Information Government and the Locus of Implementation

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Drafting a national (or regional) electronic government strategy garners a certain modicum of interest from policy-makers, stakeholders, and sometimes even the general public. Lofty goals of access and efficiency and of competitiveness and equity are discussed and combined into an impressive strategy document that, after formal adoption and frequently as part of a well-publicized promotional event, is disseminated in glossy brochures written by well-paid advertising agencies and spin-doctors. The actual implementation of the strategy is much less glamorous—and happens with only the slightest amount of public interest.

As I argue in the following paper, this neglect is unwarranted. Implementation raises significant and difficult public policy questions. More importantly, once national (or regional) strategies transition from electronic government to information government—which is likely to happen as we have argued in our introductory paper — identifying the appropriate locus of implementation turns from a difficult but largely operational question into a strategic challenge, which, if not addressed correctly, may fundamentally undermine the goal of information government itself. Consequently, decision-makers are well advised to embrace implementation as a strategic rather than as an operational challenge.

To be sure, implementation is a complex concept. It consists of structures and processes that go through stages which are sometimes parallel and sometimes overlapping. In this paper, I examine only one core implementation issue: identifying the appropriate locus of implementation.

1. Identifying the Locus of Implementation: Taking Cues from Regulatory Theory

The issue of who should implement electronic government sounds perceptively simple. Once an overall strategy has been set, individual governmental agencies are generally entrusted with implementing its various parts.[1] Embedded in this pragmatic notion is what in regulatory theory is termed the principle of subsidiarity—that an action should not be taken at a higher level within a system unless this higher level is more effective in achieving the goal. (Trachtman 1997; Follesdal 1999; Lazer and Mayer-Schönberger 2001). Subsidiarity is aimed at identifying the appropriate agency to act in a vertical hierarchy either within an agency, within the entire public sector, or, in federal states, among various jurisdictional layers (e.g. local, state, federal).

Hidden beneath the surface of the simple term "subsidiarity", however, is an evaluation of which level of implementation is actually the most effective one. This evaluation frequently leads to a choice between two competing claims. The first, quite obviously sensible claim suggests that the most appropriate locus of implementation is the agency that deals with the substantive issue that the E-Gov service is intended to address. An electronic kiosk for customs forms is best implemented by the agency charged with customs, while a web-based service to submit social security claims is best implemented and administered by the social security agency. The rationale

[1] This presupposes, of course, that jurisdictions opt for general strategies, which in turn reflect coordination on the strategic level.

behind this claim is threefold. Only that agency has the relevant substantive expertise necessary for implementation. It also knows best what information input that it can provide and what information output it requires in order to integrate the E-Gov implementation into its own processes and structures. Finally, charging the agency that will have to use an E-Gov service to implement it may further ownership and buy-in by the agency, two important ingredients for the long-term success of any E-Gov implementation.

The second claim, on the other hand, suggests equally persuasively that implementation is more effectively (and arguably even efficiently) done at a higher hierarchical level. That way multiple implementation projects can be bundled together, thus offering scale economies that are not achievable if each agency implements independently. Due to network effects of modern information and communication technologies, these economies of scale are particularly strong in electronic government.

Neither of these claims is inherently wrong. Their validity depends largely on concrete circumstances. In the abstract, they simply represent two extreme choices of where to implement on a vertical scale. In federal systems, identifying the appropriate locus of implementation is but another instantiation of debates over federalism.

Such choices of the locus of implementation, however, are not limited to hierarchies. Even in the absence of a higher authority vying to take over the implementation of electronic government initiatives, agencies are pulled in different directions. Cooperating and coordinating with other agencies may reap economies of scale — an important objective in dire budgetary times. Alternately, by remaining independent, agencies are guaranteed complete control over and ownership of the implementation process and ensured that they can implement at their own pace and in accordance with their available budgetary means.

Students of regulatory theory may recognize similarities. Jurisdictions are competing with each other, trying to attract capital or human resources by providing the most hospitable regulatory environment. By the same token, jurisdictions also coordinate with each other in order to reap the benefits of standardization, harmonization, and resulting scale economies. In addition, more coercive coordination, for example through a central or higher agency, may also help agencies to overcome the collective action challenge. Finally, by observing each other, they learn from each other's actions—both successes and failures. Not surprisingly, competition, coordination, and learning have been described as the three modes of regulatory dynamics among jurisdictions. (Lazer 2001; Lazer and Mayer-Schönberger 2002).

The process of identifying the appropriate locus of implementation of an electronic government project resembles this regulatory dynamic. Modes of coordination and learning are present, providing for centralizing and decentralizing pulls. Unlike jurisdictions vying for external resources, agencies, however, rarely find themselves in direct *competition* with each other. Even market-oriented new public management would not, for example, envision the department of the interior and the ministry of agriculture competing with each other for the provision of police services.

In theory, the absence of the competitive mode should weaken the decentralizing pull in the overall regulatory dynamic and make it more likely that implementation would happen in a more centralized fashion. Such a view, though, understates the important decentralizing pull caused by substantive expertise, the need to interface, and the advantage of buy-in as mentioned above. Taken together, these factors provide a healthy substitute for the lack of the competitive mode. Moreover,

recent considerations of security and reliability have underscored the advantages of redundancy and separation, thus providing an additional decentralizing force. Applying these lessons from regulatory theory, the task of finding the appropriate locus of implementation becomes a process of accurately evaluating and weighing the centralizing and decentralizing pulls that are present.

This, however, suggests a binary character of choice that may rarely exist in the messiness of the real world. Regulatory mixes and blends have long existed in the policymaking domain. Different jurisdictions have not only shared regulatory power and coordinated regulatory activities, but sometimes even combined coordination and competition to an innovative form of regulatory "co-competition". (Mayer-Schönberger 2003) Similar innovative mixes and blends can be identified in the realm of electronic government implementation. In Dubai, for example, one central agency provides individual public agencies with building blocks to facilitate electronic government implementation, enabling economies of scale where possible while permitting agencies to retain their independence, thereby mixing centralizing and decentralizing pulls. Similarly, in Singapore, SingPass offers a common identification method for citizens transacting a wide variety of electronic government services. (Yoke Sin 2005; Tan and Yong 2003; for Malaysia, see Rais Abdul Karim and Modh Khalid 2003) Bill Piatt describes *FirstGov*, the U.S. federal government's initiative to create a one-stop-shopping web site for E-Government services. While it only linked to independent federal and state agencies' web sites, *FirstGov's* aim was to stimulate citizen demand for more integrated offerings, thus creating a coordinative pull. (Piatt 2005).

These realities of mixed loci of implementation demonstrate that the selection of an appropriate locus of implementation is not a simple binary choice of "either/or". Instead, a whole spectrum of intriguing, even innovative implementation mixes and blends are possible, offering many more options. As policymakers need to appreciate the variety of regulatory options at their disposal, so will agencies implementing electronic government want to understand the full spectrum of implementation choices— implementation mixes and blends—that are available to them.

The existence of these implementation mixes and blends also signifies that our conceptual model of identifying the appropriate locus of implementation may be flawed. As we have seen due to centralizing and decentralizing pulls, implementation may take place in different loci at the same time, traversing horizontal and vertical agency boundaries. Consequently, "implementation", which we have implicitly understood to be a single act, should conceptually be broken down into smaller parts, each of which in turn may reside in or involve different loci. In other words: "implementation" as a concept is in need of disaggregation.

2. Disaggregating Implementation to Differentiate Localities:

Implementation is a multi-faceted aggregate of vastly diverse activities that are often distributed over a considerable period of time. Commonly, implementation includes one or more of the three central components (the three "I"s): infrastructure, interface, and information.

- *Infrastructure:* Networking an agency and connecting it to the Internet is frequently the first step in implementing online E-Gov services. Creating and maintaining a web server that is accessible 24/7 by citizens through the Internet similarly builds infrastructure capacity. Authentication services, government smart cards, or authentication units utilizing biometric data provide further examples of infrastructure components of implementation.

- *Interface:* Interface denotes the linkage between the implementing agency and its users. Interfaces make it possible for others — citizens, other agencies — to interact electronically with an agency. Interfaces could be as common as web-based forms or touch-screen kiosks in shopping malls, or they could be as specific as defining the data structure for a DNA database record. Interfaces cover everything from form design to the creation of the application that enables citizens to complete these forms online. What interfaces have in common is that they facilitate the connection of an agency with the outside world in a specific and often formalized way.

- *Information:* Information covers the issue of acquisition, processing, and management of data that agencies accumulate and use to do their work and includes important issues, such as information ownership, access control, and data structure.

Each of these implementation components has its own typical combination of centralizing and decentralizing pulls, which are fashioned by the need for coordination, the desire to remain independent, and the advantages of learning from each other.

a. Infrastructure:

The advantages of coordination are particularly strong for the infrastructure component. With high fixed and low variable costs, information and communication infrastructures are expensive to build and comparatively inexpensive to maintain. (Shy 2001) Pooling resources enables all participating agencies to reap significant cost savings due to scale economies. Moreover, if these are network infrastructures, their utility is proportional to the square of the number of participants (Metcalfe's Law), thus providing strong incentives by network users to have others join the network.[2]

On the other hand, agencies may fear that savings achieved through infrastructure cooperation may lead to shrinking budgets and smaller staffs, thus reducing the agency's power and reputation. Cooperation may also be perceived as a loss of control and ownership of the physical side of electronic government. Sharing infrastructures will also decrease redundancy, thus lowering reliability—a flipside of increased efficiency. Finally, coordination is not without cost. It requires time and effort to get everybody to agree and act in synchronization. The resulting transaction cost can be prohibitive when agencies have a limited time window to spend on infrastructure due to budgetary or other reasons.

Agencies are also apt to learn from each other when implementing infrastructure. Such learning is facilitated by the technical nature of most infrastructure issues, which are routinely delegated to the technical staff level. Technical staff, in turn, is more familiar with sharing expertise among colleagues. They also tend to identify with their job function rather than with their agency, thus lowering potential hurdles for mutual learning across agency boundaries.

[2] Recently there has been some discussion over the size of the network utility. Odlyzko and Tilly have suggested that Metcalfe overstated network utility. They suggest that the approximate utility of a network with *n* participants is *n* multiplied by the logarithm of *n*, rather than Metcalfe's *n* squared. (Odlyzko and Tilly 2005).

b. Interface:

Coordination of interface issues is an attractive option, but it offers smaller immediate benefits than infrastructure cooperation. Network effects are less pronounced, and the resulting savings are more limited. Also, while those desiring to interact with agencies— citizens and businesses, for example— may appreciate cooperation among agencies to harmonize interfaces, these constituencies do not have a seat at the agency's proverbial decision-making table.

By the same token, the importance of agency independence gains currency. Interfacing with third parties often represents the public face of the agency. The sacrifice of such an important branding opportunity in favor of customer ease of access and use is much to ask of agency leadership. Moreover, surrendering its interface "identity" is a relatively minor step compared with the ensuing task of agreeing with others on a joint or shared identity. To be sure, agencies do not necessarily have to share interfaces. Offering a mix of joint look-and-feel for customers interacting with agencies and still maintaining enough interface individuality may alleviate some of the most serious concerns. Similar possibilities exist for sharing certain parts of software code, which can be customized by each participating agency.

Mutual learning, too, is still useful for the interface component. A significant part of this component involves technical staff, many of whom are more inclined to share expertise and learn from their peers in other agencies. Once, however, issues turn political and organizational and become less technical, the capacity for learning is limited. It does not go away, but it is less important and prevalent compared with the infrastructure component.

c. Information:

Sharing information by making it accessible to other agencies and third parties is the "killer application" for the public sector. Agencies no longer have to maintain duplicate data sets; customers don't have to provide the same information more than once to different agencies. Combining information will accelerate decision-making and facilitate the creation of new integrated services that have previously not been feasible. Sharing and cooperating on information, experts suggest, will unleash vast savings and offer significant additional value. (OECD 2003)

Yet, for agencies, sharing information is also potentially threatening to what they perceive as being their power base and identity. Agency leadership has already had to adjust to a world of sharing infrastructures. Sharing infrastructure, they have been assured, is acceptable because bureaucratic power in an information society is neither derived from the budget size of an agency nor the size of its staff, but results from the information that an agency controls: information is the key to power. If information is to be shared with other agencies, it will inevitably diminish that newly found power base. Moreover, sharing information will make agencies more transparent to others, and thus potentially more vulnerable. If their information is accessible to others, what would, for example, prevent the reassignment of bureaucratic tasks by a legislature to other agencies that it perceives as being more effective, efficient, or, dare one say, more servile.

Any centralizing pull of mutual learning, too, is hampered by the desire of agencies for independence. Learning experiences could lead to information leaks that reveal agency expertise, thus lowering any competitive advantage that the agency has in performing its role. Learning is also "suspicious" as it may foster an environment conducive to cooperation and coordination. Agency

leadership may see it as a Trojan horse which would ultimately lead to a loss of independence, despite the quite obvious benefits that would be derived from such learning.

In comparing these benefits and challenges for the three components, a more nuanced picture emerges.

Unsurprisingly, coordination fairs well when implementing infrastructure. The desire for independence is strong, but the potential danger for agency independence due to infrastructure cooperation is limited. Mutual learning on a technical level further facilitates the coordinative pull. Consequently, the locus of infrastructure implementation is more likely to be away from individual agencies, either in shared arrangements or at a centralized or hierarchically higher level.

This finding is congruent with reality. Examples of coordination among agencies over infrastructure are plentiful. When agencies maintain a joint data center — a large amount of reliable and secure data storage accessible through fast network connections — they share information and communication technology (ICT) network infrastructure. When agencies cooperate on a joint authentication framework, either through smart cards or with the help of biometric scanners, they set up a common physical infrastructure. The exact shape of the cooperation varies widely and ranges from shared operations and a joint contract with an outsource partner to centralized (federal) agencies providing infrastructural support to a wider variety of public sector organizations.

The risk of power loss for individual agencies is limited, while the overall technical and organizational risk of building and maintaining an infrastructure is distributed. In short, agencies win without losing too much.

The situation is somewhat different for the interface component. Coordination is still beneficial, but as political questions arise, the value of independence increases, and learning is only useful to the extent that it furthers desirable coordination. As a result, the locus of implementation is closer to the individual agency than that for the infrastructure component. More importantly perhaps, coordination is acceptable (and accepted) insofar as it does not threaten agency identity.

Public sector web portals offer ample case studies for agencies' more cautious embrace of a centralizing pull regarding interface implementation. Many of these portals offer customers an easy starting point, but lead ultimately to individual agency web sites. The locus of implementation remains largely at the agency. *FirstGov.gov* is a prime example.

Web portals that offer common online services of multiple agencies are significantly less widespread, even if the interface ensures that agencies would not have to change internal processes. Simply the fear of losing identity *vis-à-vis* citizens, of becoming invisible to them prompts most agencies to insist on having their own web presence. Such a decentralizing pull can be offset by a stronger pull in the opposite direction: a severe budget crisis combined with budgetary incentives for agencies that join an integrated web portal or a strong central force that legally, organizationally, or culturally is successful in coercing individual agencies to cooperate. Singapore's example likely falls into this category.

Agencies may work together on the design of software objects that can then be customized by each for individual purposes, but provide a unified user or data interface. Such cooperation, if its results can be embedded in existing agency processes and structures and do not deprive agencies of their

own external identity, may create a coordinating pull that —all else equal—may overcome agency resistance more successfully than in the case of integrated web portals.

Coordination is hardest to achieve for what I have termed the information component. To be sure, sharing data holds great potential for efficiency gains and value creation. At the same time, however, control over access to information is understood by agency leadership as a fundamental source of power. Additionally, as learning is limited by the differences in information substance, it, too, fails to offset the strong decentralizing pull. This is the reason why the information component most frequently is implemented at the individual agency level. The locus of implementation stays very close to the agency that has competency over the substantive matter to which the information refers.

Hence, in relative terms, infrastructure implementation tends to be more coordinated and central, and its locus of implementation tends to either encompass more than one agency or to be pushed higher up the bureaucratic hierarchy as compared to that of interface implementation, with the locus of information implementation ranking a distant third. In reality, of course, implementation activities often entail a mix of infrastructure, interface, and information components. For the implementation of a web-based application for a business license, for example, an agency may cooperate with other agencies in maintaining a web server, may customize jointly developed software components for a web forms application, and retain control over all information by keeping it on its in-house data center. What differs is where these components are implemented.

Implementation taking place at different loci becomes more likely the more comprehensive — involving infrastructure, interface, and information — an implementation activity is planned to be. This is not necessarily problematic. Different implementation loci, however, entail costs: the transaction costs of having a project's various components which have been implemented at different loci interact with each other. For implementation to remain successful, the overall gain has to offset these costs. This is an important linkage between the locus of implementation and cost.

Conversely, cost increases caused by multiple loci of implementation create concrete implementation incentives. Implementation activities that do not require multiple implementation loci, given equal benefits, are more useful for agencies to tackle first than more complex endeavors traversing loci of implementation. Even if benefits are unequal, agencies may perceive less expensive and easier implementations as the lower hanging fruit, thus preferring them to others.

3. Shifting the Locus Question to the Strategic Level:

So far, our analysis has been fairly straightforward. While policymakers define electronic government strategy, implementation is frequently left with agencies. When choosing the locus of implementation, these agencies experience centralizing and decentralizing pulls. By unbundling the implementation activity into infrastructure, interface, and information components, we discovered that each of these components has a different likely locus of implementation. This in turn increases the cost for implementations encompassing all three components and may prompt agencies, all else being equal, to shy away from more complex implementation activities.

This is, perhaps unfortunately, what has happened. Agencies around the world have been fairly successful in implementing information and communication infrastructures for their own use. They have done so by coordinating and cooperating with others, thus lowering their share of the total

cost—providing them with the proverbial "more bang for the buck". This is not electronic government. Rather it is a necessary, but not sufficient *precondition* for electronic government to succeed.

Partly in tandem with and partly as a consequence of the infrastructure build-out, innumerous electronic government services, mostly web-based, have been deployed successfully in many jurisdictions.[3] (Lau 2005) Frequently, these web services have utilized components developed through agency cooperation. At the same time, however, many agencies have opted to create their own interfaces, ignoring activities by other agencies. The resulting electronic government landscape is a mixed bag in terms of loci of implementation.

Agencies have been least active in complex implementation activities that entail comprehensive information sharing arrangements. Given their incentives, this is not surprising. Troubling, though, is that our analysis suggests that agencies have few incentives to tackle complex electronic government implementation activities, even if they choose to keep the locus of implementation for the information component within their agency. Economies of scale pull them to coordinate at least regarding infrastructure, if not interface, but result in multiple implementation loci, which increase transaction costs, rendering such implementation activities less financially attractive.

The reasons for this uneven electronic government landscape are structural. The more an implementation centers around information and its control, the debates on the implementation level — between and among agencies — become reflective of the constitutive elements of debate in an information society: who controls access to information? Who — if access to information equals power — may hold the keys to power? Selecting a locus of implementation has profound consequences for how these questions will be addressed. One cannot expect individual agencies to answer these questions in a disinterested way.

Instead, as questions of implementation have turned into replays of core debates over information access and power in an information society, information government requires the locus of implementation decision to be understood not as an *operational* but a *strategic* question that needs to be addressed at the strategic decision-making level.

In sum, current implementation incentives result in traditional electronic government implementation, but fail to stimulate comprehensive implementation activities centered on information flows, facilitated by information sharing and enabling the restructuring of agencies and the reinvention of agency processes that the advent of information government would require. For information government to take hold, one has to accept that implementation issues, especially the selection of the locus of implementation, cannot be left to agencies, but must be addressed at the strategic level.

[3] In 2000, the U.S. Office of Management and Budget has collected information for 7,000 electronic government plans from U.S. agencies alone.

4. Conclusions

Implementation raises significant and difficult public policy questions. Once national (or regional) strategies transition from electronic government to information government, identifying the appropriate locus of implementation turns from a difficult but largely operational question into a strategic challenge that, if not addressed correctly, may fundamentally undermine the goal of information government itself. Consequently, decision-makers are well advised to embrace implementation as a strategic rather than an operational challenge.

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