Chapter 4

SDI evaluation and budgeting processes: linkages and lessons

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Abstract. Despite the number of SDI initiatives underway worldwide, routine SDI evaluation by public managers is limited. To explore the puzzling gap in SDI evaluation, this chapter examines the institutional arrangements governing the demand for evaluation (internal, external) and the content (inputs, outputs, outcomes). Examples of SDI evaluation practice were identified and analysed and among the examples found, budgeting processes appear to be a primary evaluation driver. Evaluation is used as a management control tool, supporting accountability, rationalistic investment decisions and efficiency analysis based on quantitative measures. Some information on inputs is available, while the emphasis is largely on outputs. Broader social outcomes and intangible benefits are seldom taken into account, however SDI evaluation practice is evolving and there is an active research community exploring evaluation approaches. In time, the way in which public managers adopt and implement evaluation could be a useful indicator of SDI development.

4.1 INTRODUCTION – SDI EVALUATION STATUS QUO

Over 100 national spatial data infrastructure (SDI) initiatives are said to exist (Crompvoets et al., 2004; Maguire and Longley, 2005). This
number may be an over-estimate depending on how one defines an SDI initiative, but most would agree that governments worldwide are making use of geospatial technologies and are in the process of developing and delivering an array of geospatial services. Given the ubiquitous investment in SDI, it is curious that so few government ministries or agencies have instituted basic evaluation processes to assess the public effort in this area. This low level of evaluation is even more striking in light of prevalent New Public Management reforms that have put a heavy emphasis on the rationalisation of public service delivery and the use of performance measurement to improve efficiency and accountability (see Osborne and Gaebler, 1992; Hood, 1995). Also, some authors consider evaluation as inherently associated with the success and failure of information systems, since “it is only through effective evaluation that an organisation may develop an effective knowledge base on which to found[er] successful development practice (Beynon-Davies et al., 2000, p.2).” This benefit is another reason why one would expect to see evaluation as a routine, institutionalised process.

Given the puzzling gap in SDI evaluation, this chapter explores the institutional arrangements governing evaluation. These arrangements influence the nature and role of evaluation (which in turn inform the selection of appropriate methods). My work builds upon the growing body of research focusing on organisational and contextual factors that foster the adoption and implementation of evaluation in the public sector (van Dooren, 2006; Cavalluzzo and Ittner, 2004; Behn, 2003; de Lancer Julnes and Holzer, 2001; Modell, 2001; Lawton et al., 2000). Research has shown that evaluation may depend on the power relationship between a public agency and its constituents (Modell, 2001). Some researchers, looking specifically at the evaluation of information systems and technology have indicated that specific ‘push factors’ are important in overcoming evaluation inhibitors (Gwillim et al., 2005; Seddon et al., 2002) otherwise evaluation may not take place. Oliver (1991) emphasised that when an organisation is faced with external pressures, its response depends on why the pressures are exerted; who is exerting them and by what means they are exerted.

I sought examples in which public managers ‘on the ground’ have begun to evaluate their ‘own’ SDI efforts. I omitted studies conducted by authors for research purposes, since these reflect an academic demand for evaluation rather than signals from within the public sector. My focus differs from researchers who are
contemplating the evaluation ‘production process’ (i.e. determining what to measure and the indicators and methods to use) (i.e. Giff, 2006; Delgado et al., 2005; Steudler, 2003), since it is not a given that public managers will evaluate an SDI initiative. Instead, by first illuminating the demand for evaluation, I potentially avoid putting the proverbial cart before the horse.

In the next section, I discuss the institutional arrangements surrounding evaluation within the public sector. I draw upon public management literature and observations derived from institutional theory to develop a conceptual framework of evaluation demand. In the third section, I present examples of SDI evaluation which are followed by an analysis in section four. Before concluding, I briefly explore the possibility of using evaluation practice as an indicator of SDI development.

4.2 CONCEPTUAL FRAMEWORK

4.2.1 Evaluation Demand / Institutional Arrangements for Evaluation in the Public Sector

Substantive demand for evaluation is a prerequisite to the institutionalisation of monitoring and evaluating systems (MacKay, 2006). Institutionalisation is the process by which a significant new structure or practice is incorporated into a system of existing structures and practices. Evaluation demand, as enumerated by Hatry (1999), can come from public managers’ need to: first, respond to elected officials’ and the public’s demands for accountability; second, make budget requests; three, do internal budgeting; four, trigger in-depth examinations of performance problems and possible corrections; five, motivate; six, contract; seven, evaluate; eight, support strategic planning; nine, communicate better with the public to build public trust; and finally ten, improve. Hatry stressed that most of these demands, which are internal in nature (i.e., conducted by and for program managers), are intended to make program improvements that lead to improved results (ibid). Behn (2003) and Poister and Streib (1999) also indicated that a public manager’s over-arching purpose for evaluation is to improve performance (or better decision making), an internal demand.

However, two of Hatry’s reasons for evaluation – improving public accountability and making budget requests – point to an external demand for evaluation. For instance, social pressure from
stakeholders, who are not directly involved in managing what is being evaluated, may elicit a response. Alternatively, public managers may also need to comply with a mandate from an agency that is one-step removed from operations (i.e. an arm’s length away), such as a budget agency or a regulatory body. For both of these external demands, there is an organisational (relational) distance between the demand for evaluation and the supply of evaluation results.

Some authors have noted that the distinction between internal and external determinants for evaluation is too simplistic and should be elaborated further in order to understand interrelations between various internal and external drivers (Forbes and Lynn, 2005). However, in this chapter, for initial exploratory inquiry, I use the internal-external dichotomy. My intention is to differentiate evaluation that is initiated from within, by managers themselves, and evaluation that is formally required.

In earlier work I had a slightly different interpretation of internal and external demand. For instance I indicated that demand from a management board of an autonomous agency was internal, since the management board has a role in steering operations (Lance et al., 2006). However, since there is a relational distance between a management board and public managers who are implementing activities, in this chapter I have characterised a management board’s demand for evaluation as external. The distinction is akin to the differentiation that Law and Callon (1992) made between global and local networks (resource providers and implementers). The global network is that set of relations which “generates a space, a period of time and a set of resources in which innovation takes place (p.21).” The global network therefore enables the local network through the provision of money, expertise, and political support and can be seen as ‘outside’ of where work is being performed. The local network is the set of relations “necessary to the successful production of any working devise (p.22).”

Previous empirical studies have indicated that when evaluation is done for an internal requirement, it is more likely to be adopted and has the necessary buy-in to be effective (de Lancer Julnes and Holzer, 2001; Modell, 2001). However, Lawton et al., (2000) found that legislation or a central government directive (both external) was the most important source of impetus for introducing evaluation. If public managers anticipate that conformity to an external demand will enhance the organisation’s social or economic fitness, they are likely
to acquiesce (Oliver, 1991). Similarly, acquiescence is expected if the demand is entrenched in a legal or regulatory apparatus (ibid). Several other institutional factors may reinforce conformity to external pressures, such as: economic gain; goal consistency; coercion; uncertainty; and financial dependence. Given that external pressure for evaluation is prevalent, authors have expressed concern that conformity to this pressure may lead only to superficial compliance (Cavalluzzo and Ittner, 2004; de Lancer Julnes and Holzer, 2001), or organisations may separate (de-couple) their internal evaluation activities from the externally focused symbolic evaluation systems (Modell, 2001).

4.2.2 Budgetary Demand for SDI Evaluation

The previous section makes it clear that evaluation occurs within a social context. It is often a fundamental part of government budgetary processes and is meant to assist with the control of organisational funding and functions. Figure 4.1, adapted from Ramasubramanian (1999), depicts the relationship between budgeting and evaluating and shows how the SDI is embedded within the politico-administrative framework (Lance, 2005).

![Figure 4.1: SDI evaluation embedded in budgetary (politico-administrative) processes (adapted from Ramasubramanian, 1999)](image)

National policies or programmatic goals provide the ‘business model’ for SDI (the policy base) [1]. These goals are translated into project or programmatic investments [2], which means that resources (budget, people) are allocated to appropriate agencies (ministries). The investments support activities that agencies design and implement to fulfill program goals [3]. SDI implementation is a series of activities, largely dealing with information content, and these activities must
take into account a range of influencing factors. The activities are designed to achieve results [4] that can be measured and reported on internally, within the implementing agency, or externally, to an oversight or regulatory body (and to citizens) [5].

4.2.3 Evaluation Content - Inputs, Outputs, Outcomes

Evaluation can have different orientations (Georgiadou et al., 2006). Figure 4.2, adapted from van Dooren (2006), emphasises the difference between evaluation that is for control (accountability, goal monitoring), and evaluation that may be for knowledge creation or exploration. For control evaluation, inputs (2) and outputs (4) can be quantified; they are under direct management controls, along with objectives (1) and activities (3). The control aspect is denoted by the box shaded in grey (5).

Figure 4.2: Analytical framework for control evaluation in the public sector

If the emphasis is on inputs and meeting the financial budget, the evaluation method is referred to as an audit. If the emphasis is on achieving defined outputs and/or assessing the ratio of inputs to outputs — which is the definition of efficiency (6), the method is termed as performance measurement. Other types of evaluation, such as impact assessment, are needed to explore a program’s outcomes (7, 8): outcomes typically cannot be controlled, are not easily quantified,
and largely depend on the impulses of society (9). Effectiveness (10) is the ratio of outputs to outcomes, and in the same vein as impact assessment, it is influenced by societal conditions. Effectiveness, too, requires evaluation that is qualitative in nature, is sensitive to ambiguities and social transformation.

When it comes to content of the evaluation, the focus (i.e., inputs, outputs, or outcomes) can reveal the intentions and priorities that public managers have with respect to evaluation. There is growing concern that too much emphasis is put on performance measurement, especially when the effects of interventions tend to be ambiguous (i.e. transformation processes are poorly understood). In such instances, evaluation should focus more on understanding how programs shape societal conditions, and vice versa (Georgiadou et al., 2006). At the same time, authors have stressed that more detail is needed when it comes to inputs, particularly for jointly implemented projects or programs. This is important because the inputs influence the power-relationship between agencies, as well as the accountabilities (Pitsis et al., 2004). Successful cross-sector collaboration is most likely to occur when accountability systems track inputs, outputs and outcomes, and when a variety of methods are used to gather and interpret results (Bryson et al., 2006).

4.3 EXAMPLES OF SDI EVALUATION DEMAND

Between February and April 2006, I conducted a global review of websites, searching for evidence of SDI evaluations conducted by public managers. In particular, I looked for information on evaluation demand and evaluation content (e.g. inputs, outputs, outcomes). The search was conducted in English but key words in Spanish and French also were used. In addition, I corresponded with SDI experts worldwide to assist with identifying examples. Once examples were found, I reviewed the available evaluation materials and relied on e-interviews with managers of SDI initiatives for some qualitative perspective. The complete findings were previously published in Lance et al., (2006a). Below I present an abbreviated description of evaluations of nine SDI initiatives from five countries: Western Australian Land Information System (WALIS), Spatial Data Warehouse Ltd. (SDW)/ AltaLIS) (Canada), MetroGIS (USA), National Geo-data Repository of The Netherlands (DINO), Public Sector Mapping Agencies Limited (Australia), Spatial Data Policy Executive (Australia), Geospatial One Stop (USA), The National Map
(USA), and GeoConnections (Canada). The examples also are summarised in Table 4.1 at the end of the section. Some changes or additions were made as part of the update for this chapter.

### 4.3.1 Western Australian Land Information System (WALIS)

WALIS is a land information system (LIS)-geographical information system (GIS), cooperative arrangement, designed to enable the sharing of information and improve information usefulness and accessibility. WALIS’s offices are situated within the Department of Land Information (DLI) and DLI is a lead agency in WALIS. DLI is legally required to submit to Parliament an annual report (Department of Land Information, 2005) and the Auditor General independently audits the report. Although performance indicators are in place, the process is more of a formality for accountability purposes than a tool for improving service delivery (e-interview with Genevieve Gongora-Mesas, May 30, 2006). However now that the Shared Land Information Platform (SLIP) has become operational, performance measurement is likely to be more rigorous (ibid). The SLIP governance arrangements include the development of a cross-government reporting framework.

In addition to the required annual report, in 2004 WALIS underwent an independent assessment to identify the value contributed by WALIS to both users and producers of spatial data, as represented by efficiency savings and willingness to pay (ACIL Tasman, 2004). The valuation was seen as important to the program’s effectiveness. The results of the evaluation study were used for educational and promotional material to advance the wider appreciation and use of WALIS (ibid, p.vii).

### 4.3.2 Spatial Data Warehouse Ltd./AltaLIS (Alberta, Canada)

The Spatial Data Warehouse (SDW) is a self-financing, not-for-profit organisation that maintains and promotes the distribution of provincial digital mapping to meet the needs of the Alberta market place. SDW has a Board of Directors with representatives from provincial government and local utility and communications companies. In 1998 AltaLIS Ltd. (“AltaLIS”), a joint-venture company, signed a long-term contract with SDW for the management, marketing and distribution of Alberta's base mapping, property mapping and terrain information. AltaLIS keeps statistics on its performance, as well as accounting records, which are audited by SDW annually. AltaLIS provides SDW with detailed monthly production reporting and invoicing on work completed. SDW's role is to monitor performance,
costs, and profit to ensure all contract agreement terms are met (Schlachter, 1999). The performance statistics are for AltaLIS and SDW internal use only and are communicated through a management committee.

4.3.3 MetroGIS (Minneapolis/St. Paul, Minnesota, USA)

MetroGIS is a voluntary regional geographic information systems initiative serving the seven-county Minneapolis-St. Paul (Minnesota) metropolitan area. Its primary sponsor is the Metropolitan Council. Each year MetroGIS must prepare an annual report to accompany its annual funding request to the Council. The report must outline how MetroGIS’s efforts are beneficial to Council.

In addition to this budgetary demand for evaluation, MetroGIS established a performance measurement plan to clearly state accomplishments to all stakeholders, including the Council. As the MetroGIS manager explained, “To sustain continued support for MetroGIS’s collaborative environment, we believed that a systematic mechanism was needed to demonstrate progress. The MetroGIS Policy Board concurred and authorised the creation of the current performance measurement program (e-interview with Randall Johnson, July 5, 2006).” Since 2003 performance results have been reported annually by MetroGIS staff to the MetroGIS Policy Board and the Policy Board has acted as auditor. The focus is on what the organisation delivers in terms of products and services (outputs), rather than what resources are allocated or expended (inputs).

4.3.4 National Geo-data Repository of The Netherlands - DINO (The Netherlands)

The Netherlands Institute of Applied Geoscience (TNO) is the central geoscience institute in the Netherlands for information and research to promote the sustainable management and use of the subsurface and its natural resources. Five ministries provide financial support, and public and private agencies are obligated to provide their data to TNO. The national geo-data repository (Dutch acronym: DINO), which is managed by TNO, is meant to contain all relevant data and information of the subsurface of the Netherlands. To ensure the continued financial support to DINO, its manager proactively established a balanced scorecard with measurable targets with which to assess performance, many of which are automated (Kuipers, 2005). In turn, this scorecard created the current internal demand from the participating ministries for performance information. In addition, DINO submits an accounting of its costs. TNO also gathers
information from users via interviews and questionnaires and then reports back to users (Users Advisory Council) on the findings. In 2003, the broad benefits of DINO to the economy were evaluated to demonstrate that the repository promotes investment in the country.

4.3.5 PSMA Australia Limited (formerly known as Public Sector Mapping Agencies)

PSMA Australia (formerly known as Public Sector Mapping Agencies) is a public company wholly owned by the state, territory and Australian governments. It combines spatial data from agencies of different jurisdictions to create national-level datasets. The company constitution requires the company each year to prepare an annual program and deliver the program to the shareholders, prior to the commencement of the financial year. The shareholders must unanimously approve the program. The degree of completion of the previous year’s annual program, along with responses to opportunities and circumstances during the course of the year, constitutes the primary measures of success. This is reflected in the annual report (Public Sector Mapping Agencies, 2005), which also is required for the company under corporation law. More analytical measures are also made at the Board level to assist with strategic planning but these measures are not in the public domain.

PSMA Australia is not profit driven despite being a commercial entity, so revenue is not a key measure per se. Instead, PSMA measures how broadly the datasets built and maintained by the company are being used. However, since PSMA uses Value Added Resellers for data distribution, and the Resellers are profit driven, returns to PSMA Australia are a surrogate for measuring success so the annual report does include these inputs.

4.3.6 Spatial Data Policy Executive (SPDE) (Australia)

The Spatial Data Policy Executive (SDPE) is a Secretary-level committee of Australian Government agencies involved in spatial data production or use. SPDE reports annually to the Parliamentary Secretary for Industry, Tourism and Resources (Office of Spatial Data Management, 2007). The Office of Spatial Data Management (OSDM) supports SDPE by collecting performance information through an annual survey of spatial data management in Australian government agencies. OSDM developed a database to store information about the schedule of spatial data production activities by the Australian government, resulting in the more effective and efficient management of this information (ibid). The 2005-2006 SPDE
A Multi-View Framework to Assess SDIs

Annual Report provides itemised costs of spatial data management of 29 agencies, broken down by agency and by costs associated with the production and acquisition of spatial datasets, related software and salaries.

4.3.7 Geospatial One Stop (GOS) (USA)

Geospatial One-Stop (GOS) is a geographic information system (GIS) portal that serves as a public gateway for improving access to geospatial information and data. GOS is one of 24 e-government initiatives sponsored by the federal Office of Management and Budget (OMB) to enhance government efficiency and to improve citizen services. A number of agencies contribute to GOS and each is required to report annually to the Office of Management and Budget, as established through the OMB Circular A-11. The agencies must identify performance measures, which are used for evaluation upon completion of activities.

Government agencies have begun discussing a joint budgeting and reporting process that would be broader than just GOS. It is part of the new Geospatial Lines of Business initiative focusing on shared resources under a service-oriented architecture. The GOS Technical Lead contemplates that in due time, “A shared funding algorithm will have to be developed and agreed to by the partners, as well as a shared performance measurement process (e-interview with Robert Dollison, May, 31, 2006).”

4.3.8 The National Map (USA)

The United States Geological Survey (USGS) conducted a cost-benefit analysis of The National Map in order to experiment with how the creation of The National Map relates to the effort and investment involved (Halsing et al., 2006). The National Map is an online, interactive map service that provides access to geospatial data and information from multiple partners. The analysis was a supporting document to accompany USGS’s reporting to OMB, in accordance with Circular A-11. A full accounting of the likely costs and benefits was not feasible. Instead, a novel computational model was developed that simulated the number of users, application innovation, and diffusion, as well as changes in the net benefits. While reporting was required, USGS broadened the scope of the analysis and arguably went beyond what was necessary. USGS developed a system with which to estimate and analyse the costs involved in building,
maintaining, and distributing The National Map and the various benefits streams expected from its existence.

4.3.9 GeoConnections (Canada)

GeoConnections is a national initiative to provide Canadians with geospatial information over the internet. The initiative was established as a sunset program, which is a budgeting mechanism that gives an automatic termination date unless the program is expressly reauthorised. From the onset, GeoConnections managers knew that they would have to achieve the outcomes proposed or risk having the program abolished. After the first phase of the program, they underwent a rigorous review that was performed by the Treasury Board Secretariat.

In addition to the comprehensive sunset evaluation requirement for continued programmatic funding, the Treasury Board Secretariat also introduced in 2001 a Results-based Management Accountability Framework. Every Government of Canada program is required to submit a blueprint to ensure its management is results-based. The blueprint must contain a program logic model that maps out how program activities relate to business processes (for example, public health, public safety, Aboriginal matters, environment and sustainable development). The blueprint must also contain a performance measurement framework and timetable. This sets performance targets, both quantitative to be measured annually, and qualitative to be measured in the mid-term and at the tail end of the program (Stewart, 2006). To assist with managing information (inputs, outputs, and outcomes) for evaluations, GeoConnections established a Value Management Office (VMO). The VMO coordinates internal government financial, accountability, and parliamentary reporting (vertical); reporting to stakeholders (horizontal) and handles all project contracting and contribution agreements.

4.4 DISCUSSION

SDI evaluation that is internally driven is less common, but it does occur. WALIS initiated an evaluation (proactively) to inform stakeholders and therefore garner their support. The evaluation was not obligatory. The cost-benefit analysis of The National Map, though it supported an external demand, was an internal effort to experiment on the investment and benefits of creating The National Map. For most of the examples though, the demand does not come from within. Rather, it is external, and the evaluation is routinely required as part of
budgetary processes. Evaluation is used as a management control tool, supporting accountability, rationalistic investment decisions, and efficiency analysis based on quantitative measures. Some information on inputs is available while the emphasis largely is on outputs. Broader social outcomes and intangible benefits seldom are taken into account.

In the face of external demand for evaluation, public managers potentially could try to minimise the degree to which they are scrutinised, or they could establish symbolic procedures to give the appearance of compliance. Yet, in the SDI examples in this chapter, it appears as though the evaluation demand is compatible with the managers’ own internal goals (i.e. goal consistency), or it is in the managers’ political self-interest to evaluate (i.e. potential for economic gain). Most SDI initiatives face high budgetary uncertainty and have a high degree of financial dependence on the evaluation demand source which gives the demand source the means to coerce evaluation compliance and managers acquiesce. These factors for conformity are consistent with observations from institutional theory (Oliver, 1991).
<table>
<thead>
<tr>
<th>SDI Initiative</th>
<th>Source of Demand</th>
<th>Evaluation content</th>
<th>Evaluation formality, periodicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Australian Land Information System (WALIS)</td>
<td>Internal (service managers)</td>
<td>Outputs</td>
<td>One-time independent assessment to identify for stakeholders the value contributed by WALIS</td>
</tr>
<tr>
<td></td>
<td>External (parliament)</td>
<td>Inputs</td>
<td>Legally required annual reporting to Parliament with independent audit by the Auditor General.</td>
</tr>
<tr>
<td>Spatial Data Warehouse Ltd./AltaGIS (Alberta, Canada)</td>
<td>External (principal/funder)</td>
<td>Inputs</td>
<td>Annual reporting and financial audit under terms of contract.</td>
</tr>
<tr>
<td>MetroGIS (Minneapolis/St. Paul, Minnesota, USA)</td>
<td>External (principal/funder)</td>
<td>Inputs</td>
<td>Obligatory annual report to Metropolitan Council as part of budget request.</td>
</tr>
<tr>
<td></td>
<td>External (policy board)</td>
<td>Outputs</td>
<td>Annual reporting to MetroGIS Policy Board &amp; stakeholders, with Policy Board auditing results.</td>
</tr>
<tr>
<td>National Geo-data Repository of The Netherlands (DINO)</td>
<td>External (principals/funders)</td>
<td>Inputs</td>
<td>Annual reporting and financial audit.</td>
</tr>
<tr>
<td></td>
<td>External (principals/funders)</td>
<td>Outcomes</td>
<td>One-time assessment of benefits of DINO to the economy.</td>
</tr>
<tr>
<td></td>
<td>External (stakeholders)</td>
<td>Outputs</td>
<td>Regular reporting to Users Advisory Council.</td>
</tr>
<tr>
<td>Public Sector Mapping Agencies (PSMA) Australia Limited</td>
<td>External (management board)</td>
<td>Inputs</td>
<td>Annual reporting to shareholders, required under corporation law.</td>
</tr>
<tr>
<td>Spatial Data Policy Executive (SPDE) (Australia)</td>
<td>External (parliamentary secretary)</td>
<td>Inputs</td>
<td>Annual reporting to Parliamentary Secretary for Industry, Tourism and Resources.</td>
</tr>
<tr>
<td>Geospatial One Stop (GOS) (USA)</td>
<td>External (central budget agency)</td>
<td>Inputs</td>
<td>Mandated annual reporting to OMB and on-demand web-based reporting to stakeholders.</td>
</tr>
<tr>
<td>The National Map (USA)</td>
<td>Internal (service managers) / External (central budget agency)</td>
<td>Inputs</td>
<td>Experimental assessment of investment and benefits of The National Map; support to mandated annual reporting to OMB.</td>
</tr>
<tr>
<td>GeoConnections (Canada)</td>
<td>External (central budget agency)</td>
<td>Inputs</td>
<td>Treasury Board Secretariat sunset evaluation &amp; required blueprint of Results-based Management Accountability Framework.</td>
</tr>
</tbody>
</table>
4.4.1 Budgetary Demand for SDI Evaluation

For MetroGIS and DINO, the demand initially was internal, but became external. For both SDI initiatives, managers, motivated by the uncertainty of budgetary decisions, sought (pre-emptively) to demonstrate the utility of their respective service to ensure that funding would be continued. The respective management structures appreciated the evaluation results and recognised that evaluation would validate activities in the future, so they sanctioned the routine use of the practice. Performance measurement has since become a standard operating procedure for both initiatives and both are obliged to conduct evaluations. In effect, public managers’ supply of performance information created a formal demand and stimulated a stronger accountability relationship between SDI managers and funding bodies.

In three examples, WALIS, GOS, and GeoConnections, the external demand came from a central agency. In these cases the demand is enforced through administrative policy. Sunset legislation management is the basis for the Geoconnections’ evaluation, requiring evaluation by the Treasury Board in order to justify the continuation of the program. Performance audits of GOS and WALIS are required by the central agencies responsible for budgetary oversight. Irrespective of whether the demand is internal or external, my findings are consistent with assertions by authors emphasising the importance of specific push-factors in overcoming evaluation inhibitors (Gwillim et al., 2005; Seddon et al., 2002). According to public management literature, evaluation “works best if it is a centrally driven initiative of a powerful finance ministry [and] linked closely to its main area of influence, the annual budget process (Carin and Good, 2004, p.8).” Boyle (2003) similarly indicated that evaluation should have strong central support from central government bodies. Central agencies should “provide an oversight and coordination role and also provide guidance and advice (ibid).”

Although PSMA is not under the oversight of a finance ministry or parliament, it is run as a business with conventional structures for oversight. AltaLIS, too, has a similar business orientation which dictates tight monitoring of inputs and outputs and reporting to a Board of Directors. The oversight role of a central agency can be compared to the Board of Directors oversight of PSMA and AltaLIS.
4.4.2 Other Demands for SDI Evaluation

Evaluation in most of the examples is an external requirement and a function of budgeting processes. An external requirement for evaluation can also come from legislators or political appointees, as in the case of Australia’s Spatial Data Policy Executive. An upsurge of evaluation from this kind of demand in Europe can be anticipated in years to come. The recently approved European Union INSPIRE Directive requires member states to monitor the implementation and use of their infrastructures (European Commission, 2007). The results of this monitoring should be accessible to the Commission and to the public on a permanent basis. As European countries transpose the INSPIRE Directive nationally, monitoring and reporting is meant to become an institutionalised SDI component, along with the components that most associate with an SDI, such as metadata, data specifications, network services and interoperability, data and service sharing (see Tuchyna, 2006).

Internally driven evaluation could also increase but through separate processes than INSPIRE’s coercive mechanism. As more SDI initiatives evaluate, an institutional expectation for SDI evaluation could evolve with SDI evaluation potentially achieving a ‘norm’ status. This status would diffuse evaluation practices. Further, SDI managers, through imitation, may try what others have done and have found to work. These diffusion processes are consistent with DiMaggio and Powell’s (1983) normative and mimetic mechanisms of organisational conformity.

4.4.3 Evaluation Demand (and Practice) as an SDI Indicator

Since budgeting is a routine administrative process, when SDI evaluation is part of the budget cycle, SDI performance information is likely to be consistently available. However, most SDI initiatives are not explicitly budgeted, and SDI evaluation remains at a low level. Even though each public agency involved in SDI implementation is linked to the government budget in the form of staff time and annual appropriations, their activities are often treated as a programmatic function and not identified as ‘geospatial.’ It is possible that as governments increasingly invest in the development of geospatial services, they may begin to put more emphasis on accountability for the use of these funds. The inputs and activities would become more transparent and outputs would be expected. This investment would elevate the SDI initiative from an obscure technical pursuit of agency
professionals and technicians to a primary management objective with line manager involvement. The demand for evaluation, therefore, could be used as an indicator of the legitimacy of the SDI initiative.

When the Botswana National GIS Coordination Committee was established, the terms of reference for the Committee recognised the need to measure the success of the NSDI initiative (Sandgren, 2003). However, the establishment of indicators was seen as an activity in the future, not something explored at the onset of the initiative. The South African Spatial Information Bill specifies that the “Committee for Spatial Information must, within three months after the end of each financial year, submit a report to the Minister and the Director-General, stating the activities of the Committee and its sub-committees, and any recommendations from the Committee aimed at improving its functioning or the functioning of the South Africa SDI (National Spatial Information Framework, 2003, p.15).” Though annual reports are a useful first step to improve accountability, the Committee this far is not required to synthesise financial information or assess its outcomes according to agreed-upon performance measures. If evaluation were used as an indicator of SDI development, both of these initiatives could be viewed as being in quite an early stage of SDI development.

In contrast to the Botswana and South African SDI initiatives, the United Nations Spatial Data Infrastructure initiative appears to be taking a more rigorous approach to evaluation. This indicates that it has recognised the role that investment management and accountability plays in SDI development. The UNSDI will be set-up as a Project with specific and time-bound deliverables (outputs), based on available resources, so that it is “realistic and quantified (United Nations Geographic Information Working Group, 2007, p.4).” Those involved in establishing the Project recognise that the implementation of UNSDI is as much about changing how people understand and appreciate geospatial information as it is about project expenditure. To support accountability within the UN system, it is proposed that the UNSDI Project produce an Annual Report and be subject to an independent evaluation and audit (ibid).

In Table 4.2 I expand upon the idea of using evaluation as an indicator of SDI development. In addition to the type of demand for evaluation, other aspects of evaluation reveal dimensions of the SDI initiative. Each of the SDI examples presented in this chapter provide lessons as to useful practice.
One could devise an evaluation maturity model based on the practices currently being used (see for example Lance, 2006b). Establishing evaluation practices is not a one-time challenge rather, it evolves and benefits from revision. Methods should be under constant, incremental improvement or refinement, and the validity of evaluation data should be subject to steadily more sophisticated checks. To capture SDI development in all its complexity, a variety of evaluation approaches should be used, particularly those that enable cross-agency input specificity and outcome (or impact) assessment.

4.5 CONCLUSIONS

This chapter contributes to SDI evaluation research by highlighting the role that institutional arrangements play in fostering evaluation adoption and implementation. External demand for evaluation, especially when it is a component of budgetary processes, appears to be largely responsible for the current use of evaluation by SDI public managers. It has stimulated public managers to ask ‘who is paying for what, who is accountable to whom, and how do we measure the results?’ The way in which evaluation is done could fundamentally affect how agencies interact with each other. Evaluation practices also could help distinguish dimensions of an SDI initiative, such as governance mechanisms, strategy for value management, and user orientation. However, for most SDI initiatives, a ‘disconnect’ still exists between the public geospatial efforts and the politico-administrative mechanisms that foster evaluation. A key problem is that government geospatial investments are seldom categorised as ‘geospatial,’ so they elude routine evaluation processes. It is possible, though, for public managers to use evaluation as a means to stimulate awareness among those who hold the purse strings and therefore bring SDI to the forefront.

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<td>GeoConnections – financial audit, performance measurement, impact assessment</td>
<td>Inquiring and analytical approach to SDI</td>
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REFERENCES

ACIL Tasman (2004). Value of the Western Australian Land Information System: An assessment of the value contributed by WALIS to the WA Geographic Data Infrastructure, Western Australian Land Information System, Western Australia Department of Land Information.


A Multi-View Framework to Assess SDIs


