INTEGRATED LAND ADMINISTRATION IN AUSTRALIA- THE NEED TO ALIGN ICT STRATEGIES AND OPERATIONS

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ABSTRACT

A modern Land Administration System consists of four key functions: land tenure, land valuation, land use and land development. The integration of these functions and associated land information are essential if we are to achieve sustainability objectives and a more efficient property development process. Historically many countries have divided up their key functions; the advent of information and communication technologies [ICT] offered the possibility of integration.

Current research suggests that land administration functions have resisted integration, despite technological advancements. This paper analyses such findings by considering the land administration functions of Victoria, Western Australia and New South Wales. It considers each state’s spatial-mapping and registry functions at a strategic and operational level. Particular attention has been given to ICT policy and operations. The study suggests that many factors have obstructed integration, including historical backgrounds, politics and disparate organizational cultures have all played a role. Another important factor has been the failure to align the ICT strategies and operations of the different functions: land registries have tended to view technology as supporting core operations rather than core strategy. Conversely, spatial-mapping units see ICT as fundamental to operations and strategy: not only has ICT enhanced traditional practice, but it has also allowed for the creation of new products and services. It is argued that in order to achieve further integration, Land Administration functions must align their perception and use of ICT. Shared leadership, integrated ICT infrastructures and government mandates will assist this alignment.

BIOGRAPHY OF PRESENTER

Rohan Bennett completed a double degree in Geomatic Engineering and Information Systems in 2003 in the Department of Geomatics, The University of Melbourne. He is currently undertaking his first year of a PhD at the same institution with The Centre for Spatial Data Infrastructures and Land Administration. The research will focus on determining the role ICT and the private sector can play in assisting the management of property restrictions and responsibilities. Rohan has undertaken work in the property development sector as both as a cadastral and engineering field surveyor. He has tutored and lectured in Organizational Analysis and Change, Managing the IT Function, Telecommunications Concepts, Subdivision Design and Land Administration.
INTRODUCTION

Information and communication technologies [ICT] play an important role in the integration of Land Administration Systems. This paper aims to demonstrate how ICT has impacted differently on the core strategies and operations of the various land administration functions, how these differences have hindered the prospects of achieving integration and how such differences might be overcome.

The first section provides a background to integrated Land Administration. The benefits of integrating land information are outlined. The growing problem of integrating the administration of all land related activities, restrictions and responsibilities is considered briefly. Analysis is then limited to the spatial-mapping and registration functions of Land Administration. A number of Australian jurisdictions are used as case studies: Victoria [VIC], Western Australia [WA] and New South Wales [NSW]. The ICT strategies and operations of the registration and mapping agencies are critically compared using Applegate et al’s [2002] strategic grid analysis theory. A summary of the different ICT perspectives within Land Administration and the reasons for their existence is provided. The paper concludes with preliminary recommendations for mitigating such differences and promoting further integration.

A BACKGROUND TO INTEGRATED LAND ADMINISTRATION– JUSTIFICATIONS AND OBSTACLES

In developed countries Land Administration Systems consists of four key functions: land tenure, land valuation, land use and land development [UN-ECE, 1996] [Figure 1]. The economic development of a jurisdiction is dependant on these functions: land tenure and valuation systems are used to generate economic wealth through taxation and land transfer; tenure systems are also used to strengthen social cohesion through the provision of tenure security; and land development systems are used to promote growth, but, limit environmental degradation of land for the benefit of the wider community [Enemark et al, 2004]. An integrated Land Information Infrastructure (or the spatial-mapping function) should support the activities of the four core functions by providing the fundamental and authoritative spatial information sets such as cadastre and address.

Historically many countries have divided the core functions into separate institutions [Enemark et al, 2004]. This has led to the creation of many incompatible spatial/non-spatial information sets which record variations of the same thing: parcel location, ownership, use and value. Such replication is costly and creates a void: there are limited mechanisms that link the management of ownership, land use development, environmental conservation and other forms of property regulation.

Figure 1: The Land Management Paradigm (Enemark et al, 2004)
It was thought that the advent of ICT would provide much needed assimilation [Love, 2005]. While integration would cause much heartache, the benefits would outweigh the perceived costs. Processes, information and communications would be integrated and the Land Administration functions would experience cost reductions through less replication. The arrival of the Internet promised higher service standards and better access to land information. The large amounts of information required for any commercial, industrial or residential development could be made available through a centralised system. Integration could also promote the sustainability objectives of many state governments. Integrated land information would lead to better decisions through enhanced environmental and social impact analysis of proposed developments [Figure 2].

![Figure 2: Sustainable Development is not attainable without good land information [FIG, 1999]](image)

While much has been achieved, the vision of complete integration is still largely unrealised: the vast improvements in data, standards and access regimes that comprise land information infrastructures have not produced substantial integration between Land Administration functions. Furthermore, disparities between the four core land administration functions and their information is only one part of a much bigger integration problem; administering the large amounts of new land related legislation and information that has emerged over the last 50 years is a much greater challenge.

Before WWII the Torrens system of land registration formed the backbone of Australian land administration. Introduced in the mid 1800s the system simplified its British predecessor of deeds registration [Wallace, 2005]. It allowed greater security of tenure with a less complicated process for transferring land. The Torrens system had one major deficiency: it focussed only on managing the ownership layer of land interests. Title was indefeasible but subject to other community interests. These paramount and regulatory interests began to proliferate in the second half of the twentieth century [Wallace, 2005].

The post-WWII era presented a number of challenges to traditional Land Administration systems. Population growth and the industrialization of farming processes placed massive pressures on land, and the impact was becoming evident. This led to the emergence of social movements that focused upon the environmental, rather than economic, dimensions of land use [Ting, 2002]. Such movements inspired legislative regimes that could exist independently of Torrens while protecting land for the benefit of all [Wallace, 2004]. As governments continue to embrace sustainable development the number of laws is increasing [Lyons et al, 2004]. While the regime is itself good, it remains inadequately administered. The laws are ad hoc, non-centralized and undermine the vision of a single system as the depository of all interests in land.

There is now clear consensus that an information management problem exists; however the solution is contentious. Some Land Administrators [Lyons et al, 2002] advocate a complete overhaul of the systems, in an effort to recentralize and recapture Torrens principles. Others suggest that we extend Torrens to incorporate restrictions; however, Torrens was designed for the management of private rights. Do we really want to tamper with the traditional registry? Furthermore, some restrictions are actually managed well. A more comprehensive analysis of the current restriction-responsibility situation is required. Providing a complete solution to this larger integration issue is outside the scope of this paper. Nonetheless, before holistic management of all land related activities can take place, the integration of the core Land Administration functions needs more attention. Discussion will now focus on the core Land Administration functions and the levels of integration they have achieved through the use of ICT.

**ASSESSING THE INTEGRATION OF LAND ADMINISTRATION- A RESEARCH METHODOLOGY**

Having justified the reasons for integrated Land Administration, it is worth assessing why the advent of ICT has not fast tracked the process. Two of the core Land Administration functions mentioned earlier- spatial-mapping and title registration (land tenure) will be considered. In this paper spatial-mapping functions are broadly defined to include the collection of private/crown land surveys and other forms of spatial information. The spatial-mapping function is
increasingly responsible for the provision of core datasets to the state or National Spatial Data Infrastructure. Registration functions encompass the organisations that primarily record and maintain land parcel details and ownership. The Australian states of NSW, VIC and WA will be used as case studies in an attempt to explain why these organisations have resisted integration. An in-depth investigation is made into the impact of ICT on each state’s spatial-mapping and registration functions. The analysis of the impact of ICT on the various land administration regimes will incorporate Applegate et al’s (2002) ‘strategic grid’ [Figure 3]. The impact of ICT may be divided into two parts - impact on core operations and impact on core strategy.

Firstly, ICT affects core operations in varying degrees. At the Australian Stock Exchange- for example-reliable technology is critical to the performance of core activities. Failure for even a few seconds can cripple the share trading industry. In a small accounting firm, however, the impact of an IT failure is generally less immediate and severe. Secondly, ICT can have an extensive strategic impact. In organisations such as American Express, the steady stream of technological innovations drives strategy development [Applegate et al, 2002]. IT development activities are inextricably linked with the strategy of the organisation. For other organisations, however, IT development priorities are aimed at incremental, operational improvements that enhance the cost profile but do little to change its position or power in the industry. The “strategic grid” outlines four categories of IT impact. It clarifies the approach used in identifying and implementing IT-enabled business initiatives.

RESEARCH FINDINGS- THE ROLE OF ICT IN THE REGISTRATION FUNCTION

The core strategy of any land registration office is to create and transfer as many titles as possible and to ensure the integrity of the information: its core business is information management. Performance for these departments is usually based on measurable indicators. New South Wales for example measures: daily average dealings; plan lodgements; title searches; and time to process a lodgement. In this way Registries are working on economies of scale- mass production. Organisations that use this paradigm are looking to increase efficiencies and minimize costs: ICT is primarily seen as a tool for achieving this [Jaffee, 2001]. It would therefore be expected that ICT would impact minimally on a registry’s core strategy but have a higher impact on core operations. This places registries in the ‘Factory’ or ‘Support’ quadrants of the strategic grid. Throughout the 70s and 80s this hypothesis was certainly supported. The case study states tend to support this hypothesis although more strategic use of ICT is becoming evident.

In the jurisdiction of NSW the registry function is located within the Land and Property Information [LPI] division of the Department of Lands: the department was established in 2003. Information integration and the development of value-add services are firmly on the agenda. LPI is now responsible for the integration, capture and management of all land, property and valuation information and services.
A closer look at the current and proposed ICT projects in the NSW registry reveals that technology is still being used to improve core operations rather than change strategy. The Electronic Settlement, Electronic Lodgement and Automatic Registration of Real Property Dealings [ELARD] Project is investigating the feasibility of electronic lodgement and automated registration of dealings for conveyancing of property. A similar project exists for electronic plan lodgement. New invoicing and payment arrangements are all undertakings to improve performance of core processes i.e. ‘Factory’ on the strategic grid. One project where NSW has used ICT more strategically is the “Water Access License Register.” The land register has extended its processes and the registration system to manage water licenses.

In VIC the registry function is located within Land Victoria, a division of the Department of Sustainability and Environment. The Land Registry is a Government Business Enterprise and is broken into 5 units: Title registration, Land Records and Information Services, Surveyor General and Valuer General. Land Victoria’s mission is to provide Victoria’s authoritative, comprehensive and easily accessible land information to underpin effective decision making and appropriate use of land [DSE, 2004]. Information integration and value added services have been on VIC’s agenda since the 1994 Tomlinson Report – which called for the creation of an integrated strategic spatial information management vision [Batty, 2004].

Current ICT initiatives that relate to the registry function within Victoria are being developed within the Land Exchange Project. Unlike NSW, Victoria has almost completed the development phases of its e-Conveyancing and streamlined automated planning [SPEAR] projects [Tullock, 2005]. Both projects concentrate on improving the core processes which run through multiple divisions of Land Victoria. Once again this demonstrates how registries typically fall within the ‘Factory’ quadrant of the strategic grid. Victoria’s registry has recently begun planning a new project related to the restrictions/responsibility management problem. While the project is still in its formative stages, if the registry decides to extend its function using ICT it would be an indicator that it is beginning to perceive ICT as creating strategic opportunities.

Western Australia’s registry function is located within the Registration Services Branch of the Information Services division in the Department of Land Information [DLI]. Like NSW, DLI was only established in 2003. It is a statutory authority with commercial powers and aims to deliver greater return to government and community on the State’s land information assets. Information integration is once again clearly on the policy agenda, however, in DLI’s case there is more evidence of implementation. The sub-branch is titled “Registration of Interests” and this unit aims to be a ‘one-stop-shop’ for all rights, restrictions and obligations relating to a land parcel: this is clearly an expansion of the traditional registry which concentrates on ownership rights. DLI’s restructure demonstrates much integration in relation to policy and operations: one division is now responsible for strategic direction and business planning. DLI also has strong links with other government departments and the community through the WALIS forums [DLI, 2003]. Like NSW and VIC, WA is also working on electronic survey plan lodgement and conveyancing projects under the guise of EASIFORMS. Once again these projects concentrate improving core processes and have minimal impact on strategy i.e. ‘Factory.’

The way that the registry functions utilize ICT is changing [Figure 4]. The smaller ICT ‘support’ projects of the 1970’s and 80s which were aimed at improving registry specific tasks are being overhauled or replaced. Today the focus is on using ICT to improve core processes, such as conveyancing and plan lodgement i.e. ‘Factory’. Such projects make use of the internet and include benefits for external stakeholders such as local councils and financial institutions who take part in the processes. All three case study registry functions are showing signs of moving into the ‘strategic’ quadrant: NSW with its water titling registry extension, VIC with its plans to incorporate restrictions and responsibilities into its register, and WA with its online ‘Register of Interests’ being included as an initial service for its Shared Land Information Platform [SLIP] enabling framework. The registry function is being integrated with other land administration functions, all of which use ICT to create value and increase business opportunities.
RESEARCH FINDINGS- THE ROLE OF ICT IN THE SPATIAL-MAPPING FUNCTION

The business opportunities created by new ICT have changed the role and the management of the spatial-mapping functions in most Australian jurisdictions. Historically two spatial-mapping functions have existed in each state: one for mapping registered private parcels and one for crown lands [Dalrymple et al., 2003]. In recent years these were combined into the one department. Spatial-mapping is a science: the technologies available determine how the mapping process is completed- advances in technology are therefore embraced smoothly. Governments too have begun to embrace advances in spatial technologies and information technologies in general; the emergence and implementation of whole-of-government SDI strategies and Chief Information Officers demonstrates this. Figure 5 demonstrates the increasing role that spatial mapping is playing within government- a move from small divisions which produce paper based cadastral maps to strategic departments servicing whole-of-government. The spatial-mapping functions are now closely linked with eGovernment and eCitizenship strategies and coordinate the many layers of the digital spatial information infrastructure. The case studies support this premise.
In NSW, the spatial-mapping function is now located in the Information Sourcing Division of LPI within the Department of Lands. The division sources and verifies data for incorporation in LPI’s property datasets. Survey services, maintenance of topographical and cadastral data, and associated information products are managed within the division. The Production and Business Development Division is responsible for identifying and pursuing new markets for the Department of Lands - most new initiatives have a strong spatial-mapping component and rely on the Information Sourcing Division.

There are two key projects in NSW that demonstrate how the spatial-mapping function uses ICT for both core operations and strategy. The Single Land Cadastre [SLC] Project aims to create a single authoritative digital cadastre for NSW, something the State has never had. The upgrades to the LPI maintenance systems will improve core operations; however, SLC will also provide the fundamental data underpinning the State’s spatial data infrastructure. The Geo-coded Urban and Rural Address System [GURAS] project aims to link every address to a property identifier, geo-code and title identifier - again, a standardized address file will certainly help core LPI operations, but, the value of an authoritative address file to all areas of government and industry will create a large market for LPI. The mapping and registry divisions of NSW are now integrated into a single department. A separate business unit is responsible for guiding the strategy of both divisions.

Victoria’s spatial-mapping division, the Spatial Information Infrastructure [SII], no longer resides within Land Victoria - it resides in the Strategic Policy and Projects division of the Department of Sustainability and Environment. This demonstrates the growing strategic; whole-of-government role the spatial mapping function is playing within VIC. SII has established strong links with the state CIO, which was established after a Boston Consulting report of 2003. The report identified spatial information management as a key focus area for the government’s information infrastructure. The CIO is responsible for delivering an information infrastructure for the whole-of-government. VIC’s spatial mapping function was driven by the various spatial strategy documents over the last 15 years. These provided for the creation of 8 core SDI datasets, reciprocal property dataflow arrangements with all local councils and the delivery of a number of web mapping services via the Land Channel website. The most recent spatial strategy, VSIS 2004-2007, calls for the creation of an industry wide spatial council [VSC] and an inter-governmental council [VGSC]. The VGSC council will help SII source potential projects and assist in achieving its goal in providing whole-of-government spatial solutions. SII’s current projects focus on creating services and products for other government agencies - these leverage off core Vicmap spatial datasets. SII is also considering the role it might play in providing solutions for the restrictions and responsibilities management problem.

Within WA it is hard to determine exactly where the spatial-mapping function sits. The 2003 departmental restructure resulted in WA’s land administration functions being heavily integrated within a single department. Like NSW, a single division drives core strategy. This strategy focuses on creating commercial opportunities by leveraging value off the state’s SDI. SLIP is currently under construction and will provide architecture and standards for over 60 government agents to share spatial information over the internet. Rather than just providing the infrastructure, SLIP will also be used strategically to provide services to external customers. Initial services will include land interest enquiries, a streamlined subdivision process, and emergency management and natural resource management. DLI’s Landgate internet gateway aims to be a one-stop shop for property and valuation information. Landgate consists of a number of channels, customized for its communities of interest. Landgate will expand strategically as more agencies participate in supplying and integrating information.

Spatial-mapping functions have used ICT in numerous ways over the last 30 years [Figure 6]. Early digital cadastral databases with limited capabilities have been replaced. ICT has been used for the creation and integration of regularly updated spatial data layers - network technologies have been used to develop state SDIs. The internet was embraced early by spatial-mapping functions and provided a cheap effective means to provide new primitive spatial products and services to customers. Today spatial-mapping functions are benefiting from the development of the fundamental data layers and the maturation of web technologies. All departments are looking to develop sophisticated value-added services from the use of their information.
SUMMARY OF THE KEY FINDINGS

ICT has impacted differently on the strategies and operations of the Land Administration functions. Registries have tended to view technology as supporting core operations rather than core strategy. Conversely, spatial-mapping units see ICT as fundamental to operations and strategy: not only has ICT enhanced traditional practice but it has also allowed for the creation of new products and services. Different perceptions of ICT have been caused by the different focus of each function. Registry functions concentrate on creating and transferring titles in a secure manner. In the past this has not required a strong technology focus. On the contrary, mapping functions have always had a strong technical focus: surveying and mapping are sciences. The advent of ICT has provided the opportunity for mapping functions to improve their map production processes.

Today most states are moving towards integrated land administration functions through the alignment of the ICT strategies and operations of the different Land Administration functions. Core reasons for this alignment and subsequent integration include:

- Amalgamation of all land related functions into a single department with an over-arching management team.
- Creation of a single whole-of-department vision. The vision focuses on creating business opportunities by leveraging off existing spatial information and infrastructure.
- Creation of a single business unit responsible for sourcing and pursuing new strategic opportunities for all other divisions within the department.
- Creation of intergovernmental and industry groups such as VSC, VGSC and WALIS to facilitate dialogue between the key spatial information providers and users.
- Creation and use of spatial information architectures to facilitate sharing of data between land administration functions and other government agencies.
- Development of web portals which combine the spatial information of multiple government agencies to provide value-add services to end users. Such services are often maintained by the spatial-mapping function.

CONCLUSION

Integrated Land Administration offers the potential for decreased costs, improved service provision and better land management. It was thought ICT would fast track integration, however, a number of factors have limited the impact of ICT. A key reason has been the manner in which different Land Administration functions perceive ICT. These perceptions have resulted in ICT impacting differently on the core strategies and operations of the functions. While some Australian states have overcome some of these differences through shared business strategies, ICT strategies and the convergence of separate departments, there are still many opportunities for more integration in all jurisdictions. Integration will require the different land administration functions to align their perceptions and use ICT.


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