

ANZLIC - The Spatial Information Council

Economic Assessment of Spatial Data Pricing and Access

SUMMARY

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Background

Fundamental spatial data constitute data about the location and attributes of features that are on, above or beneath the surface of the earth, that are captured from primary sources and, typically, cannot be derived from other data. While there are differences between jurisdictions in the delineation of what constitutes fundamental data, examples of fundamental data include topographic information, aerial photography, the cadastre and administrative boundaries.

Fundamental data are an authoritative source of spatial data for public and private sector users and are precursors for a wide range of processed (or value-added) products, applications and data services. Spatial data are dynamic in nature and datasets usually require ongoing maintenance and updating to retain their value. Fundamental data are a form of public infrastructure, unlike many other forms of public sector information, such as reports and legal documents. Fundamental data enable important business and policy decisions and facilitate the functions and operations of many government agencies.

Fundamental data have historically been produced and maintained by government agencies as part of the core activities of the agencies. Typically, one agency within each jurisdiction has assumed a role as an aggregator of fundamental data from the source agencies. The land information agency typically processes that data to a 'fit for purpose' state and acts as a 'shop front' for sale and distribution to other government and private sector users. A central element of the sale and distribution role is determining and implementing policies on the prices that the agency charges to government and private purchasers of fundamental data.

There is no common or shared view across governments in Australia and New Zealand on how fundamental data should be priced, or the terms under which they should be made available to users. Recent international and Australian inquiries have called for public sector information (which would include fundamental spatial data) to be provided free on-line or at 'marginal cost', with the aim of making this information more affordable to a larger suite of users and stimulating greater levels of use and innovation in products, applications and services that use the information. ANZLIC – the Spatial Information Council (ANZLIC) is concerned that proponents of the 'free on-line' model have not considered the full economic implications of this approach on the long term sustainability of the spatial data industry. A particular concern is that the free provision of fundamental data relies on governments fully funding the necessary activities of production, maintenance and distribution of the data and there is a risk that erosion of government funding will lead to a decline in the quality of fundamental datasets.

Against this backdrop, ANZLIC decided to conduct an analysis of the economic fundamentals surrounding the creation, management, maintenance and provision of access to spatial data. ANZLIC has recognised a potential benefit in having a robust framework for managing access to, and pricing of, fundamental data to support the development and sustainability of the spatial data industry. ANZLIC accordingly commissioned this study by PwC to undertake an economic assessment of alternative models of access and pricing for fundamental data.

The study has been undertaken in two stages. Stage One developed guiding principles for access to, and pricing of fundamental data and defined four alternative pricing models. Stage Two comprised a comparative analysis of the economic benefits and costs of the alternative models. Separate reports have been produced for each of these stages.

The analysis undertaken in this study built on previous economic studies of spatial data pricing and access in the following ways.

- The analysis explicitly addressed the dynamic effects of pricing models – addressing factors such as changes over time in funding for the producer agency and implications for data quality (accuracy, currency, and resolution). PwC used a dynamic modelling approach to evaluate the economic implications of changes in funding, changes in data quality and consequent changes in benefits to society from data use (measured as the economic concepts of consumer and producer surplus).
- An assessment was made of the capacity of alternative pricing models to address the public good characteristics of spatial data, the effect of pricing signals on consumption and production decisions (including the efficient level of investment in data quality) and the dynamics of competition and innovation.

Guiding principles for access to, and pricing of, fundamental data

The following principles should guide selection of an access and pricing model.

- Governments should not impose any ‘hard constraints’ to access to fundamental data (that is, non-price constraints) unless there is a defensible public interest reason for restricting access.
- Access and pricing policies should promote efficiency in the production and consumption of fundamental data.
- Pricing policies should take into account the public good nature of fundamental data and the possibility of positive spillover benefits from its use.
- Pricing policies should be equitable, with prices charged to different users reflecting the differences between classes of users in the benefits gained from use of the data and the capacity to pay.
- Access and pricing policies should be consistent with the principle that government businesses do not enjoy competitive advantages over their private sector competitors simply by virtue of their public sector ownership.
- Pricing and access policies should be applied to specific fundamental data or classes of data and not to an agency as a whole.

Alternative pricing models

Different pricing models vary in the extent and manner in which users of fundamental data are charged prices to recover costs of production and distribution of the fundamental data.

PwC identified four models for managing the pricing of fundamental data for assessment. These lie on a spectrum of approaches that are differentiated by the extent to which costs are recovered, and by the extent to which there are differences in prices charged to commercial and non-commercial users of data.

At one end of the spectrum of models is the ‘**full cost recovery model**’ in which data are priced to recover all of the costs (the ‘full cost’) of producing, maintaining and distributing fundamental data from users. The data are licensed such that each new data user is required to purchase the data product from the land information agency at a price

that enables the agency to recover the full cost of the data when all data purchases are taken into account. Prices would apply uniformly to commercial and non-commercial users.

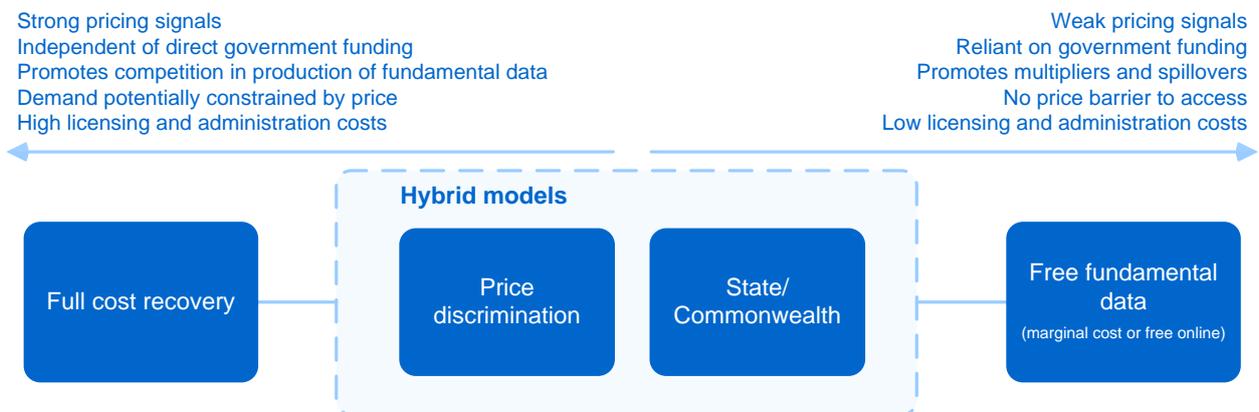
At the other end of the spectrum lies the ‘free fundamental data model’ in which fundamental data are priced to recover only the marginal cost of distribution. For electronic distribution of data, such as through internet channels, the marginal cost of distribution is so low as to be effectively zero, and hence the data are made available to users for free. Under this model, governments finance all of the costs of data production, maintenance, extraction and distribution.

In between these two models is the ‘price discrimination model’, which applies differential pricing according to customer type. Commercial users are supplied with data at a price based on recovery of full cost, while non-commercial users, including other government agencies, are provided with data at the marginal cost of distribution or for free. Under this model, revenues from commercial users and from government funds finance the costs of data production.

The ‘Commonwealth/State model’ is a hybrid of the above models. This model involves the Commonwealth Government providing fundamental data under a free fundamental data model, and state governments providing data under the full cost recovery model.

The alternative pricing models have different consequences for the economics of data production and consumption, which are indicated in Figure 1.

Figure 1: Pricing and access models identified for analysis



Comparative analysis of pricing models

Economic benefits derive from the production and use of fundamental data. The four pricing models were compared on the basis of the changes in the economic benefits that would occur in changing from one pricing model to another such as, for example, changing from the free fundamental data model to the full cost recovery model, or vice versa.

We undertook the comparative analysis in four stages:

- a static welfare analysis to estimate quantitatively the benefits accruing to the producers and consumers of spatial data under each model;

- a dynamic welfare analysis to estimate quantitatively the change in benefits accruing to producers and consumers of spatial data over time due to changes in funding or quality;
- qualitative consideration of a number of other factors including competition and innovation in production of spatial data, data quality, public good values, positive spillovers from use of fundamental data, equity in data availability and pricing, complexity of pricing models, and access to raw data (fundamental data are typically processed to a 'fit for user' state before sale); and
- application of the welfare analysis to four State and Commonwealth fundamental data products.

Results of this analysis demonstrate that there is no uniquely optimal access and pricing model when a range of practical and dynamic considerations are taken into account. Rather, the access and pricing model with greatest economic benefit varies with differences in the broader economic and policy context for production and consumption of fundamental data.

Of particular significance amongst the elements of the economic and policy context is whether governments will be prepared to fully fund the production and distribution of fundamental data given competing priorities for government spending.

If adequate government funding can be relied upon, the free fundamental data model delivers greater economic benefits than the alternative models. The larger benefits result from increases in the use of fundamental data that would occur as a result of the data being provided for free or at a very low price, and flow-on effects of increases in competition and innovation in downstream markets for products and services that use fundamental data. However, the achievement of these benefits also requires that certain other conditions hold, notably that:

- the government agencies that produce the data do not rely on the purchasing decisions of data users to provide signals to guide decisions on the quality of the data; and
- the benefits of free provision of fundamental data are not negated by fewer market opportunities for competition and innovation by non-government producers of fundamental data.

Where these conditions do not hold, the benefits of the free fundamental data model may not be sustained and models that allow for cost recovery are superior in the longer term. The comparative analyses of the current study show that the full cost recovery model is superior where the free fundamental data model results in deterioration in the quality of fundamental data over time due to funding constraints or misspecification of data quality.

The comparative analyses also show that the price discrimination model achieves most of the economic benefit of the free fundamental data model, particularly where there is a significant government share of data use. The price discrimination model provides a trade off between the independent-funding benefits of the full cost recovery model and greater-use benefits of the free fundamental data model. The price discrimination model has benefits of:

- a high level of use of fundamental data in policy and administrative processes of government agencies;
- a funding stream for fundamental data production and distribution that is at least partly independent of government funds; and
- decisions of data producing agencies on data quality being guided by market signals from purchases of commercial users of data at full cost recovery prices.

The optimal pricing model may vary depending upon government objectives

Governments and land information agencies may have a range of policy objectives and priorities that will affect the optimal choice of pricing model for fundamental data. Differences in objectives may cause different pricing models to be optimal for different jurisdictions.

Table 1 indicates how different policy objectives and priorities affect the optimal choice of pricing model. The number of ticks in each cell of the table indicates how well a pricing model performs against the objective, with three ticks indicating the best performance.

Differences in government objectives may be reason for variance between jurisdictions in the optimal pricing model. Jurisdictions may adopt the Commonwealth / State model on this basis.

Table 1: Delivery of objectives by model

Objective	Full cost recovery	Price discrimination	Free fundamental data
Economic development	✓✓ Less benefit than alternative models in short term, but may be superior in long term due to access to revenues as a funding stream for data production	✓✓ Less support to economic development than the free fundamental data model but the gap is small where the share of use by non-commercial user is large	✓✓✓ Maximises the use of fundamental data and the contribution and spillover benefits of fundamental data. Benefit may decline in long term if government funding for data production is not maintained
Use of fundamental data by government agencies	✓✓ Government agencies have to pay for use of fundamental data and hence are motivated to reduce use	✓✓✓ Government agencies receive fundamental data for free or minimal price and hence are motivated to maximise use	✓✓✓ Government agencies receive fundamental data for free or minimal price and hence are motivated to maximise use
Generation of government revenue	✓✓✓ Maximises revenue generation and makes data production independent of direct appropriations of government funding	✓✓ There is some reduction in government revenue where fundamental data are used by non-commercial users.	No revenue generated
Accountability of data producers to funders of data production	✓✓✓ The requirement of land information agencies to derive revenues from data sales makes these agencies responsive to the needs of data users	✓✓ Land information agencies may be responsive to the needs of commercial users of data, but less responsive to government and non-commercial users	✓ As land information agencies do not rely on revenues from data sales, there is no commercial incentive to be responsive to the needs of data users
Availability of data to the community to inform public participation in public policy and government decision making	✓ Public, non-commercial use of fundamental data may be restricted by limited capacity to pay prices.	✓✓ Fundamental data are freely available to non-commercial users	✓✓✓ Fundamental data available to all commercial and non-commercial users
Promotion of competition in production of fundamental data	✓✓✓ Competition in production of fundamental data is promoted as private firms may compete on a competitively neutral basis with government land information agencies	✓✓ Free provision of fundamental data to government agencies and non-commercial users limits the market opportunities for private data production firms	✓ Free provision of fundamental data from government land information agencies lessens commercial opportunities for private data production firms
Promotion of competition in downstream markets for services and products using fundamental data	✓ Less use of fundamental data reduces the opportunities for competition in products and services	✓ Less use of data by commercial users reduces the opportunities for competition in products and services	✓✓✓ Free provision of fundamental data promotes competition in products and services

Note: the tick scores indicated in this table indicate relative performance against policy objectives and are not intended to be interpreted as a quantitative assessment of benefits or to be additive across multiple policy objectives.