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Electronic government: Information management capacity, organizational capabilities, and the sourcing mix

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Abstract

The information systems-related sourcing literature currently emphasizes a portfolio approach combining homegrown, hybrid, and outsourced (contracted) systems. This study found similar approaches in the sourcing for electronic government (e-Government, e-Gov). E-Gov-related sourcing mixes potentially create high switching costs and path dependency. They may also severely impact governments' information management capacity and organizational capabilities. Further, e-Government leads to business process change, all of which necessitates an increased understanding of e-Gov-related sourcing and its integration with traditional public management information systems (PMIS). In the absence of an e-Gov-specific sourcing theory, this study explores current sourcing practices and uncovers overlaps in sourcing concepts and also significant differences between private and public sourcing practices. E-Gov sourcing portfolios were found not systematically managed potentially compromising the public information management capacity. To help public managers design and manage e-Gov sourcing mixes, the article proposes framework for e-Government sourcing for further testing.
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1. Introduction

In the past two decades, the hollow state,[1] redesigned for steering rather than rowing,[2] has been heralded. In more recent discussions on contracting (outsourcing) and privatizing,

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however, both the contract management[3] and the public management capacity[4] have become focal areas of concern when following those concepts. Likewise, the organizational capacity of service providers in contracting has been studied surfacing serious issues of lacking contractor accountability, responsiveness, and competition,[5] as well as reduction in administrative capacity, lack of monitoring,[4] loss of flexibility, and lack of delivered quality,[6] among others, which have put into perspective the initial high-flying expectation of a very lean, reinvented government[2] in a greatly privatized public sector.[7] Contrary to widely touted advantages such as cost savings and increased flexibility, convincing empirical evidence for those claims is still missing.[8]

Information technology (IT) infrastructures and information systems (IS) have also been primary targets for reassessing sourcing decisions in many organizations, not only governments. In the 1990s, private sector firms went as far as outsourcing their entire IT operations. IT and IS were seen as commodity-type goods and services comparable to easily reversible investments such as, for example, car fleets. This perspective, however, misses the difference between the two types of investments. When switching vendors, managing the new car fleet would generally not critically impact the organizational capabilities involved,[9–12] while this might be critically different with IT and IS for two reasons: First, IT and IS investments have the capacity to reshape the basic processes in an organization. Orlikowski[13] and deSanctis and Poole[14] point out that IT and IS both influence and are influenced by an organization's socio-technical processes. Second, while hardware and software components might in fact have turned into commodity goods, the organizational and human resource capabilities required for using those are certainly not. Quite a few dramatic IT/IS outsourcing failures,[15] mostly in the private sector, can be cited as evidence. "{E}conomies of scale . . . are less likely to be realized in purchase of special goods."[6] In other words, while at face value IT- and IS-related investments seem to resemble other investments in fixed assets, they are in fact very different posing fundamental strategic choices, and the information management capacity as a core component of the public management capacity presents a special challenge.[16]

E-Gov systems interface and integrate with traditional public management information systems (PMIS), which have been found markedly different from their private sector counterparts[17] along dimensions such as design, purpose, use, organizational role, and assessment criteria.[18] For e-Government, which has been defined as "any process that the citizenry, in pursuit of its governance, conducts over a computer-mediated network,"[19] this may be no different. While some scholars see e-Government as just another technology wave,[20] others view it as the fundamental transition[21] and redefinition of information management in government with a strong institutional impact.[22] However, most sourcing-related studies in e-Gov, if any, focus on outsourcing and not on the sourcing subject as a whole. Because e-Gov systems, as we discuss below, are distinct from traditional PMIS in a number of ways, one could hardly assume sourcing practices to be identical for both. Consequently, this study explores current policies and practices in e-Government sourcing and found that although agencies practiced a portfolio approach, they did not *manage* those portfolios. Drawing on those findings the paper elaborates on an e-Gov-specific portfolio perspective of sourcing.

This article is organized as follows. First, it discusses the relation, similarities, and differences between e-Government and traditional PMIS. Second, it summarizes the IT- and

IS-related, mostly private-sector-oriented sourcing literature. Third, it portrays the gap of knowledge regarding the practices of e-Government sourcing. Fourth, it outlines an exploratory, interview-based study design, in which senior state government officials were asked about their sourcing decisions. Sixth, it presents the results of this. Beyond and apart from private sector concepts, this study uncovers idiosyncratic concepts to sourcing used in the public sector. In the light of the findings, the paper discusses the strategy, information management capacity, and organizational capability-related aspects of sourcing. Finally, it develops a framework for e-Government sourcing and proposes it for testing.

2. Literature

2.1. e-Government and PMIS

Almost two decades ago, there was discussion of the major differences between PMIS and their private sector counterparts.[17] PMIS had to provide "economic" and "political" efficiencies and also served a "policy mission," while private MIS were geared towards "economic efficiency" and, ultimately, "profitability." Further, in planning, PMIS were subjected to "incremental" modes and "extra-organizational" considerations, while private organizations had full control over their MIS planning (ibid.). Finally, while private MIS were seen as providing labor savings and MIS-related skills were readily available to private sector organizations, for PMIS labor savings were little, if any, and skilled MIS labor scarce for public organizations. For PMIS relative to private MIS, those findings confirmed earlier research, which had had identified public-to-private differences in three areas: (1) environmental drivers and constraints, (2) organizational mandates and scope, and (3) internal processes, complexities, and incentives.[23] Other studies showed similar results, for example, the PMIS-related environment was found less agile, more interdependent, bureaucratic, and monitored than the private sector,[24–28] hence, prescriptions from the private sector would only partially apply at best.[29] Private MIS were found many times as resourceful as PMIS (per-capita investment trained personnel), whereas the importance of IT-related decisions or training did not differ between the sectors.[16] Finally, in PMIS management, the focus was directed towards the budgeting process, technology integration, and aligning PMIS with agency goals, whereas in the private sector the emphasis was on planning, competitive advantage, and others.[30] Recently, Layne and Lee presented a four-stage model of e-Gov development,[21] according to which e-Government advances through the stages of (1) catalogue/presentation, (2) transaction, (3) vertical integration, and (4) horizontal integration, the latter two of which would lead to major change in government operations and processes. For the private sector, however related to this, IT infrastructure investments were found unfolding along the two lines of technological scope and strategic objective.[24] While the infrastructure renewal serves the short-term needs such as cost reduction, the higher-impact changes occur when it comes to process improvement and transformation. The advanced stages of e-Government mostly fall into one of those latter categories of high-impact changes, particularly when it comes to the stages of vertical and horizontal integration.

With regard to the institutional environment, e-Gov systems share a few essential characteristics with PMIS, while they observably lack quite a number of others:

- Similarities. Just like PMIS, e-Gov is situated in the same environment of distributed control and interdependency. External influences play a certain role. Investments in e-Gov underlie the same (mostly annual) budgetary algorithms. Like PMIS, e-Gov serves economic and political efficiency goals as well as a policy mission.
- Differences. However, unlike PMIS, (1) e-Gov is not primarily geared at increasing managerial control; (2) e-Gov is not anchored in volume data transaction processing, and hence not confined to the management of information generated from that data source, but involves any aspect of information management (including individual transactions, non-structured information, ad hoc interaction, etc.); (3) e-Gov is government specific in its various formats of government-to-citizen (g2c), government-to-business (g2b), government-to-government (g2g), and internal effectiveness and efficiency (IEE), while many PMIS are private-sector-originated systems adapted to public sector needs (for example, enterprise resource planning (ERP) systems); (4) e-Gov promotes the incremental investment pattern in the public sector due to its modular, standardized, small-size/low-cost system increments (Web servers, networked workstations); (5) e-Gov has captured and maintained the attention, involvement, and support of the highest elected and appointed officials; (6) to significant portions, e-Gov is developed and deployed by and through government-internal providers outside the IT or PMIS departments; (7) when compared with its private counterpart (e-commerce), labor and cost savings[25] as well as service improvements[26] seem also sizable through e-Gov; (8) the entry threshold for introducing e-Gov in terms of initial investment and trained labor appears significantly lower; (9) through standardization of protocols and access methods, the connectivity between e-Gov systems also appears far less cumbersome and costly, although e-Gov benefits from using networks and other infrastructure previously implemented for PMIS; (10) e-Gov applications are rapidly developed and flexibly maintained; (11) local agencies assume the autonomy to create, maintain, and control their local e-Gov; and (12) e-Gov provides citizens, businesses, and other government agencies with direct, every time access to government resources and services.

In summary, e-Gov is a new organizational and information-managerial paradigm, within which sourcing cannot be expected to follow the exact same standards practiced in the context of PMIS or private MIS. Yet, even for those traditional MIS, a growing body of literature suggests that sourcing-related frameworks need to be revisited[27] due to their strong impact on institutional processes and capabilities.[28] In the following sections, the prominent considerations underlying the various approaches to sourcing are portrayed.

2.2. Outsourcing

Sourcing discussions have traditionally started from the concepts of transaction cost (TC) theory.[29] Williamson argues that in cases of low asset specificity suppliers enjoy

economies of scale over buyers.[30–32] However, as asset specificity increases, transaction cost theory favors making over buying.[33] In IT- and IS-related sourcing, empirical research was unable to demonstrate any significant influence of asset specificity,[34] although high competition among suppliers contained opportunism in contracting, so that outsourcing decisions were supported.[35] Despite their weak empirical support,[8] outsourcing decisions have been couched on the cost argument.[36] Comparisons demonstrate that internal IT departments using cost-reduction strategies as used by outsourcing bidders were capable of achieving similar savings (ibid.). Along with the cost argument, a better focus on the organization's core business rather than IT/IS as well as higher flexibility have been presented as typical arguments in favor of making.[37] In summary, in MIS sourcing, the argument of expected lower cost is used for supporting outsource decisions.

Le Blanc finds that other motives for outsourcing comprise those of intended knowledge transfer, increased flexibility, or new technology adaptation.[38] Some authors present rules for outsourcing. Buying is recommended, for example, in cases where the IT activity in relation to the business operations though being useful is just a commodity in regard to positioning the business.[15] Also, if the in-house IT activities have only subcritical mass from an economies-of-scale perspective and managerial practices are lagging at the same time, outsourcing is proposed.[37] In summary, desired knowledge and skill acquisition is among the premier motives for preferring buying rather than making MIS. For PMIS, this argument found strong support for the scarcity of both skilled labor and funding.[18]

2.3. Insourcing

From a TC theory vantage point, making has to be favored over buying the higher the organization's IT/IS-related asset specificity. Beyond this, internal IS departments can employ the same cost reduction tactics as the outside bidders, for example, data center coordination, unit cost charge back systems, and standardizing software,[27] thus arriving at similar cost.[36] However, cost reductions under whatever sourcing regime come at the expense of service quality.[6] A high impact of an IT/IS, future or present, on an organization's core business is generally seen as an indicator in favor of insourcing. Also, if the IT/IS-related managerial practices provide the organization with an edge, while at the same time in-house economies of scale have critical mass, making has to be favored (ibid.). Moreover, making can often be characterized as the lower-risk proposition because long-term outsourcing may increase the organization's exposure to risks of various kinds,[39] for example, loss of critical knowledge and skills, lack of organizational learning, or loss of innovative capability.[40] Further, if IT/IS is growing and competitively significant at the same time, making would be the choice.[38] In summary, insourcing is preferred to buying IT/IS in areas of high asset specificity, core competency, and specificity of capability, and/or when maximum control over outcomes is sought. Also, insourcing is preferred to buying when the homegrown IT/IS is expected to provide the organization with a significant (for example, competitive) advantage.

2.4. Sourcing frameworks

From a vendor perspective and in the context of application services provisioning (ASP), Currie and colleagues researched the role of IS outsourcing and distinguished four scenarios (from total to partial outsourcing): (1) joint venture sourcing (with highly customized applications, full service provisioning, and fully outsourced IS); (2) business process outsourcing ("commodified" applications, full service provisioning, and fully outsourced IS); (3) vertical application services provisioning (with highly customized applications, application provisioning, and selective sourcing); and (4) business application services provisioning (with commodifed applications, application provisioning, and selective sourcing).[41] Although vendors heavily promoted the ASP model, Currie and colleagues found no evidence for the extreme cases of total ASP outsourcing and only hesitant demand for more integrated uses. However, elements of the taxonomy may be used as a lens in sourcing decisions. Within a more general context of IT outsourcing, Goo and colleagues propose the study of a whole set of factors including technical, risk, service quality, human resource, cost control, financial, IT roles and capabilities, new lines of business, performance improvement, core competency, alliance, change management, time to market, and syndication factors when outsourcing.[42] Other dimensions encompass supplier stability and service offerings[43] as well as the organization's own IT and learning capabilities.[44] IT managers rely on portfolios which, however, expose the organization to certain risks.[37] In summary, in practice, an evolution towards a sourcing portfolio has been observed,[27,28] in which the extreme cases of total insourcing or total outsourcing appear to occur extremely rarely. Still, little evidence has been found that those IT/IS portfolio mixes are systematically managed.

3. Research question and study design

3.1. Research question

Studies published so far have focused on outsourcing[18] or on sourcing PMIS.[28] Little, hence, is known what sourcing policies, practices, and mixes are actually used in e-Government projects, and no specific theory is available for guiding. This research fills the gap and explores those policies and practices in e-Gov sourcing. In particular, it pays special attention to the sourcing-related impact on organizational capabilities and on the information management capacity. A pre-study gave further indication that e-Government sourcing and portfolio decisions might be governed by different, at least additional, and potentially more complex decision rules than used in both MIS or PMIS sourcing. As a consequence, the researchers decided to personally interview public managers who had been involved in large e-Government projects. The study used two exploratory research questions:

  (a) What are the sourcing policies and practices in e-Government projects?
  (b) How do those policies and practices differ from other sourcing decisions?

Based on the literature,[19,45,46] two broad statements, purposely conjectural in phrasing, were used to induce ample comments from interviewees. The statements read as follows:

1. "Commercial off-the-shelf e-Gov systems (COTS) are inadequate if they do not support all existing organizational and process knowledge."
2. "Areas of strengths and core competencies predispose an agency to make rather than buy its electronic government systems."

With the knowledge about MIS/PMIS sourcing in hand, it was expected that outsourcing advocates might advance the cost argument and the knowledge transfer argument when commenting on the first statement, while it was expected that proponents of insourcing would argue along the lines of asset, task, and skill specificity as well as organizational advantage on the second statement. Both statements were found to address the notion of a portfolio mix. However, the study expected to find rich data regarding the practices of sourcing and the composition of e-Gov-related sourcing portfolios beyond what had been known in terms of traditional MIS and PMIS sourcing.

3.2. Sampling method

When this study was launched, advanced e-Gov projects with a strong element of horizontal and vertical integration[21] were still rare. Hence, a purposive sampling approach[47] was chosen for this study. For their relatively high number and availability, initially the sampling focused on senior public managers in New York State (NYS) who had supervised at least one major e-Government project, which included at least a significant transactional component. Study participants were recruited by e-mail and/or phone and selected from the official list of seventy-five top-ranked e-Government projects prepared by the NYS Office for Technology.[48] Priority was given to those managers who had supervised very large projects. The study was then expanded to include at least another state (Washington State) and other levels of government (King County and the City of Seattle). For the study, participants from Washington State (WAS), King County (WA), and the City of Seattle, identical sampling principles (senior management with supervisory experience in at least one large e-Government project) were applied. Senior managers from Washington State and the City of Seattle appeared as good candidates because the inclusion of this parallel sample provided access to three of the most advanced e-Gov sites in the US.[49–51]

3.3. Data collection

Data were collected via a semi-structured interview format, which allowed for additional probing on the basis of a fixed structure of uniform statements.[52] In a series of twenty-three semi-structured interviews, thirty senior-level government managers from thirteen NYS agencies, and on the West Coast from four WAS agencies, two King County (WA) agencies, and two City of Seattle agencies were asked to comment on the two statements outlined above. Interviews were conducted with single individuals, with groups of two, and in one case with a

group of three individuals. The interviews were conducted in person or over the telephone. The statements were read to the interviewees, one at a time. Interviewees were then asked to comment on those statements from their own experience and involvement in e-Gov projects. Probing questions were asked. The interviews, which lasted between thirty minutes and two hours, were audio taped and transcribed for analysis.

3.4. Data analysis

Data analysis was performed in four passes. First, two researchers independently read the transcripts, one statement at a time assigning levels of agreements or disagreement on a Likert scale to each statement of every transcript. The Likert scales were then compared and discrepancies of magnitude (defined as a variance >1 on the scale) were discussed and resolved. In the second pass, the two researchers read the transcripts again, now one unit of data at time. In an open coding process,[53] each unit of data was assigned to a preliminary category or subcategory whose dimensions and properties were developed from the data. New categories and subcategories were introduced, in case existing categories did not apply.[54] Convergence and assignment of categories, which the two researchers had identified independently, were performed at each step of the data analysis. In a subsequent pass, an axial coding process was applied, during which the converged categories and subcategories were analyzed regarding their inherent structures and processes leading to paradigms, whose internal relationships were identified wherever possible.[53] In the final pass, a selective coding process was performed, in which the resulting concepts and theories were related to each other.

4. Results

As desired, the two conjectural statements generated detailed comments from the interviewees. The answers indicated that most agencies indeed employ a portfolio approach to e-Gov sourcing, albeit not in a strategically planned or managed fashion. Depending on the stage with respect to Layne and Lee four-stage model,[21] and also subject to the area of predominant focus in the e-Gov projects, the mix between in- and outsourced systems varied.

4.1. Overall tendency

As mentioned, the responses were translated into a one to five Likert scale, with the following indicators: 1 = strongly agree, 2 = agree, 3 = undecided/neutral, 4 = disagree, and 5 = strongly disagree. Responding to the first statement, 46.7 percent of interviewees rejected the conjecture, that is, they found commercial off-the-shelf systems (COTS) quite adequate even if not all organizational and process knowledge could be maintained, while 28.9 percent confirmed it, and 24.4 percent would neither accept nor reject it. The conjecture in the second statement was accepted by 63 percent of interviewees, that is, areas of strengths and core competencies were seen as predispositions for an agency to make its e-Gov systems, whereas

17.3 percent rejected it, and 19.6 percent found arguments both in favor and against. No significant differences were found between the New York State and West Coast samples.

4.2. Categories and subcategories identified in the data

Over 94 percent of all interviewees emphasized the strategic nature of sourcing decisions as the overarching theme in e-Government, whereas 3 percent found sourcing to be of only tactical nature and another 3 percent did not refer to either. Within the overarching theme of strategic nature, three categories in the data were distinguishable: (1) strategic importance given through the specificity of process, assets, and mission of government; (2) resource availability (capabilities, competencies, skills, and funds); and (3) frequency of change (both endogenously and exogenously created). The category of strategic importance could be broken down further into the subcategories of (1) cost, (2) specificity of government/idiosyncratic processes, (3) protection of core proficiencies, (4) control, (5) vendor viability, (6) moral hazard, (7) stakeholder commitment, (8) integration/interoperability, and (9) general strategic issues. The category of resource availability broke down into (1) funding and labor constraints, (2) acquisition of knowledge, (3) acquisition of best practices, (4) resource allocation, and (5) internal skill development. In the third category of frequency of change, (1) rapid change in service demand, (2) time to market, and (3) customizability were found as subcategories. In the following, those concepts are discussed in more detail.

4.3. Strategic importance and specificity of government

More than half of all interviewees pointed out that cost considerations were prominent among strategic considerations regarding sourcing. Interestingly, cost considerations were used for making the case for both insourcing and outsourcing:

1. Cost arguments in favor of outsourcing. Most insourcing advocates perceived COTS as becoming ever more inexpensive, and hence good alternatives to costly in-house development. Also, making its own e-Gov systems they said appeared to some agencies no longer affordable as making was seen as a prohibitively expensive and resource consuming undertaking in budget-constrained times.
2. Cost arguments in favor of insourcing. An equal number of interviewed practitioners made the case for insourcing on the cost argument as well. On the basis of cost analyses of projected versus actual costs of COTS, government agencies seem to have experienced unexpected cost overruns and sizable hidden costs when they had outsourced. Some interviewees pointed at outright cost blunders, particularly with customized COTS. Those interviewees maintained that in-house systems compared favorably, if not very favorably, with customized COTS. In one case, the finally accrued customization costs for a commercial package were four times higher than its initially quoted purchase price, by which it had beaten the competing insourcing bid. Except for government-unspecific areas and for the area of productivity tools, customization, it was said, could not be escaped, at

least not to the minimal extent that a number of outsourcing advocates propose because the commercial packages were too strongly geared towards private sector requirements.

Thus, cost considerations were key factors in the decision process.

4.3.1. Government specificity/idiosyncratic government processes

Making systems, a majority of practitioners argued, could not be eliminated because beyond some obvious highly government-specific niche areas there were also idiosyncratic business processes and procedures on a broader scale, for which no commercial package existed. Because the uniqueness of many processes unsupported in COTS rests on legal, statutory, or regulatory requirements, agencies had to maintain application system development proficiency in-house with or without homegrown systems. Also, because governments are chartered with supporting citizens as evenly as possible, e-Gov systems seem to pose greater challenges.

4.3.2. Protection of government core proficiencies

Many interviewees maintained that critical knowledge in both the e-Gov system and the business side could not be outsourced because otherwise the effective management of those processes and practices would cease to exist. A number of interviewees also emphasized the need for maintaining and regaining government-internal proficiency in conducting functions and processes beyond obvious areas of, for example, security, defense, taxation, immigration, or adjudication. Stripping government of too many core processes those practitioners maintained would greatly compromise the basic principle of democratic governance. Government-specific processes have been mirrored in government-specific systems, for which no commercially equivalent system was available.

4.3.3. Vendor viability/stability

When using COTS in more strategic areas of business, vendor viability or stability was another major concern. The size of a vendor or her large market share was not necessarily seen as an insurance against sudden lack of support and supply calling for only limited dependency on any one vendor. It was said that government systems had longer life spans than in the more quickly moving and changing private sector.

4.3.4. Moral hazard caused by vendor self-interest

Not only with respect to cost, vendor self-interest was a major concern among almost all interviewees. Although profit seeking was seen as acceptable and conducive to the contractual relationship, consultants and vendors had given ample evidence for unacceptable and selfish behavior according to a number of insourcing advocates. For example, a too high frequency of system revisions had rendered one agency either without support or with expensive, unplanned, and unwanted updating in exchange for only minor improvements.

4.3.5. Stakeholder commitment to homegrown systems

Agency users as well as internal e-Gov staff, it was argued, would have more identification and commitment to insourced rather than outsourced systems. Case examples were given, in

which outsourced systems were imposed on users and e-Gov staff resulting in a total system failure. Insourcing provided a more inclusive approach addressing constituents' needs via ongoing involvement and feedback.

4.3.6. Control

It was argued that certain areas in government were both complex and sensitive. Such areas (for example, in criminal justice, defense, homeland security, but also taxation, vital and health records, among others) would be better served via insourced systems with a minimum of or no external dependency. Some proponents of this argument conceded that the concept of need of control was also advanced in some cases of no real need but rather for certain constituents' unwillingness to change.

4.3.7. Integration

Whatever the sourcing decision, most interviewees argued that e-Gov systems need smooth integration with other e-Gov systems and with PMIS. Quite a few practitioners argued that the aspect of interoperability is of strategic importance in e-Gov sourcing. The interviewees emphasized the need for integration and interoperability of mainly internal systems, and also horizontal (with other agencies, departments, and branches) as well as vertical interoperability (with other levels of government). In many cases, interviewees argued that this would require COTS to be modifiable to fit business processes, practices, content, and systems, which already exist. Other interviewees also considered to change old processes, practices, and modify or retire existing systems.

4.3.8. General issues

The majority of interviewees who had acknowledged the strategic importance of sourcing decisions in e-Gov also said that a sound sourcing strategy and better planning would be needed. Step-by-step and little-by-little tactics as used in the context of many early e-Gov projects was no longer appropriate because otherwise the strategic fit of e-Gov systems might be compromised, some interviewees maintained.

4.4. Resource availability

4.4.1. Funding and resource constraints

Hand-in-hand with the cost argument, shrinking budgets and the deliberate curtailing of government over the last decade were also cited as major motives for buying e-Gov COTS. Due to massive loss of IT/IS expertise to the private sector and long periods of underinvestment in IT/IS, agencies seemed to be forced to make rather than buy in many instances even when the proficiency to make was readily available. Also, the post-election fulfillment of political platform and campaign promises in favor of lean government was mentioned as exerting a sometimes massive direct influence on the sourcing decisions; that is, internal resources were reportedly curtailed to such an extent that any insourcing options were effectively eliminated. However, the shrinking and curtailing notwithstanding, internal and external expectations regarding service volume and quality were rising. Coping with those

drastically higher demands on the basis of ever fewer resources left government agencies with a fundamental challenge as quite a number of interviewees pointed out. Their agencies, those interviewees said, saw themselves forced into buying COTS as the only choice rather than basing that decision on a thorough analysis of the outsourcing-versus-insourcing choices. Quite many interviewees were concerned about this limitation of choice. Yet, cost-efficient COTS were a welcome and timely relief for coping with what was seen as an increasing demand-to-supply service gap in government.

4.4.2. Acquisition of critical knowledge

According to several interviewees, whether eventually bought or not, COTS had to be considered and even scrutinized for the sake of acquiring knowledge regarding system functionality, potential cost savings, and streamlined business processes embodied in such systems. In principle, when governments purchase COTS, then it would be indispensable to quickly and comprehensively transfer both the organizational and technical knowledge embedded in the system from the vendor to the government agency. However, on a more tactical level it was also argued that COTS could be used as knowledge brokers and buy governments time by quickly providing the potential users with some basic functionality while government staff was building up its own knowledge and experience in incremental steps.

4.4.3. Acquisition of best practices

Another line of reasoning focused on the assumption that outsourced e-Gov systems would embody best practices. Because these systems were widely used, it was concluded that they represented the state-of-the-art in practices and processes. Through COTS, hence, agencies had at least a point of reference enabling them to assess their own practices and redesign those if found necessary. Standard e-Gov COTS were also seen as more stable, better tested, more robust, and more predictable than homegrown systems.

4.4.4. Inevitable resource allocation

With or without customization, the advocates for buying conceded that acquiring COTS would not relieve the agency from committing substantial resources to the system in terms of training, maintenance, and update. Likewise, the overall management task would still rest with the agency not with the vendor, consultant, or application software provider. In other words, insourcing advocates were well aware of (potentially hidden) costs in form of indispensable resource allocation to COTS.

4.4.5. Internal skill-set development

The more resourceful and skillful an agency in this regard, the more should it maintain its proficiency and the critical mass for being able to build major components of its e-Gov systems. Almost naturally, areas of competency and strength were those where, in fact, systems had been homegrown, albeit the danger of overinvestment in these insourced systems was clearly seen also by proponents of making. According to these interviewees, areas, in which skills and expertise were lacking, should not automatically trigger a buy decision but

rather lead to assessing and, if necessary, building the skill base in critical areas of knowledge, which might have strategic impact on the agency's business.

4.5. Frequency of change

4.5.1. Rapid changes in service demands

As indicated by some practitioners, unlike the pre-e-Gov era, e-Gov is expected to function as smoothly and flexibly as their private sector e-commerce counterparts. Initially, it was said this might pertain to a paradigmatic shift in service orientation in the public sector towards highest availability, immediacy of response, accuracy of information, and ease rather than to the actual system itself. Changes in service demands occurred it was said much more rapidly than before.

4.5.2. "Time to market"

Some interviewees argued in favor of buying as a tactical means to quickly meet the increased demand for government services. This was repeatedly referred to as the governmental analog to "time to market" and used for justifying the deployment of outsourced e-Gov systems. Fast deployment was explicitly favored over service complete-ness, system perfection, and system elegance in those practitioners' comments.

4.5.3. Customizability

As seen above, the demand for service and process integration and system interoperability in e-Gov requires either the customization of systems or the change of processes, or both. While some interviewees strongly argued that agency processes and practices should be shaped along the lines of commercially available e-Gov systems with little or no customization as seen above, others maintained that COTS were viable alternatives to homegrown systems if, and only if, they could be modified to address specific agency needs. Nowadays, even small and niche COTS provided the capability of customization it was said. A number of interviewees held that customization while necessary should be kept to a bare minimum. If not, the benefits of future revisions of the system might not be easily obtainable, or the system, if not upgraded, could even fall out of vendor support. Moreover, such systems, if unaltered, could more easily be phased in and out. With an accelerated rate of technology changes and new generations of systems every three years, it was argued that investing into one generation too heavily could be counter-productive.

4.5.4. When to outsource–when to insource?

As known from the MIS and PMIS outsourcing literature, the arguments of cost and of acquiring critical knowledge are also advanced for justifying e-Gov COTS. However, apart from those known justifications of outsourcing this study found additional important motives for purchasing or "ASPing" COTS in e-Government beyond those mentioned in the private-sector-based sourcing literature. These include the concepts of time-to-market, funding and resource constraints, best practices, resource allocation, and customizability, in which the latter presents a concept controversial among outsourcing advocates.

As also suggested in the MIS- and PMIS-related sourcing literatures, in e-Gov, the specificity of government and capabilities (idiosyncratic government processes), core competencies (protecting government proficiencies), and outcome control (control) are invoked for substantiating insource decisions. However, the motive of any advantage over others expected via making was not detected in the governmental sourcing context (even though governments have a clear sense of competition, for example, in attracting job-generating private sector investments). Beyond the MIS/PMIS sourcing concepts and motives, many insourcing advocates claimed a significant cost advantage of homegrown systems due to the projected very long-term usage of e-Gov systems. Also, it was said that agency e-Gov developers had a far better grasp of the particular challenges when matching technology options with government-specific organizational requirements than private sector developers. This line of reasoning flies into the face of the cost argument traditionally presented in the MIS and PMIS literatures.

5. Discussion (towards an e-Government sourcing framework)

In the private sector, as mentioned before, a trend towards a portfolio approach to IT/IS-related sourcing decisions has been observed.[27] This research confirms that trend also for the public sector. While similar arguments for in- or outsourcing are found in some areas, others differ widely between the private and the public sector. Similar experiences seem to derive from an overemphasis of either sourcing approach. Interestingly, in e-Gov, the cost argument, which according to the MIS- and PMIS-related sourcing literature suggests outsourcing, is equally invoked for making the case for insourcing. Thorough portfolio assessments of IS sourcing and internal capabilities were not found through this research.

This study explored and described the sourcing practices of large-scale e-Gov projects (research questions a) and identified practices in e-Gov sourcing similar to those used in other areas, both public and private. However, it also uncovered quite a number of areas, in which e-Gov sourcing is distinct from those approaches (research question b). In the following, those findings are synthesized and presented in a framework, which can be used for both practical management of e-Gov sourcing mixes and further testing in research. Sourcing decisions were found to be influenced by (1) the degree of strategic importance / government specificity), (2) resource availability, and (3) the frequency of change. Indeed, three issues affected particularly the sourcing decisions:

1. Strategic importance. The higher the strategic importance, the more e-Gov practitioners favored insourcing, whereas outsourcing was favored for e-Gov applications with low degrees of strategic importance.
2. Resource availability. Whenever skills and capabilities were readily available, or when the need for developing internal skill-sets was identified, insourcing was favored, whereas partial outsourcing was advocated for acquiring and replenishing skills and capabilities as well as for studying best practices.

3. Frequency of change. The government process in all three branches creates frequent changes. E-Gov applications are subject to those changes. Insourcing for applications with high rates of anticipated change appears as most appropriate. COTS were found as widely acceptable, where the rate of change was low.

With respect to Currie et al.'s vendor-oriented framework (the Currie framework) of ASP-outsourcing,[41] this study uncovered no instance of total outsourcing of any e-Gov system, while selective sourcing was used both in vertical application purchasing as well as service provisioning and also in business application purchasing and provisioning. Also, in this study, the application integration between core e-Gov applications and selectively outsourced applications was found to be very limited, if existent at all. The "total outsourcing" dimension in the Currie framework appears as a highly unlikely proposition in an e-Gov sourcing context. The remaining selective outsourcing dimensions can be expanded to include both purchasing and application provisioning; this leaves the dimensions of integration and of scope (customization/standard). With this reduction, four distinct cases of selective outsourcing, which in the following is referred to as the e-Gov sourcing portfolio approach, can be derived from the Currie framework: (a) integrated (with other applications), customized/non-standard applications; (b) integrated (with other applications), standard applications; (c) not integrated, customized/non-standard applications; and (d) not integrated, standard applications. The higher the degree of integration with other applications both out- and insourced in a portfolio, the higher is the path dependency, that is, the switching costs for those applications. The same holds true for customized applications. Hence, the combination of integrated/customized applications in a portfolio leads to the strongest path dependency and the highest switching costs, while not integrated/standard applications create the least path dependency and the least switching costs. Under this perspective, it is evident that sourcing decisions in e-Gov pertaining to strategic business areas and idiosyncratic governmental needs require particular attention and consideration. This study found evidence that e-Gov outsourcing advocates and opponents were aware of the risk of increased lock-in through customization. As a result, some practitioners suggested employing an integrated/standard or not-integrated/standard approach to outsourcing only. This study suggests using the reduced Currie framework for assessing the lock-in risk in e-Gov portfolio mixes. With regard to Goo et al.'s set of outsourcing factors,[42] this study found no particular evidence for their explicit use in the context of e-Gov sourcing decisions.

In a managed portfolio approach to e-Gov sourcing, the use of the three empirically identified dimensions immediately yields the two extreme cases for insourcing and outsourcing:

1. Scenario 1. Insourcing would be preferred in the straightforward case of an area of application or service with strategic importance, high government specificity, a dynamic environment and frequent change, and high internal availability of capabilities, competencies, and skills. High degrees of integration and customization with its implicit high switching cost also predispose an e-Gov portfolio manager towards insourcing.

2. Scenario 2. Outsourcing would be preferred in the likewise straightforward case of an area of application or service with no strategic importance, no government specificity, a static environment or little change, and no internal availability of capabilities, competencies, and skills. Outsourcing would be least problematic for e-Gov applications and systems, which are not integrated or customized. Issues regarding the contract management capacity may still exist in this case.[3]

While the extremes of this three-dimensional space present relatively few problems when composing and managing an e-Gov sourcing portfolio, those cases may present the least frequent, that is, the critical sourcing mix-related decisions mainly revolve around the center of this decision space. In the following, important aspects of the e-Gov sourcing mix-related decisions are presented for each scenario.

1. Scenario 3. The government agency faces an area of application or service with strategic importance, high government specificity, a static environment or little change, and high internal availability of capabilities, competencies, and skills. In such a scenario, the organization would lean towards selective outsourcing (for example, when an IT infrastructure renewal is desired) using standard building blocks, which are configurable or modifiable or which can be accessed via an application program interface (API). Insourcing of major building blocks would only occur with low priority. The degree of integration and customization of any outsourced components would be maintained at low levels for avoiding high switching cost and/or undue vendor dependency.

2. Scenario 4. The government agency confronts an area of application or service with strategic importance, high government specificity, a dynamic environment and frequent change, and low internal availability of capabilities, competencies, and skills. In this scenario, the organization faces a serious competency gap.[55] Selective outsourcing aiming at acquiring critical knowledge is incorporated. Hiring of consultants and experts along with training of internal IT staff might pave the way for increased insourcing over time. As in Scenario 3, the degree of integration and customization of any outsourced components would be maintained very low, if any (that is, no integration/no customization), in order to avoid high switching cost and/or vendor dependency.

3. Scenario 5. The government agency has to source in an area of application or service with strategic importance, high government specificity, a static environment or little change, and low internal availability of capabilities, competencies, and skills. Obviously, outsourcing is the only option in this area. The immediate acquisition of knowledge is less critical as in Scenario 4, even though any competency gap in a strategic area needs to be carefully monitored over time. However, due to the static nature of the application, a modified/configured, outsourced product or service for meeting the specific needs might pose a relative low risk to the organization. This scenario is similar to Scenario 3, in which integration and customization need to be contained at low levels.

4. Scenario 6. The government agency has to make a decision in an area of application or service with no strategic importance, low government specificity, a dynamic environment or frequent change, and high internal availability of capabilities, competencies, and skills.

Because the area is of no particular strategic importance, an opportunity for selective outsourcing exists in this scenario. An over-commitment of resources to this area may have occurred such that redirecting those resources may be desirable. However, a tradeoff between internal resources managing frequent changes more effectively and cost-efficiently and outsourcing may exist as well. Because of the high frequency of change, the degree of integration and customization would be maintained at low levels.

5. Scenario 7. The government agency has to make a decision in an area of application or service with no strategic importance, low government specificity, a static environment or frequent change, and high internal availability of capabilities, competencies, and skills. This scenario is precarious and indicates a definite over-commitment of internal resources, which need to be swiftly redirected. The e-Gov systems in this area should be outsourced while the sourcing conditions are monitored regarding potential change. Integration and customization of outsourced components would assume a higher degree without unduly compromising the government agency. Vendor self-interest still has to be sharply monitored.

6. Scenario 8. The government agency confronts an area of application or service with no strategic importance, low government specificity, a dynamic environment or frequent change, and low internal availability of capabilities, competencies, and skills. This scenario is also predestined for outsourcing. However, due to the dynamic nature of the environment and frequent changes, tradeoffs between in- and outsourcing may call for close monitoring. In Table 1, the eight sourcing scenarios are summarized. Whenever dynamic change is involved, the degree of integration and customization should remain relatively low.

6. Conclusion

If e-Government, as some scholars believe,[21] tends to progress towards vertical and horizontal integration at least within a given level and branch of government, sourcing decisions may require more frequent review and revision. A tighter integration of systems and application areas seems to call for the high internal availability of capabilities, competencies, and skills, and perhaps for increased insourcing of at least critical components and interfaces. Two main insights follow from this study.

6.1. An IT/IS sourcing policy framework is currently missing in government

Sourcing decisions in e-Government involve serious choices regarding the information management capacity and the portfolio of organizational capabilities and skill mixes.[56] These decisions are more complex and more far-reaching than those regarding the procurement of commodity-type hardware or software components. While applications such as office productivity tools do not compromise government's independence from private interests and its freedom of choice when completely outsourced because they are readily and compatibly available from other including open sources, other IT/IS

Table 1
Sourcing portfolio mix in e-Government

e-Gov sourcing	Strategic importance, government specificity		No strategic importance, no government specificity	
	High availability of resources, capabilities, competencies, and skills	Low availability of resources, capabilities, competencies, and skills	High availability of resources, capabilities, competencies, and skills	Low availability of resources, capabilities, competencies, and skills
Dynamic change	Insource (Scenario 1)	Acquire knowledge; selectively outsource; prepare for insourcing (Scenario 4)	Redirect resources; selectively outsource (Scenario 6)	Outsource; monitor (Scenario 8)
Static, little change	Selectively outsource; API integration, low priority insource (Scenario 3)	Selectively outsource; monitor (Scenario 5)	Swiftly redirect resources; outsource; monitor (Scenario 7)	Outsource (Scenario 2)

applications would potentially pose the threat of compromising government's neutrality and freedom of choice. For example, when government agencies use COTS enterprise resource management (ERP) systems for their back-office organization, business processes may need to be tailored along the lines of the commercial system. This in itself might pose certain legal and statutory conflicts, when business processes in government are adjusted to meet the requirements of the commercial systems. However, even if critical elements are built around the edges of COTS, government may "find itself held for ransom on maintenance and version upgrades," as one study participant put it. The frequency of and fees charged for such COTS upgrades and maintenance services largely remain at the vendor's discretion. An initially attractive tender offer can turn into a cost nightmare over time as quite a number of interviewees reported. Worse, if a "vendor chooses to pursue a new business or technology direction, which government does not want to follow, the government agency faces the dilemma of its direction being controlled by an outside and private interest," as another interviewee pointed out. Despite such political and even constitutional issues, no evidence was found for an active IT/IS resource and asset portfolio management. IT/IS portfolios seemingly just keep evolving, without being actively managed or guided by a policy framework.

6.2. An IT/IS sourcing policy framework is needed in government

An active and informed management of the e-Gov system portfolio is indispensable for the advanced and transformational stages of integration. The scenarios presented here may serve for taking inventory of existing sourcing portfolios and as a first step when developing a sourcing policy framework. They help assess the portfolio mix along the dimensions described in each scenario. Areas of resource over-commitment, for example, become identifiable, as well as areas of a strategic dilemma, where resources should be allocated and skills should be developed to mitigate undesirable consequences disposed in the sourcing mix.

Because sourcing decisions are complex, biases towards either insourcing or outsourcing have the capacity to exacerbate the problem as the scenario analysis easily uncovers. For example, if government agencies' IT/IS resources are stripped to the extent that the procurement of COTS remains as the only choice, undesired effects in terms of undue private control over public affairs or cost overruns are almost pre-programmed. Likewise, if an over-commitment of IT/IS resources to insourcing remains undetected, taxpayers' money might be wasted for non-strategic purposes. In recent years, however, the latter case seems to be much less pervasive than the former according to the data analyzed in this study.

In summary, this paper contributes to the deeper understanding and implications of e-Gov sourcing in theory and practice. It details similarities, but also uncovers sourcing concepts used in e-Government, which go beyond those used for MIS and PMIS. The paper presents an e-Gov sourcing framework, which relates to and connects the analytical frameworks of Layne and Lee, Currie et al., as well as Goo et al.[21,41,42]

Because sourcing decisions in e-Government strongly affect the information-management capacity and the mix of organizational capabilities, the sourcing framework helps understand the strategic choices involved. With respect to the information management, capacity and the

mix of organizational capabilities serious limits seem to exist. This research strongly suggests that e-Gov sourcing mixes need to be actively and thoroughly managed with a long-term perspective in mind. With its tendency towards higher institutional information integration and interoperability e-Gov presents unique technical, organizational, and managerial challenges to sourcing. At the same time, the risk of lock-in and moral hazards through too tight integration of vendor-controlled components in the e-Gov sourcing mix increases dramatically. The strategic dilemma created by under-funding and resource starvation needs further assessment in this context. Future research will be geared at more deeply developing and testing those sourcing concepts specific to e-Government including a policy framework regarding the e-Gov portfolio mix.

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Other studies showed similar results, for example, the PMIS-related environment was found less agile, more interdependent, bureaucratic, and monitored than the private sector,[57–61] hence, prescriptions from the private sector would only partially apply at best.[62] Private MIS were found many times as resourceful as PMIS (per-capita investment trained personnel), while the importance of IT-related decisions or training did not differ between the sectors.[16] Finally, in PMIS management, the focus was directed towards the budgeting process, technology integration, and aligning PMIS with agency goals, while in the private sector the emphasis was on planning, competitive advantage, and others.[63]

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