A FRAMEWORK FOR PROPER FUNDING

To Charge or Not to Charge

Should users pay for geo-data produced by government and institutions? This question has fostered a long and heated debate, often spiced by contributions fully in favour or fully opposed to free access. Based on an extensive review of the literature, and acknowledging that there is no one-size-fits-all solution, the authors developed a framework for selecting proper funding models. Free access is the predominant model, but in some cases charging is both viable and justifiable.

Figure 1 left, Google Earth aerial image of part of the campus of Wageningen University in The Netherlands

The rationale behind reigniting the key question of 'to charge or not to charge' is the risk of stagnation in a debate in which proponents of each funding model persist in their stance, leaving policy-makers more confused than informed regarding which funding model to choose. Our aim is to distinguish between different cases in a transparent and systematic way, and to recommend the ideal funding model for each.

Tax Money

Public Sector Information (PSI) is information needed, collected, stored and managed to support one or more legally mandated task. PSI is funded from taxpayer's money. Some datasets are collected just once, or else irregularly, with huge time-spans in between, such as soil maps; others are regularly updated, such as weather and land-rights maps. While primarily produced to support good governance, PSI may also serve unintended users in the public or private sector, in non-governmental organisations (NGO) and citizens. Completely unexpected applications may arise, so increasing the societal value of PSI.

No Answer Yet

Figure 1 right. Oblique image of the Arc de Triumph in Paris, France; free internet access to such makes citizens wonder why their governments should charge at all for geo-data.

The key question of whether access to PSI datasets should be charged has been the subject of longstanding debate. A debate scattered and complex, with compelling arguments in favour and against data charging, and largely covering two issues: the ratio of indirect to direct funding, and the pros and cons of government agencies charging each other. Indirect funding stems from taxes, and direct funding from non-governmental users, including companies, citizens, NGOs and researchers. Research has been ongoing for almost twenty years now, without yet yielding any conclusive answer. Meanwhile, there have been three major developments:

- growing bottom-up and free compilation of data, often grounded in Google Earth reference maps: voluntary geographic information, or VGI
- tumbling distribution costs due to advancements in internet and worldwide web and availability of maps in digital format
- a preference for free data of inferior quality, as users cannot afford the high prices of superior quality government data.

The emergence of free-of-charge non-PSI datasets such as Google Earth, open street map and online route navigation systems adds a new dimension to the debate on data charging. Citizens, NGOs, private companies and government agencies increasingly demand that PSI be made freely available. Research suggests that overall free access is the superior funding model, although some researchers point convincingly in other directions. In all probability, a one-size-fits-all funding model does not exist, and therefore the next step should be to identify individual cases in a transparent and systematic way, along with their ideal funding model.

Two-tier Debate

It is getting easier and easier to access, copy and reuse digital data, resulting in a growing demand for improved accessibility to information. Factors impeding access include not only technical issues and lack of standardisation, but also legislation; the latter is debated at two levels. At the highest level the focus is on whether data should be accessible at all, given democratic rights, privacy and national security issues. The events of 9/11 had a major impact on this discussion, prompting policies to

limit data accessibility for reasons of national security. This level of debate is beyond the scope of the present article; suffice it to note that arguments based on national security sentiments might be unreasonable and should provide no grounds for banning access to geo-data. Let us optimistically assume that politics grants open access. Now, at the second level the question arises of 'to charge or not to charge?'

Charging Issues

Circle of Money *by Karl-Henning Seemann, Aachen, Germany.*

Public activities such as crime fighting, road maintenance and protecting property rights all benefit from PSI. The costs of producing PSI are quantifiable, but the benefits are not. Asking informants how much completion of this or that task would cost without PSI doesn't work, because it's difficult to answer such a question. The results of a comparison between countries with and without charging will be contaminated by other differences. Querying informants is tricky because often those best informed will have biased views. For example, those who cannot afford the high prices of government products will emphasise the importance of free access, while manufacturers will prefer charging. PSI production is expensive, and the number of producers thus limited. Competition, enabling balancing prices and needs in other settings, does not work here, because producers have a monopoly. However, if PSI is under development, the 'go-no-go' decision will depend on the number of potential prime users, those in government agencies. Charging generates extra funding but reduces the number of users, diminishing the chances of commercial value-adders, and can lead to less informed decision making. Revenues generated through charging are more easily quantifiable than the indirect revenues accruing from enhanced access.

Transaction Costs

Digital data can be easily copied and distributed - the music industry provides a distressing illustration - which challenges the feasibility of charging. Do the costs of charging surpass the benefits? This depends on transaction costs. Selling one licence to a large user in a single transaction minimises costs per user as against charging a large number of individual users. Likewise, prosecuting a large company for copyright violation is financially viable; identifying and prosecuting a large number of individuals is not.

Adding Value

Developing commercial value-added products on top of PSI is risky, demand being a largely unknown factor. Since PSI is not primarily produced as input for novel commercial products, the suitability of PSI as a resource for such products is not obvious beforehand. Even additional processing, which may be costly, may not turn PSI into useful material. Charging people in the early stage of product development creates an extra burden for start-up companies.
Hence start-up companies will refrain from development and costly trials, reducing the chance of new products being launched which might ultimately have proved successful. Charging may be appropriate once the product is doing well on the market and a proper price negotiated. Transaction costs for a licence can be low, and lawsuits against copyright infringement are commercially viable. When profits are made thanks to tax-funded PSI, a streaming back of money into the treasury would seem fair. The chargeable price is generally too low for compensating transaction costs when the data is going to non-commercial users. Furthermore, PSI is funded with taxpayer's (user's) money, and why should one pay twice? Once automated, charging systems become affordable; a small charge may be viable to cover distribution costs if this is acceptable to users. However, this is a matter which will be resolved variously, according to culture.

Funding Models

Free-of-charge road datasets or satellite photos (Google Earth) make citizens wonder why similar datasets held by their government cannot be freely accessible. In the internet economy the common business model is free access for most users, while a select group of users pays for advanced services, such as Google Earth Pro and road datasets incorporated in navigation hardware installed in vehicles. Overall, the present discussion reveals two key variables in the 'to charge or not to charge' debate: user type and product phase. The table identifies the ideal funding model for diverse cases. Our framework shows similarities with the internet business model. Some notes on the framework:
- during the time a new PSI dataset is still under development, we recommend that government (prime) users pay for access; once fully embedded in governmental work-processes, access should become free-of-charge for all government users
- only successful companies should pay (the government) for access to PSI
- the development stage of commercial value-added products is still under discussion, i.e. whether government agencies should be allowed to produce value-added products to generate more funding for PSI production. The overall conclusion is that this creates unfair competition for the commercial sector and that governmental PSI producers should confine themselves to producing PSI as required for legally mandated public tasks.

Concluding Remarks

The risk is ending up with the 'tragedy of the commons' described by Onsrud (1998), who foresaw the risk of a cascade effect, with data-charging policies eroding the PSI user base and ultimately public support for tax money being spent on collecting PSI. The same threat now comes from another direction: restrictive pricing policies for PSI may drive users towards free-of-charge online data, eroding the PSI user base and ultimately public support for tax-funded PSI. The countermeasure is in most cases simple: free access. Our framework recommends no charge for the majority of users, and charging the few, where both feasible and justifiable.

User type	Production phase	Funding model
Government	Development of new PSI dataset: negotiating PSI product specs, testing by prime users	Data charging; data only accessible to prime users
	Production: PSI widely used within government and stable product specs	Free access (including updates)

	Development: changes in legally mandated tasks translate into new product specs, modifications to existing PSI production process	Data charging for post-processing
Companies	Development of commercial value-added products that incorporate PSI	Free access
	Production: commercially successful product has been developend and the company is making a profit out of it	Data charging
Non-profit	development of PSI: negotiating product specs for PSI	Not applicable, only prime users have access
	Production: PSI widely used and stable product specs	Free access

Further Reading

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