencies, they believe a national approach would be of advantage to Australia.

The PLRA are not alone in their support for change. A submission to the House of Representatives Standing Committee on Legal and Constitutional Affairs by the department responsible for land registration in Victoria also supported the need for harmonised national title legislation. The department's submission acknowledged its support was in recognition of a project initiated by the Registrars of Titles in Australia in October 2004 to consider the issue. The submission drew attention to the fact that over \$200 billion of land transactions occur each year in Australia and that an increasing proportion of these transactions were interstate (Department of Sustainability and Environment Victoria, 2005).

In 2011, the PLRA commissioned the drafting of a national Torrens legislation and in 2012 made it available for public comment. The view of the PLRA is that the harmonised property law system would:

- lower costs for transactions involving multiple properties across jurisdictions
- lower compliance costs for property owners with national operations
- increase mobility of legal and industry professionals
- provide a basis for further national reforms, in areas such as mortgage and lease legislation.

(Property Law Reform Alliance, 2012b)

This example clearly demonstrates that it is not necessarily the national and state governments driving change to reform jurisdictional based systems, but an industry that believes there are efficiencies to be gained through a federated approach

2.4 Chapter Summary

This chapter described how Australia operates as a federated nation and in particular how it has evolved since its establishment as a nation in 1901. What is clear is the way in which Australia now operates as a nation has changed dramatically over the past century. This is particularly evident in the breadth of the activities now undertaken by the Australian Government compared to those at its early beginnings and the various departments established to fulfil these new roles.

One of the major changes that occurred was the control the Australian Government now has over economic policy and in particular the collection of taxes. Whereas once the states had control over much of their revenue they are now dependent to a far greater degree on the Australian Government for revenue whether it is from GST revenue or specific grants to fund infrastructure or other government programs. The more recent thrust towards a seamless national economy involving a partnership agreement between the Australian Government and the states and territories continues this trend of Australia operating more as a single entity, from an economic perspective, rather than as eight individual states and territories. From a resources perspective this is also occurring through Infrastructure Australia and the National Water Initiative.

The changes however have not only been from an economic perspective, issues such as the environment, native title, health, education, water reform, transport, etc. have all increasingly become national issues particularly from a policy and funding perspective. The Australian Government now has active policy participation in all these areas and in some cases a direct operational role.

A key element in the changes which have occurred over the past twenty years has been the role COAG. As the body which represents all the governments of Australia, including local government, it has played a significant role in identifying the areas for change and then facilitating the implementation of the changes. The end result of the changes that have occurred over the past century and continue to occur, is that the role of the states and territories is increasingly becoming one of a service provider in many areas, with the overall management responsibility from a national perspective lying with the Australian Government.

As outlined in this chapter, there have been many changes to the governance of Australia over the past 100 years however land administration remains the sole responsibility of the various jurisdictions in Australia, as it was at the time of federation. As shown above, whether it be

for water management, property management or infrastructure development, land and information is often a key element in the development and implementation of national policies. Given this situation, the research clearly indicates a national view of land information in Australia is required to support national policy development and implementation across many areas. It also indicates that the Australian Government needs to become more active in the development of a national land information infrastructure as it has in other areas of national importance over the past 100 years. Given its need for land information sourced at state and local government, this may include the provision of funding to support this data collection and management process. Furthermore, the national land information infrastructure needs to encompass all three levels of government in Australia. As outlined in this chapter the responsibility for many functions is now shared across all levels of government. As such all levels have key roles if a successful land information infrastructure is to evolve.

Chapter 3 Land Administration

3.1 Introduction

Chapter 2 provided background to the governance of Australia and how the federated system of government has evolved since its establishment. The challenges being faced in tackling various issues from a national perspective were also examined. This chapter now provides a background to land administration and particularly its relevance to a nation's economic prosperity and policy development. The theoretical concept of the land management paradigm is used to assist in building an understanding of land administration and its importance to the development of policies at both state and national levels. The relationship between land administration and spatial data infrastructures (SDI's) is also examined in an effort to better understand the key role land administration can play in the development of an efficient and cost effective national SDI.

3.2 Land Administration – Its Role in and Value to Society

Land is a fundamental resource and the manner in which it is managed by societies has a significant bearing on the economic, social and environmental prosperity of each society (Enemark, 2004). In economic terms, the importance of land in Australia can be indicated by the fact that total registered properties are valued at \$3.5 trillion and annual property sales are estimated to exceed \$250 billion (National Electronic Conveyancing Office, 2010). Given this level of investment in land, the administrative systems which facilitate the management of the land could be considered critical to the economic management of Australia.

Williamson et al. (2010a) describe land administration as:

“An infrastructure for implementation of land policies and land management strategies in support of sustainable development. The infrastructure includes institutional arrangements, a legal framework, processes, standards, land information, management and dissemination systems, and technologies required to support allocation, land markets, valuation, control of use, and development of interests in land.” (Williamson et al. 2010a, p.453)

As noted in this definition of land administration, a key element of any land administration system is the underlying information infrastructure which provides records and disseminates the information relating to the various transactions relating to the land.

The role of land administration systems and the relationship between land policies and land information infrastructures in supporting sustainable development is further conceptualised by Enemark (2004) in his land management paradigm pictured below.

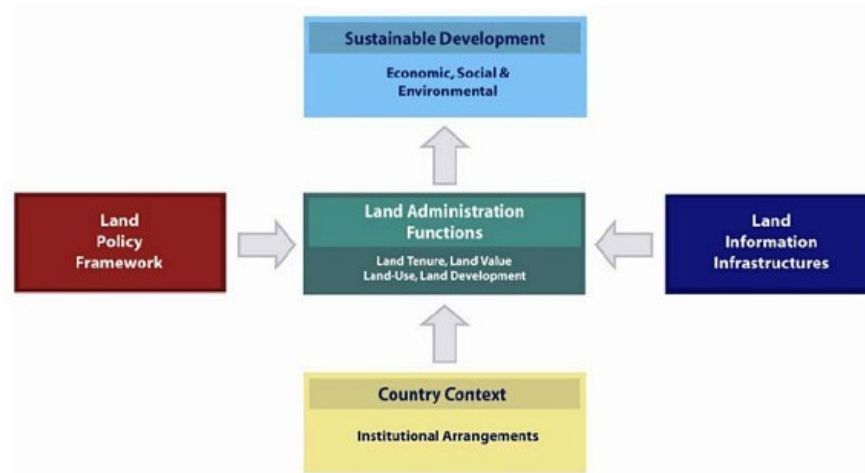


Figure 3.1 Land Management Paradigm (Enemark, 2004)

The land management paradigm considers that the land administration at the centre of the model encompasses the processes and systems to support the following functions, namely:

“Land Tenure: the allocation and security of rights in lands; the legal surveys to determine the parcel boundaries; the transfer of property or use from one party to another through sale or lease; and the management and adjudication of doubts and disputes regarding rights and parcel boundaries.

Land Value: the assessment of the value of land and properties; the gathering of revenues through taxation; and the management and adjudication of land valuation and taxation disputes.

Land-Use: the control of land-use through adoption of planning policies and land-use regulations at national, regional/federal, and local levels; the enforcement of land-use regulations; and the management and adjudication of land-use conflicts.

Land Development: the building of new infrastructure; the implementation of construction planning; and the change of land-use through planning permission and granting of permits.” (Enemark, 2004)

Enemark (2004) argues in his land management paradigm that effective land management cannot be achieved through land administration alone but that it must be supported by a land policy framework and a land information infrastructure. Taking into account the context of the country in which they are being implemented, he contends that these three land management functions are central to the economic, social and environmental prosperity of a country. The next section focusses on this context component by examining the administration of land in Australia.

3.3 Land Administration – An Australian Context

From an Australian context given each state and territory is responsible for the administration of land within its jurisdiction (Newnham et al., 2001), the land management paradigm is replicated essentially eight times as shown in the diagram below.

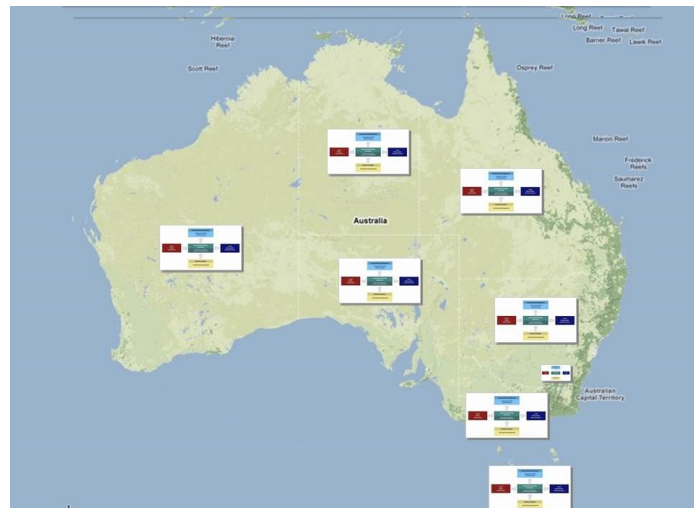


Figure 3.2 Land Management Paradigm in Australian Context

Each state and territory has developed its own land policies, and operate their own land information infrastructures in support of their individually legislated land administrative functions. These policies and systems have all been influenced over time by the institutional arrangements operating within each jurisdiction. Some of the differences between the jurisdictions are evident from the documentation produced by the Permanent Committee on Cadastral Reform of the Intergovernmental Committee on Surveying and Mapping (ICSM). This provides commentary on many of the administrative arrangements associated with land administration for each of the states and territories (Permanent Committee on Cadastral Reform, 2011). As such whilst the land administration systems have a consistent theme to their operations (e.g. all are Torrens systems), the differences between the respective systems

indicates they cannot be viewed as a distributed national system. This situation is also reinforced by the documentation arising from an ICSM cadastral reform workshop in 2008 that flagged considerable variations in terms of technology implementation, management structures and legislative arrangements (Permanent Committee on Cadastral Reform, 2008).

This poses a considerable challenge to the adoption of the land management paradigm at a national level in Australia. As previously outlined one of the cornerstones of this concept is that the country context is a key element in determining land management in any given country. Given Australia is a federated country where the state and territories are responsible for administration of land in their respective jurisdictions, this is certainly the case. But why if responsibility for the efficient land management systems lies at the jurisdictional level, is a national approach required? This would require a national approach to land policies, land administration systems and the legal framework surrounding them. There has been debate for some considerable time regarding a national Torrens system and to this end draft legislation was drafted by the PRLA (Property Law Reform Alliance, 2012b), as outlined in Section 2.2.4. This PRLA initiative is directed at each state and territory implementing similar legislation with regards land registration more so than having national legislation (i.e. a pseudo national approach). The land policy framework and land development processes specific to each jurisdiction would remain essentially as they currently are, although potentially moving towards national consistency over time. This process would need to be supported by intergovernmental agreements similar to a number of COAG initiatives. For example, national electronic conveyancing (Australian Registrars National Electronic Conveyancing Council, 2012) where the participating states agreed to implement the necessary legislation.

Notwithstanding the difficulties involved there would appear to be a sound case, based on the discussion in the previous chapter regarding the changing role of the Australian Government, for the adoption of the land management paradigm at a national level. The scope for such an approach has become more apparent since the establishment of COAG and the trend towards achieving more efficiencies at a national level in a broad range of areas, many of which have a linkage to land (e.g. environmental issues, housing development etc.).

As outlined in Chapter 2, the Australian Government is increasingly involved in policy and quality of service delivery issues in areas such as the environment, housing, emergency management, etc. In summary, if the Australian Government is to play this role as manager of efficiency in the Australian economy as suggested by Griffith (2009) then it will need a real time national view of the information relating to land administration in terms of tenure, use,

development and value rather what than currently exists within the eight disparate systems. The use of land information sourced from lower levels of government by the Australian Government is outlined in chapter 5.

3.4 National Spatial Data Infrastructures

The preceding two sections described the value of land management to society and most importantly put the land management paradigm into an Australian context. The land administration functions however can also be viewed as part of a broader framework known as spatial data infrastructures (SDI). This relationship between SDI and land administration is often described in varying way as shown in the following commentaries:

“Spatial data infrastructures in a land management framework provide mechanisms for sharing geo-referenced information.” (Enemark, 2004, p. 13).

“This paper shows how standardization activities are progressing and contributing to the fact that Land Administration (LA) is considered more and more the cornerstone of the spatial information infrastructure.” (Van Oosterom et al. 2009, p. 298).

“Within each individual country, the land management activities needed to support sustainable development may be described by the three components of land policy, land information infrastructure, and land administration functions. In this regard, the SDI plays a central role in facilitating a country’s land information infrastructure. Increasingly, large-scale “people relevant” data derived from LAS drives the development of SDIs.” (Williamson et al. 2010a, p. 226)

This is clear from these statements however that there is an important relationship between SDI and land administration.

The SDI / land administration interface is perhaps best represented in the “butterfly” diagram (diagram below) offered by Williamson et al. (2010a). In this diagram, the “cadastral engine” is shown to have both its traditional role in supporting land tenure, land use etc. and, together with the other components of an SDI such as utility infrastructure data, vegetation data, topographic data, imagery etc., provide the information required to support the components of the land management paradigm and ultimately spatially enabled government.

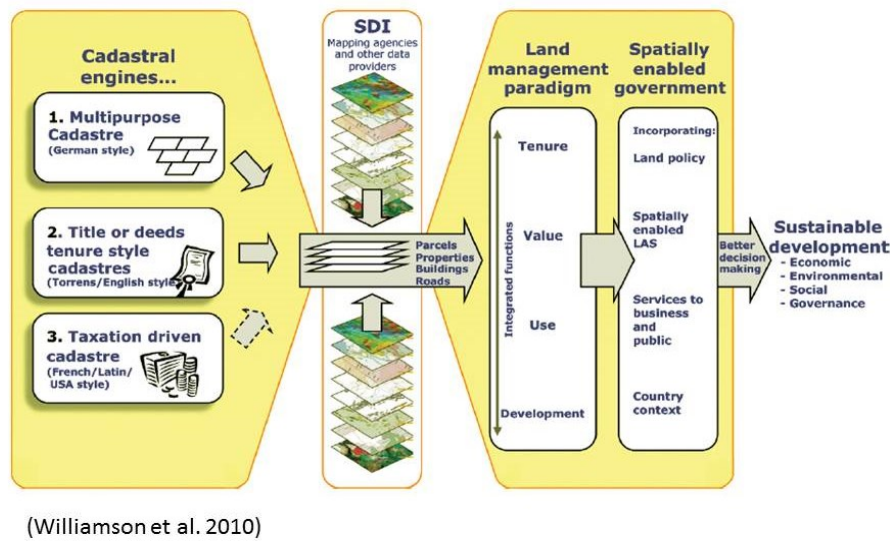


Figure 3.3 Land Administration interface with SDI (Williamson et al. 2010a)

Given the relationship as shown in the “butterfly” diagram between the SDI and land administration, and the reality that land tenure and land use layers exist as part of the SDI, the work undertaken to date in building SDI’s in Australia is certainly relevant to the design of a national land information infrastructure. The application of the concept of integrated information shown this diagram to the national level suggests that the spatial enablement of the Australian Government is dependent on a national view of the land management paradigm and the development and delivery of national land information.

3.5 Land Administration as an Infrastructure

In the preceding section, land administration is discussed more as a series of processes to facilitate the development and management of land where land is viewed as a resource. It is also explained in terms of its relationship to spatial data infrastructures. Land administration however can also be viewed as an infrastructure in itself. In a paper by Bennett et al. (2012b), the authors evaluate land administration systems as a critical public good infrastructure. They first evaluated land administration as an infrastructure against an criteria established by Star and Ruhleder which uses an assessment of an infrastructure based on embeddedness, transparency, reach/scope, learned as part of membership, links with conventions of practice, embodiment of standards, built on an installed base, and becomes visible upon breakdown. This showed that where land administration was formalised within a country it met all eight criteria. In the less developed countries not all the criteria was met. Testing of land

administration as public good infrastructure and critical infrastructure were also undertaken against other criteria with similar results.

The research by Bennett et al. (2012b) demonstrated that land administration is more than merely a series of processes designed to support land development and administration. Rather it is a critical public good infrastructure which is essential for the economic prosperity and social well-being of a country. This commentary on the importance of land administration to a country's well-being is certainly consistent with that argued by Enemark (2004) outlined in Section 3.1.

3.6 Chapter Summary

Land is a fundamental resource which is critical to the economy of all countries and the effectiveness in the management and administration of this land has a direct bearing on the country's economic wellbeing. The concept of the land management paradigm identifies four components namely land tenure, land value, land use and land development as being the key elements of land administration which must be properly managed in order to sustainably manage land as a resource. A key component of the land management paradigm is the requirement for a land information infrastructure to underpin the land policy development.

The land information generated by the jurisdictional land administration cadastral engines is a key component of the nation's spatial data infrastructure as shown in the "butterfly" diagram. Given this situation, land information can be considered critical to the spatial enablement of the Australian Government. The critical importance of land administration to a nation is also supported by research that classifies land administration as a public good infrastructure.

The challenge for Australia is that land administration is the responsibility of the state and territory governments. There is no singular system but eight efficient, but disparate systems. If land is to be treated as a national resource and the appropriate policies developed, then the land management paradigm dictates that the eight systems should have the capability of assisting as a singular national system. This is particularly important in Australia as shown in Chapter 2. This highlighted the increased involvement of the Australian Government in policy development in a wide range of areas like transport infrastructure, water reform, housing and the environment where land information plays an important role.

Chapter 4. Collaborative Frameworks

4.1 Introduction

Chapter 2 outlined the manner in which in Australia today many of the functions and responsibilities are shared between the three levels of government. It also identified that improving the performance of Australia as a federated nation (i.e. across all tiers of government) was reliant to a significant degree on the adoption of a collaborative approach given the legislative powers held by the states and territories within their respective boundaries under the Constitution. The formation of COAG as a collaborative initiative and the work it has undertaken to date is a clear demonstration of this reality. Whilst legislation may in some cases be required to underpin an initiative, collaboration is still required possibly to bring the legislation about in the first place or with the legislation in place, to maximize the effectiveness of the legislative outcomes.

Chapter 3 provided some insights into land administration in Australia and how it is currently comprised of eight disparate systems. The adoption of the land management paradigm from a national perspective building on the existing jurisdictional systems will necessitate a collaborative effort in all governments of Australia not dissimilar to other national initiatives undertaken in the past.

This chapter therefore examines the concept of collaboration and in particular the key factors in ensuring collaborative efforts are successful. Specific research efforts in the area of land information and spatial data infrastructures related to collaborative frameworks are also discussed.

4.2 Collaboration

The Oxford English Dictionary Online (2012) defines “collaboration” as simply to “work jointly on an activity or project”. Given the volume of research literature available on collaboration, this definition understates the complexities associated with the collaboration in terms of what is meant by the term, its basic features and the conditions for a success in collaboration. Majumdar (2006) reviews some of this research with a particular focus on collaboration between government agencies. He concludes his review by commenting that there are a number of common traits of successful collaborative ventures. These include:

- “closer working relationships, characterised by interdependence, commitment, and mutual understanding, trust and respect
- participative decision making
- open and frequent communication
- complementarily in terms of resources and skills
- strong, shared leadership” (Majumdar, 2006 p. 11)

The broad scope of the factors which must be considered in establishing collaborative arrangements is also supported by Préfontaine et al (2000) where they list twenty-seven key success factors across a six stage collaborative process. The stages shown in Figure 4.1 below include a start-up, search for partners, setting-up, implementation, operational management and cessation. Each stage involves negotiation, decision, action and evaluation processes that are required to take into account the extent of project completion and most importantly the manner in which the relationship between the partners is evolving. They also suggest that the effective management of the relationships between the partners and project management will promote a climate of trust and so contribute to the smooth running of the collaborative operation.

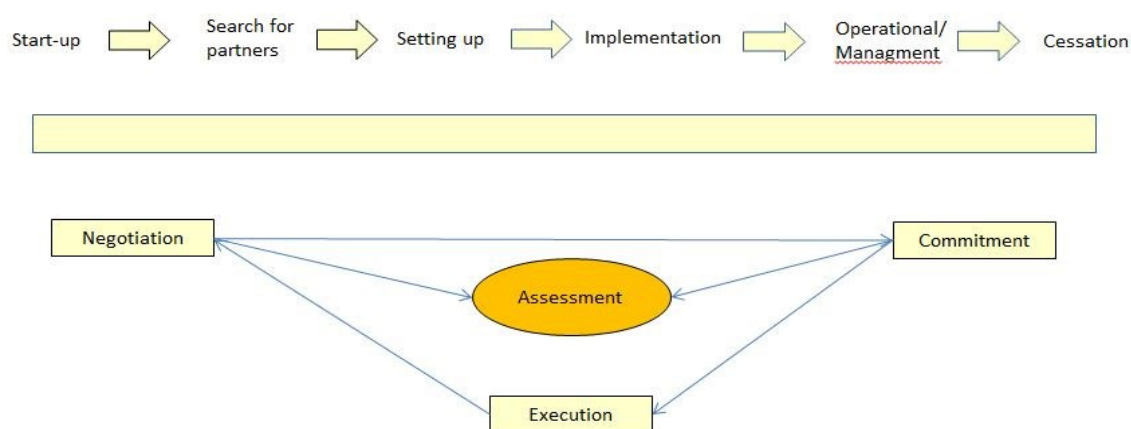


Figure 4.1 Scope of Collaborative Arrangements (Préfontaine et al., 2000)

Notwithstanding these critical success factors, it would appear it is important to the success of the collaborative effort that the process is well founded at its commencement. When discussing the mechanisms to facilitate collaboration, Majumdar suggests that it is necessary to “set the stage” for collaboration to progress to an organised and effective relationship. This will allow the “mechanisms for achieving, preserving and improving collaboration come into play” (Majumdar, 2006 p6). This requirement of having a clearly articulated vision of the

purpose of the collaboration is also supported by London (1995) where he maintains the collaboration process must be carefully defined by the parties and if necessary by redefining the purpose before moving on to the solution. He supports this requirement quoting Matthews (1994):

“We cannot even begin to agree on how we should act until we have a common definition of the problem, one that reflects an understanding of our own interests, the interests of others, and how the two diverge and converge.”

Accordingly to London, it is this shared purpose and direction which distinguishes collaboration from cooperation. Cooperation may involve common interests of the participants but not a collectively articulated goal or vision. Melaville and Blank (1991) takes this further in that they suggest that:

“a collaborative strategy is called for where the need and intent is to change fundamentally the way services are designed and delivered. By contrast, cooperation merely involves “coordinat[ing] existing services.” (as cited in London, 1995, p.4)

The implementation of a collaborative venture is clearly a complex arrangement with many variables that may impact the outcome. It is also a process that goes beyond the cooperation between organisations. What seems to be clear however is that establishing a collaborative project will require a shared and well defined vision at the outset, an effective on-going relationship management strategy and continual reassessment of the status of the arrangements throughout the life of the project. Most importantly successful collaborative arrangements have the potential to change the way services are designed and delivered.

4.3 National Collaborative Model

The research of Préfontaine et al (2000), Majumdar (2006) and London (2005) identified above clearly demonstrates that the establishment of collaborative arrangements are complex and require the implementation of predefined strategies to ensure their success. To assist Australian Government agencies, state/territory and local jurisdictions in working collaboratively to achieve government objectives, the Australian Government has developed a National Collaborative Framework (NCF) (Department of Finance and Deregulation, 2012a). This framework was endorsed by the former Online Communications Council which was a standing committee of COAG. As such it has the support of all the governments of Australia. The NCF provides processes and tools, including a number of template agreements, designed

to save time in developing the necessary documentation to support any proposed collaborative arrangement.

The NCF is based nine principles as listed below. These principles essentially reflect many of the key success factors listed in the research on collaboration. The documentation seeks to provide a starting point for Australian Government departments and the jurisdictional governments to understand the “rules of engagement” for collaborative ventures. The document also acknowledges that *“barriers to collaboration are unlikely to simply disappear; rather they must be actively overcome”* (Department of Finance and Deregulation, 2012b, p.1).

The nine principles are:

- Principle 1: All parties to a collaborative service delivery arrangement must share a common vision and an understanding of the scope.
- Principle 2: Collaborative service delivery will be customer-centric, requiring the customer constituency to be consulted and their views represented in decision-making.
- Principle 3: Participants must demonstrate, through action, a willingness to make collaboration succeed.
- Principle 4: Collaboration arrangements must be collegiate and sufficiently flexible to encourage participation regardless of jurisdictional affiliation or size.
- Principle 5: A standards based approach to collaboration will be employed whereby relevant standards and guidelines will be agreed early to steer all collaboration work.
- Principle 6: An analysis of all costs and benefits must underpin the initial decision and sustain the ongoing case to deliver collaborative services.
- Principle 7: Governance arrangements in a collaborative environment must be explicit, open, transparent and sustainable and include a clear definition of accountabilities
- Principle 8: Collaborative service delivery initiatives must be delivered in a secure environment with acceptable levels of privacy and confidentiality protection.
- Principle 9: An express agreement between parties must support any collaborative service delivery.

(Department of Finance and Deregulation, 2012b)

The NCF also adopts a five tiered structured approach to assist government agencies in establishing collaborative service delivery ventures. The five tiers cover five framework areas namely governance, legal, financial, business rules and technical. The five tiers are as follows:

- Tier 1: Involves establishing overarching principles to collaborate that identify vision, value, scope, cost, benefits and security that guide the integration of services.
- Tier 2: Involves agreement on statements about how organisations plan to do business together.
- Tier 3: Is a Collaborative Head Agreement (CHA) representing commitment to those elements that apply to multiple projects across a jurisdiction/s.
- Tier 4: Involves parties creating project specific agreements.
- Tier 5: Provides templates, checklists, guidelines etc. specific to collaborative service delivery. (Department of Finance and Deregulation, 2012a)

Consistent with the research which suggests that there should be a shared approach to the establishment of collaborative arrangements, the templates that form part of the documentation have been designed to be non-adversarial and are based on the parties having agreed about the business reasons for collaboration. The templates are not intended to create legally binding contractual relationships between the parties however this could be changed if the parties were to agree (Department of Finance and Deregulation, 2012c).

To assist in the promotion of the NCF across the Australian Government and the jurisdictional governments, the Australian Government Information Management Office (AGIMO) conducted a series of information sessions around the country during the period April - June 2011 (Department of Finance and Deregulation, 2012d).

The development of the NCF under the auspices of COAG, clearly demonstrates that there is recognition amongst the governments of Australia that collaborative ventures are a key mechanism in assisting in the delivery of government services.

4.4 Land Information and Spatial Information

Not surprisingly, given a significant component of land and spatial information lies within the hands of governments across a number of levels (i.e. local, state, national), the concept of collaboration has been the subject of considerable SDI research for some years, both directly and more often indirectly. For example, from indirect perspective, in their discussion

regarding the implementation of SDI's within and across the various levels of government, Rajabifard et al. (2002, p.1) conclude that *"SDI is fundamentally about facilitation and coordination of the exchange and sharing of spatial data between stakeholders in the spatial data community, and it constitutes dynamic partnerships between inter- and intra-jurisdictional stakeholders."* Given the Oxford English Dictionary Online (2012) definition of "collaboration" as to *"work jointly on an activity or project"*, it is clear that collaboration is being implied by Rajabifard. Of particular interest in the work by Rajabifard (2002, p.6) is the concept of an SDI as a process where *"an SDI initiative can proceed by following certain steps towards the creation of an infrastructure in which to facilitate all parties of the spatial data community in the cooperation and exchange of their data sets."*

The theme of collaboration has been a direct focus of other researchers. For example, Warnest developed a National SDI Collaboration model (Warnest et al. 2005) that outlined the importance of a collaborative approach in bringing together spatial information. This included the land administrative information generated by the respective state and territory governments. His model was based on three components namely, a SDI strategy which was linked to a Coordination Strategy and a Collaboration Strategy (refer Figure 4.2 below).

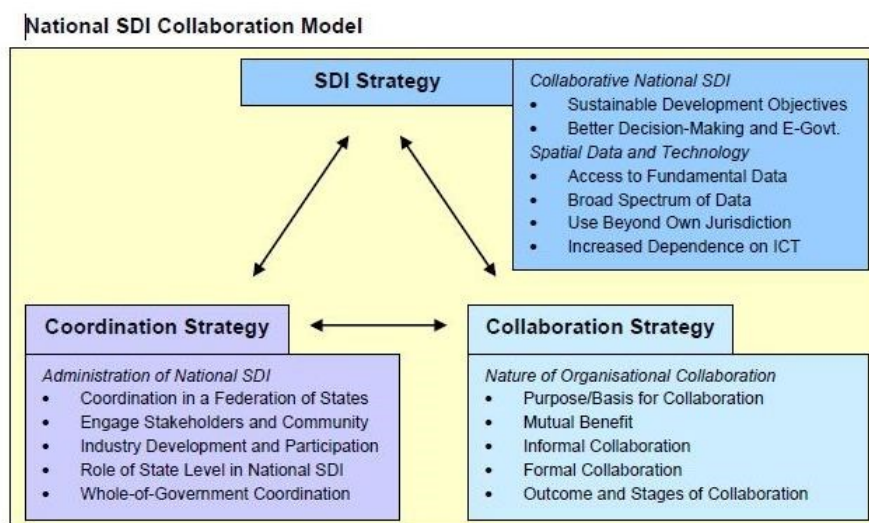


Figure 4.2 National SDI Collaboration Model (Warnest et al. 2005)

The SDI Strategy provides the policy framework at a national level to guide the user, provision and management at the jurisdictional and organisational level. The Coordination Strategy provided the framework to guide the various SDI organisations in their interaction with each other. This coordination strategy was considered most pertinent to federated countries where

cohesive interaction between state governments and the national government is most critical. The collaboration strategy was to provide guidance to organisations entering into spatial information partnerships.

Warnest's model demonstrates the multi-faceted elements to building a national spatial infrastructure. This model includes the fundamental land administrative data as per the land management paradigm discussed earlier. Critical to his national collaborative model is the use of data beyond the jurisdiction which collects and maintains this data. He suggests that each level of government (i.e. national and state) should be coordinated across their own level so as to best service the overall national requirement. Furthermore he states that some legislation may be required under a public good banner to bring about data consistency and cross-agency collaboration. Warnest (2005b) acknowledges however that his model, which was one of the first efforts of research into this area, remains more a strategic model than an implementation model. To some degree, this is reflected in the absence of discussion on aspects such funding processes required to bring the state and local government information into a coherent national dataset. This inevitably would impact the sustainability of the model.

Similarly McDougall (2006) also covered some of this same area in terms of collaboration however he primarily focused on the how a collaborative approach could work in terms of local government feeding information into the state government systems. McDougall's research provides an excellent overview of the various forms of collaboration and once again demonstrates the breadth of issues to be managed in delivering successful collaborative ventures. His research also indicates the importance of performance benchmarking of the collaborative process throughout the life of a project. The data partnership model developed by McDougall also covers key elements such as governance and partnership sustainability. The collaborative process is a core component of McDougall's partnership model.

A most important part of McDougall research into the development of his partnership model was a detailed investigation of existing spatial information partnership projects between state government and local government in three states of Australia. Using his qualitative and quantitative research finding, McDougall identified twenty-two significant issues impacting these partnerships. He classified these in four areas namely, jurisdictional environment, institutional environment, collaborative process and outcomes. These are shown in Figure 4.3 below.



Figure 4.3 Components of a State –Local Government Partnership Model (McDougall, 2006)

The collaborative process comprised a major part of these issues. In line with the research outlined earlier, issues such as shared goals, defined business needs leadership, communication and trust are included within the significant issues. McDougall then uses these components to develop a shared partnership model as shown below in Figure 4.4.

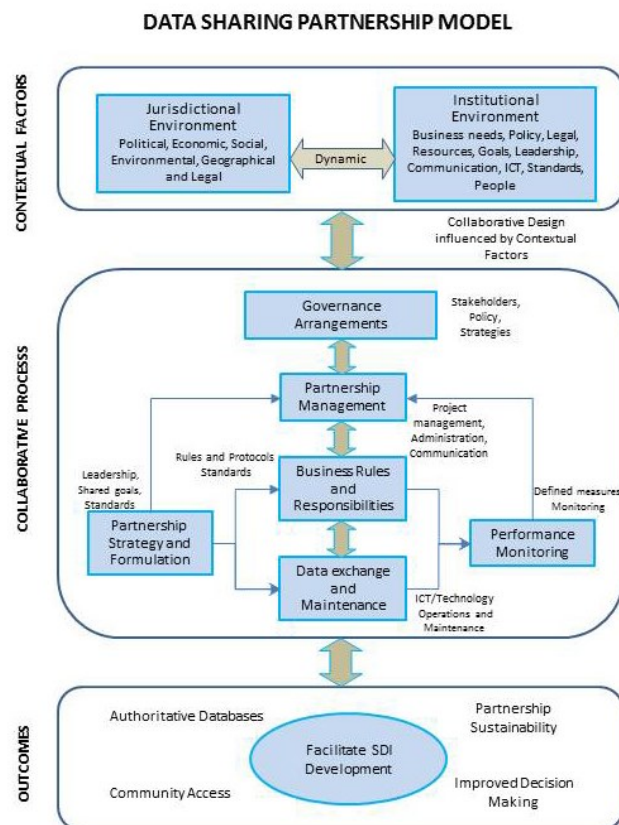


Figure 4.4 Data Sharing Partnership Model (McDougall, 2006)

In evaluating his model, that had a primary focus between local government and state government, he gives some consideration to the application of the model to the federal – state relationship. McDougall argues that the model should be applicable in supporting such an arrangement although he tends to focus on a relationship between a federal government department and a state government on a specific issue such as water management and policy rather than the Australian Government in its entirety. With regards such partnerships he indicates that factors such as governance, partnership strategy and management would be key factors. He goes on to say that “*the development of a shared goal and vision would be critical in the early stage development of such a partnership*” (McDougall, 2006, p. 219)

Like Warnest’s collaborative SDI model, this model is also generic in nature and does not address the specific issues required to bring about the establishment of an Australian land information infrastructure. The generic model developed by McDougall does however embody all the key factors that would be necessary to bring about a national land information infrastructure. Issues such as governance, performance review, data exchange, maintenance, partnership strategy and formulation are all certainly key issues which need to be addressed.

4.5 Chapter Summary

As acknowledged at the commencement of this chapter, the effective operation of a federated country such as Australia relies significantly on a collaborative effort between all levels of government. Based on the research findings in many papers, the process of “collaboration” is far more complex than to simply “work jointly on an activity or project” if successful outcomes are to be achieved and sustained over a period of time.

Section 4.3 identified that the Australian Government has developed documentation to assist in initiating collaborative arrangement in the delivery of government services where multiple levels of government are involved. This documentation associated with the NCF is consistent with the research on collaboration in that ‘setting the stage’ is a significant factor in ensuring the success of a collaborative service delivery. The fact that it is seen as a “starting point” to assist in ensuring the prospective partners clearly understand the “rules of engagement” highlights this alignment with the collaboration research. The first principle of the NCF which requires the parties to have a shared vision for the outcome and understanding of the scope of the project is consistent with this theme of making sure the stage is correctly set for the collaborative effort to develop.

Another key success factor of collaborative arrangements reflected in the research is the effort required in relationship management. The work by McDougall in evaluating data partnership arrangements in Victoria and Tasmania also supports the importance of ongoing relationship management to successful collaborative ventures. The models developed by Warnest and McDougall show the importance of collaborative processes to the implementation of land information infrastructures. These processes need to bridge the various levels of government in order to provide government and the community access to complete and cohesive information. All the key elements to be addressed in developing a national land information infrastructure such as governance, performance monitoring and business rules, etc. are contained within their respective collaborative models.

The research outlined in this chapter clearly shows that collaborative models are a viable means of delivering services involving the input of multiple organisations. It requires however that appropriate recognition is given to a number of underlying principles and in particular, all parties clearly understand the rules of engagement at the outset.

Chapter 5. Drivers for a National Land Information Infrastructure

5.1 Introduction

The preceding chapters have endeavoured to outline the challenges facing Australia as a federated nation and the value of land administration in delivering a sustainable environment in the broadest sense. With eight disparate land administration systems as a result of the federated system of government, ready access to land information from a national perspective is not easily achieved in Australia. The need for this national perspective has become increasingly important as the areas of involvement of the Australian Government have broadened into areas traditionally solely the role of the states and territories.

This chapter provides an overview of a number of areas where the Australian Government now requires access to land information as a result of its functions broadening. As previously indicated, this requirement for national land information brings with it considerable challenges given this information is spread across eight state and territory governments.

The land information collection activities of various Australian government departments and agencies outlined in this chapter are then used to assist in identifying the major drivers for a national land information infrastructure.

The need for a national approach to land information is however not a recent phenomenon. Considerable efforts have been made over many years directed towards developing a national approach to land information. Notwithstanding these efforts, the required infrastructure to support all the components of the land management paradigm at a national level has not been achieved. Some of the initiatives arising from these efforts are outlined in this chapter.

5.2 Developing a National Perspective

The implementation of a national perspective with regards land information has in some ways been an ongoing effort since 1945 when the National Mapping Council (NMC) was established (XNATMAP, 2012). The NMC was established following a conference involving the Commonwealth Survey Committee and state Surveyors-General. This was subsequently agreed by the Australian Government.

“The NMC's role was to coordinate the national mapping activities of commonwealth and state government civilian and defence force mapping entities that comprised the council's

membership.” (XNATMAP, 2012 p.1). Whilst the focus of NMC was primarily mapping, it was the commencement of a collaborative arrangement to facilitate a national perspective of the collection and management of land related information in Australia. The NMC continued in this role until 1986 when it was disbanded and replaced by the Intergovernmental Committee on Surveying and Mapping (ICSM) to provide a broader coverage of both surveying and mapping. Its role was:

“...to consider matters relating to the development of recommended national standards and to assist decision makers in national approaches to major surveying, mapping and land information issues...” (Priebbenow, 2010, p.3).

Since its establishment, ICSM has been instrumental in developing many of the standards associated with surveying and mapping in Australia in support of activities such as geodetic control, street addressing, cadastral reform and more recently electronic plan lodgement (ICSM, 2012b). ICSM has also been active in the development of the Australian Spatial Data Infrastructure (ASDI). In a report prepared for ICSM in 2008, the vision of the ASDI was seen as:

“The ASDI will provide a transparent supporting structure for spatial decision making and information access that will be used on a regular basis by all members of society” (Geomatics Technologies, 2008 p. 13).

The ASDI as outlined in the document included the information and services from the various jurisdictions and was to be readily available on a national basis.

In 1986, the Prime Minister and the heads of the State and Territory Governments took a further step towards achieving a national perspective on land information when they established the Australia Land Information Council. New Zealand would later join the Council to form the Australian and New Zealand Land Information Council (ANZLIC). ANZLIC reports to various Ministerial Councils on an issue by issue basis (Australian Government, 2012f). In 2002 ICSM became a standing committee of ANZLIC (ICSM, 2012a). Other ANZLIC standing committees also exist on emerging issues and geospatial futures, land administration and emergency management. As such ANZLIC is:

“the peak intergovernmental organisation providing leadership in the collection, management and use of spatial information in Australia and New Zealand. ANZLIC's role is to facilitate

easy and cost effective access to the wealth of spatial data and services provided by a wide range of organisations in the public and private sectors.” (Australian Government, 2012g)

The standing committee on land administration has actively pursued for a number of years a national approach to the management of rights, restrictions and responsibilities (RRR's) (ANZLIC, 2013). The requirement for a national approach was outlined in a report prepared for ANZLIC in 2008 (Lyons and Davies, 2008). Whilst the drive for a national approach did not exist at the time, ANZLIC continued to work with the states and territory to ensure consistency between the jurisdictions in their efforts in this regard (ANZLIC, 2013).

In August 2011, ANZLIC endorsed the development of national spatial data themes and the development of national policies. These eleven initial data themes were based on the New Zealand model. Subsequent work carried out further refined these data themes. In November 2012 ANZLIC published the broad specifications for ten “foundation” data themes which would form the foundation of the Australian and New Zealand spatial data framework.

These data themes were:

- Geocoded Addressing
- Administrative Boundaries
- Positioning
- Place Names
- Land Parcel and Property
- Imagery
- Transport
- Water
- Elevation and Depth
- Land Cover.

The publication of this document represented Phase 2 of a four phase process to build the national spatial data framework. Subsequent phases included industry consultation, the finalisation of policies and guidelines and the delivery of the foundation data themes (ANZLIC, 2012). This work will be led by the Office of Spatial Policy (OSP). OSP is a “central policy unit, responsible for facilitating and coordinating spatial data management across Australian Government agencies” (Department of Resources, Tourism and Industry, 2013). OSP and its role are discussed in greater detail later in this section.

The establishment of a company in 2001 jointly owned by the governments of Australia, known as PSMA Australia with a charter to build national spatial datasets from data supplied by respective governments was a further step in the evolving levels of collaboration designed to provide a national view of land related information. There seems little doubt that the collaborative cultural developed over the many years through the work of ANZLIC and ICSM was instrumental in the establishment of PSMA Australia. This is evident in the fact that in the majority of cases the members of the Boards of ANZLIC and PSMA Australia come from the same legal entities (i.e. shared membership) (Lawrence, 2011). The establishment and role of PSMA Australia is discussed in some depth in Chapter 6.

From the activities of NMC commencing in 1945 through to those of ICSM, ANZLIC and PSMA Australia, there has been considerable collaborative effort over sixty years of endeavouring to lay the ground work for a national land information infrastructure. The scope of the work has been broad, covering the many elements of land administration. The reasonably close alignment of many of the jurisdictional systems is no doubt due to this collaborative effort across all levels of government in Australia.

5.3 The Australian Government and Land Related Information

As outlined above, the Australian Government has been involved in the various collaborative efforts in building a national perspective of land information. As previously mentioned it has been involved in the National Mapping Council and ICSM over the past sixty years. The Australian Government has traditionally been responsible for national topographic mapping programs to support Australia's requirement for small scale mapping (e.g. 1:50,000 up to 1:1,000,000 scales) and the establishment of the national geodetic datum. Traditionally the states and territories had undertaken mapping programs at the larger scales. The national work in mapping is the responsibility of Geoscience Australia, an agency within the Department of Resources, Energy and Tourism. In more recent years, Geoscience Australia has worked closely with the states and territories to coordinate mapping programs to minimise duplication through the National Topographic Information Coordination Initiative (NITICI) (ICSM, 2005)

The widespread use of spatial information across the various Australian Government departments and agencies and the need for the efficient use of the information have been understood for some time. The requirement for coordination of activities was recognised in 2001 with the establishment of the Office of Spatial Data Management (OSDM) in 2001

within Geoscience Australia to support its national role with regards spatial information.

OSDM was established to focus on

- providing support and services to facilitate implementation of the 2001 Commonwealth Policy on Spatial Data Access and Pricing
- facilitating sharing of experience and expertise between Australian Government agencies;
- providing technical advice to the Spatial Data Management Group;
- promoting efficient use of Australian Government spatial data assets;
- representing the Australian Government's interests in spatial data coordination and access arrangements with the states and territories, and
- fostering the development of a private sector.

(Commonwealth of Australia, 2011b p.65)

Notwithstanding the establishment of OSDM and the work undertaken over the following ten years, OSDM lacked the authority to bring about substantial changes across the Australian Government with regards the use of spatial information (Scott et al. 2011). This resulted in inadequate leadership within the Australian Government with regards spatial information and this situation lead to duplication and lost opportunities. In 2011, this resulted in the establishment of the Office of Spatial Policy (OSP) reporting directly to the Secretary of Department of Resources Energy and Tourism. (RET) (Commonwealth of Australia, 2011b).

The value of spatial data to the Australian Government was also acknowledged when the Secretaries Board of the Australian Government commissioned an APS 200 study to develop options to deliver location information policy, governance, and investment. The APS 200 comprises the Secretaries Board and senior government officials and is the senior leadership forum for the Australian Public Service (APS). Its role is to lead the vision of the future APS and build the engagement of staff to the APS reform agenda. The APS 200 Locations study resulted in the development of a strategic framework which outlined the vision, strategic goals and guiding principles that could be used to form the basis of future location policy initiatives for the Australian Government (Scott, et al, 2011). The framework is encapsulated in the figure 5.1 below. This strategic framework demonstrates the proposed breadth of use of spatial information across the Australian Government.

VISION	Australian Government information is linked to a location, improving decision making and service delivery, and increasing innovation and productivity					
OUTCOMES	Sustainable Environment	Innovative & Productive Economy		Safe & Secure Australia	Social Inclusion	
STRATEGIC GOALS	Inform policy development & decision making		Drive service delivery		Engage & inform the public	
NATIONAL DRIVERS	Water security Climate change Environment	Agriculture Energy Defence	Emergency management Tourism Health	Education Social services Regional Australia	Budget Infrastructure Workforce	
CONTEXT	<ul style="list-style-type: none">Engage: Getting on with Government 2.0Spatial Data Access & Pricing PolicyAustralia's Digital Economy: Future DirectionsVenturous Australia: Building Strength in InnovationNational Government Information Sharing StrategyDeclaration of Open GovernmentNew Freedom of Information LawsOffice of Australian Information CommissionerStrategic Vision for the Aust Gov use of ICTOne APS Reform Agenda					

PRINCIPLES	Good Governance	Fundamental Location Data	Stewardship & Custodianship	Access & Sharing	Standards & Interoperability	Licensing & Investment	Capacity & Capability
INDICATORS	Establish a policy lead Develop & implement a governance structure Leadership to build & sustain	Identify framework datasets Geocode information to location Consistent & maintained datasets	Accountable data management practices Recognised custodial responsibilities Delivery of consistent data	Promote information sharing principles Improved access & availability of data Consistent data catalogues	Agreed standards & guidelines Develop standard geographies Consistent metadata Interoperability principles defined	Appropriate licensing Commitment to Creative Commons licensing Invest in life-cycle data management	Build skills & knowledge resources Improve & standardise capability across agencies Improve analytical capabilities

Figure 5.1 Framework for a location strategy for the Australian Government (Scott et al. 2011)

The Secretary of Department of Resources Energy and Tourism (DRET) also commissioned a report in 2011 to “investigate the Australian Government’s current spatial capability and suggest how that capability can be improved for the benefit of the Australian public sector, private sector and the wider Australian public” (Lawrence, 2011 p. 5). This Lawrence Report made 22 recommendations covering all aspects of a national spatial infrastructure for Australia including governance of spatial information, data management, the conflation of the state and territory data into national datasets, the need to build datasets to exacting standards and the marketing and licensing of the spatial information. An implementation model was also suggested in the report.

In this report by Lawrence, the recommendations include the following:

“The new central policy office for spatially-enabled data in DRET should provide direction at a ‘whole of Australian Government’ level to all departments and agencies for the creation, management and dissemination of spatially-enabled data.”

“the new policy centre should articulate the specification required for geospatial data to facilitate the effective running of the Commonwealth and better governance of the ‘whole of Australia’”

(Lawrence 2011, p. 8-9)

These recommendations plus a number of the other recommendations confirmed the importance of spatially enabled information to the functioning of the Australian Government and the need to implement a more coordinated approach to its use.

5.4 Use of Land Information by the Australian Government Departments and Agencies

The reports by Lawrence (2011) and Department of Finance (Commonwealth of Australia, 2011b) clearly indicate that there is considerable use of spatial data across the Australian Government. The following section provides an overview of some of the activities making use of data sourced from the state and territory governments of Australia and the contribution this data makes to the functioning of the Australian Government. Based on the Lawrence report, the areas identified represent only a small cross section of the departments utilising land information sourced from state and territory governments. The most recent use is the establishment of a national foreign ownership register for agricultural land by the Australian Government. (Minister for Agriculture Fisheries and Forestry, 2012).

5.4.1 Water Policy and Management

As previously outlined in Section 2.3.3, national water reform has been a significant area of involvement for the Australian Government over the past decade. One of the agencies central to much of this involvement has been the Murray Darling Basin Authority (MDBA) which operates under Commonwealth legislation (i.e. Water Act 2007). The organisation however was initially established as the River Murray Commission in 1918 through agreement between the states of Victoria, NSW and South Australia. In more recent years Queensland and the Australian Capital Territory (ACT) have also become signatories to the agreement.

The Water Act 2007 requires the MDBA to fulfil the following functions:

- Measuring, monitoring and recording the amount and quality of Basin water resources and condition of water-dependent ecosystems
- Researching to improve knowledge on Basin water resources and water-dependent ecosystems
- Providing a fair, efficient and sustainable use and delivery of Basin water resources
- Developing a water model for the Basin
- Collecting, utilising and sharing information about Basin water resources and water dependent ecosystems, and
- Educating the Australian community about Basin water resources

(Commonwealth of Australia - Murray Darling Basin Authority 2008)

To meet these requirements the MDBA must collect information across the five jurisdictions which it encompasses. Whilst much of this information it collects and maintains itself such as imagery, stream flows etc., other information such as the digital cadastre, land and water ownership, value etc., it must obtain from the respective jurisdictions. To achieve this end, it establishes MOU's with each jurisdiction and then transforms the information into a common structure (Forghani et al. 2011). The availability of a national land information infrastructure would minimise this requirement.

5.4.2 Climate Change

Over the past decade, the development of climate change policies has further broadened the Australian Government's role. For example, as part of its commitment to the Kyoto treaty, the Australian Government has undertaken to ensure its greenhouse emissions for the period 2008 to 2012 are no more than 8% above the levels in 1990 (Department of Climate Change and Energy Efficiency 2012a). The legislation to assist in meeting this target includes the Building Efficiency Disclosure Act 2010 which provides for the establishment of a new national scheme for the disclosure of commercial office building energy efficiency (The Parliament of the Commonwealth of Australia, 2010).

Essentially this Act requires owners and lessors of commercial space over 2000 square metres to disclose the energy efficiency of the office building to prospective buyers or tenants when advertising or offering it for sale, lease and sub-lease. Whilst the obligation to ensure the requirements of the Act is the responsibility of the owners or lessors of the buildings, monitoring of compliance with the Act is being undertaken by the Australian Government, Department of Climate Change and Energy Efficiency. This department monitors sale, lease

and sublease transactions as well as advertisements in print and online media (Commonwealth of Australia, 2010). This is required across all jurisdictions.

5.4.3 National Statistics

The collection of national statistics has also evolved from a state based system in the early 1900's to become a key function of the Australian Government (Australian Bureau of Statistics, 2013). The collection of national statistics is undertaken by the Australian Bureau of Statistics (ABS) which is located with the Department of Treasury portfolio. As well as collecting national statistics, ABS also “...assists and encourages informed decision-making, research and discussion within governments and the community, by providing a high quality, objective and responsive national statistical service.” (Commonwealth of Australia, 2012e)

Its current activities include the evaluation of the feasibility of building a Land Account in accordance with international statistical standards and as part of a set of integrated environmental-economic accounts. This standard, the System of Environmental –Economics Accounts (SEEA), was developed by the United Nations Statistical Division and became an international standard in 2012. Australia already produces annual water and energy accounts consistent with this standard. As part of this evaluation, a Land Account has been produced covering the Great Barrier Reef (Australian Bureau of Statistics, 2012a).

“A land account integrates information already held by different levels of government in order to:

- *enable the relationships between the land and the economy to be identified, analysed and understood*
- *present data using a framework that is consistent with broader economic data, such as the System of National Accounts (SNA)*
- *examine the effectiveness or efficiency of private and public environmental protection and natural resource management expenditures*
- *support more targeted policy development by showing how land is used by different parts of the economy and how different economic activities may deplete or degrade the productive capacity of land*
- *show how land use and land cover affect the availability of water*
- *provide a system into which monetary valuations of land assets and environmental-related flows can be incorporated with physical data*
- *access the monetary implications of environmental actions*
- *identify critical gaps and deficiencies in land data, and*
- *identify which industries currently own or manage land that is of significance to carbon storage and exchange.”* (Australian Bureau of Statistics, 2012a)

The above uses of the land account clearly demonstrates the critical value of information relating to land for the purpose of policy development and implementation at a national level.

To produce the Land Account, ABS will collect information from a number of government departments both at the national and state levels covering more than 70 attributes for the land areas. From the state level, the information includes land parcel details (i.e. the cadastre), land use, land valuation and land cover. This is essentially all the elements of the land management paradigm. Other data collected includes rainfall, population and fire hazards.

Whilst ABS currently utilises the national spatial provided by PSMA Australia Limited such as the parcel structure (i.e. Cadlite) and address data (i.e. G-NAF), land valuation and land use must be accessed from the various Valuer-Generals in the respective state governments to support the Land Account data collection requirements (Hodges, 2011).

5.4.4 Disaster Management

Another area of where the role of the Australian government is changing is disaster management. Whilst state and territory governments have responsibility for disaster management within their respective borders, the Australian Government, through the Department of the Attorney General, accepts responsibility for and prepares plans for providing physical assistance and financial support to disasters. In its strategic plan it outlines its role in this area as being to:

“Promote greater national focus on disaster prevention, preparedness, mitigation, response and recovery by improving information sharing arrangements and financial reporting and assessment frameworks with State and Territory governments by implementing the National Strategy for Disaster Resilience” (Australian Government, 2012e, p. 6).

For example, the Australian Government Disaster Response Plan (COMDISPLAN) provides the framework for addressing state requests for Australian Government physical assistance arising from any type of disaster. Within the Department of Attorney General the nominated agency that undertakes this function is Emergency Management Australia (Emergency Management Australia, 2008).

In 2011 COAG adopted a whole of nation resilience based approach to disaster called the National Strategy for Disaster Resilience. One of the initiatives arising from this strategy was the proposal to develop a National Flood Risk portal and associated guidelines. The

requirement for this portal is contained in national guidelines which set out “*the framework and principles under which Australian jurisdictions will work together to improve flood risk information*” (Australian Emergency Management Institute, 2012). This four year project will be jointly run by the Department of Attorney-General and Geoscience Australia. The project aims to improve the quality, availability and accessibility of flood information in Australia. It is envisaged this will lead to better decision making in land use planning, emergency management and insurance.

Much of the information input to the portal will be sourced from state and territory governments via their various agencies. It is intended that the portal will be used by local government and property developers to support applications including planning and land use. The information provided via this portal will need to closely align with similar information generated directly by the respective land administrative systems in each state and territory

Another example of the Australian Government’s increasing role in national disaster management is the establishment of the National Exposure Information System (NEXIS). This system will provide a detailed risk assessment of the number and types of buildings, people, infrastructure, structure value and the contents of the building exposed to hazards (Geoscience Australia, 2007). This project resulted from a COAG review that included a recommendation to develop and implement a five-year national program of systematic and rigorous disaster risk assessments.

The system integrates data from a number of national spatial databases such as:

- PSMA Australia’s geocoded National Address file (G-NAF) and its property cadastre (Cadlite)
- ABS’s census data and Business Registry
- Reed–Cordell building cost factors
- Cityscope (commercial properties within CBDs).

It also includes data collected directly from local government not available from existing national databases such area, types of roofs and walls, structural value, content value and usage (Geoscience Australia, 2006).

5.4.5 Fiscal Policy

With its responsibility for collecting taxes as part of its fiscal responsibilities, the Australian Government must rely to some degree on the information relating to land ownership, value and land transfers held at state and local government levels. This information is often required to support the collection of Capital Gains Tax and the Goods and Services Tax (GST). It is also essential for collection of income tax from proprietors of land (Tambuwalla et al. 2011a).

Whilst the Australian Taxation Office (ATO) can gain access to the respective land and state tax registries under its legislative powers, the processes to gain access to this data vary between the states and territories and certainly places the responsibility to collate the information at a national level on the ATO. To a large degree therefore, the ATO relies on declarations in income tax returns and data collected from sources in the private sector. This information is often not timely, nor is it from authoritative sources as to the veracity of the sale price of the land or the ownership (Tambuwalla et al. 2011b).

5.4.6 Monetary Policy

Like fiscal policy, the Australian Government's monetary policy also relies to some degree on land information held by the states and territories (Tambuwalla et al. 2011a). Given land as an asset represents a significant component of the Australian economy (i.e. \$3,614.4 billion in June 2010- Australian Bureau of Statistics, 2012b p127) information pertaining to the land market is of considerable importance to the work of the Reserve Bank of Australia (RBA) In setting the cash rates, the RBA, which is Australia's central bank for implementing monetary and banking policy, must take into account activity within the housing market amongst other input and in doing so needs timely and accurate information. Authoritative information relating to property sales and ownership and value are held by the respective state and territory governments. As such the RBA must rely heavily on private sources for information (Tambuwalla et al. 2011b). Figure 5.2 by Tambuwalla provides a good overview of the manner in which land information is central to the processes of the RBA and the setting of monetary policy.

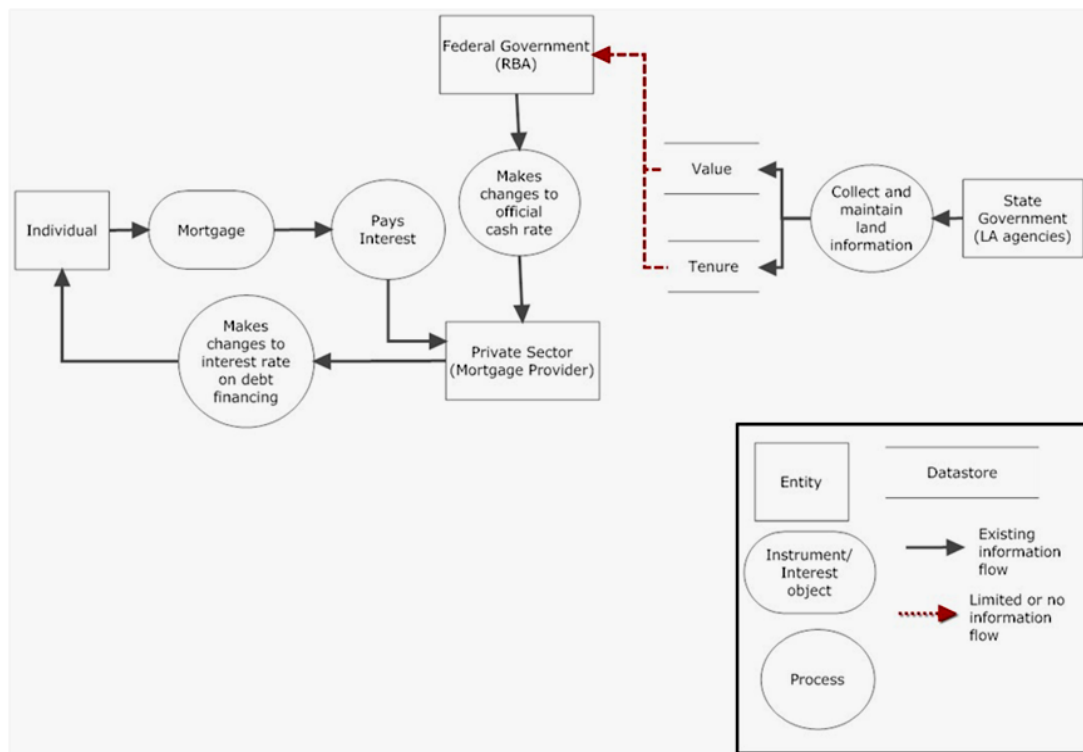


Figure 5.2 Land Information and the Reserve Bank of Australia (Tambuwalla et al. 2011b)

5.4.7 Housing

Whilst housing is considered a responsibility of the state and territory governments, the Australian Government plays a significant role in terms of policy development and funding particularly as it applies to public housing. Two examples of how it participates in this area are the National Housing Supply Council (National Housing Supply Council, 2012) and a Report by the Senate Select Committee on Housing Affordability in Australia undertaken in 2008 (Senate Select Committee on Housing Affordability in Australia, 2008)

The National Housing Supply Council was established to “*to aggregate and assess data on housing supply and demand and to report to the Minister for Housing on its findings*” (National Housing Supply Council, 2012). This agency was established in recognition of the importance of having better information of supply and demand to guide policy development with the goal of improving the affordability of housing. The Council was established with the support of COAG (National Housing Supply Council, 2012).

The Senate Select committee on Housing Affordability in 2008 was established to report on

- the taxes and levies imposed by state and territory governments;
- the rate of release of new land by state and territory governments;
- proposed assistance for first home owners by state, territory and the Commonwealth governments and their effectiveness in the absence of increased supply;
- the role of all levels of government in facilitating affordable home ownership;
- the effect on the market of government intervention in the housing sector including planning and industrial relations laws;
- the role of financial institutions in home lending; and
- the contribution of home ownership to retirement incomes.

The committee tabled its report entitled a '*A good house is hard to find: Housing affordability in Australia*' and released it on 16 June 2008. Whilst some of the recommendations were directed to the state and territory governments, most of the recommendations were directed to the Australian Government. This further demonstrates the level of involvement of the Australian Government in another area traditionally managed by the state and territory governments.

In both the above examples, access to information arising from the state and territory based land administration system is of significant importance given the registration of new land parcels arising from land development, land sales, the value of land and planning applications occurs at the jurisdictional level. It could be expected the development of sound national housing policies would be reliant to some degree on this information.

5.4.8 Australian Government Funded Research programs

The previous examples demonstrate the collection by Australian Government departments and agencies of land information held the state and territories in response to national requirements. This example relates to Australian Government research funding being used to collate land information as part of an effort to build an Australian Urban Research Information Network (AURIN).

“The Australian Urban Research Infrastructure Network (AURIN) is a \$20 million initiative funded by the Australian Government’s Super Science scheme. AURIN will provide built environment and urban researchers, designers and planners with infrastructure to facilitate

access to a distributed network of aggregated datasets and information services.” (AURIN, 2011).

Whilst the primary purpose of this research project would appear to build a single platform to support urban researchers and planners, in doing so the project has also initiated its own collection of land information at a local, state and national government levels. A number of demonstrators have been built involving some fifty datasets, including land use, land valuation, planning zones and the spatial parcel structure sourced from twenty organisations including several local councils, the Victorian Government departments and several Australian Government departments (University of Melbourne, 2012). These demonstrators serve their purpose in showcasing the potential of integrating multi sourced and multi-disciplinary data with land information. Furthermore, consistent with the thrust of this thesis, the project demonstrates the outcomes which can be achieved through a collaborative approach (Eagleson, 2013).

In doing so however outside of a broader national collaborative framework it creates yet a further level of disparate collection funded through the Australian Government. This is not dissimilar to the individual sourcing of land information by Australian Government departments identified in the previous sections of this chapter.

5.5 Key National Drivers

Based on the foregoing examples, there is considerable effort being undertaken by the Australian Government in acquiring information related to land held by the state and local governments arising from the land administration processes in each jurisdiction. The reality is that much of the data collected by the individual Australian Government departments and agencies is solely for their own use to meet their particular goals and as such considerable duplication of effort exists. It could be argued that this duplication of effort is itself the major driver for a national land information infrastructure that could underpin the requirements of the various departments with regards land information. A national land information infrastructure would also ensure the ready availability of authoritative land related data viewed from a national perspective and delivered in a timely manner (i.e. the most current data available). As such data consistency and timeliness could also be considered key drivers for a national system.

In their research of the drivers for national land information in Australia, Bennett (Bennett et al. 2012a) has looked at it from a different direction by identifying the drivers in terms of what

the information within the national land infrastructure would be used for. This research categorised them into six areas and also placed them in the context of the Land Management paradigm previously referenced in Section 3.1. These areas were:

- Adherence to international standards by national governments
- Better federal or central governance
- Improved shared governance
- Economies of scale for lower levels of government
- Opportunities and Cost Savings for Business
- Social Inclusion for Citizens

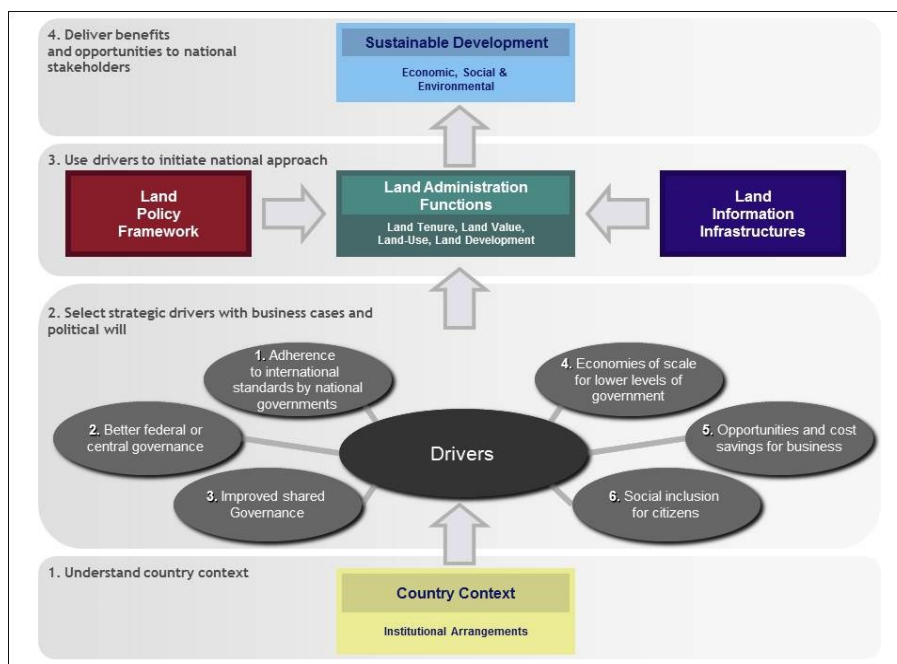


Figure 5.3 Drivers for an Australian Land information Infrastructure (Bennett et al. 2012a)

Whilst the Australian Government is the direct beneficiary in first three categories, the research argues that state and local government would also benefit in some cases through improved shared governance and economies of scale in building new national land related databases rather than each jurisdiction going alone (e.g. information relating to rights, restrictions and responsibilities)

Furthermore they highlight the fact that the private sector businesses will also benefit through the existence of a national land information infrastructure. This will be particularly so where

companies operate across state borders and require access to multiple jurisdictional datasets. This situation is not dissimilar to the advantages to business arising from the implementation of the seamless national economy previously discussed. This is clearly evidenced by the current implementation of the national electronic conveyancing system as previously mentioned.

5.6 Chapter Summary

The requirement for the governments of Australia to collaborate in the interests of building a cohesive and complete land information infrastructure at a national level is clearly evident by the establishment of various coordinating bodies over the past sixty years. These bodies have ensured a good level of cooperation between the respective governments with regards the sharing of knowledge particularly in relation to the evolving technologies and most importantly the development of standards. The provision of spatial data to underpin the establishment of PSMA Australia and the development of several important national spatial datasets is also one of the outcomes of this collaborative approach.

Whilst this collaboration has developed over many years between the governments of Australia with regards land information, this same collaborative approach does not appear to exist within the Australian Government. This is evidenced by many Australian Government departments and agencies individually collecting and maintaining land information to support their operational and policy development requirements. This information pertaining to land tenure, valuation, use and development status is being collected to support areas such as statistics, water management and reform, fiscal and monetary policy and disaster management. Much of this information is sourced by the individual departments from the state and territory governments and also local government to meet their own specific requirements. In some cases departments and agencies will make use of the national spatial datasets built by PSMA Australia however their requirements often extend beyond what PSMA Australia produce. This results in considerable duplication of efforts and inevitably data inconsistencies given the different sources and timing issues. It also must place additional load on the data providers given the multiple requests.

This situation has been recognized in recent times by the Australian Government with the establishment of the Office of Spatial Policy (OSP), the APS 200 locations project and the commissioning of a report on the spatial capability of the Australian Government. Collectively these activities have highlighted the inefficiencies in the current collection and

use of spatial information across the Australian Government. They have also demonstrated the importance of the requirement for a sustainable approach to the collection and use of spatial information by the Australian Government and in doing so also land information which forms a critical part of this spatial information.

Given the identification of this issue facing the Australian Government what can be done to generate a national view of land information to support the requirements of the Australian Government and the broader community. The following chapter examines five different collaborative ventures across different levels of government involving land information to assist in identifying the key success factors in the initiatives.

Chapter 6 Case Studies

6.1 Introduction

The preceding chapters examined how Australia functions as a federated nation and the disparate nature of land administration in Australia arising from federation. The broadening of the functions in which the Australian Government has become involved since federation has led to an ever increasing need for land information by Australian Government departments and agencies to support their various national policy initiatives. This requirement for land information has resulted in considerable duplication of effort across the Australian Government as each department individually pursues land information from the states and territories.

The research to date has identified a number of initiatives established in the past to improve this situation. The establishment of ANZLIC, and more recently the Office of Spatial Policy (OSP), have been focussed on developing policies to assist in developing a national approach. There have been other initiatives however which have ventured beyond policy to actual implementation of a national view of some component of the required land information. One organisation, PSMA Australia has now been creating national datasets since the early 1990's whilst the other organisation NECDL will soon deliver a national electronic land conveyancing system. These two organisations are reliant on collaborative arrangements between the state and territories for their existence. This chapter examines their formation to provide some insight into the key factors which have brought about their implementation.

This chapter also recognises that land information is often sourced from local government by state and national governments. To this end, one case study examines the Property Information Project, a collaborative venture undertaken in Victoria between the state government and 79 local councils that commenced in the late 1990's.

Looking beyond Australia, there are also other federated countries that have been faced with similar challenges to Australia resulting in the establishment of organisations to bring together land information from multiple jurisdictions into a national view. This chapter also examines two of these initiatives to gain further insight into collaborative ventures involving land information. These two organisations are GeoConnections in Canada and INSPIRE in the European Union. Geoconnections in Canada was selected as it is a federated country of a similar size and population as Australia. Its land registration systems are jurisdictional based

and utilise the Torrens system in a number of provinces (The Free Dictionary, 2013). INSPIRE was selected as it represents possibly the most significant spatial data infrastructure undertaken to date involving many layers of government.

The five case studies in this chapter therefore cover not only the collaborative initiatives across the three tiers of government in Australia, but also cross jurisdictional collaborative ventures beyond Australia. Through these five case studies will come an understanding of the factors which influence the success to date of national operational collaborative projects. It also provides an opportunity to assess these factors against the research on collaboration covered in Chapter 4.

6.2 PSMA Australia Limited

6.2.1 Overview

The first case study is of PSMA Australia Limited (PSMA Australia) which is a collaborative initiative that has been in operation since 1993. PSMA Australia is a company owned by all the governments of Australia and uses information provided primarily by the states and territories to build national spatial datasets. It describes its mission as:

“The return of social, environmental and economic benefits through the provision of authoritative national location information, knowledge and services.” (Paull, 2009, p. 6).

PSMA Australia currently provides the following products on the three monthly basis:

- Administrative Boundaries - contains boundaries in seven themes including Australian Bureau of Statistics (ABS) boundaries, electoral boundaries, state and territory boundaries, local government areas, suburbs/localities, town points and wards
- CadLite® - provides spatial representation and information about the 14.7 million legal land parcels across Australia
- Land Tenure - aligns land tenure classifications to cadastral parcel identifiers in Cadlite
- G-NAF® - the authoritative index of geocoded Australian addresses
- Points of Interest - combines authoritative government data with comprehensive point of interest from selected organisations (being replaced by Features of Interest)

- Features of Interest - combines authoritative government data with comprehensive features from selected organisations
- Post Code Boundaries - definitive set of postcodes developed by Australia Post including spatial representation
- Transport & Topography™. - provides a comprehensive picture of Australia's transport infrastructure and unique topography

(PSMA Australia Limited, 2013b)

6.2.2 Background to Establishment

In the early 1990's the Australian Bureau of Statistics (ABS) identified a requirement for digital map data to support the 1996 census. As a result, ABS issued a tender for the supply of facilities and services to this purpose.

There were three broad facilities and services to be provided:

- hardcopy field maps for collection purposes (ideally generated from digital spatial data)
- digital spatial data (both statistical boundaries and base map features) for the presentation and analysis of census and other ABS data (in both digital and hardcopy form)
- the means by which statistical boundaries may be updated.

(Paull, 2009, p. 4)

In response to this requirement the states and territories formed a consortium named the Public Sector Mapping Agencies (i.e. later to become PSMA Australia). The bringing together of the land information from the states and territories for use in this manner at a national level was not without its difficulties. Issues to be resolved included:

- jurisdictional sovereignty
- costs/price
- agreement content (9 Crown Solicitors had to agree!)
- standards
- definitions
- revenue sharing
- scope of operations, etc. (Paull, 2009 p.4)

Agreement was reached on the various issues and a proposal from the Public Sector Mapping Agencies consortium (PSMA) was submitted to ABS. This proposal was selected by ABS and a contract was signed in June 1993 to deliver the required services at a cost of \$3.4 million. Some \$1.4 million of this amount was to be paid over 6 six monthly payments commencing in July 1993 with the \$2 million balance being paid after July 1996 in 4 six monthly payments. The provision of operating capital for the project by ABS in advance of the mapping data and services was essential to assist the states and territories to bring their respective datasets up to the standards required. The states and territories also contributed some \$1.5 million to this activity to gain the benefits of improved digital services in their respective business environments (Holmes, 2006).

The retained earnings from the sale of this information would eventually allow PSMA to develop other national spatial products such as CadLite (i.e. a parcel map of Australia) and G-NAF (i.e. national geocoded address file).

The successful delivery of the datasets to ABS in 1995 involved many private sector organisations as well as the work by the individual jurisdictions and took two years to complete. Given the effort to build this national dataset for the first time, no updates were proposed until the next Census in 2001 (Paull, 2009).

6.2.3 The formation of PSMA Australia Limited

Following the successful delivery of ABS contract in 1995, the private sector also sought access to the national datasets assembled for ABS. In 1997, the first contract with a Value Added Reseller (VAR) was signed for the distribution of the data to the private sectors and other government agencies. This marked the start of the establishment of a value adding chain to distribute national spatial datasets to a broad range of end users. It also marked the start of a four year transformation where the Public Sector Mapping Agency evolved into a government owned company with a mission to build and distribute national geospatial datasets. This move in 2001 to an unlisted public company (i.e. PSMA Australia Limited) limited by shares owned by the governments of Australia was undertaken after a comprehensive management review and discussions with ANZLIC. Each government holds an equal share and provides a director to the Board of PSMA Australia. The structure of PSMA Australia is in reality a collaborative framework which allows the states and territories to contribute to the establishment of national spatial datasets. As PSMA Australia is funded through the sale of the datasets and services it provides, the organisation is able to act independently and focus in achieving the national goals established by the Board.

Notwithstanding the fact that PSMA Australia is owned by the governments of Australia, it gains access to the datasets of the respective governments under full commercial terms. This with the self-funding ensures that PSMA Australia operates as an independent company fulfilling the role of a “*trusted broker*” with full transparency of its operations (Paull, 2009).

6.2.4 National Spatial Datasets

As previously outlined, the original datasets were assembled for the 1996 census and involved considerable effort. Under the agreement with ABS, PSMA was required to provide an update of the datasets in readiness for the 2001 census. It was decided however that merely updating the previously built datasets would be too difficult and as such between 1998 and 2001, the dataset was totally rebuilt from scratch with provision to support incremental updating in the future (Paull, 2009).

In 2001 it was resolved to move to annual updating of the dataset. To support this move, PSMA Australia appointed via competitive tenders, a number of data maintainers from the private sector to underpin the maintenance process. Over the next several years the dataset developed for ABS had evolved into the Transport and Topography product and three new national products namely, the national cadastral dataset, the national administrative boundary dataset and the national points of interest dataset. In 2004 this annual updating was moved to a quarterly updating cycle and the national geocoded address file (G-NAF) was added to the datasets being made available by PSMA Australia through its VAR network (Paull, 2009). The Land Tenure, the Features of Interest datasets and a Property cadastre have been also added since that time (PSMA Australia Limited, 2012). With the release of the Feature of Interest product in 2012, the Points of Interest product will be phased out given the extent of the overlap of the products (Callpoint Spatial, 2012)

To better support the changes to the number of products and the increased updating frequency, PSMA Australia migrated the individual datasets into a single harmonised and highly normalized data schema. This new environment subsequently assisted PSMA Australia in implementing a significantly streamlined approach to the processing of the majority of datasets received every three months for the state and territories using a product called Radius Studio. The semi-automated handling of the contributor data through a rules based system has enabled PSMA Australia to process the data internally without the need for external data managers in a significant less period of time (Dixon et al. 2011).

The establishment of the integrated data model also enabled PSMA Australia to consider and eventually commence the implementation of web based services for some data. Given the increasing desire amongst some users for improved data currency outside of the current three monthly update cycle, the storage model developed by PSMA Australia has provided the viability of this approach (Paull, 2009)

6.2.5 Key Success Factors

PSMA Australia has now been delivering national spatial datasets to public and private sectors since 1995, a period of 18 years. Since that time there has been significant changes in the available technology and the expectations of users. There is little doubt the embedding for several years of PSMA products in Google Maps impacted those expectations in that it raised the awareness of a broad range of users to the value of the spatial information to their respective businesses.

How then has PSMA Australia continued to successfully deliver to the users in this changing environment? Paull (2009) sets out three reasons for its success, namely:

- a.) Good relationship management which embraces all the informal and formal arrangements associated with the establishment and operation of PSMA Australia. This includes the management of relationships with the data suppliers, the VAR's, the end users and those organisations that set and influence policy and standards
- b.) Successful data management to support the development, maintenance and distribution of the various PSMA Australia products. This data management includes the aggregation of contributor data and most importantly its standardisation in national datasets.
- c.) A sustainable business model that generates sufficient revenues to support ongoing activities including growth without government funding. This model includes understanding user requirements and ensuring PSMA Australia continues to deliver better than others in the marketplace could.

Whilst it may be implicit in the sustainable business model identified above, it could perhaps also be argued that PSMA Australia was able to become established through the support of a major client (i.e. ABS) who provided both the initial funding and a clear understanding of the required deliverables.

Figure 6.1 below summaries the key success factors in the PSMA Australia initiative.

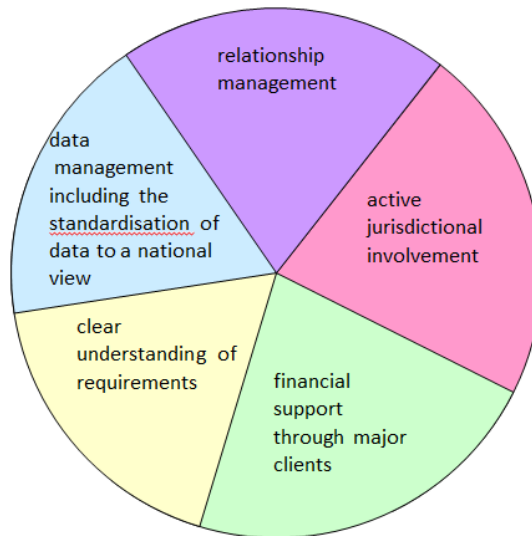


Figure 6.1 PSMA Australia key Success Factors

6.2.6 Discussion

Having now been operating for nearly 20 years, PSMA Australia clearly demonstrates that land information held by the states and territories can be successfully delivered as national datasets in a sustainable manner. Data has been provided to a wide range of clients across all sectors on a three monthly update cycle during this period. Improving technology has over the years enabled PSMA Australia to streamline the data collation processes. Most importantly the organisation has evolved since its establishment in terms of its structure and the delivery of data products.

Whilst the data products generated by PSMA Australia do not meet all the requirements of the Australian Government it has the potential to contribute significantly to an Australian land information infrastructure. The potential PSMA Australia has to play in the establishment of a national land information infrastructure is indicated in the conclusion to a paper given by the CEO of PSMA in 2009 to the GSDI 11 Conference where he concludes by stating:

“At this point it is worth posing the question, “If PSMA Australia is owned by all the governments of Australia and has a focus on developing and delivering fundamental national spatial datasets through innovative information technology and can sustain this activity through a functioning business model, then wouldn’t this constitute a sustainable continental spatial data infrastructure?” (Paull, 2009, p. 16)

6.3 National E-Conveyancing Development Limited (NECDL)

6.3.1 Overview

National E-Conveyancing Limited (NECDL) is a company established to develop a new single national e-conveyancing system based on the work of Electronic Conveyancing Victoria and the National Electronic Conveyancing Office. It was incorporated in January 2010. NECDL was initially established under a governance arrangement between the Victorian, NSW and Queensland governments with provision for the other states and territories to join at a later date (National Electronic Conveyancing System, 2010). In November 2010, the Western Australian Government through Landgate became a shareholder in NECDL (NECDL, 2010). The four major banks and Macquarie Capital have also become shareholders in NECDL and have invested in the company however the state governments retain the majority of the shareholding (NECDL, 2012b).

Essentially this system once established will provide an efficient and convenient way of completing property transactions and lodging land title dealings for registration at a national level rather through the traditional non electronic means which currently operate within each state and territory. The system will be called PEXA (Property Exchange Australia). The system will be developed through 2012 and testing is expected in early 2013 (NECDL, 2012b). PEXA will for the first time, link up four land registries offices in Australia. These land registries hold key elements of Australia's land information such as ownership, land transfers, etc. As such, the potential to access this information on a national level is greatly enhanced through the establishment of PEXA. NECDL therefore represents an important component of Australia's national land information infrastructure.

6.3.2 Background to Establishment

Each state and territory in Australia operates its own land registry and maintains a titles register under the principles of the Torrens System. Whilst the underlying principles are the same, each jurisdiction has specific legislation and practices which have evolved over the years since the implementation of the various systems. Each jurisdiction has over the past years progressively moved from paper based registers to computer based registers thus supporting the use of electronic documentation for many of the transactions. This change by the various registries to electronic media has also been supported by industry practices in the manner in which information is stored and processed (Australian Registrars National Electronic Conveyancing Council, 2012)

“In law, conveyancing is the transfer of legal title of property from one person to another, or the granting of an encumbrance such as a mortgage or lien. A typical conveyancing transaction contains two major landmarks: the exchange of contracts (whereby equitable title passes) and completion (whereby legal title passes).” (Australian Institute of Conveyancing, 2013).

Essentially this involves a process where documents are created electronically by the private sector conveyancing systems, printed and signed by parties, physically exchanged and then lodged with the land registry office of the jurisdiction in which the property exists. This necessitated a collaborative approach between industry and the respective governments if maximum advantage of the technologies were to be achieved. A system was required where conveyancing transactions could be managed electronically from the conveyancing processes through to the registration with the appropriate land registry. Such a system would require agreement from all parties involved and also changes in jurisdictional legislation to support these processes (Australian Registrars National Electronic Conveyancing Council, 2012).

In the early 2000's, several states initiated projects to integrate electronic settlements with electronic lodgement. Victoria initiated its electronic conveyancing project (i.e. Electronic Conveyancing Victoria) in 2002 and in August 2006 actually launched its system. The system has been progressively improved since that time and processes some 2000 transactions per month which are mainly discharge of mortgages and caveats to land titles. NSW and South Australia also initiated projects of a similar nature around the same time, however the projects were limited to assessment of the requirements and making their system able to receive documents electronically. They did not reach the implementation phases like Victoria. Queensland's land registry had also recognized the value of electric lodgement of documents and its systems already had this capability (NECDL, 2012a).

Notwithstanding the efforts by several states to advance the process in their own right, achievement of a collaborative approach between the key industry participants and the respective jurisdictions was impacted by the fact that most of these industry participants were national organisations (e.g. the major banks). They had no wish to see eight individual e-conveyancing systems evolve (Merritt, 2008).

A meeting of the State and territory Registrars in March 2005 acknowledged the need for a national electronic conveyancing system and a decision was made to commence work in this regard. With the support of the major industry players, the National Electronic Conveyancing

Office (NECO) was established later that year to progress the development of a National Electronic Conveyancing System (NECS). This initiative was to be built upon the work undertaken by those states and territories that had already commenced work in this area (NECDL, 2012a).

By 2008 Victoria had implemented its own electronic conveyancing system however there was still no agreement between the states and territories on the implementation of a national electronic conveyancing system. In May 2008, Victoria's favoured approach was for each jurisdiction to implement similar systems, essentially based on the one they had built. This approach was rejected by all other States except Queensland. The other states, the Australian Government and businesses were seeking a national system rather than a series of state based systems. There would also appear to have been some debate over the business model to be adopted, governance arrangements and sharing of the intellectual property arising from the establishment of the Victorian system in 2006 (Merritt, 2008). This approach of establishing a single national entity was endorsed by COAG and the project was listed as one of the 27 projects within the partnership agreement for the Seamless National economy in 2008 (COAG Reform Council, 2009).

With the COAG agreement in place, work continued towards the establishment of a national electronic conveyancing system. In January 2010, the new legal entity NEDCL was established to develop a national electronic conveyancing system based the efforts of NECO and Electronic Conveyancing Victoria. During the time since its establishment NECO had compiled a substantial body of work through a national consultation program including the concept of a national business model (National Electronic Conveyancing Office, 2010). NECDL also purchased the intellectual property rights to the electronic conveyancing system established by Victoria (Accenture, 2011).

6.3.3 Key Success Factors

Whilst NECDL is a relatively new organisation and yet to deliver electronic conveyancing services, its progress to date in establishing a system still throws some light on the key elements on achieving collaborative success. One of critical factors is that the differences between the jurisdictions in terms of their requirements were clarified prior to the commencement of the project. Whilst this may have taken some years to resolve it has resulted in a clear understanding of the expectations of those jurisdictions involved and the major users of the proposed system. Another key factor was the involvement of COAG in establishing the

project as a key national project and the provision of the initial funding to get the project underway. In some way COAG was the “champion” required to assist in resolving the differences between the jurisdictions and providing the focus the project required. Possibly the most important factor however is that as the major user of this new system, the major financial institutions were clear about what they required to support their businesses. Since its establishment, the financial institutions have also taken a significant role in the establishment of NEDCL including the provision of financial support.

Figure 6.2 below summaries the key success factors in the NECDL initiative

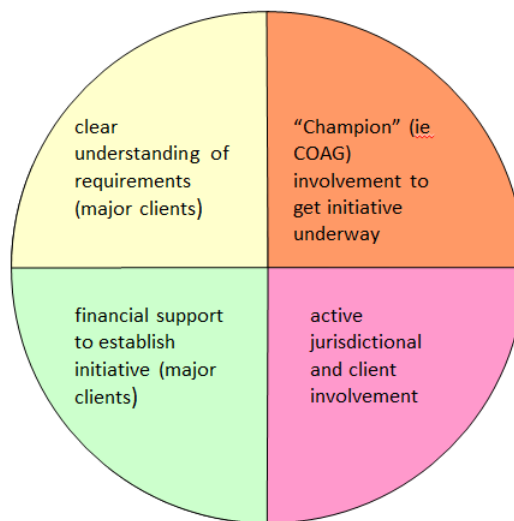


Figure 6.2 NECDL Key Success Factors

6.3.4 Discussion

Given the time to bring about the establishment and the challenges in achieving a unified solution between the jurisdictions and the industry, the establishment of a national electronic conveyancing system has not been an easy journey. With land titling being a jurisdictional responsibility, the adoption of a single national entity to link up the eight registry offices posed considerable challenges. The option of eight individually operated systems was rejected by a number of jurisdictions and most importantly, also the major potential users (i.e. the banking industry). Recognition of the value of a single national entity to establish the system is reflected by the investment made by the banking industry in this new company. The involvement of COAG in the establishment of NECDL is also recognition of the importance of the system to the national economy.

With the majority shareholding of NEDCL still with the states and territories, a national service has been achieved through the adoption of a collaborative approach, the support of COAG and the support and capital investment of the major users. This is similar to the initial formation of PSMA Australia, where ABS directly influenced its establishment. ABS achieved this by identifying its requirements and the provision of funding. Likewise, the establishment of national electronic conveyancing system been directly influenced by its major users.

6.4 Victorian Property Information Project

6.4.1 Overview

The third case study focusses on the relationship between state and local government. This is particularly important to a national model in that local government plays a key role in the generation of land information. This case study provides some insight into a collaborative project initiated in 1997 by the Victorian Government with all 79 local governments. The objective of the partnership agreement was to ensure land parcel and property information including street addresses was available through the state government portal as part of the Vicmap products (Jacoby et al. 2002). The partnership agreement established during the project continues to support the state's land information requirements today. Whilst this initiative was between the state and local governments rather than at a national level, the establishment of a partnership agreement on this scale and the improvements achieved provides further insight into a collaborative approach initiated to deliver better land information to government and the community.

6.4.2 Background to the establishment of the project.

Notwithstanding the establishment of a new digital cadastral database (DCDB) in the mid 90's, Victoria had not resolved a number of objectives identified in an earlier GIS strategy report. These issues were

- the absence of a mechanism to enable the timely maintenance of street addresses on a State-wide basis,
- no mechanism to access proposed plans of subdivisions in rural Victoria
- minimal use by local government of the newly constructed DCDB and significant duplicate maintenance where councils were maintaining their own digital mapbases within their area of responsibility (Marwick 2001).

In an effort to resolve these issues, all of which involved local government, the Property Information Project (PIP) was initiated by the Victorian state government in 1997. The project was funded and managed by the Department of Sustainability and Environment (DSE).

6.4.3 Implementation of the Property Information Project

On the initiation of the project in 1997, the state government engaged with each local government (i.e. council) to establish a mechanism through which the state government could be supplied proposed plans of subdivision and any new or modified addresses recorded by councils. In return for this information, the state government would provide regular updates of the Digital Cadastral Data Base (DCDB) covering the council's area of responsibility thus overcoming each council's requirement to maintain its own copy of a digital mapbase. The state government also agreed to spatially upgrade the DCDB where the councils existing mapbase was superior to DCDB (Marwick, 2001).

In undertaking this project, the state government provided funding of approximately three million dollars for technical support to councils and to offset some of the councils' development costs to meet the state government's requirements. In addition further funding, in the order of \$20,000 to \$40,000 depending on the size of the council, was available, as an incentive during the establishment phase (Jacoby et al. 2002).

Whilst an initial in-principle agreement was reached with all 79 councils, it would take until 2002 before all councils had signed contracts with the state government for participation in the project. These contracts were in the form of licence agreements which included the objective of the project, the responsibilities of both parties and the program of works that would be undertaken to meet the objectives. The term of the agreement was three years however this was later modified to the option of a three year rolling agreement that could be renewed annually (McDougall, 2006).

The agreements resulted in the regular transfer of information between the state government and the respective councils. Councils would be sent new or amended addresses, council property numbers for each land parcel and any anomalies identified in the DCDB. These were in the form of agreed formats (i.e. M1's and M2's). The state government would send to the councils updates undertaken to the DCDB over the past fortnight. These were sent in a format that would meet the requirements of the individual council (McDougall, 2006).

6.4.4 Relationship management

Recognition of the importance of maintaining sound relationships with the councils involved in the project was recognised by the state government. Ten staff, equivalent to six full time, were assigned to work with the councils to provide technical advice and support, manage issues such as those related to data quality, timeliness and to provide training programs (McDougall, 2006). This was in addition to a full time project manager being assigned to the project.

A project web site and regular newsletters were also established to assist in the communication between all parties involved in the project. This allowed the status of the project, specific initiatives and common problems to be broadly communicated. Given many of the councils were in rural areas, conferences were also organised and hosted several times a year in rural towns by the state government focussing on the use of spatial information within Victoria. This provided another mechanism to communicate the various initiatives being undertaken as part of the project and the value of spatial information (Marwick, 2001). The success of this approach is reflected in the fact that these regular NewTech conferences were still being held in 2012 with the most recent one being in October 2012 in Shepparton (Department of Sustainability and Environment, 2012).

6.4.5 Project Reviews

The progress of the project could be directly identified through the improvement in the quality of Vicmap and the receipt by councils of digital map data from the state government. (Marwick, 2001). The regular monitoring as part of the maintenance process was supported in 2004 with the implementation of six monthly quantitative reporting on the “*key areas of data matching, frequency of data submission, plan lodgements, data quality and participation in GIS improvement activities*” (McDougall, 2006). Individual reporting back to the councils was provided as a means of facilitating continuous improvement in the processes. The initial feedback from this audit process showed that more work was required with some rural councils where there was a lack of capacity. This audit process would later be formalised as a regular audit project.

The project also underwent a significant review initiated by the Victorian Spatial Council in 2005. The purpose of this review was to assess the performance of councils against ‘best practice’ in executing the maintenance processes established as part of the Property Information Project (Alexander Tomlinson, 2006).

6.4.6 Governance

The Property Information Project was managed by a nominated project manager within DSE who reported to the Director of the Spatial Information Infrastructure Group. In 2004, seven years after its commencement, it was determined that the processes established by the project were now embedded in the regular maintenance processes of Vicmap and that its status would be better reflected as a program rather than a project. This however did not reflect any diminishment of its importance. The Victorian Spatial Council (VSC) established in 2004, to represent the peak spatial information associations in Victoria, sought to have its status reported as a regular agendas item (McDougall, 2006).

6.4.7 Project outcomes

In 2005 the state government initiated an independent evaluation of the project *“to provide a detailed assessment of its achievements and the potential barriers to creating a long term and sustainable Program”*. This concluded *“that the collaborative partnership established by PIP is an achievement not matched anywhere else, either in Australia or internationally, a high level of skills and expertise among participants has been established, and there has been a significant improvement in the accuracy and integrity of local council property records”* (Victorian Spatial Council, 2010).

This positive outcome was also supported by McDougall in his research when evaluating the project as one of his case studies (McDougall, 2006 p 128). He identified the following significant benefits to both state and local government as:

- *“the introduction of GIS to many small local governments;*
- *a more comprehensive mapbase for use by both state agencies and LGAs;*
- *a single high quality authoritative property and address database for use by emergency service organisations;*
- *improved intergovernmental relations;*
- *the authoritative database for the web portal for public access to land information in Victoria;*
- *facilitation of other key projects such as rural addressing, valuation and planning information to be integrated; and*
- *a contribution towards the national geocoded address file (G-NAF).”*

It could be argued that the project was also important in establishing the value of a collaborative approach to building a sustainable land information infrastructure in Victoria. This to some degree is reflected in the Victorian Spatial information Strategy 2008 – 11 where it states:

“The management of Victoria’s core spatial information already relies on a range of partnerships and relationships between agencies across all three levels of government, the private sector and utilities. For example, local government and Land Victoria are critical to property/cadastral data; purchase partners support the development of imagery; there are multiple custodians of the various layers of the topographic products.” (Victorian Spatial Council, 2008 p 24)

From a data quality perspective, the outcomes of the Property Information Project are also reflected in statistics associated with PSMA Australia’s G-NAF (i.e. Geocoded National Address File). For example, Victoria’s addressing is currently the best of all the states and territories with the exception of the ACT which has significantly less addresses (i.e. 3,000, 000 vs. 250,000) (PSMA Australia, 2012).

In summary, the outcomes of the Property Information Project in Victoria have significantly contributed the development and sustainability of Victoria’s land information infrastructure. Support for this collaborative approach can also be seen in NSW where the state government has recently established the Comprehensive Property Addressing System (CPAS) project. This four year project will be led by the state government and will establish a collaborative framework across many organisations including local government in support of a centralised addressing management system for the state (Land and Property NSW, 2011).

6.4.8 Key Success Factors

The project reflects many of the key features of the collaboration theory. Clear goals were established and agreed to by all participants at the outset and all stood to gain something tangible from the project. The resources necessary to deliver the project requirements were available through the state government and in particular the necessary funding. Most importantly, considerable effort was made to establish mechanisms to convey the status of the project and the various achievements to all the participants. Review processes were also established to ensure the goals of the project were being achieved. It should also be noted that the state government as the major beneficiary played a significant leadership role.

The project duration also provided the time necessary for the new processes to become integrated into the operational procedures within each council and the state government. This facilitated the project being able to evolve into an ongoing program.

Figure 6.3 below summaries the key success factors in the Victorian Property Information Project.

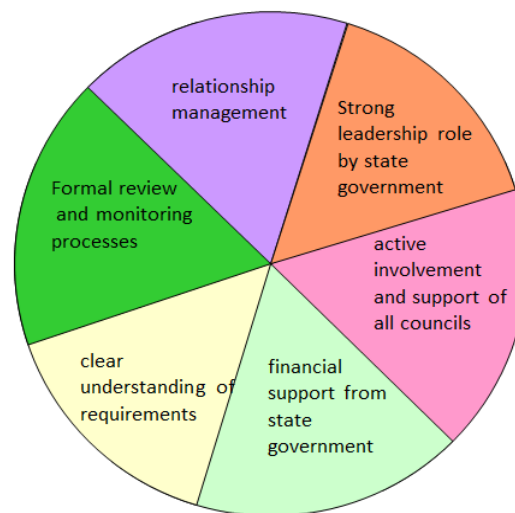


Figure 6.3 Victorian Property Information Project Key success Factors

6.4.9 Discussion

The Property Information Project undertaken in Victoria has demonstrated that through a well-structured and resourced collaborative effort between the state government and 79 councils, a sustainable land information infrastructure can be established. Having now been fifteen years since the project was initiated and with results that put Victoria's land information amongst the best in Australia, the arrangements established through this collaborative framework must be considered a success.

The importance of the involvement of local government within the national framework from a land information perspective is also clearly demonstrated through the impact on the quality of the PSMA Australia's national datasets. Most importantly as indicated above, this success was not achieved quickly but took many years to come to fruition. This has lessons for the timeframe for the establishment of a national collaborative framework for land information in Australia as similar collaborative partnerships would be required in the other jurisdictions to attain the quality expected by users in the future..

6.5 GeoConnections - Canada

6.5.1 Overview

The fourth case study moves beyond Australia to consider a collaborative initiative established in Canada in 1999. GeoConnections led by Natural Resources Canada is progressively building the Canadian Geospatial National Infrastructure (CGDI). The collaborative program involves partnerships between all levels of government, the private sector, Non-Government Organisations (i.e. NGO's) and academia. During the period 2000 – 2010 some \$120 million had been invested in the program (Habbane, 2009).

The goal of the program in building the CGDI is to provide Canadians with on demand access to geospatial information through an interoperable standards based network built by many data, services and technology suppliers. This is reflected in the mission statement of GeoConnections.

“GeoConnections will foster the creation of a Canadian Geospatial Data Infrastructure to enable online access and sharing of geographic information and services.” (CGDI Architecture Working Group, 2001 p3).

6.5.2 Canada

Like Australia, Canada has a federal system of government with responsibilities being shared between the federal government, ten provincial governments and three territorial governments. Canada also has local governments and like Australia this level of government is not recognised within the constitution. Local government falls under the jurisdiction of the provincial and territorial governments (MapleLeaf Web, 2013).

Responsibility for the various functions of government is shared between the federal, provincial and territorial governments. These responsibilities are set out in the Canadian constitution with some being the exclusive responsibility of each level and others being a shared responsibility.

Canada is the second largest country in the world by area with the vast majority of its land (i.e. 89%) being Crown Land. The management of this Crown land is divided by the Federal Government and the provincial governments.

The exclusive responsibility for the federal government includes all the national functions such as defence and immigration and also *“works connecting provinces; beyond boundaries of one*

province; within a province but to the advantage of Canada/or more than one province”.(Government of Canada Privy Council Office, 2013)

The exclusive responsibilities for the provincial government include direct taxation within the provinces, municipalities and legislation relating to property and civil rights. Under this legislation the registration of private land is managed by the land registry offices operated by the respective provincial and territorial governments under the legislation. This is not dissimilar to Australia.

Local Government (i.e. municipalities) undertakes the functions required to support local communities such as planning and local development, local utilities such as water and sewerage and local transportation.

6.5.3 Background to Establishment of the GeoConnections Program

The GeoConnections program was initiated by the Canadian federal government through Natural Resources Canada with the first budget allocation of \$60 million over the period 2000 – 2005 being made in the 1999 federal budget. The mandate of the program was to make Canada’s geospatial data online by building the Canadian Geospatial Data Infrastructure (CDGI) (GeoConnections, 2007). This first phase was to focus on:

- building the CGDI
- developing examples of how the program could benefit Canadians through pilot studies
- capacity building in aboriginal communities.

During this first phase its accomplishments included:

- developed advanced technologies / applications, databases, and portals of core operational infrastructure
- delivered a common agreement on data licensing
- created standardized framework data
- strengthened federal-provincial-territorial collaboration (First ever Ministerial Canadian Geomatics Accord with provinces/territories.

Examples of achievements from this first phase included the following:

- in 1999 the national road network was maintained by eight provincial governments. In 2005 this national road network was only being maintained by two organisations resulting in a significant drop in duplication of effort.
- as a result of the \$60 million expenditure by the federal government, a total program expenditure of \$170 million was achieved. This was a leverage factor of nearly 2.1.
- as a result of the program, a closer liaison was achieved with the private sector with annual consultations with Geomatics Industry Association of Canada being established.

In 2005 this success was recognised in that a further \$60 million was allocated in the Federal Government for the period 2005 – 2010. The following is a statement from the budget papers:

“Under the program, governments, the private sector, academia and non-government organizations have partnered to develop the Canadian Geospatial Data Infrastructure, bringing together data previously held by different organizations and orders of government. Budget 2005 provides \$60 million over five years for GeoConnections to continue this work and to support decision making on a broader range of issues, particularly health, public safety, sustainable development, the environment and issues of importance to Aboriginal people.”
(GeoConnections, 2007)

As part of this program, monitoring is undertaken through formal audit processes to ensure the objectives of the GeoConnections programs are being met and that there was compliance with the policies and terms and conditions set down by the Treasury Board. Recommendations from the audits are translated into ongoing performance management plans (Natural Resources Canada, 2013).

In 2010 having delivered on its mandate for the previous five years, the federal government renewed its commitment with a further \$30 million over the next five years (GeoConnections, 2011).

6.5.4 Datasets

The availability of the datasets through the GeoConnections program has been achieved through the establishment of GeoBase which is recognized as being the key framework data component of the Canadian Geospatial Data Infrastructure (CGDI). GeoBase was initiated in 2001 following the release of a report entitled *“The Case to Upgrade the National*

Geospatial Information Base” (Hickling Arthurs Low, 2001). This report had been prepared for Natural Resources Canada. This report suggested that basic geographic information in Canada was in danger of becoming irrelevant unless significant investment was made at all levels of government. As a result of this report, a joint initiative between the federal, provincial and territorial mapping agencies came into being. This was the beginning of GeoBase.

Since its establishment through consultative processes and collaboration, significant changes have been made to the manner in which the collection and maintenance of the fundamental geographic data has been undertaken. The management of GeoBase is overseen by the Council of Geomatics Canada which is the major federal-provincial-territorial consultative body for geographic information management.

The GeoBase data is the result of all the various mapping agencies making their data available in accordance with established national standards under partnership agreements between federal, provincial and territorial agencies. GeoBase partners are involved in different levels of the data production process such as project funding, sharing of source data or by working on data collection and data processing. In line with the requirement of the CGDI mandate of making the information freely available to all Canadians, the data via the Geobase portal is available without restriction (Canadian Council on Geomatics, 2008).

This approach was supported by a KMPG study as part of the GeoConnections program in 2001 which examined a number of organisations at all levels of government and recommended that, where possible, framework data should be made available freely. It also recommended however, that where provincial and municipal governments had established transaction fee based systems to support their cadastral systems, these should remain (Masser, 2002). The establishment of GeoBase is based on a number of principles. These are:

- regional and, where practical, national data all share the same geometry.
- GeoBase provides national data coverages.
- source data is collected once and used by many.
- source data is collected and maintained closest to source.
- all GeoBase data is available at no charge.
- GeoBase data has no restrictions on its subsequent use.
- GeoBase data uses a common license. (Canadian Council on Geomatics, 2008).

The datasets which are available include seven framework datasets namely the Digital Elevation Data, Geodetic Network, Geographical Names, Geopolitical Boundaries, National Hydro Network, National Road Network and Satellite Imagery. New datasets are progressively becoming available. In 2010, datasets such as Canadian electoral boundaries and municipality boundaries were being included (GeoBase Secretariat, 2010). Other possible future datasets identified in the 2007 survey included cadastral mapping, key buildings, railways and power lines (Canadian Council on Geomatics, 2008). No cadastral data was available on GeoConnections website at the time of this research in late 2012.

Governance processes exist to control the adding of new datasets. This is required to ensure new datasets will meet the requirements of users, will be supplied with long term certainty and meet the national data specification standards. The criteria are based on the following questions:

- Is there a data coordinator identified?
- Is there a reasonably broad user base for the information?
- Is the dataset well defined, or, if it currently is not, will the definition be developed as part of the data project?
- Is there a defined and accepted maintenance cycle for the data theme?
- Does, or will, the data theme have national coverage?
- Will having this data theme available on GeoBase eliminate or significantly reduce or prevent redundant collection of the information?
- Will the information be collected by agencies closest to the source or with their participation?
- Will the information be made available at no charge to the users and with no restrictions on the use of the data?
- Are all issues related to hosting the data, whether on the GeoBase Portal or elsewhere, identified and resolutions identified?

(Canadian Council on Geomatics, 2008)

The currency of the various datasets provided by the data supplier partners would appear to be variable. Based on the information available on the GeoBase website, the validity dates of the datasets vary between the various provinces and territory mapping agencies. For example, with the National Road Network (NRN) dataset in February 2013, six provinces had supplied data with 2012 validity dates, four with 2011, one with 2009 and another with 2008 (GeoBase,

2013a). Notwithstanding this variation in validity dates, a national view of the roads in Canada has been achieved through the collaborative process.

According to the GeoBase website (September 2012), partnership agreements for new updates to the NRN dataset are currently being jointly negotiated by Natural Resources Canada and Statistics Canada to secure the '*closest to source*' maintenance principles of GeoBase. It is also noted that the GeoConnections program is providing funding opportunities to participating provinces, territories and lead federal agencies maintaining NRN data (GeoBase, 2013b).

6.5.5 Key Success Factors

This case study reinforces the value of a clearly articulated vision and principles which guide the activities of the program. Most importantly all datasets established as part of the program must also meet a documented set of criteria including adherence to agreed national standards. This assists in managing the expectations of both the participants in the partnership and the users.

Critical to this process however has been the leadership and considerable funding provided by the federal government in five yearly cycles (i.e. \$150 million over 15 years). This five yearly funding cycle also allows forward planning and provides industry with the incentive to participate. It is also interesting to note the leverage gained through the federal funding in generating additional funding within the industry.

This funding is obviously a key factor in the data being freely available for use. As such it is possible the fact that the data is freely available is also a factor in the success of the initiative.

Another factor in the success of GeoConnections is the governance of the program in that it is subject to audits and performance reviews. This ensures the outcomes being achieved are consistent with the objectives of the initiative and where differences do occur some corrective action is taken.

Figure 6.4 below summaries the key success factors in the GeoConnections program.

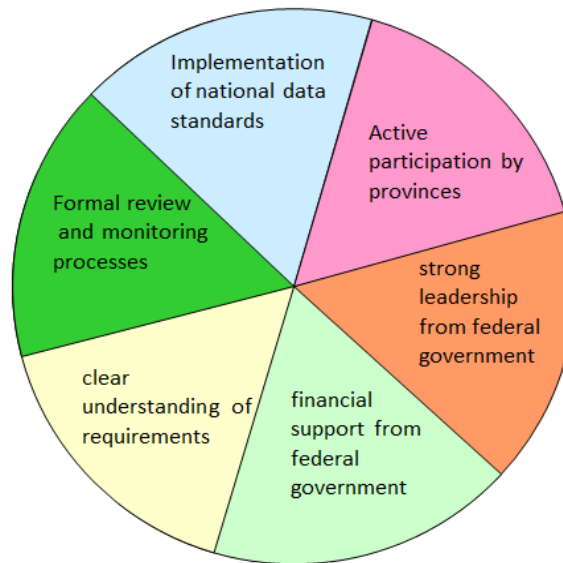


Figure 6.4 GeoConnections Key Success Factors

6.5.6 Discussion

The GeoConnections program has successfully made available spatial data collected and maintained by lower levels of government in a common national format data. This clearly demonstrates the value of a collaborative approach in managing land information in a federated country. Given it has now been in operation for over 13 years, it further demonstrates that with the appropriate governance arrangements in place, the process can be sustainable.

As mentioned above the federal government has played a very significant leadership role including the provision of funding and a governance program. This approach is quite different to that which occurs in Australia where the jurisdictions to date, have generally played the key roles particularly in the establishment of PSMA Australia and more recently NECDL.

It is perhaps worth noting that cadastral related data is not available through GeoConnections possibly due to the continued existence of transaction fee based systems at the provincial level. The availability of this parcel based information obviously poses a challenge to the GeoConnections principle of freely available data as it runs contrary to the commercial approach adopted by the provinces for parcel based land information. The absence of a cadastral framework could also be considered a significant gap in the national spatial framework.

6.6 INSPIRE (an Infrastructure for Spatial Information in the European Community)

6.6.1 Overview

The final case study is also beyond Australia and focusses on a significant collaborative initiative being conducted across the European Union. This initiative being established by the European Commission is building an infrastructure for spatial information to support the European Community environmental policies, and policies or activities which may have an impact on the environment. It has been established under a directive of the European Parliament issued on 14 March 2007. INSPIRE is based on the collective infrastructures of the 27 Member States of the European Community and several other participating countries. It is underpinned by agreed standards and legislation. The INSPIRE directive issued through the Parliament covers 34 data themes required to support environmental policy development particularly where cross border policy is involved. The key components will be specified through technical implementing rules (European Commission, 2012a). The implementation roadmap as at September 2012 shows a completion date of October 2020 (European Commission, 2013a).

“INSPIRE is based on a number of common principles:

- Data should be collected only once and kept where it can be maintained most effectively.
- It should be possible to combine seamless spatial information from different sources across Europe and share it with many users and applications.
- It should be possible for information collected at one level/scale to be shared with all levels/scales; detailed for thorough investigations, general for strategic purposes.
- Geographic information needed for good governance at all levels should be readily and transparently available.
- Easy to find what geographic information is available, how it can be used to meet a particular need, and under which conditions it can be acquired and used.”

European Commission , 2013b)

Each Member State is responsible for undertaking the work necessary to bring their respective datasets into alignment with the standards specified. Given the involvement of 27 independent countries, all of which are required to embed the requirements of the Directives into their own

legislation, plus another seven countries (i.e. 4 European Free Trade Association countries and 3 Candidate Countries), this is a unique initiative in building a spatial data infrastructure through collaboration and legislation. The figure below provides a diagrammatic view of the INSPIRE vision.

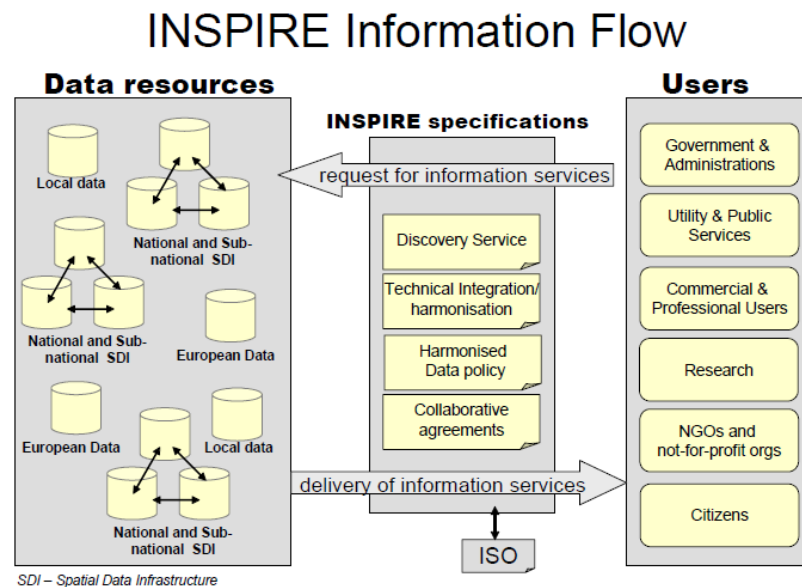


Figure 6.5 Diagrammatic View of the INSPIRE Vision (ISF Working Group, 2002)

6.6.2 Establishment of INSPIRE

INSPIRE had its beginnings in September 2001 when the European Environmental Spatial Data Infrastructure (E-ESDI) Expert group convened in Brussels. This group comprised members of the European Commission, the European Environmental Agency and nominated members of the Members States of the European Community. A number of observers representing government bodies and NGO's were also invited to participate. Arising from this meeting was a report first published in December 2001 which outlined the proposal (European Commission - Directorate-General Environment, 2001). This is summarized in the opening paragraph of the Executive Summary of that report:

“The Environmental European Spatial Data Infrastructure initiative (E-ESDI) aims at making available relevant, harmonised and quality geographic information for the purpose of formulation, implementation, monitoring and evaluation of Community environmental policymaking. At a later stage, the initiative will be broadened to other sector policy areas such as transport, agriculture, and will eventually culminate in the establishment of a cross-

sectoral European Spatial Data Infrastructure (ESDI).” (European Commission - Directorate-General Environment, 2001, p.4)

The report proposed a legislative framework and outlined a detailed plan to bring about a European spatial data infrastructure. This plan included the establishment of working groups across the topics of Common Reference Standards and Metadata, Architecture and Standards, Legal Aspects and Policy, Funding and Implementation Structures and Impact Analysis.

In April 2002 a MOU was signed by European Commissioners Wallström, Solbes and Busquin to underpin the collaboration required between Directorate General (DG) - Environment, Eurostat and the European Commission Joint Research Centre (JRC) to develop the INSPIRE initiative (European Commission, 2002).

In 2003, the European Commission commenced a process of consultation of the INSPIRE initiative. Some 185 organisation responded to this process. The initiative also underwent a full detailed impact assessment and involved representatives from Member States from both the environmental and geographic sectors. This assessment concluded that the INSPIRE initiative could yield benefits six times greater than the estimated costs in the environmental sector alone (European Commission, 2012b).

In July 2004 the INSPIRE proposal for a Directive was adopted by the European Commission. In April 2005, an INSPIRE works program was published identifying the work required to define the detailed implementation rules needed for the coherent application of the Directive. At the same time, the registration of interest by Spatial Data Interest Communities (SDIC) and Legally Mandated organisations (LMO) was made. SDIC's were to be self-organised communities of interest bringing together human expertise, technical competence, financial resources and policies of users, producers and transformers of spatial information organised by geographic region, societal sector or thematic issue. LMO's were to be those organizations at local, regional, national, or international level that had a formal legal mandate giving them the responsibility for specific thematic data resources. The scale of this collaborative initiative built on a legislative framework can be seen in that in September 2012 there are 480 SDIC's (European Commission, 2012c) and 272 LMO's listed as stakeholders in INSPIRE (European Commission, 2012d).

After intensive informal discussions between the Council of Europe, the European Parliament and the European Commission, the formal conciliation process began in November 2006. The

final directive was agreed between the Council of Europe and the European Parliament and in March 2007 the legislative directive formalising the establishment of INSPIRE was passed by the European Parliament (European Commission, 2012b).

Over the following years, Member States have been progressively building into their legislative processes the implementation rules required by the Directive. This will ensure the spatial data infrastructures of the Member States are compatible. These rules cover aspects such as metadata, data specifications, network services, data and service sharing and monitoring and reporting. The implementation rules are binding in their entirety on the Member States. By mid-2011 all countries had to some extent put in place the legislation to support the INSPIRE Directive (Spatial Applications Division K.U.Leuven Research & Development, 2011).

One of the key elements of the INSPIRE initiative has been the attention paid to assessing the status of SDI's in the various countries and the progress being made towards implementation of the various elements of INSPIRE. In 2002 the European Commission launched a study entitled "*Status of the National Spatial Data Infrastructures in Europe, a State of Play*" to describe, monitor and analyse the activities related to SDI for the individual countries. This enabled the European Commission to better understand the status of the member states with regards SDI implementation. The focus elements of the study were organisation, legal framework and funding, reference data and core thematic data, metadata, access and other services, and standards. This study was conducted over the period mid-2002 to 2005 and resulted in annual reports being prepared for 32 countries on the status of SDI within each country. The study was subsequently continued for the period 2006 – 2007. Summary reports assessing the overall status of Europe were also prepared. A further study was also carried out to assess the status of INSPIRE and the National SDI's for the years 2009-10 and 2010-11 (Vandenbroucke, 2011).

The most recent study released in mid-2011 clearly shows that considerable progress is being made across all the participating countries with regards the development of the respective SDI's. As would be expected there is considerable variation in the status of the respective countries as well as the approaches to implementation of the directive. This is not surprising given the variations between the countries with regards cultural, political and history factors. The study also shows the complex nature of a wide range of issues including:

- achieving a balance between the technical implementation of the legislation framework and the underlying concept of data sharing between organisations and countries
- open data policies and open data
- the rapid advances in technology
- the need to continue to involve the broad range of users
- competing goals between the various SDI initiatives across INSPIRE.

(Vandenbroucke, 2011).

6.6.3 Key Success Factors

There is little doubt that one of the key factors in the success of INSPIRE to date has been the role played by the European Commission. It has provided the necessary leadership, governance and financial support. Whilst it is recognised each participating country is responsible for implementing the legislation in support the INSPIRE framework, the role of the European Commission in bringing the countries into the collaborative framework is not to be underestimated. The role of the major users of INSPIRE, namely (i.e. EUROSTAT and the Directorate General (DG) – Environment) has also been significant in encouraging the take up by the European Commission. This is not dissimilar to the three Australian case studies.

INSPIRE has also made considerable use of a well-structured review process. These reviews which have been routinely scheduled over a period of years have provided feedback on the status of each of the countries with regards progress across a range of elements. The reviews also appeared to have aided in the collaborative process in that all participants are able to be fully cognisant of the issues, progress being made and the commitments being made by the respective countries. This approach of implementing a thorough review process is also consistent with the collaboration theory outlined in Chapter 5.

The development, promotion and implementation of standards is also a key contributor to the success of INSPIRE to date. Given the differences in data standards across the 30 plus countries, the use of standards is critical to the success of INSPIRE.

These success factors also align very closely to the research on collaboration covered in chapter 5 which suggest that key criteria are a shared and well defined vision at the outset, an effective on-going relationship management strategy and continual reassessment of the status of the arrangements throughout the life of the project.

Figure 6.5 below summaries the key success factors in the INSPIRE program. The size of the segments in the diagram do not imply any weighting.

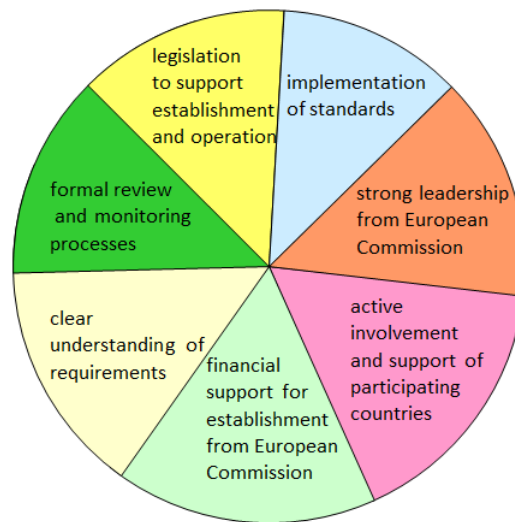


Figure 6.6 INSPIRE Key Success Factors

6.6.4 Discussion

There is little doubt that the INSPIRE initiative is a significant effort in establishing a spatial data infrastructure through a collaborative effort and supported by legislation that binds 27 independent countries. The length of the process to date (i.e. 2001 to 2012) and the work still to be completed (i.e. 2013 – 2020) spans some 19 years and clearly demonstrates the lengthy timeframes and costs to bring about a legislative and standard based approach. This approach, which brings with it significant overheads and complexities, is required given the involvement of the large number of independent countries, each with their own cultural, political and legislative regimes. Whilst Australia as a federated nation has some legislative differences between the states and territories, Australia does not face challenges to that extent and as such the legislative requirements to support a national land infrastructure should be minimal compared to INSPIRE.

With regards standards, Australia is fortunate in that whilst differences do exist between the states and territories with regards the various land administrative processes and information, the work undertaken by the various collaborative bodies such as ICSM over the past years has ensured the practices and data standards are more closely aligned. This effort on alignment has assisted work undertaken by PSMA Australia in building national spatial datasets through

the use of rules based software (Dixon et al., 2010). This tends to indicate that national datasets in Australia can be implemented without the enforcement of rigorous data standards.

Despite these differences however INSPIRE represents a valuable model for Australia in terms of establishing a collaborative national land information framework.

6.7 Chapter Summary

The five case studies clearly demonstrate that collaborative frameworks provide a mechanism to bring together land information, collected and managed by local and jurisdictional governments, for the higher levels of government. Notwithstanding the fact that all five initiatives are at different phases in terms of their implementation, there is sufficient evidence of the success of each venture to date to support the use of collaborative framework.

Whilst there is some consistency across the five initiatives in terms of the collaborative effort required to deliver a national approach, the scale, the breadth of the service and the approaches adopted vary considerably. For example, the INSPIRE initiative is a massive undertaking across over 30 independent countries covering over 34 data themes whilst the NECDL initiative is within a single federated country with a specific focus of delivering a national electronic conveyancing. Notwithstanding these differences in scope, many of the underlying issues in establishing the systems are common. These include:

- the support from the major beneficiaries of the system including funding and well defined specifications of their requirements,
- clearly articulated outcomes
- review mechanisms to ensure the desired outcomes are being met.

These factors also are consistent with the research on successful collaboration discussed in chapter 5. Of considerable importance also was that all five initiatives have not been short term implementations but have taken many years to evolve to their current status.

The key success factors identified throughout the five case studies will be used in the next chapter to assist in developing a collaborative framework to support a national view of land information in Australia.

Chapter 7 A National Collaborative Land Information Framework in Australia

7.1 Introduction

The previous chapter covered five case studies and clearly demonstrated that successful collaborative initiatives could be established to support land information infrastructures and that there are common factors in their success. Earlier chapters also provided evidence that Australia has changed considerably since it was established as a nation in 1901. The functions of the Australian Government have significantly broadened and as a consequence there is a far greater need for land information to assist in the development and implementation of national policies. It was also shown that land administration continues to be a jurisdictional responsibility and that land information held by the states and territories must be brought together if a national view is to be available.

The evidence also shows that the building a national land information infrastructure has been underway for many years dating back to 1945, with the formation of the National Mapping Council. In the 1980's, the Australia Land Information Council was formed and in the 1990's Public Sector Mapping Agency, later to become PSMA Australia Limited, first came into being. More recently in 2011, the Australian Government initiated a review into the requirements for a national spatial information strategy and ANZLIC identified its support for the establishment of a number of fundamental national datasets. Late in 2012 the Australian Government also announced its intention to seek a whole of government licence for G-NAF from PSMA Australia (Department of Resources, Tourism and Energy, 2012). A timeline of these initiatives is provided in Figure 7.1 below.

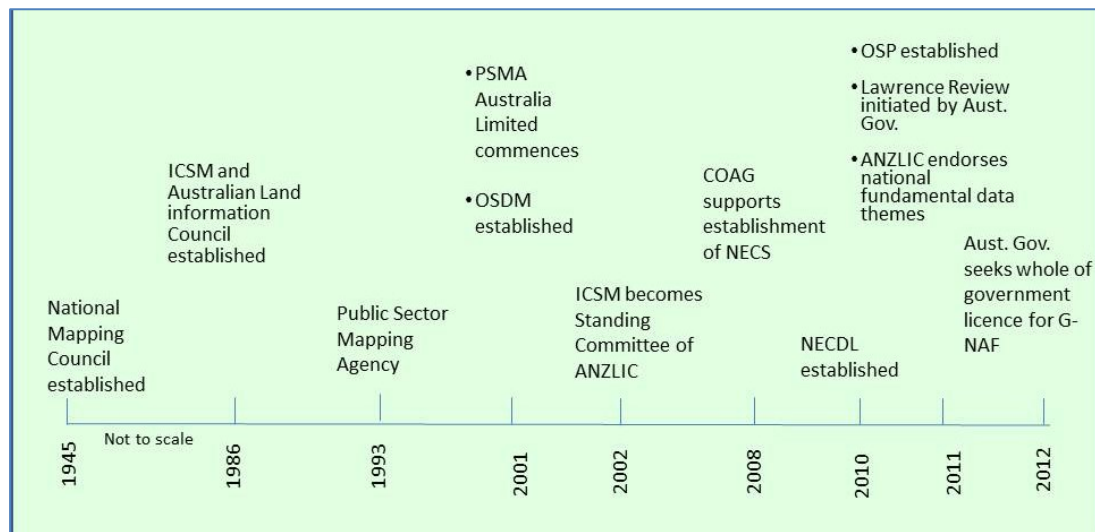


Figure 7.1 Timeline of national collaborative spatial initiatives

Notwithstanding these initiatives over many years, no framework has been implemented to support a sustainable approach to making critical land information readily available at a national level. This chapter endeavours to build on the information outlined in the proceeding chapters to design a framework that could provide a sustainable platform to meet Australia's land information needs into the future. In particular, the key success factors identified in the case studies and the research on collaboration are used to design this framework.

7.2 The Key Success Factors

The design of a sustainable national land information infrastructure based on a collaborative framework must ensure the issues that will impact its success are adequately addressed. The experiences to date in Australia, over many years in pursuing national initiatives with regards land information and the examples identified in the case studies, clearly indicate that the establishment of a national land information infrastructure in a federated country is a complex undertaking requiring many years to bring to fruition. There are obviously many factors that will contribute to the success of a national land information infrastructure. For example, McDougall (2006) identified twenty two significant issues when he examined partnerships between state and local government. Whilst issues such as these will influence the implementation of a national collaborative national land information infrastructure, the key success factors identified through this research, including the five case studies are as follows:

- The existence of a major client / investor
- Active jurisdictional support
- A shared understanding of the problem and the desired outcome
- An extensive monitoring and review process
- A commitment to standards

Figure 7.2 below summarises the key success factors identified in a diagram and identifies the source of these factors. No weighting is implied by the size of the sectors.

These five key success factors are detailed in the following sections.

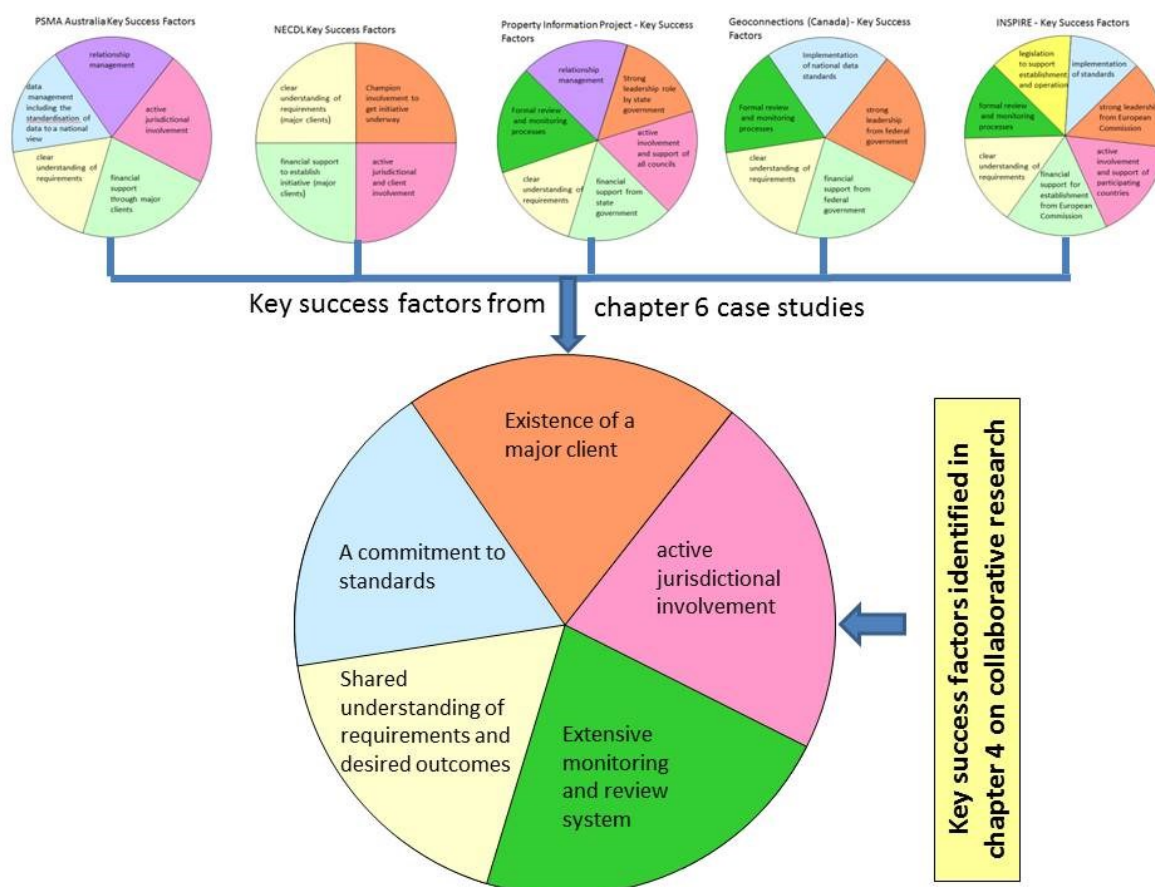


Figure 7.2 Key success factors considered critical to a national collaborative framework

7.2.1 The Existence of a Major Client / Investor

The establishment of a business venture generally requires an initial capital investment plus a client or clients prepared to support both the initiation of the venture and its ongoing viability. As stated by Paull, CEO of PSMA Australia (2009) – *there must be a “sustainable business model”*. The establishment of a national land information infrastructure is no different. Funds will be required to establish the necessary technical infrastructure, build the data collection and collation processes, and facilitate the necessary relationships amongst the collaborative partners. Funding is also required for the ongoing operational requirements to ensure clients continue to have access to the required data services.

In all five cases reviewed, the initiatives had the support of an organisation/s that either had an identifiable need for the land related information or recognised the value of the existence of national land information. They were prepared to ensure funding was available to support the initiative through the development and operational periods. In the case studies relating to the Victorian Property Information project, GeoConnections and INSPIRE, the major client also played a significant leadership role in bringing about the establishment of the project (i.e. Victorian Government, European Commission and Canadian federal government). In the case of NEDCL, COAG was not a major client but it did play a leadership role in the jurisdictions resolving their differences.

INSPIRE came about as a result of the requirements of the European Environment Agency and Eurostat. The ABS required national datasets to support their work in developing the Australian census every five years and their other statistical work. The Canadian Government through Natural Resources Canada felt that there were sufficient national requirements to provide the initial funding and for two subsequent five yearly programs. The establishment of a national electronic conveyancing via NEDCL has been strongly supported by the major banks in Australia as reflected by their investment of capital in the company. The Victorian state government had a requirement for current street address and subdivisional development information held by the 79 local councils across the State.

7.2.2 Active Jurisdictional Support

Within a federated country such as Australia where land administration is the responsibility of the state and territory governments, a key success factor in the establishment of a national land information infrastructure is the active participation of the jurisdictions. A national system

needs the land information the jurisdictions collect, store and manage to support their individual requirements. Beyond that however their active participation is also required to ensure the necessary data standards are implemented to support the efficient conflation of the data. This will also lead to the data quality and improvement goals being achieved over time.

In four of the case studies, the jurisdictions or in the case of INSPIRE, the individual participating countries of the European Union, have been proactive in the support of national initiatives to build spatial data infrastructures beyond their borders. The INSPIRE initiative requires each country to implement legislation in support of the European Union directive as well as implement the data standards to support the initiative. In the case of PSMA Australia, the jurisdictions are all shareholders and with NECDL all are expected to be shareholders in the future. They also all agree to make their data available as required to support the national initiatives and to progressively improve their data. To establish the GeoConnections program in Canada all provinces agreed to convert their datasets into the national standard. In some cases with the financial support of GeoConnections they have also undertaken data improvement programs to better align their data to the national standards. In a similar manner, the 79 local councils in Victoria all agreed to modify their systems to support the interchange of information with the state government.

Given the underlying data quality of a national dataset is dependent to a significant degree upon jurisdictional data, the active participation of the jurisdictions and local government is fundamental to the success of a national land information system. This is a significant challenge as it will require managers of systems at a local or state government level to modify their processes to improve data quality to meet the expectations of national users. Given these jurisdictional systems already support their existing operations, it seems likely that incentives to make the required changes, albeit over time, will need to be considered. This issue is also relevant to the key success factor in the following section related to achieving a shared understanding of the scope of the project.

7.2.3 A shared understanding of the problem and the desired outcome

The theory on collaboration shows that a key element of successful projects involving collaboration is that the participants have a shared understanding of the problem and the desired outcome. This includes recognising the interests and concerns of the other parties. This is also reflected in the Principle 1 of the National Collaboration Framework which states

“All parties to a collaborative service delivery arrangement must share a common vision and an understanding of the scope”. (Department of Finance and Deregulation, 2012b)

In the case studies it was evident that considerable effort has been made at the commencement of each initiative to ensure the requirements have been clearly documented and understood by the participants. In the case of INSPIRE many working groups were established and extensive consultative programs undertaken in the formative phases to ensure the requirements developed would support the coherent application of the directive. This effort is reflected in the fact these consultative efforts took five years from the signing of the initial MOU to the issuing of the directive from the European Commission. For the GeoConnections program, the initial phase included pilot studies to provide examples as to how the program would deliver benefits to Canada. In case of PSMA Australia, the ABS provided a specification of their requirements via a tender and followed this up with further discussion prior to establishing a contract for delivery of the services.

Put in the context of establishing a national collaborative land information infrastructure for Australia, it could be argued that the development of a shared vision or understanding of the problem will only be achieved if the outputs of the land information infrastructure are clearly understood by all participants (i.e. data providers and data users). In other words, this would require as a minimum, the following questions to be answered:

- what land information should this infrastructure deliver?
- how should the information be structured?
- what update frequencies are expected?
- What data quality standards would be expected?
- What changes are required at the data sources to meet these expectations?
- Can key themes be identified as a priority and therefore allow the infrastructure to evolve?

As the single major beneficiary of a national land information infrastructure it is therefore incumbent on the Australian Government to deliver a clear specification of its requirements. There would also be a requirement on the jurisdictions to identify the changes required in the local data collection and maintenance processes to meet the standards specified at a national level. The thorough documentation of these issues is considered critical to the development of a shared understanding particularly in term of the scope of the project.

7.2.4 Thorough Monitoring and Review processes

The research on collaboration suggests that monitoring and review processes are critical as they provide feedback to all the participants on progress being made and assist in building trust across the project. This requirement was reflected in the performance monitoring and review processes which were found in the initiatives covered by the case studies.

The INSPIRE project has established regular reporting processes since its initiation which detail the progress being made in each of the individual countries as well as collectively as the European Union. PSMA Australia and NECDL are both companies and are required to report on a formal basis to their shareholders like any other company under Australian company law. GeoConnections has been required every five years to demonstrate its performance and achievements in order to continue to be supported by the Canadian Government with funding. In the Victorian Property Information Project monitoring of the progress of the project was undertaken in the form of data audit programs and a formal independent review.

The implementation of a collaborative model to underpin a national land information infrastructure for Australia will inevitably require changes in processes associated with the collection, collation and distribution of land related information across three levels of government. These changes will arise from new or revised data standards, revised data, supply schedules and new data supply chains. Given the involvement of several tiers of government, like in the INSPIRE example, it would be expected the information infrastructure will take many years to evolve to its full potential. Bearing in mind the research of Prefontaine et al (2000), the establishment of processes to monitor and review the initiative will be important to its success as it will not only take into account the progress being made but also the manner in which the relationships between the participants are evolving. These processes will also support the benchmarking suggested by McDougall (2006) in his research.

7.2.5 Commitment to Standards

Spatial data infrastructures involve the sharing of spatial information across multiple organisations and platforms. To a significant degree, the level of interoperability achieved is impacted by the use of standards by the various participants. The long term success in the implementation of a national land information infrastructure will inevitably be linked to a commitment to standards.

Notwithstanding the different approaches to standards, the case studies demonstrated the need for standards to be developed and accepted by the participants in any national initiative. Without the existence and use of the standards, the conflation of the information from multiple organisations is made increasingly difficult.

In reviewing the case study initiatives, it was clear that different approaches have been taken in the different countries. In the case of INSPIRE, legislative processes have been established to ensure the standards can be enforced. This use of a legislated approach is understandable given INSPIRE involves independent countries with legacy systems that have significant differences given the language and cultural variations between the countries. Without such an approach the collation of the information into a standardised structure would be most difficult.

Australia does not have these language and cultural differences and all the jurisdictional land administration systems operate under the Torrens Systems. As a result there is considerable similarity in terms of their operations of the respective systems. Work undertaken by ICSM over the past 30 years in developing harmonised data models across many of the land information themes has also meant that whilst the data structures and formats may vary between the jurisdictions, translation into a common data structure is readily achieved. This is reflected in the integration of jurisdictional data across multiple themes by PSMA Australia every three months. As such whilst no single standard is used across the jurisdictions, understanding the differences between PSMA Australia national data model allows ready translation. A similar approach is being taken in the development of the national electronic conveyancing system where NECDL are establishing the technology framework to manage the differences between the respective land registries.

A similar situation applies in Canada where all the provinces have agreed to translate their respective datasets into the national standards to ensure users can readily consume their datasets at a national level. In Australia PSMA Australia effectively does this on behalf of the jurisdictions.

7.3 Components of a National Collaborative Model

Given the vast majority of land information in Australia is generated through administrative process at either a local or state government level, a cohesive model to support a national land information infrastructure must reflect the involvement of all three levels of government (i.e. local, state and federal), either as data generators, data integrators or as data users.

As previously highlighted, a national land information infrastructure in Australia has been evolving over many years. Building on these previous initiatives where possible should allow ready integration with existing processes and systems. Most importantly, it builds on relationships that have been established over long periods in some cases, thus assisting in building a sustainable system. For example, state and local governments already collaborate to facilitate land development and planning processes. A national infrastructure should build on these existing processes given they exist for operational reasons. This should assist in ensuring a sustainable data collection process. In a similar manner, building on the initiatives of PSMA Australia, ANZLIC and NECDL in support of a national framework would also appear to have considerable merit.

Recognition of these existing initiatives therefore supports the adoption of a collaborative framework for national land information infrastructure that comprises the following components:

1. Data Supply and initial Integration Tier
2. Major Client Tier
3. Data Integration of Jurisdictional Land information Tier
4. Standards and Review Tier

The framework is essentially three operational collaborative systems working together plus an overarching standards and review body. The degree to which of the four components successfully meets their respective goals, will determine the degree of success of the national framework. It is a framework which can evolve over time as the various data themes are developed. The standards and review tier would have no statutory control over the other tiers but would publish reports to all levels of governments on the progress being made.

7.3.1 Data Supply and Initial Integration Tier

The data processes between local government and state government represents the first tier of a collaborative model required as part of an overall national land information infrastructure. Essentially this tier is driven by long standing operational requirements for the effective operation of each state and territory. This tier is the source of the majority of land information required for a national system.

Local Government represents the foundation or source of much of the land information required to support a national land information infrastructure. At the local government level,

information pertaining to land such as addresses, valuation, land use, building and occupancy details are generated to support various state legislative processes. Whilst local government requires this information to fulfil its operational requirements, much of the information is also required to underpin broader state government policy and operational requirements. To this end, each state government collects and integrates, normally as part of legislative requirements, each of these data themes into its various databases. In some cases there is no legislative requirement however operational requirements over the years have led to the establishment of practices which bring about the data integration (e.g. street addresses in most states). Many of these data themes are held as discrete databases at a state government level although over the past years there have been some efforts to align the themes. As a general rule, each of these databases meets the respective state and local government legislative and operational requirements.

Given the manner in which these databases have evolved over many years in response to legislative and operational requirements, there has been minimal enforcement of data standards. Data is consumed by the state government agencies from each council and massaged into the state government databases. For example, the allocation of addresses is not a legislated process however there is a national standard, albeit the address data in G-NAF suggests it is often not applied at local government level. To a large degree the quality of the land information generated by local government and held by state government can be measured by the level of collaboration between state and local government. This was reflected in the research undertaken by McDougall (2006).

Whilst further improvements to support the national land information requirements are needed, this tier of the model is already functioning and generally meeting its requirement towards a national infrastructure. The areas for improvement are a more consistent approach to the timely collection of data by state governments, data standardisation and better alignment of the various themes.

7.3.2 Major Client Tier

The second tier of the framework is the major client tier. To a large degree this identifies the Australian Government as the major client for a national land information infrastructure however it will also involve major users such as the financial sector of industry (e.g. major banks) and those organisations seeking to distribute the information such as PSMA Australia's major VAR's.

As shown by the research, the major potential client is the Australian Government with many departments and agencies seeking access to the land information generated by both state and local government. The creation of national spatial datasets by PSMA Australia such as Cadlite, Transport and G-NAF (i.e. addresses) has certainly assisted this access as shown by the widespread use by Australian Government departments of the PSMA Australia datasets. These PSMA Australia datasets however do not meet all the Australian Government's requirements either in terms of content (e.g. valuation, land use), data currency and data quality. This arises from the fact that apart from the initial specification by ABS in the early 1990's which brought about the creation of PSMA Australia, the Australian Government has failed to date to outline what its detailed requirements are. With each Australian Government department focusing on its own requirements there has been no collective effort to define the Australian Government's requirements until recently. Unlike the local government / state government tier of the proposed national framework there has been no operational requirement to do so. Whilst there are some initiatives, such as the establishment of the Office of Spatial Policy (OSP) and the APS200 Location project, directed towards this goal, this tier of the model remains a work in progress. Essentially this tier involves collaboration across all Australian Government departments and agencies to deliver a specification as to the Australian Government's requirements. This may require the development of a value proposition to support such collaborative activity. This would involve individual departments acknowledging their current and future requirements and their current costs in working across multiple state and local government departments in collecting and translating land information into their respective datasets. Only through this work would the Australian Government be able to assess the true value of collecting land information to support the development of policies and their operational needs.

In summary, this tier of the national framework could be considered a work in progress given the current efforts being undertaken by OSP on behalf of the Australian Government and ANZLIC.

7.3.3 Data Integration of Jurisdictional Land information

The third tier of the national infrastructure is the integration of the state and local government data into national datasets. To a significant degree much of the framework for this is in place. PSMA Australia has been in existence for nearly 20 years and NECDL is in the process of establishing a national electronic land conveyancing system which will link up the various land registries around Australia. Both these organisations are companies owned to a very large

degree by the governments of Australia with only the four major banks being minority shareholders in NECDL. As companies they are not funded by government for their operational requirements but rely on the development of products and services that meet the needs of clients prepared to pay for the information or service.

In the case of PSMA Australia, the income derived from its products and services funds the integration of land data held by the states and territories plus a royalty back to jurisdictions payable for all data sold.

It would be expected that if a client (i.e. the Australian Government) detailed their requirements with regards land information in terms of content and quality, either PSMA Australia or NECDL could assess the requirements and costs of delivering to these specifications in conjunction with the states and territories given their role in the data collection process. This is no different to any company operating in the private sector where a potential client is seeking a new or improved product.

In the case of PSMA Australia where a Value Added Retail (VAR) network exists, an assessment could also be made of the wider use by the private sector of new and improved products.

In summary, the national integration tier of the framework required to bring together the jurisdictional based data into a national framework already exists to a significant degree and is operational. Like any private sector company however it will only deliver to what the market place requires and is prepared to pay.

7.3.4 National Standards and Review Body

This body also already exists in the form of ANZLIC. This organisation is comprised of representatives from the Australian, state and territory governments. It is therefore well placed to report back to all governments on a regular basis on the progress of the other three tiers of the model. Preferably its constituency could be expanded to include a local government representative given the key role local government plays in the data collection phases of the land information process. This is not dissimilar to COAG which has local government representation. Under the proposed framework, ANZLIC would also take the requirements of the Australian Government as the major client, together with any additional requirements it deems necessary, and create standards across the various datasets. It already performs this role having completed a number of standards such as the addressing, transport and cadastral standards.

As outlined earlier in late 2012, ANZLIC through OSP initiated a program of activities directed at developing specifications for ten foundation datasets for Australia. The key land information components required to support the land management paradigm outlined in chapter 3 are included in these foundation datasets. In support of identifying the requirements OSP are also undertaking a survey of Australian Government departments and agencies to determine their requirements from these foundation datasets (Department of Resources, Tourism and Industry, 2013) Given this situation much of the necessary work for this tier of the framework is now underway.

7.3.5 The National Land Information Infrastructure Framework

The overall framework as outlined in the preceding section is provided below in figure 7.3. The diagram below sets out the key components of the framework. Whilst the establishment of standards and service agreements identified in the diagram are important to the effective operation of the framework, it is the relationship management roles which are crucial to the overall framework. These relationship management roles are to be facilitated by:

- The national data integrators who will need to ensure the expectations of both the Major Client tier and the state and territory governments as the primary data source are being met
- The Office of Spatial Policy who will need to ensure they can convey the collective needs of the Australian government to the data integrators
- The State and Territory government who have the responsibility of working with local governments within their jurisdiction to improve the data quality of land information in terms of consistency and timeliness generated through the various legislative processes.

The other crucial task is the independent monitoring of the effectiveness of the framework to ensure it is meeting its objectives and most importantly the expectations of all participants. This is the role of ANZLIC.

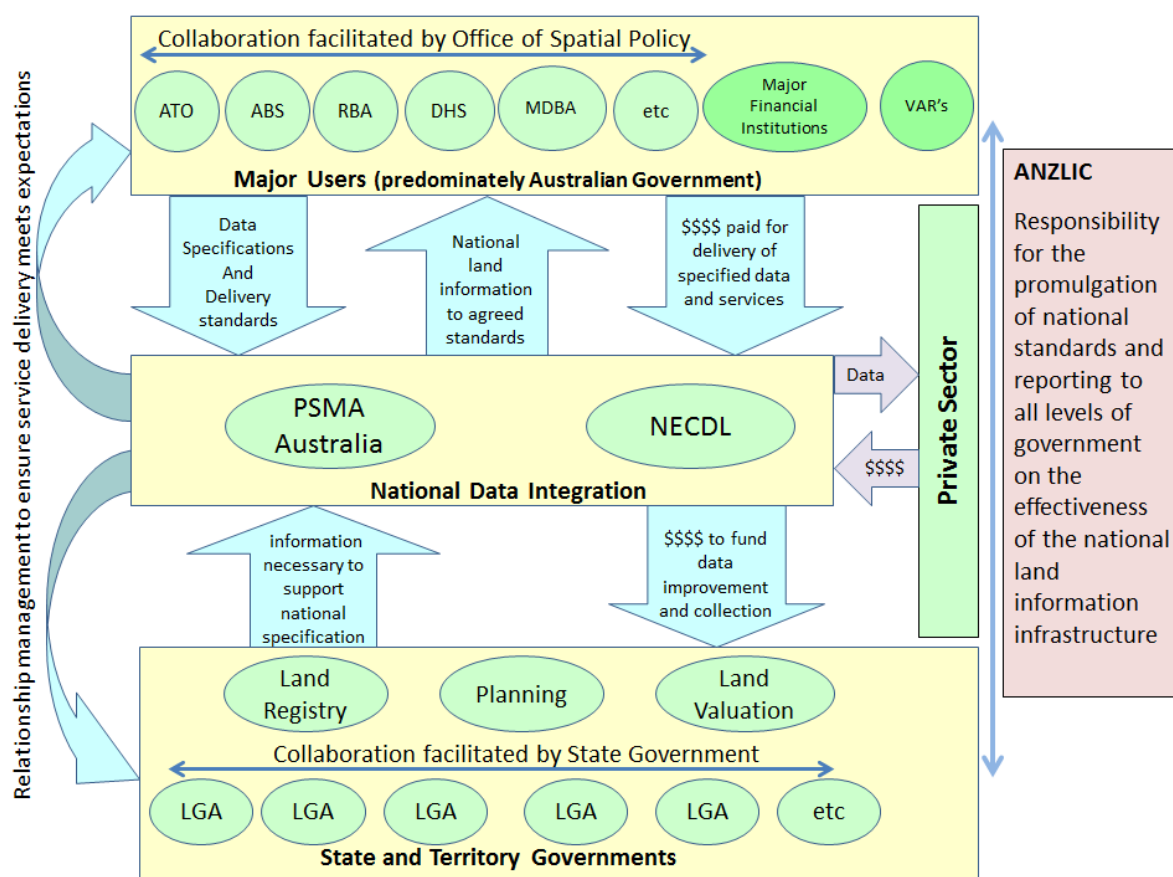


Figure 7.3 Proposed Collaborative Framework for an National Land Information Infrastructure for Australia

The following section also provides some commentary on the proposed collaborative framework with regards to the key success factors including some of the key implementation requirements to bring about the successful implementation of the framework.

7.3.5.1 Identification of the Major Clients / Investors

The framework clearly designates the Australian Government as the major client for a national land information infrastructure. The other major clients will be the financial sector (e.g. major banks) and the larger resellers of the land information made available through the infrastructure. As the major beneficiaries, the funding of the infrastructure will need to be provided by these major clients. This funding would be contingent on the delivery of the land information in line with the specified requirements covering data quality and timeliness of delivery. Provision would need to be made for the specifications to evolve over time to support progressive improvements in the data quality of the information.

7.3.5.2 Developing a Clear understanding of the requirements

The major clients would be required to provide a data specifications including their data delivery standards. This will ensure those collecting the data at the source and those building the integrated datasets have a clear understanding of the expectations of the users. With this level of understanding both “the primary data collectors” (i.e. state and local government) and “the primary data integrators” will be able to develop processes to ensure the specifications can be met and also properly assess the cost of delivering this service. Through these specifications the “gaps” between the current land information datasets and the required standards can be identified. Programs can then be established to bring the existing data to the required standards. The timeframes and any issues to meet these requirements can then be clearly understood by all parties.

7.3.5.3 Active jurisdictional support

The proposed collaborative framework requires and encourages active jurisdictional support. Firstly the jurisdictions will continue their partnerships with local governments in order to build the necessary land information infrastructures at the state level. Whilst a significant proportion of this is in place through the existing planning and development processes, the jurisdictions will need to seek agreement with local governments for improved compliance with standards.

Secondly, the jurisdictions have a significant component of the ownership of PSMA Australia and NECDL and as such can influence these organisations from both a strategic and operational perspective. Finally the jurisdictional are also represented on ANZLIC. As the body responsible for standards and review the jurisdictions will have direct feedback as to the effectiveness of the framework and be well placed to make any corrective action which is required. Most importantly as previously indicated, the framework provides a funding stream for improvements that will benefit the jurisdictional processes in the longer term particularly in regard to data standards, currency and consistency.

7.3.5.4 An extensive monitoring and review process

One of the roles of ANZLIC will be to oversee the establishment of monitoring and review processes to ensure the collaborative framework is delivering increasingly improved land information over time in terms of completeness, currency and consistency (i.e. closing the gap on the required standards). It would also be expected that PSMA Australia and NECDL would

establish processes to monitor their performance that would reflect the level of service being delivered to the major clients as would be required of any company. Collectively the monitoring and review process established should allow transparency in terms of the operation of the national land information infrastructure.

7.3.5.4 Commitment to Standards

The efficiency of the framework and hence the long term success will rely significantly on the commitment to standards by all the participants. Without the implementation of minimal standards, reaching the required specifications within the required timeframes will be difficult. It would be expected in the early phases of the project that considerable data cleansing would be necessary however over time this requirement should diminish thus lowering the costs associated with the data integration. It would also be expected that this commitment to national standards by local government would need to be supported by funding as some of their data collection processes would need to be enhanced.

7.3.5.5 Relationship Management

As a collaborative framework, the management of relationships will be a significant role. PSMA Australia and NECDL would be required to manage the relationships both with the major clients and the data suppliers in the jurisdictions. This role is no different than that already played by PSMA Australia and NECDL today. One major difference however would be the existence of an agreed data standard and an agreement in terms of timeframes for compliance with this standard. It is expected the availability of this documentation would assist in managing the relationships given the improved understanding of all parties of what was expected.

There would also be a requirement for PSMA Australia and NECDL to establish a working relationship between themselves to ensure the integration of jurisdiction information was coordinated. Whilst both a separate un-listed public companies with their own commercial focus, both have a high level of government ownership and a common goal of bringing together jurisdictional data and services into a coherent national model.

The ongoing relationship management requirement however also exists within the major client and jurisdictional tiers. Many individual departments and agencies exist across these two tiers and ongoing efforts would need to be made to ensure the expectations were being met either as a user or supplier as the land information.

7.4 Chapter Summary

This chapter set out to develop a collaborative framework that would assist in delivering a national land information infrastructure. Such an infrastructure is required to support the Australian Government and other national users. In addition to the existing jurisdictional infrastructures, the framework as proposed makes use existing organisations with significant track records such as PSMA Australia and ANZLIC to provide the services required to underpin the framework. More recent initiatives such NEDCL and the OSP are also utilised. The outcomes of the research of Chapters 4 and 6 relating to the key success factors for collaborative ventures are also incorporated into the framework. Through the use of existing organisations and their established relationships and the factors that are crucial to long term collaboration, it is expected that this framework will support, in a sustainable manner, the national land information requirements of Australia.

Chapter 8 Research Summary, Future Research and Conclusion

8.1 Introduction

The preceding chapter developed a collaborative framework to support a national view of land information in Australia. It also included some discussion on the issues relating to implementation from the perspective of the key success factors. Having finalised the framework, this chapter now closes the loop and reviews the research aim and objectives outlined in Chapter 1. Further possible research areas linked to this thesis are also discussed and finally a concluding statement.

8.2 Research Aim

The aim of the research was set down in Section 1.3 as:

“To develop a collaborative framework using the existing jurisdictional based land administration systems capable of meeting Australia’s national land information requirements.”

Chapter 7 developed the collaborative framework using the jurisdictional based land information as outlined in the research aim. This framework took into account the research discussed in chapter 4 on collaboration and chapter 6 on the five case studies. Of some importance to the resultant framework were the factors that were identified as being crucial to success of collaborative initiatives. The collaborative framework however also acknowledges that there have been various initiatives directed towards a national approach over the past decade. These initiatives are ANZLIC, PSMA Australia and more recently NECDL and the OSP. As such, these organisations are key components of the framework. The framework thus takes advantage of the work of the past and most importantly the many relationships already in place.

8.3 Research Objectives

8.3.1 Research Objective 1:

“To identify the need for a national land administration information infrastructure in Australia as a federated nation”

The fact that Australia was established in 1901 as a federated nation and has undergone considerable changes since that time from a governance perspective lies at the heart of this research. At the time of federation, land administration like many other responsibilities was left with the states and territories. As a result, eight separate land administration systems have continued to evolve somewhat independently. There are however many similarities between the jurisdictional systems, with all being based on the Torrens Systems of land registration and the links between the jurisdictions through organisations like ICSM.

Chapter 2 highlights the manner in which Australia is now evolving as a nation and that this is driving the need for a national view of the land information. In 1901, the Commonwealth Government’s scope of responsibility was essentially limited to taxation, defence, foreign affairs and postal and telecommunications. The current responsibilities of the Australian Government now extend to policy development and strategies to support the growth of the major cities and related major infrastructure, water management and climate change, etc.

The development of policies to cover this broader range of responsibilities now requires a national approach in many areas of activities. The use of land information by the Australian Government for policy development, and at times operational purposes, is but one of these areas. Whilst the evolving nature of the federated system of government underlies the requirement for a national view of land information as set out in Chapter 5, the identifiable driver is the need to remove the inefficiencies brought arising from the duplicative efforts in collecting the information by the various Australian Government departments and agencies. This current approach also often results in land information lacking in quality and timeliness.

Chapters 2 and 5 together identify the need for a national land information infrastructure and therefore address the requirements of Research Objective 1

8.3.2 Research Objective 2

“To document some of the current uses of jurisdictional land administration information within Australia at a national level”

Chapter 5 outlines the many uses being made of land information at a national level, particularly by the Australian Government. These uses arise from the need to develop policies relating to issues such as climate change, water management and monetary and fiscal policy. All of these involve cross-jurisdictional land information. As a result, many of the departments and agencies collect and maintain land information relating to their particular needs. The outcome of this situation is considerable duplication of effort in data collection together with data quality and currency issues.

Whilst chapter 5 documented the specific uses of jurisdictional land information, chapter 3 also examined the value of land administration to the economic prosperity of the Australia as a nation. The scope of the land administration is explained through the land management paradigm as land use, valuation, tenure and development. The key role that land administration processes plays in the implementation of the broader national spatial data infrastructure was also highlighted.

The work undertaken to support the requirements of Research Objective 2 has shown broad use of the land information at a national level and most importantly flagged the value of land administration process to Australia’s economic, social and environmental prosperity.

8.3.3 Research Objective 3

“To document relevant existing collaborative arrangements within Australia’s land administration infrastructure and relevant examples from overseas federated countries”

The case studies covered in Chapter 6 demonstrated that collaborative frameworks have been successfully used in establishing land information infrastructures both in Australia and overseas. Most importantly the cases studies allowed consideration of collaborative efforts across all levels of government (i.e. national, state and local). The use of INSPIRE as a case study further broadened the scope in that it involves collaboration of independent countries requiring a greater emphasis the need for standards and legislation to overcomes significant differences between the countries. This assisted in providing a good point of comparison with Australia where the differences between the jurisdictions are not as significant. Notwithstanding differences between the case studies in terms of scope and deliverables there

were a number of common elements in terms of their implementation. These were identified in support of Research Objective 4.

8.3.4 Research Objective 4

“To determine the key success factors in establishing collaborative national land information infrastructure”

The five case studies in Chapter 6 supported the determination of the key success factors in establishing collaborative land information infrastructures. Despite the differences between the initiatives, there were a number of common factors that contributed to the success to date in the projects. Factors such as:

- the establishment of a clear understanding of the proposed outcomes,
- the active involvement of the participants,
- a major client to both drive and invest in the initiative,
- the establishment of mechanisms to review progress and
- ensure agreement along the way and good relationship management practices

were to be found in most of the initiatives. All but one of the initiatives examined had been in existence for over 10 years. Their longevity and outcomes achieved demonstrated the value of a collaborative approach particularly in a federated country like Australia. It should also be noted that the key success factors were consistent with the more general research on collaboration examined in Chapter 4.

The research undertaken in support of objective 4 is a key input to the proposed collaborative framework. Based on the research, the embedding of key success factors in the implementation of the framework would be crucial to its long term success.

8.3.5 Research Objective 5

“To develop a collaboration framework capable of supporting a sustainable national land information infrastructure”

Based on the research undertaken and the examination of five case studies, the establishment of a land information infrastructure for Australia using a collaborative framework is both achievable, and most importantly, can be built on a number of the achievements of the past thirty years. The proposed framework is based on four separate collaborative initiatives all of

which must interact to deliver the overall framework. In all four cases, the collaborative partnerships are either already in place or are currently under development. The four components of the overall national framework as shown in the diagram below are

- Data Collection and initial integration (State and Local Government)
- Major Client / investors (Australian Government and major industry partners)
- Major Data Integration and delivery (PSMA Australia and NECDL)
- Monitoring, Review and Standards (ANZLIC)

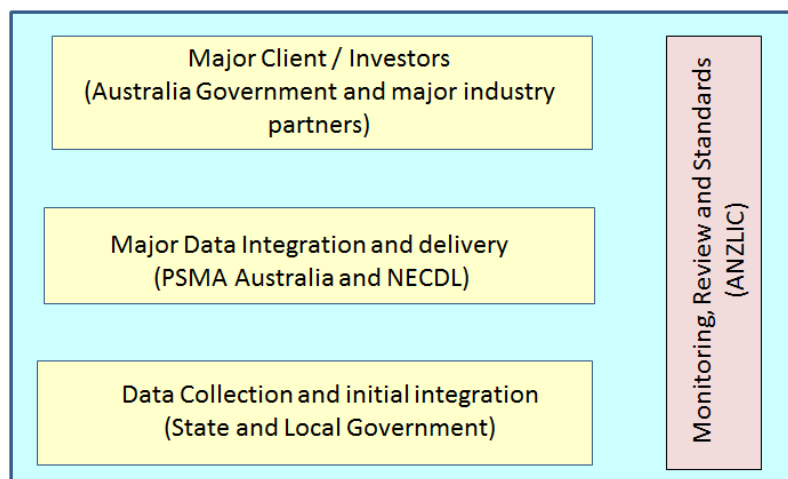


Figure 8.1 Core Tiers of the National Collaborative Framework

Of considerable importance to this framework is that it will need to evolve over time to allow local, state territory governments to bring their data to the specifications set by the major clients. Most importantly, the funding provided by the major clients for the delivery of the services must also flow through to local and state governments to support data improvements to bring the data to the expectations of the major clients. Research objective 5 focussed on the development of a framework to support a sustainable national land information infrastructure. The sustainability of the proposed framework provides for the sustainability by focussing on:

- the use of pre-existing initiatives as the core components,
- the key success factors for collaborative initiatives such as clear objectives, common understanding of the required deliverables and relationship management
- the policy and operational requirements of major users who would pay for the information and services.

8.4 Further Research

8.4.1 The Role of Technology

There is little doubt that technology will play a significant role in the delivery of the services provided through the proposed national land information infrastructure framework. Notwithstanding this, there has been minimal discussion on technology issues throughout this thesis. This approach was taken because, in the initial literature review and from the involvement of the author in industry for many years, technology appears to have had less impact on the actual outcomes achieved compared to aspects such as relationship management, understanding the project requirements, identifying the major clients and obtaining sustainable funding.

For example, in reviewing the evolution of PSMA Australia, whilst technology has definitely influenced the manner in which the integrated datasets have been built and delivered over a period of nearly twenty years, it appears to have been a secondary issue. Similarly with INSPIRE, the focus has been on establishing standards and legislation and ensuring the buy-in of all the participating countries rather than with the technology itself.

The research on INSPIRE and PSMA Australia does however indicate that the role of ontologies certainly has the potential to improve the efficiency of the data conflation processes through automated linking of data contributors. As previously mentioned in Section 6.2.4, PSMA Australia have already automated some of their processes which has improved data processing efficiency and in particular reduced delivery times. The potential for this technology to assist in providing conflating data from the jurisdictions and other organisations contributing data to the Australian spatial data infrastructure has also been recently recognised in Program 3 of the Collaborative Research Centre for Spatial Information (CRC-SI) (West, 2012). Through this research program the CRC-SI plan to develop tools and techniques to assist in a range of activities associated with spatial information including the seamless integration of datasets.

Given these examples, further research in the area of ontologies should be undertaken with a view to maximising the efficiency of the proposed framework.

8.4.2 Land information dataflows between state and local government

The collaborative framework proposed by this thesis recognises the primary source of the majority of land information as being state and local government. The research also identified

data quality as one of the key requirements of the Australian Government (Lawrence, 2011). The research by McDougall (2006) examined the relationship between state and local government in some detail in developing a partnership model. Whilst McDougall demonstrated through his case studies that the quality of data was improved through better partnership arrangements there would appear to be a requirement to better understand other factors that may influence the quality of land information at a local and state government level. Is it just funding issues or do aspects such as legislative requirements, non-use of standards, poor underlying data collection process etc. that influence the quality of the information? This area would benefit from further research and further advance Australia's national land information infrastructure.

8.4.3 Beyond Electronic Conveyancing

One of the national data integrators proposed in this model is NECDL. As outlined in Section 6.3, NECDL involves the linking of the jurisdictional based land registries for the first time. Whilst NECDL has been established to service electronic conveyancing, there is a significant opportunity to make available the information held by the registries at a national level. Whilst this is obviously a commercial decision for NECDL, it presents itself as an opportunity for further research as access through a single system to Australia's land registries has not been possible until the establishment of NECDL.

8.5 Conclusion

As previously mentioned there have been many initiatives over the past decade directed towards a more national view of land information. Whilst some progress has been made, the inability of the Australian Government to gain access to a national view of complete and timely land information reflects the absence of a national land information infrastructure. During the latter half of this three year thesis there have been a number of initiatives focussed on improving the Australian Government's access to land information held by the state and territories. Possibly the most important of these has been the establishment of OSP and its efforts to define the requirements of the Australian Government with regards land information. This and other initiatives have been acknowledged previously in this thesis.

The strength of collaborative framework proposed in this thesis is that it builds on the many past initiatives such as PSMA Australia, NECDL and ANZLIC. It also incorporates the key success factors of these and other collaborative initiatives examined in the case studies. Most importantly given the states and territories have a shared ownership in these three

organisations, there is a vested interest in making it work. Of critical importance however to the framework is the recognition of the Australian Government as the major client and the value of it having access to current and complete jurisdictional based land information. This recognition is obviously required to ensure the necessary funding is available to the state and local governments to go beyond their own requirements to deliver information suitable for a national purposes.

In summary, the framework links together existing initiatives, in which the jurisdictions have a majority shareholding, into a single framework incorporating proven key factors in achieving successful collaborative ventures. The major beneficiary of this framework is the Australian Government. It will importantly also support the establishment of a national land information infrastructure for Australia to the benefit of all governments, business and the broader community.

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