

The Economic Impacts of Open Access Policies for Public Sector Spatial Information

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ABSTRACT

Governments around the world are the largest producers of spatial information. Public sector spatial information is a major, but so far under-exploited asset, which could and should be a fundamental building block of the new economy and the information society.

United States federal information policy is based on the premise that government information is a valuable national resource and that the economic benefits to society are maximized when government information is available to all. However, other governments do not necessarily share this view and are sometimes treating their information as a commodity to be commercialised.

Arguments to support open access policies have primarily focused on the fact that the information has already been paid for by the taxpayers who should not be charged a second time for it. Although these arguments are convincing to many, they are not yet strong enough to convince all governments to abandon short-sighted attempts to raise relatively small sums of immediate revenue in favour of adopting policies which maximize economic benefit, particularly jobs and wealth, encourage scientific and technological research and development, and thereby ultimately maximize general tax revenues in the longer term.

This paper provides an economic argument to go towards open access policies: Based on the specific economic characteristics of spatial information and both qualitative and quantitative research on economic effects it is argued that open access policies are beneficial in the short term as well as in the longer term for the general public, the private sector and also for government entities.

In addition, this paper looks at the larger public policy issue behind open access policies: government competition with the private sector. Is it proper for a government agency funded primarily by the taxpayers to perform commercial government activities that compete with the private sector?

This research was performed under contract for the United States National Weather Service, as an update to previous research in the field of conflicting information policies [Weiss and Backlund 1997]. The entire research report [Pluijmers and Weiss 2002] and accompanying summary report are forthcoming.

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1. INTRODUCTION

Many nations are embracing the concept of open and unrestricted access to public sector information – particularly scientific, environmental, and statistical information are of great public benefit.

Federal information policy in the US is based on the premise that government information is a valuable national resource and that the economic benefits to society are maximized when taxpayer funded information is made available inexpensively and as widely as possible. This policy actively encourages the development of a robust private sector, offering to provide publishers with the raw content from which new information services may be created, at no more than the cost of dissemination and without copyright or other restrictions.

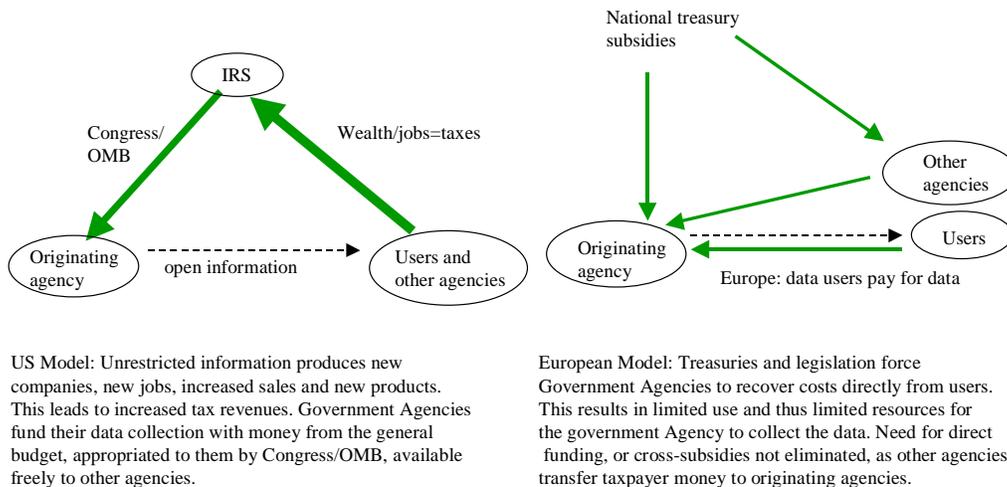
In other countries, particularly in Europe, publicly funded government agencies treat their information holdings as a commodity used to generate short-term revenue. They assert monopoly control on certain categories of information in an attempt – usually unsuccessful – to recover the costs of its collection or creation. This is called “Government Commercialization”: The trend towards government agencies charging the public for information services which previously were considered “public good” and financed by general tax revenue, e.g. spatial and meteorological information. Also known as “cost recovery”.

Such arrangements tend to preclude other entities from developing markets for the information or otherwise disseminating the information in the public interest. The U.S. government and the world scientific and environmental research communities are particularly concerned that such practices have decreased the availability of critical data and information. And firms in emerging information dependent industries seeking to utilize public sector information find their business plans frustrated by restrictive government data policies and other anticompetitive practices.

In the US, open and unrestricted access to public sector information has resulted in the rapid growth of information intensive industries particularly in the geographic information and environmental services sectors. Similar growth has not occurred in Europe due to restrictive government information practices. As a convenient shorthand, one might label the American and European approaches as ‘open access’ and ‘cost recovery’, respectively.

The following figure illustrates the fundamental differences in the policy and funding models for public sector information in Europe and the United States.

Funding of Public Sector Information United States vs. Europe



The (European) cost recovery model is now being challenged on a variety of grounds:

- Economists argue that the benefits to the American Treasury that accrue from corporate and individual taxes from the secondary publishing and service activities stimulated by open access policies far outweigh any revenues that might be generated through cost recovery policies;
- Cost recovery policies often mean that budgetary constraints prevent some government agencies from acquiring information that has already been created or collected by another part of government, resulting in agencies either doing without or using inferior alternatives;
- A growing realisation that no one supplier, public or private, can design all the modern information products required to meet the needs of all users in a modern information-based economy. Private sector intermediaries are increasingly important players in the rapidly developing information-based economy;
- Growing frustration among European information service providers at the competitive advantages enjoyed by their American counterparts and with the failure of European governments to adopt an information policy regime that is closer to the American model;
- A recognition that efforts to build transnational data sets, be they meteorological or environmental (where serious problems have already arisen), statistical or spatial, are hampered by national agencies bent on preserving intellectual property to pursue local

cost recovery policies;

- A growing understanding of the wealth creating possibilities that arise from a common information base (e.g. US street mapping) or software standard (e.g. the World Wide Web).

2. THE BENEFITS OF OPEN ACCESS POLICIES

Information is not a normal good in the economic sense, and basic economic laws of supply and demand work differently in the information world. Information has certain characteristics that generally make attempts at government commercialization fail. For example, information has high fixed costs and low variable cost of reproduction. This means that information is costly to produce but cheap to reproduce, and that once the first copy of an information good has been produced, most costs are sunk and cannot be recovered. In addition, information is considered to be “non rival”, meaning that the use by one set of users does not reduce the information available to others, and that the economic benefits to society are the sum of the benefits reaped by the very many and diverse users of the information. Further, (public sector) information exhibits public good characteristics, but whether it behaves as a public good in a particular case depends on the medium in which it is expressed and the exclusion policies followed by the relevant public sector authority. The most important characteristic that leads to failed attempts at government commercialization is that information tends to exhibit high elasticity of demand, meaning that consumers are very sensitive to price changes. If prices are too high, people just do without it.

The vast economic potential of public sector information has only recently begun to be recognized in the economics and public policy literature. Recent significant research, much of it originating in Europe, documents the effect that governmental information policies have on the economy in general and on particular sectors. In the following, the research that is focused on public sector spatial information is summarized.

2.1 The Potential of European Public Sector Information

With respect to the growing challenge from economists, the European Commission’s Directorate General for the Information Society commissioned a study from PIRA International of the *Commercial Exploitation of Europe’s Public Sector Information*. (“the PIRA study”) [PIRA International, 2000]. The PIRA study attempts to quantify the economic potential of public sector information in Europe and the extent to which it is being commercially exploited, and suggests policy initiatives and good practices. Although some of the qualitative data had to be extrapolated, the study should be sufficient to persuade policy makers of the need for serious rethinking of European information policy and its high priority. As the study states:

“Cost recovery looks like an obvious way for governments to minimize the costs related to public sector information and contribute to maximizing value for money directly. In fact, it is not clear at all that this is the best approach to maximizing the economic value of public sector information to society as a whole. Moreover, it is not even clear that it is the best approach from the viewpoint of government finances. [...]

Estimates of the US public sector information market place suggest that it is up to five times the size of the EU market.”

The PIRA study went on to observe that the fledgling European market would not even have to double in size for governments to more than recoup in extra tax receipts what they would lose by ceasing to charge for public sector information. The problem is that these positive macro-economic effects are masked by the adaptation of European markets to cost recovery policies, by which both individual agencies and partner publishers have grown adept at extracting a monopoly rent from captive markets to their own benefit but to the detriment of the economy at large. Furthermore, as the study noted with understatement:

“The concept of commercial companies being able to acquire, at very low cost, quantities of public sector information and resell it for a variety of unregulated purposes to make a profit is one that policymakers in the EU find uncomfortable.”

The amounts of money involved are significant. PIRA distinguished between government investment in public sector information (“Investment Value”) and the value added by users in the economy as a whole (“Economic Value”). Economic Value could not be directly obtained, so aggregated data was used. PIRA estimated the Investment Value of public sector information for the entire European Union at 9.5 billion EURO/year. The Economic Value was estimated at 68 billion EURO a year. By comparison, the Investment Value for the United States is 19 billion EURO/year and the Economic Value is 750 billion EURO/year.

Economic Potential of PSI in Europe		
In EUROS	EU	US
Investment value	9.5 billion	19 billion
Economic value	68 billion	750 billion

The nearly six-fold difference between the US and the European Union offers opportunities and challenges for European companies and their governments. PIRA’s main conclusions are:

- Charging for public sector information may be counter-productive, even from the short term perspective of raising direct revenue for government agencies;
- Governments should make public sector information available in digital form at no more than the cost of dissemination;The fledgling EU market would not even have to double in size for governments to more than recoup in extra tax receipts what they would lose by ceasing to charge for public sector information;Governments realize two kinds of financial gain when they drop charges:Higher indirect tax revenue from higher sales of the products that incorporate the public sector information; andHigher income tax revenue and lower social welfare payments from net gains in employment.

2.2 Two Dutch Studies on the Economic Effects of Open Access Policies

A study commissioned by the Dutch Ministry of the Interior examined both qualitative and quantitative prosperity effects of different pricing models for public sector information [Berenschot, Nederlands Economisch Instituut, 2001]: no cost, marginal cost and full cost recovery. Three of the four datasets they looked at were spatial datasets: the large-scale base map of the city of Rotterdam, the elevation dataset from the Ministry of Transport and Water Management and the 1:10.000 vector dataset of the Dutch Topographic. The main conclusions are:

- Prosperity effects will be maximized when data is sold at marginal cost. Marginal cost is defined as all costs related to the dissemination of public sector information. This includes shipping, promotional costs, personnel and IT costs. Enormous additional economic activity can be expected by extrapolating the study's results to all public sector information.

The private sector members of the Dutch Federal Geographic Data Committee commissioned a second Dutch study. It quantifies the economic effects of open access policies for spatial data [Ravi Bedrijvenplatform, 2000]. The main conclusions are:

- Consumers as well as private business can profit significantly from freely accessible public sector information;
- Growth potential for the geographic information industry: lowering the price of public sector geographic data by 60% would lead to a 40% annual turnover growth plus employment growth of approximately 800 jobs. Companies that pay a much lower price for public sector information will invest these savings in the development of new products, thereby expanding the potential market.

2.3 Resolving Conflicts Arising from the Privatization of Environmental Data

A U.S. National Academy of Sciences study [National Research Council, 2001] that examined the practices of commercialized government agencies in Europe and experiences with privatization of environmental data in the US concluded:

"...[c]ountries that exercise intellectual property rights over government data...limit the extent to which government-collected data can be used, even in international collaborations. By making it more difficult to integrate global data sets and share knowledge, such a commercialization policy will fail to achieve the maximum benefits provided by international collaboration in the scientific endeavor."

For example, basic research on monsoon prediction at the India Institute of Technology is hampered by the unaffordable prices for historic atmospheric model data from the European Centre for Medium-Range Weather Forecasting. As a result, the researchers are not able to integrate the European data with freely available US data [Goswami, 2001].

Thus, the Academy recommended:

- Environmental information created by government agencies to serve a public purpose should be accessible to all. To facilitate further distribution, it should be made available at no more than the marginal cost of reproduction, and should be usable without restriction for all purposes.
- The practice of public funding for data collection and synthesis should continue, thereby focusing contributions of the private sector primarily on value-added distribution and specific observational systems.

2.4 Policy Comparison in the Dissemination of Spatial Data

A North-American-European comparative study on the impact of government information policies, focused on databases from National Mapping Agencies [Lopez 1998], concluded that:

- A direct association exists between pricing and its effects on public access and commercialisation of government agency information. Current pricing problems are having a deleterious effect on the affordability of spatial data in Canada, France, and the United Kingdom;
- A direct association exists between the application of intellectual property rights and the degree of public access and commercialisation of government agency information. The greater the restrictions on access, the less successful dissemination programs will be;
- Reducing prices and relaxing intellectual property restrictions on government datasets are significant factors improving opportunities for access and commercialisation for stakeholders in the geographic information community.

3. COST RECOVERY EXPERIMENTS NOT SUCCESSFUL

There have been a number of examples of failed cost recovery experiments in both the United States and Europe, which demonstrate concretely the practical effects of restrictive data policies.

3.1 United States

The United States Geological Survey (USGS) in the early 1980's attempted to move towards cost recovery by increasing prices for data products including maps. As a result, demand dropped so precipitously that the USGS was forced to quickly reduce prices to recapture the previous market. After reducing the charges to previous levels, sales took three years to return to their earlier level. After this failed attempt towards aggressive cost recovery, the USGS struggled for several years to find a balanced method to recover dissemination costs, suggesting that recovering dissemination costs only is itself not always easy. USGS has recovered close to 100% of its dissemination costs for the past 4 years, which they now realize is the practical limit.

A spectacular example of the failure of cost recovery for data comes from the State of California. California encouraged State level agencies to charge fees to other levels of government within the state for products derived directly from base data provided by these

same levels of government. This cost recovery policy resulted in several problems. First, some local governments could no longer afford to pay for the same products they once obtained at no cost, leading to a disincentive for these local governments to continue providing updated data to the State. Second, some local governments retaliated against the State-level agencies by charging their own user fees. While the State of California has since returned to the free system, some local governments continue to charge user fees. Now, due to intellectual property rights, the State cannot include information in public documents obtained from local governments that charge user fees for that information. This has led to incomplete datasets, and State regional plans have a “swiss cheese” appearance, with some areas containing significantly more detail than others. These incomplete and internally inconsistent maps can be particularly troubling during public emergencies when complete, accurate, and easily accessible data is essential. Recognizing the failures of cost recovery policies, California has begun to move towards a statewide open data policy.

An unintended controlled experiment in cost recovery was performed by two counties in the Wisconsin. Clark County adopted a cost of dissemination policy for its digitized aerial photographs (digital orthophotos); and Brown County adopted a full cost recovery policy for its identical products. The inexpensive data in Clark Co. led to widespread use by individuals who might not otherwise have even tried using the data. People invested in CAD/GIS software and availed themselves of the County data for a broad range of applications. People got "hooked" on using the data and kept coming back for more. The contrast with Brown County was striking. The cost recovery pricing did not discourage a small number of specialized users such as professional surveyors or others who have site-specific projects where only one section or two of data was needed. However, those needing much larger areas, e.g. entire townships or cities, were deterred by the high pricing. As the county program manager stated:

“Some of the responses from people requesting data is, ‘I can't afford that! That blows the entire budget for this project’. So they choose not to buy ANY of the data, hang up the phone, and generally go away with a bad taste about the entire program. I don't think we're generating much support this way. When people choose not to use our data because it is too expensive, what are the implications? Most people who want to use the data are doing something to the land which affects the community that we all live in. Without good, accurate data, are these people able to make the best decisions?”

3.2 Europe

The Ordnance Survey (OS) of the United Kingdom was chartered as a semi-independent Executive Agency in 1990, and is required to maximize its reliance on revenue from customer entities. However, OS does not approach full cost recovery. Of the £100 million annual OS revenues, only £32 million comes from commercial product sales. The remainder comes from other central, regional and local government departments and agencies as well as from entrenched usage of large scale maps by the recently privatised utilities. These remaining revenues cannot reasonably be characterized as “commercial”, but rather are a combination of monopoly rent and reallocation of public money from one public sector ledger to another, with no net benefit to the taxpayer or the Treasury.

Other, non spatial, examples of failed cost recovery include the UK Meteorological Office, the Deutscher Wetterdienst and the European Centre for Medium-Range Weather Forecasting.

4. GOVERNMENT COMPETITION WITH THE PRIVATE SECTOR: WHAT IS THE APPROPRIATE ROLE OF GOVERNMENT?

Behind the economic argument for different public sector information policies lies a much larger public policy issue: whether or not commercial government activities that compete with the private sector are proper for a government agency funded primarily by the taxpayers. So far, two countries are approaching the information policy issue from the point of view of government competition with the private sector.

In Sweden, the Agency for Administrative Development (Statskontoret) identified a range of issues associated with government entities entering the commercial field and the effects on the private sector [Statskontoret 2000]. For example, they found that the National Land Survey:

- Had an unfair competitive advantage over emerging commercial firms;
- Was the dominant player in the geographic information market;
- Is the “preferred” provider in the market due to its “official” status;
- Has access to taxpayer-funded “strategic infrastructure”, including government owned information technology assets;
- Has copyright and other rights over public sector data;
- Is partly funded by taxpayer Kronor and enjoys monopoly rents from other entities;
- Obscures the demarcation between government and private activities.

In light of these findings the Statskontoret recommended that the commercial arm of the National Land Survey be completely privatised, subject to open public audit and oversight, and its data holdings placed in the public domain for access by the general public and competing private sector entities. It is presently examining the operations of the Swedish Meteorological and Hydrological Institute, and is likely to reach similar conclusions.

In the Netherlands, the Ministry of Economic Affairs published a report on unfair government competition with the private sector in the specific context of public sector information [Ministry of Economic Affairs 1997]. The main conclusions were:

- Public sector databases should be made available to third parties on a non-discriminatory basis at uniform prices;
- The public sector should not make unnecessary modifications to databases to create unfair competition, In other words, extra information services directly linked with the “public task” are allowed, and all other (commercial or “value added”) services are forbidden;
- Additional (commercial) information services may only be provided by the public sector when there is a public need for such services, and no private sector company is already providing that service and it is unlikely that any private sector company is going to pursue it in the near future.

Based on this report, the Dutch government separated the commercial arm from the Dutch Royal Meteorological Institute into a commercial entity.

An opposite viewpoint remains prevalent among commercialised European government agencies, particularly among national mapping and meteorological agencies. It has been articulated formally in the United Kingdom, where Ministries actively encourage government bodies to develop value-added services charged at market prices:

“All government bodies will be free to offer value added products and services providing this is done in a transparent manner in a level playing field among all market participants [Department of Trade and Industry 2000].”

The author believes, however, a level playing field without unfair competition and cross subsidization is impossible in the case of commercialised government agencies providing both commercial and public interest services. A recent experiment in the UK will test this conclusion.

In December 2001, the UK government preliminary decided to transfer the entire Ordnance Survey from a “Trading Fund” to a government-owned public limited company (PLC) with the government owning 100% of the shares. By contrast, in Sweden and the Netherlands, the approach is full privatization (i.e. no government ownership) of the "commercial arm" while retaining the "public interest" arm in the government. The belief in Sweden is that the public interest mapping and land registration functions of the Swedish land office are inherently governmental. This approach inevitably leads to an open data policy since the new "spin off" will need to fend for itself against the competition, and the only way to guarantee a "level playing field" is through an open data policy.

In the Ordnance Survey situation, if the entity performs both governmental and commercial functions, it will tend to have a natural monopoly position due to economies of scale and other factors, and will continue to need infusions of taxpayer funds (even if under contract rather than as a direct appropriation) as "commercial" revenues will not be adequate to fund the "public interest" aspect. If this is accompanied by the right to control the underlying data, funded in part by the taxpayers, healthy competition from other private entities and the overall growth of that economic sector will be impeded.

In general, the UK government has accepted the general principle of providing government data at marginal costs. However, Trading Funds, e.g. the Ordnance Survey and the Met Office, are specifically excluded from this principle. Trading funds have the most interesting public sector datasets when it comes to opportunities for the private sector and the scientific and research communities [Lopez 1998]. The Trading Funds are, however, to “improve” (i.e., make transparent) pricing and dissemination policies. A trend within the UK towards making basic data available is illustrated by a freedom of information law that was enacted in November 2000 and will be implemented starting fall 2002. However, a counter trend towards increasing commercialisation of government agencies still exists, particularly in the cases of the Ordnance Survey and the Met Office, discussed above. Financial targets for Trading Funds are set by the Treasury, and reflect the cost of assembling data, not its value.

The problem this creates is illustrated by the decision to make 2001 Census Data free of charge when it became clear that public sector bodies wouldn't budget to buy the data, which costs £250 million to assemble. In addition, the UK Meteorological Office is now openly disseminating categories of meteorological observations which are of potentially great public benefit, but which did not generate significant revenue for the agency.

5. CONCLUSIONS

The consensus of recent research is that charging marginal cost of dissemination for public sector information will lead to optimal economic growth in society and will far outweigh the immediate perceived benefits of aggressive cost recovery. Open government information policies foster significant, but not easily quantifiable, economic benefits to society.

Over the long term, the cost recovery goal of European governments' commercialisation approach cannot succeed, because:

- The private user base that can be charged is not large enough to support a comprehensive information service;
- Charging other government users merely shifts the expenses from one agency to another rather than actually saving the national treasury any money;
- Due to some of the fundamental economic characteristics of information (high elasticity of demand, public good characteristics) we question whether any governmental entity can successfully raise revenue adequate to pay not only for the dissemination of its information but also for the costs associated with creating the information for governmental purposes in the first instance.

High prices for information ultimately lead to predatory and anticompetitive practices, like price dumping, and the creation of government owned corporations or joint ventures with preferred private sector entities that may serve to exclude others from the market. The most sensible solution for government commercialisation therefore is to separate commercial activities into truly commercial entities separate from the government and adopt open access policies. Separation of commercial activities would be the basis not only for a market in accordance with European competition law, but also guarantee market structures with maximum overall economic potential.

Some government agencies are willing to liberalize their policies, but fear that they will suffer budget consequences. Therefore, the relevant government Ministries must come to understand that open data policies will create wealth and tax revenues more than adequate to offset the short term "losses" and to fully fund agency information activities.

In sum, recognition is slowly emerging in Europe, as it did in the US, that open access to government information is critical to the information society, environmental protection, and economic growth. However, recent trends towards more "liberal" policies face opposition from entrepreneurial civil servants in charge of "government commercialization" initiatives, who are tempted and incentivised to engage in anti-competitive practices, either singly or through pan-European groupings, to thwart the growth of perceived private sector competitors. Therefore, these issues require consideration at the highest levels of government.

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BIOGRAPHICAL NOTES

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