The Challenge of Evaluating M-Government, E-Government, and I-Government: What Should Be Compared With What?

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In his original "reengineering" article, Michael Hammer distinguished between automating business processes and reengineering them. Automation has "delivered disappointing results," he argued, because it consisted merely of using "technology to mechanize old ways of doing business." In contrast, to implement Hammer's concept of reengineering, firms would "use the power of modern information technology to radically redesign our business processes in order to achieve dramatic improvements in their performance" (1990, 104). Similarly, under the rubric of E-Government, public agencies have both automated existing processes and reengineered them.

Indeed, some public agencies have done more than convert Manual Government into Electronic Government. They have gone beyond using technology to automate or even reengineer M-Gov into E-Gov. In some cases, public agencies have employed the power of statistical analysis and the advantage of data distribution, which all of those little electrons make possible, to create information-based innovations. They have moved beyond Manual Government and Electronic Government to what is truly innovative: Information Government.

E-Gov is more efficient — and often more effective — than M-Gov. But it is I-Gov — Information Government — that can be truly innovative.

Automation, Reeingineering, and Innovation

Every year, the Ash Institute for Democratic Governance and Innovation at Harvard's John F. Kennedy School for Government presents several awards for "Innovation in American Government." Over a thousand public agencies apply for this award annually, and it is amazing how many apply for the mere electronic automation of one of their existing, manual activities. They have taken their old paper processes and put them online. Yes, at the same time, they may have streamlined these processes. Still, these public agencies are seeking to be recognized as "innovative" for merely converting from M-Gov to E-Gov. The work that these agencies are now doing electronically is not fundamentally different from what they were doing with their old manual, paper-intensive processes. Hammer's article contained in its subtitle his key admonition: "Don't Automate, Obliterate." Nevertheless, much of what has been touted as E-Government is little more than the automation of some manual process: do not send employees their payroll checks through the mail; deposit their pay in their bank accounts electronically. Then, do not send employees their pay stubs through the mail; send these notices to them electronically or, even better, send them an electronic notice telling them how to download their pay stub. What Hammer worried was happening in business has also happened in government. For most of what is called E-Government is little more than the automation of what had previously been manual processes. M-Gov has become E-Gov, but the fundamental, underlying

nature of what government is doing remains unchanged (though citizens *may* find the electronic version more convenient[1]).

Thus, five years into the twenty-first century, any state government or any good-sized local government would be embarrassed to not have created several E-Government web sites — as well as its own portal.[2] For example, several states, including North Carolina, Kentucky, and Virginia, have an easily found "E-Procurement" web site.[3] Michigan has a web site for purchasing hunting or fishing licenses online from its Department of Natural Resources and another for renewing a profession license from either its Bureau of Commercial Services or its Bureau of Health Professions.[4] And Sunnyvale, California, has a web site for obtaining building and planning permits.[5] Such E-Government initiatives (and there are thousands of them) are little more than Hammer's automation. They are not his reengineering.

Some E-Government initiatives are, however, true reengineering. Chicago's 311 call system did radically redesign a core activity of city government: accepting, tracking, and responding to citizen requests for service. Prior to the development of computer networks (for entering, reading, and modifying data in a central database), nothing like Chicago's 311 E-Government system would have been possible.[6] Now, however,

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[1]   Or, they may find the electronic version less convenient. Personally, I liked the old way. I got my pay stub in the mail, tore it open, discarded the envelope, glanced at the critical number, and filed the document with its predecessors. Now, however, I have to log onto the web site, go through multiple screens, enter my password at two different points in the process, get to the document, check "print view" to see if it the document will print onto one page (rather than on 1.05 pages), and then click print. As with some forms of E-Commerce, E-Government may gather some of its increased (internal) efficiency by off-loading work onto citizens.

[2]   Even my own town of Watertown, Massachusetts, (pop. 33,000) has its own portal: http://www.ci.watertown.ma.us. For a discussion of U.S. governmental agencies' web sites (including its portal, *FirstGov.gov*), see Stowers (2002). For a discussion of the web sites of state governments within the United States, see Gant, Gant, and Johnson (2002).

[3]   See   North   Carolina: http://www.ncgov.com/eprocurement/asp/section/ep_index.asp,   Kentucky: https://eprocurement.ky.gov; and Virginia: http://www.eva.state.va.us.

[4]   http://www.mdnr-elicense.com/welcome.asp, and http://www.michigan.gov/elicense.

[5]   http://ecityhall.sunnyvale.ca.gov/cd/default.htm

[6]   Okay. It would — technically — be possible to create a manual 311 system. After all, to calculate the trajectories of V-2 rockets during World War II, Wernher Von Braun organized a gymnasium full of clerks with mechanical desk-top calculators.

Similarly, it is conceivably possible to create an M-Government version of 311. This M-Government would require a large, warehouse-sized room, thousands of telephones, thousands of file cabinets, and a very large staff. Some staff would answer the telephones and record each citizen's service request (SR) on a form in at least quintuplicate. (This form would come pre-stamped with a service-request number.) Other staff would run these SR forms to the file cabinets. Here, more staff would file one of the forms by its SR number and another by the nature of the service requested while shipping the other three copies to the appropriate agency. When the agency had finished the service request, it would note this on its three copies, keep one, and send the other two back to the warehouse. There, these two copies would be filed next to the first two forms. Then, when the citizen called back to check on his or her service request, the appropriate form could be retrieved, and the citizen informed of what action was taken when.

This manual system for handling service requests requires extensive staff, lots of space, and lots of file cabinets. The advantage of automation is that the electrons occupy less space, move much faster, and can be managed by considerably fewer people. This hypothetical M-Government approach is not, however, conceptually different from E-Government's new 311 system.

The electrons create one more advantage: Each service request comes with a number of different characteristics: the nature of the problem; the location of the problem; the time and date that the request was made, the person who made the request. Ideally, any 311 system — manual or electronic — would permit government to retrieve the status of any SR by any of these characteristics. For example, it might be desirable or necessary to retrieve all the SRs for problems at the intersection of Third Avenue and Main Street. Electrons make this easy. But the manual system described above does not permit this. To make this kind of retrieval possible, the system would require some significant expansion: it

citizens can call a single number to request any one of the multiple services that the city provides. If citizens want to city to tow away an abandoned vehicle, to fill a pot hole, or to trim a tree, they just need to call one, three-digit telephone number: 311. Moreover, city employees — from the front-line worker who is responsible for handling the service requests, to the local alderman who wants to know what is happening in his or her ward — have access to such information. Chicago figured out how to use information technology to make the kind of "dramatic improvement" in an existing activity that Hammer had advocated.

From E-Government to I-Government

Further, in a few situations, public agencies have employed the advantages of computer technology not merely to reengineer an existing process but to originate totally new processes. Indeed, the 311 number is more than reeingineering. Yes, Chicago did "obliterate" each of its city agency telephone numbers that were designed to receive service requests from citizens. Yes, Chicago did "radically redesign" the "business processes" by which it took citizen requests, stored such requests, responded to such requests, and accounted for its response to such requests — "to achieve dramatic improvements in their performance." But Chicago did more. Analysts in city departments and the mayor's office studied the data collected through the 311 system to detect patterns and develop different ways of responding to standard, frequent, or difficult requests.[7] This is more than Electronic Government. This is Information Government.

To move from M-Gov to E-Gov requires mere automation. To move from E-Gov to I-Gov, however, requires true innovation.

Two other examples of I-Gov are the Compstat process invented by the New York Police Department and the similar CitiStat process created by the City of Baltimore. In both cases, computer technology has been central to the innovation. William Bratton, who as Police Commissioner drove the creation of Compstat, has emphasized that he was following a management strategy similar to Compstat while a young police lieutenant in Boston, Massachusetts, (Bratton 1998, 99–100); yet, without the technology, he could not have expanded his approach from a single precinct to an entire city as big as New York. Similarly, without the technology, Baltimore could not have created its CitiStat strategy. For both Compstat and CitiStat, computer technology was an enabler. Technology, however, is not, by itself, the core of these I-Gov innovations.

Nevertheless, many reports on CitiStat have emphasized the technological aspects of the innovation. *The Baltimore Sun* labeled it a "new high-tech program for government efficiency" (Shields 2004). *The Star* of Windsor, Canada, said it is "a computer program" (Sacheli 2003). *The Buffalo News* called it "a computer tracking system" ("The State of the City" 2004). *The Daily Standard* termed it "a computerized accountability program" (DiCarlo 2004). *TIME* magazine called it "a computerized score sheet" (Thompson 2005, 20).

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would require two more copies of the SR forms (one to be filed by location and one to be sent to the department and returned) plus an additional set of filing cabinets so that one copy of all SR forms would be filed according to location.

Electronic technology permits government to do such things as calculating trajectories or organizing citizen requests for services both faster and more efficiently. Because Chicago could purchase super-high-speed computers with a lot of storage capacity, it could think about incorporating the data obtained from a 311 citizen call-in system into a large, searchable, retrievable database of every request made by a citizen for service as well the status of the city government's response. Subsequently, it could create an I-Government Innovation by analyzing the information stored in its computers. Indeed, without the existence of such technology, Chicago would have been unable to exploit the analytical, I-Gov possibilities created by its 311 telephone system.

[7]   For example, in an effort to detect potential outbreaks of West Nile Virus, Chicago analyzes calls to 311 to find areas of the city with concentrations of dead crows. Then, it sends city crews to these locations to find and kill mosquito larvae (Kiviat 2005).

Indeed, if you visit a Compstat or CitiStat session, you can easily be mesmerized by the dazzling technology — particularly the constant flashing of new maps and graphs on the walls during a session. Moreover, the folks who manage Compstat and CitiStat are proud of their technology and love to feature it when making a presentation. But this focus on the technology misses a more fundamental point: Compstat and CitiStat were neither created by automating a standard government process, nor were they created by reengineering an existing government process. Rather both are essentially new governmental undertakings, virtually new governmental functions, fundamentally new governmental strategies. Both are true innovations.

Compstat and CitiStat do more than collect and organize data in electronic form so that it can be entered, observed, and retrieved by a variety of government employees — and by citizens too. Compstat and CitiStat use the data stored in the electrons to create new forms of information. Compstat and CitiStat *convert data into information* and use that information to create new strategies for managing either a police department or a city.

This is why 311, Compstat, and CitiStat are more than Electronic Government: they are new, innovative forms of Information Government. The Cities of Chicago and Baltimore and the New York City Police Department have exploited the technology of E-Government to create new forms of I-Government.

The Four Levels of E-Government (and I-Government)

Obviously, the phrase "E-Government" covers a variety of different public-sector activities that are enhanced or permitted by the data-processing capacity of those speedy electrons. I divide these electronically enabled activities into four distinct categories.

> **Level I. E-Gov Information** involves making existing facts and knowledge more widely available to citizens by putting them on the Internet or making them more available to government employees on an Intranet (Mahler and Regan 2002). This information may have to be first collected and organized in a new (searchable) database. Once it is easily available, however, citizens can find this kind of E-Government service very valuable in their daily lives, and public employees may find the information very useful in their daily jobs. On May 17, 2000, when New York City put the results of its restaurant inspections online, this web site received an average 23,000 hits per hour from citizens checking out their favorite eatery (Lueck and MacFarquhar 2000).

> **Level II. E-Gov Automation** consists primarily of doing electronically — or, at least, more electronically — work that had previously been done manually. Why make human eyes and fingers (to say nothing of human arms and legs) do the work, when free electrons can do the same thing faster and cheaper. For example, to file their federal income taxes, U.S. citizens no longer have to complete a paper form; they can do this electronically. Indeed, in 2005, more than half of all U.S. citizens filing their federal income tax did so electronically (Internal Revenue Service 2005).

> **Level III. E-Gov Reengineering** involves, as Hammer advocated, the radical redesign of an important but existing process. Technology is essential for this reengineering for it makes the process redesign possible. One obvious example is the 311 Call Center, now in operation in many U.S. cities.

> **Level IV. I-Gov Innovation** begins not with the task of either automating or redesigning existing work. I-Gov involves more than storing data electronically or putting information on the Internet. Instead, I-Gov is an entirely unique, completely unprecedented strategy for achieving public purposes — perhaps even a wholly new

public purpose. Technology makes this new strategy possible; it provides an inexpensive, highly flexible way to collect, analyze, and then deploy information to provide substantially different or conspicuously better services to citizens. Still, no matter how visible such technology may be, the electronic technology is *not* the core of an I-Gov innovation. This technology does facilitate the innovation but it is not, itself, the innovation. The innovation lies in the novel use of the information that the electronic technology makes possible.

The Evaluation Question: What Should Be Compared With What?

Evaluation requires a comparison. That comparison may be purely informal and strictly implicit — a comparison of what I see with what I expect or hope to see. I evaluate the color of an automobile by comparing it inside my head with the color I have either envisioned or desired. When I look at a 1958 MG, I implicitly compare its color with those of other MGs that I have seen, as well as with the colors that I have seen on Austin Healeys, Triumphs, and perhaps even Alfa Romeos. If I find the comparison pleasing, the color gets s smile; if I am disappointed or irritated, it gets a frown. Red or British Racing Green deliver contentment; right; pink or purple elicit a contorted grimace.[8]

Thus, the first task in undertaking a systematic evaluation of anything — whether it is an antique sports car or an E-Gov initiative — is to decide on the initial basis of comparison. Before launching any evaluation, the evaluator must first answer the key evaluation question: "What Should Be Compared With What?"

The standard answer to the evaluation question — the answer implied in the technique of benefit-cost analysis[9] — is that the benefits should be compared with the costs. And while the costs may be relatively easy to enumerate, the benefits are often more difficult to specify. After all, the benefits of an E-Gov initiative, like the benefits of any management or governance initiative designed to improve the functioning of public agencies, come in a variety of incongruous forms: budgetary savings, increased efficiency, greater effectiveness, process improvements, and enhanced operational capacity (Pollitt 2000).

The benefit-cost answer to the what-should-be-compared-with-what question contains an implicit assumption: the benefits should be compared with the costs by converting all of the different kinds of benefits (and also all of the different kinds of costs) into a single metric: money. Because many of the costs are financial and can be directly measured and compared, the easiest mechanism for comparing what with what is to make this comparison in monetary units.

This is not the only mechanism for making such evaluative comparisons.[10] After all, if you really cared only about the color of a sports car that you were considering buying — if money were not a factor — you would neither need to consider the speed nor styling of the options, let alone compare them in common (monetary) units. You would just pick the car with the most appealing color. But if, in addition to the color, something else were important — maybe you prefer Austin Healeys to MGs — you would need some basis for making the comparison. Thus, you may want to ask: how much would it cost to repaint that Austin Healey in British

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[8]   Yes: there are some electrons involved in this comparison — for it is electrons that are firing the neurons in my brain that are making the comparison. Nevertheless, this evaluation is strictly personal and subjective. Other individuals with different neurons (though identical electrons) will evaluate the color of these objects quite differently. Electrons don't make an evaluation objective.

[9]   Johnson argues that "governments should conduct studies that analyze the benefits and costs of developing web portals and applications for online transactions" but reports that "only one state reported conducting a benefit-cost or return-on-investment analysis *prior* to investing in a web portal project" (Gant, Gant, and Johnson 2002, 51, 41).

[10]   For one critique of benefit-cost analysis, see House (2000).

Racing Green? In a variety of circumstances, money provides a convenient metric for comparing what to what.

When conducting a benefit-cost evaluation of any initiative in the public sector, one core difficulty is to capture fully both the benefits and the costs in common, monetary units. Sometimes the costs are easy to measure; the budget and accounting people can sort out the direct and indirect financial costs for whichever initiative needs to be evaluated. The benefits, however, are traditionally much more difficult to identify, let alone measure. Consequently, when seeking to conduct a benefit-cost evaluation of any of the four kinds of E-Government, the biggest difficulty usually lies with the benefit side.[11]

Evaluating Level II, E-Gov Automation: Calculating the Return on Investment

A Level I initiative in E-Gov Information may be the easiest of the four types of E-Government to implement; it merely requires putting sentences or numbers on a web site. Nevertheless, a Level II initiative E-Gov Automation may be the easiest to conceptualize and the easiest to evaluate. Conceptualizing E-Gov Automation is relatively easy because this initiative evolves nothing more than replacing an M-Gov process with its E-Gov equivalent. If government buys goods and services, it could do this more efficiently with an automated E-Procurement process (Moon 2002). If government sells its surplus property at an auction, it could sell such property through an online auction (Wyld 2001; Wyld 2004). If citizens have to register to vote, they could do this online; if citizens vote, they could do this online as well (Done 2002). Yes, the inevitable technical issues must still be worked out. How many bytes should we allocate to this data field? What should we label it so everyone understands what information the field contains? Still, the transition from a manual to an electronic process is relatively straightforward. Indeed, numerous vendors are prepared to help (for a small fee) governmental agencies undertake such automation.

Similarly, evaluating E-Gov automation is relatively straightforward. This is basically a question of efficiency; the objective behind the automation is to do whatever is being automated more efficiently. The government is not trying to accomplish anything new or different. It is simply trying to do what it has always done more efficiently.

Thus, costs (or benefits) have no new categories. The nature of the costs and the benefits remain unchanged, though the values in many of the cost categories ought to decrease. Moreover, (most of) the important costs and (most of) the important benefits of automation may be easily captured on the agency's annual expenditure statement. Thus, an evaluation of a Level II, E-Gov Automation will be based — almost exclusively — on the efficiency savings found in the government's budget.

Consider the Internal Revenue Service (IRS)'s E-Gov Automation of electronic filing. Any catalogue of the costs and benefits would include those listed in Table 1.

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[11] For an example of a benefit-cost analysis of E-Government, see Texas Department of Information Resources (2003).

Table 1 **The Costs and Benefits of a Level II, E-Gov Automation** **E-Filing Income Tax Returns**	
Costs	Benefits/Savings

Agency Capital Expenditures[12]
    Software
    Hardware
    Facilities
	Agency Capital Savings
	    Less storage space required

Agency Operating Expenditures Employee salaries
    Employee training & adjustments
    Maintenance
	Agency Operating Savings
	    Fewer data-entry processors
	        Fewer hassles over its own data-entry mistakes

Citizens Costs
    Time to learn new system
    Time to implement new system
	Citizens Benefits
	    Time saved
	    Quicker refunds[13]
	        Fewer hassles over the IRS's data-entry mistakes

Of course, neither citizen costs nor citizen savings appear on the IRS's annual statement of expenditures. Any E-Gov Automation will require some change in the behavior of some of the people who work within government to adjust their on-the-job behavior. And an E-Gov Automation, like electronic tax filing, would require some citizens to adjust their behavior. Thus, even for an E-Gov initiative that is designed strictly to improve the efficiency of government operations, it may be necessary to consider the costs and benefits to citizens.

Still, it may be possible to make a comparison. After all, in the case of electronic tax filing, every citizen has a choice: he or she can file a paper or an electronic return. And presumably for every citizen who chooses to file an electronic return, the benefits (however he or she calculates them) exceed the costs. (For those citizens who do not file electronically, neither their costs nor their benefits have changed.) Consequently, if the IRS can determine that its own expenditure savings exceed the additional expenditures that it incurs, the benefit-cost evaluation comes out positive. Indeed, Cohen and Eimicke (2001, 36) conclude that "the Internal Revenue Service's electronic filing initiative must be judged a success."

Of course, evaluating an E-Gov Automation has one, last complication. Many of the costs (and savings too) are found in the annual operating budget. But for any E-Government initiative, there are also up-front capital costs that must be paid for within the first year or two. Still, this problem has a well-known technical solution: discounting. If all future costs (and future savings) are discounted back to the present, all costs and savings can be converted to their present value, summed up, and compared.

If all of the benefits from an E-Gov initiative are forgone expenditures — particularly well-known expenditures that the organization has historically made year after year and that now are certifiably less —

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[12] Johnson reports (2002, 41) that, although web portals are clearly capital projects, 85 percent of them in state governments "are currently funded as operating expenditures."

[13] Some may argue that Agency Operating Expenditures should include the loss of interest on the funds that the government refunded to taxpayers more quickly. This, however, is not a loss to the Internal Revenue Service but to the Federal Government's general fund. Moreover, neither the refunded money nor the interest that can be earned from it really belong to the government. Consequently, I have not included them in Table 1.

then the evaluation is strictly a financial calculation. And for many an E-Gov Automation, this is indeed the case. There may also be some citizen costs as well as citizen benefits; but if citizen behavior suggests that the citizens' benefits exceed their costs, then the agency may be quite confident that, if its own savings outweigh its own expenditures, that benefit-cost evaluation is, indeed, positive.

Evaluating Level I, E-Gov Information: Estimating the Benefits of Information

An E-Government initiative that consists purely of putting information on a web site may be easy to implement. The information does need to be collected. And it may have to be reorganized in some kind of electronically-searchable database. It may not, however, be easy to evaluate. After all, an initiative in Level I, E-Gov Information involves more than doing some activity more efficiently. Even if the information was already official "public information" — even if it was legally available to any and all citizens — it was certainly neither widely nor easily accessible. Citizens may not have known the information was available. They may not have found it to be simple to obtain. They may also not have found this information to be simple to understand.

The financial costs of a Level I, E-Gov Information initiative may be easy to calculate; they will look very similar to the capital and operating costs listed for E-Gov Automation. And the financial benefits that accrue from costs saved by not providing the information in the old way may also be easy to calculate. Unlike in the case of E-Gov Automation, however, these savings may not be greater than the costs; after all, an initiative in E-Gov Information often consists of a new or expanded service (not just the automation of an existing one).

Thus, when launching an initiative in E-Gov Information, a public agency may be forced to make a large number of choices about how to organize and present this public information. What information should be included? What information should not? And how should it be presented? What should be the structure of the web site? How should this information be distributed among the various web pages, and how should information be presented on each web page? E-Gov automation is just that — the more efficient automation of an existing process. Given that the process already exists, there may be few basic design choices that need to be made. But unless an initiative in E-Gov Information is strictly putting on a web page — without any change in format — something that was previously on a paper page, the task may involve a number of fundamental choices.

Moreover, these choices will affect the nature of the benefits that citizens gain from the increased availability of some (but not all) information. And these social benefits are much more difficult to specify. What, exactly, are the social benefits of new information more widely available to citizens? And are there any new (perhaps unanticipated) social costs?

Consider New York City's E-Gov Information initiative of putting the results of Health Department's restaurant inspections on the Internet. Table 2 lists the categories of benefits and costs for this Level I initiative. What are the benefits to citizens of having this information so readily available? Given that thousands of citizens seek out this information daily, we can assume that, for these citizens, the information is worth more than the time and hassle it takes to find the information on the Internet.[14]
Thus, for these citizens, at least, the net benefits are positive. But how positive are they? Without forcing citizens to pay for the service, it is difficult to determine how valuable citizens really think the service is.

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[14] Starting with the search engine Google, it took me less than two minutes to find the inspection results of several restaurants in mid-town Manhattan. The basic web page for these restaurant inspections is: http://www.nyc.gov/html/doh/html/rii/index.shtml.

Additionally, consider the citizens who obtained restaurant inspection information the old-fashioned way — either by looking it up in some publication or by calling or visiting the Health Department. Are their net benefits positive? We could assume that they are. After all, for them, obtaining the information would appear to be much easier and more convenient. Still, there may be some (how many?) curmudgeons who really do prefer the old system.

Finally, providing information to citizens in different ways has an opportunity cost. Maybe a city's Health Department should devote its limited resources to other ways of providing this information to the elderly and the poor who are not apt to use the Internet. Maybe it should devote its resources to ways of ensuring that the information is available in Spanish and any other language that is spoken by at least 10 percent (2 percent?) of its citizens? (Pollitt 2000, 191). The budgetary costs of this initiative in E-Gov Information do capture these opportunity costs.

Still, this budgetary approach does not produce a definitive answer to the what-should-be-compared-with-what question. Maybe this Level of E-Gov initiative (indeed, maybe all Levels of E-Gov) should be compared not with doing nothing — with not spending any money — but with other initiatives that require the same level of expenditures, including those that do not exploit the speed and agility of electrons. Table 2, however, implicitly compares a Level I initiative in E-Gov Information with doing nothing.

Table 2 The Costs and Benefits of a Level I, E-Gov Information Restaurant Inspections on the Internet	
Costs	Benefits/Savings

Agency Capital Expenditures
      Software
      Hardware
      Facilities
	Agency Capital Savings
	      Maybe none

Agency Operating Expenditures   Employee salaries
      Employee training & adjustments
      Maintenance
	Agency Operating Savings
	Mailing savings
	      Telephone-operator savings

Citizens Costs
      Time and hassle of going online and finding the desired information
	Citizens Benefits
	      More access to more information

But E-Gov Information does not have to provide new or better information to the citizens. It could provide new or better information to government employees. For example, the Iowa Department of Revenue created a "data warehouse." With this electronic storage facility, the department collects and organizes in one electronic location information from a variety of state agencies that deal with businesses and citizens who are taxed or regulated by state government; this information includes the Revenue Department's data on businesses and citizens (as well as similar IRS data), unemployment compensation data, and data on vendors that do business with state agencies. This form of E-Gov Information permits auditors in these various agencies to check for noncompliance.

As usual, calculating the capital and operating costs was relatively straight-forward. For Iowa's data warehouse, these totaled 11.5 million USD over three years. But what are the benefits? In this case, what increased tax revenues did the data warehouse produce? Of course, the data warehouse itself produced no new tax revenues. Instead, its existence permitted some state employees to launch a variety of special

programs that did, indeed, collect revenue "above and beyond" the state's traditional "baseline, existing revenues." And, the department estimated, these additional revenues totaled 32 million USD over the first three years.[15]

Still, this benefit number is an estimate. For it assumes that *none* of the 32 million USD would have been collected were it not for the analysis that the data warehouse made possible. Yet, it is not obvious that government would have done nothing; no one can say for sure that one or two entrepreneurial state employees — if they had not had the data warehouse available — would not have invented some other way to identify and collect one or two additional dollars (or one or two million additional dollars). If the world had not discovered the electronic technology that permitted Iowa to create its data warehouse, financial pressures may well have encouraged other innovators within state government to find other creative ways to identify and collect the state's outstanding revenues.[16]

Nevertheless, it is probably reasonable to assume that the state revenues would have been significantly lower (if not 32 million USD lower) without the data warehouse. Thus, even if you believe that the state overestimated by a factor of two the value of the additional tax revenues gained by employing its data warehouse, a simple comparison of the cost number with the benefit number still suggests that the state's investment in the data warehouse was worth it.

Evaluating Level III, E-Gov Reengineering: Estimating the Value of Improved Service

If the evaluation of an initiative in E-Gov Information depends primarily on the estimate of the benefits that citizens receive from more-easily obtained information, the evaluation of an initiative in E-Gov Reengineering depends principally on the estimate of the benefits that citizens receive from significantly better service. Yes, a Level II initiative in E-Gov Automation produced a better — that is, more efficient — service. But a Level III effort at E-Gov Reengineering requires the obliteration and the subsequent redesign and reconstruction of the original services; consequently, the replacement service is not merely "better." The service is now significantly better — and, perhaps, qualitatively different.

This is certainly the case for 311, for which Table 3 catalogues the benefits and costs. From the citizen's perspective, this service is both significantly better and qualitatively different. The city is accepting — indeed, encouraging — citizen requests for services through a single, simple-to-remember telephone number. By creating this 311 number, the city is not merely making it easier for citizens to call the city. With the 311 number, the city is actually inviting such calls. The city is stimulating additional requests for service.

How much do citizens value this new, improved service? How do they evaluate the ease with which they can now request a service from the city (and check back on its status)? How do they evaluate their city's increased willingness to respond to their requests for service?

For this initiative in E-Gov Reengineering, what should be compared with what? To estimate the value that the citizens are receiving, the new service is one "what." And, if only implicitly, the citizens would be comparing this new, improved service with the old, decrepit, hard-to-use (or impossible-to-use) service. When citizens estimate the benefits that they receive from the new service, they will not attempt to compare

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[15] This information comes from "Nuclear Research (2004) plus a telephone conversation on Friday, April 22, 2005, with Rhoda E. Kirkpatrick, project manager, Iowa Department of Revenue and Finance.

[16] For example, in the 1980s, without the advantage of a data warehouse, the Massachusetts Department of Revenue found a variety of innovative ways to identify and collect taxes that were legitimately owed to the state. See Behn (unpublished).

the fancy 311 service with the modest, automated, but not reengineered service that the city may have been able to provide. They will simply compare the new service with the old.

But how will they do that? How much better will they decide that the new service is? How will they even think about the value of the new service? What kind of thought process would they use? How do citizens go about evaluating a service that government has never before provided?

Economists have created a mechanism for getting citizens to answer this question in monetary terms: ask them how much they are willing to pay for the service. Unfortunately, citizens' hypothetical willingness to pay often differs significantly from their operational willingness to pay. When confronted with a concrete payment decision, the behavior of humans often differs significantly from the hypothetical answer that they gave to a pollster. Thus, any evaluation of an E-Gov initiative that requires an estimate of non-financial benefits and costs — particularly those that accrue to citizens — depends upon a variety of assumptions that the evaluators make about them.[17]

Table 3 **The Costs and Benefits of an E-Gov Reengineering** **311 Call Center**	
Costs	Benefits/Savings

City Capital Expenditures
    Software
    Hardware
    Facilities
	City Capital Savings
	    Agencies' telephone lines discontinued or converted to other uses

City Operating Expenditures   Employee salaries
    Employee training & adjustments
    Maintenance
	City Operating Savings
	    Agency telephone-operators who are now free to perform other tasks.

Citizens Costs
    Poorer service for some insiders
	Citizens Benefits
	    Requesting a service is easier
	    Obtaining information on the status of a service request is much easier
	    Requesting a service is encouraged

Evaluating a Level IV, I-Gov Innovation: Estimating the Value of a Completely New Service

Evaluating a Level III E-Gov Reengineering is complicated because it requires an estimate of the value citizens gain from the new and, perhaps qualitatively, improved service. At least, however, the citizens have a basis for making this evaluative estimate. For 311, they have a sense (if not personal, operational knowledge)

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[17] There is also the question of the costs imposed upon citizens by the new 311 system. There do not, however, appear to be many. Maybe a few citizens (plus a few aldermen) really knew how to make the old system work. They had memorized one (or several) of the city's key telephone numbers and had made friends with the people who answer these telephones. They had devoted the time and energy to figuring out how to make the old system work for them. Consequently, they were able to obtain immediate and personal service. Now, however, their request is no different than any other citizen's. These few insiders would, with the new system, incur a cost in terms of impersonal (i.e., poorer) service.

And how would they evaluate this deterioration in their own, personal service? Again, willingness to pay — "How much would you pay to have the old system back?" — could provide an answer. Still, we may be a little uneasy about how accurate or meaningful any answer to this question may be.

of how their government worked before the city reengineered its telephone-answering and service-request system; they have some understanding (if only implicit and indirect) of how easy or difficult it was to get the city to fill a pothole. They may not be able to give an intelligent, reliable, monetary estimate of how much they value the reengineered service. Still, they have, at least, a basis of comparison.

But what basis of comparison may citizens use for a Level IV, I-Gov Innovation? What might they compare with what? What benchmark might they use as the basis from which to compare such an innovation? And what might they conclude are the benefits and costs of the innovation?

For example, in the case of Compstat or CitiStat, citizens do not directly see, feel, or otherwise experience the innovation's benefit. Sure, Compstat may reduce the crime rate, and CitiStat may get the potholes filled more quickly. But how do citizens know? And how do citizens know to attribute any improvement that they perceive in their quality of life to Compstat or CitiStat. Sure, the entrepreneurs who launched these, Level IV, I-Gov Innovations are telling the citizens how their new-fangled invention is improving everyone's lives. But how much will the citizens believe them? How much should the citizens believe them? For two reasons, the citizens' answer to the economists' willingness-to-pay question become even more chimerical.

First, citizens have no clear benchmark with which to anchor their judgment about any improvement in their quality of life. Maybe it does appear that the pothole got filled more quickly. But how much more quickly was that? How quickly was it *before?* How quickly is it now? Maybe it does appear that the neighborhood is safer. But how much safer? How much safer was it *before?* How safe is it now? For citizens, this is the measurement question.

Second, citizens have no clear way of knowing how much any quality-of-life improvement was caused by the I-Gov Innovation about which the jurisdiction's public officials are constantly speaking. Maybe that pothole was filled quicker not because the CitiStat innovation was keeping the Public Works Department focused on this important service. Maybe that pothole was filled quicker (if it was quicker) because the asphalt truck just happened to be driving past, and the driver bothered to stop. Maybe the crime rate is down not because the Compstat innovation is keeping the precinct commanders and beat officers focused on developing locally-effective, crime-fighting strategies. Maybe the crime rate is down (if it is down) because jobs are more plentiful, and criminals now have other economic opportunities. For citizens, this is the attribution question.

The catalog of costs and benefits for an I-Gov Innovation (see Table 4) may be quite a bit shorter. For example, neither CitiStat nor Compstat are apt to create any significant savings in either the city's capital or operating budget. And neither are they likely to impose many costs on citizens. Moreover, the costs to the city's capital and operating budgets are relatively easy to specify.

For a Level IV, I-Gov Innovation, the big question concerns the benefits to citizens. These benefits are quite complex, often intangible, and perhaps only ethereal. How large do citizens think these quality-of-life improvements are? And how much do they think governmental innovation caused these improved benefits? These measurement and attribution questions are what make evaluating a Level IV, I-Gov Innovation so difficult.

Table 4 **The Costs and Benefits of an I-Gov Innovation** **Compstat and CitiStat**	
Costs	Benefits/Savings

City Capital Expenditures
     Software
     Hardware
     Facilities
	City Capital Savings

City Operating Expenditures   Employee salaries
     Employee training & adjustments
     Maintenance
	City Operating Savings

Citizens Costs	Citizens Benefits Improved Quality of Life

The Evaluation Challenge

The task of evaluating even a simple Level I initiative in E-Gov Information — for example, New York City's database of restaurant inspections and Iowa's database of the financial interactions that citizens and businesses have with government — is not all that simple. Indeed, the conceptual challenge is the same at Level I as at Level IV. For any effort to evaluate a new form of M-Government, E-Government, or I-Government confronts the same basic question: *What should be compared with what?*

Often, buried in an evaluation of a government initiative lies the implicit assumption that, had the government not created this initiative, it would have done nothing. Indeed, this is the assumption that the public official would prefer: "Look how much better things are compared with when I took over." Implicit in this declaration is another assumption: "If I had not taken over, nothing would have happened." "If I had not done something, your quality of life would not have improved."

Indeed, our knowledge of organizational behavior suggests that this assumption is quite plausible. After all, the best predictor of what an organization will do this year is what it did last year; all organizations have created routines and standard operating procedures that they continue to employ year after year after year. Moreover, an organization does not develop its routines and procedures randomly but to solve its own, real problems of coordination, consistency, and predictability. The continuity in the behavior of public agencies is well known and derived from important organizational needs (Allison 1971, chapter 3). Perhaps then, we should take seriously at least part of the public official's default basis of comparison. Any change in the operation of government (though not necessarily the presumed consequences) should be compared with what government was doing before the initiative was launched.[18]

Many scholars who specialize in program evaluation would disagree. They would advocate a controlled experiment, which provides a clear answer to the what-should-be-compared-with-what question. One "what"

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[18] Pollitt (1995 144) has a (slightly) different answer to this part of the what-should-be-compared-with-what question. He argues that it "should be where the organization is now compared with where it would have been if it had continued developing as it had been immediately prior to reform." Of course, it is difficult to say with any assurance how the organization would have "continued developing." Indeed, this assumes that the organization was indeed "developing" rather than stagnant. Naturally, it is in the current public official's interest to assert that the organization was not developing but was, indeed, stagnant. Nevertheless, from what we know about organizational behavior, that may not be such an unreasonable assumption.

comes from the treatment group that receives the benefits (and costs) of the governmental initiative. The other "what" comes from the control group that is denied access to the initiative.

For example, a controlled experiment of 311 would have involved installing the new system in half of the city while continuing the old system in the other half. Such an experimental approach to evaluation confronts, however, some significant practical problems. What will the citizens in the half of the city that does not get the 311 system — to say nothing of their alderman — say about the experiment? Can the mayor justify politically the huge capital cost of the 311 system if it is only an experiment? Can the operators of the 311 system develop a practical method for denying half the city access to the 311 number?[19]

Other scholars advocate that any such experiment should introduce only one aspect of an initiative in any experimental jurisdiction (Karmen 2000, 95). But what if the various components of the initiative are expected to not have independent effects, but to reenforce each other synergistically? (Behn 1991, chapters 8, 9) The 311 system includes not just the single telephone number — it also includes the database of the service requests, plus the tracking and follow-up on these requests. Indeed, it even includes a publicity campaign to convince citizens to call 311. What would the half of the citizenry who could not get through to 311 do? Answer: complain — and loudly.

Conducting a controlled experiment of any E-Gov or I-Gov initiative (and of many M-Gov initiatives in governance and management) would appear to confront some problems of practical and political significance. Thus, for most E-Gov and I-Gov initiatives, the public official's implicit assumption — that the default baseline from which we should evaluate any initiative is what was happening before the initiative and thus would have continued to happen without the initiative — may be the only realistic basis for a comparison.

Still, even with this as the baseline from which to measure citizen benefits, the second, attribution question remains: *What caused what?* If the citizens' quality of life did increase, whose fault is it? Was this improvement caused by the government? How do we know that any improvement was not caused by an unusual change in the intensity of sunspots, by fluoride that was (secretly) added to the water, or by the aliens who visited Area 51 half-a-century ago? How can we be confident that a governmental initiative actually caused any improvements?

Indeed, tracing out any cause-and-effect connection is never easy. There exist many possible cause-and-effect theories. Indeed, for every public official who asserts that Compstat reduced crime in New York City (Bratton 1998; Giuliani 2002) there exists a scholar who will assert precisely the opposite (Harcourt 2001; Levitt and Dubner 2005). Thus, without a social experiment, it is impossible to eliminate the competing cause-and-effect theories. Indeed, without such an experiment, someone can always assert that any change from the baseline was somehow caused by sunspots, fluoride, or aliens.

Evaluating an E-Gov initiative is hardly different from evaluating any effort to improve the workings of government regardless of whether it seeks to achieve that improvement by deploying electrons or with some other management strategy. The electrons offer a number of advantages; they are speedy, agile, cheap, and versatile — and they do not talk back. They provide government with the opportunity to do things more efficiently and more effectively. Moreover, they offer government the opportunity to do new and different things.

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[19] An alternative would be for two similar cities to flip a coin. Philadelphia installs 311; Cleveland doesn't. But any comparison of citizen services in Philadelphia with those in Cleveland would be so confounded by other differences that the experiment could hardly produce a definitive conclusion.

Electrons, however, are not the only mechanism that government has to increase efficiency, to improve effectiveness, or to foster innovation. We can also improve the workings of government by capitalizing on the motivation and ingenuity of humans. Still, whether we rely on electrons or humans, the core challenges of evaluating such initiatives to improve the performance of government are the same (Boston 2000; Blalock 1999; Denrell 2003; Pollitt 2000). Always, there is the fundamental question that only humans (not electrons) can answer: "What should be compared with what?"

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