Eight Imperatives

for Leaders in a Networked World:

[A Series of Guideline Papers for the Year 2000 and Beyond]

Imperative 3:

Utilize Best Practices for Implementing IT Initiatives

The Harvard Policy Group
on Network-Enabled Services and Government
John F. Kennedy School of Government

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Overview

"The time is ripe for public leaders to engage information technology issues more deeply, directly, and successfully."

PREFACE

As we enter the new millennium, everyone from futurists to the general public has observed that information technologies are changing our patterns of social, commercial, and political interactions. These changes raise profound opportunities and threats for people everywhere. It is a revolutionary period, with many issues not yet fully understood, let alone resolved.

Throughout this period, our public leaders—including elected and appointed officials and their overseers in all branches of government—have too often ignored technology issues or have delegated them to others. The conventional wisdom has been that technology is either not very important, or requires technical expertise rather than leadership, or is simply too risky for leaders to get personally involved.

These views are changing, however. Due primarily to the astonishing growth of the Internet and e-commerce, technology is now widely acknowledged as a critical force in shaping the future. The need for skillful and committed leadership has become obvious.

But the risks are still there.

As a result, public leaders—often under enormous and competing pressures—remain uncertain about how to successfully engage technology-related issues.

In response to these developments, Harvard University's John F. Kennedy School of Government assembled a group of distinguished public leaders to explore what was being learned about computer networking and its impacts on the roles and responsibilities of government.

The Harvard Policy Group on Network-Enabled Services and Government (HPG) includes legislative and executive leaders, private-sector and public-sector leaders, technology managers and general managers, and public officials from federal, state, and local governments in the United States and Canada. Working over a three-year period, the HPG concludes that the time is ripe for public leaders to engage information technology issues more deeply, directly, and successfully. To improve the quality of engagement, the HPG has developed a set of eight imperatives for those who seek to lead in this critical period. Each of the individual imperatives addresses a significant leadership responsibility and is the subject of a separate paper (for a list of the papers, see the back page). Taken together, the HPG papers provide a framework to guide those who seek to develop successful information age leadership strategies.

The report you are reading explores imperative #3: *Utilize Best Practices in Implementing IT Initiatives.* It addresses how leaders can avoid critical implementation problems by using proven—if not yet widely applied—strategies for managing IT implementation. The central theme is to approach IT implementation primarily as an organizational change challenge, not simply a technology issue.

The HPG was made possible through a partnership among the Kennedy School of Government, American Management Systems, Cisco Systems, and IBM's Institute for Electronic Government. The views in these papers are those of the individual members of the HPG and not the institutional views of their home organizations or project sponsors. But it would have been impossible for the group to learn and to produce what it has without the opportunity provided by this partnership to meet together and to share insights over an extended period of time.

We sincerely hope that these papers will prove helpful to leaders and to the public at large.

THE HARVARD POLICY GROUP ON NETWORK-ENABLED SERVICES AND GOVERNMENT
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In recent years, public leaders around the world have increasingly recognized that information technologies (IT) are powerful tools for improving organizational strategy and performance. As we discussed in reports on Imperatives #1 and #2,* these leaders have begun to identify and develop innovative, high-value IT projects that will fundamentally change the way public sector organizations work. At the same time, however, such projects have historically come in late and over budget and have often failed altogether.[1]

In response, public oversight agencies such as the U.S. General Accounting Office and the Treasury Board Secretariat of Canada have published guidelines and methodologies to help governments implement IT initiatives more successfully.[2] While these tools have been used with much success, many IT initiatives continue to fall short of their initial promise.

In large measure, these implementation problems exist because too many organizations conceive of, organize, and implement IT projects first and foremost as technology efforts. Admittedly, the technology decisions and issues in major IT initiatives require careful attention. The "showstopper" problems, however, are almost always the problems that flow from the politics of organizational change. IT implementations can be greatly improved when change-related issues get the kind of attention they deserve.

The purpose of this paper is to explore the implementation challenges posed by IT projects and to describe what public leaders should do to manage such projects successfully. The ideas presented here are based not only on sound theory but, most importantly, on the recent experience of leading public-sector organizations.

Implement

"...implementation risks are substantially higher than they need to be."

THE IMPLEMENTATION PROBLEM: IGNORING ORGANIZATIONAL AND BEHAVIORAL CHALLENGES

For many years, IT projects were left largely to technology experts. While general managers and political leaders were usually involved in approving such projects, they typically delegat-

**Imperative #1: Focus on How IT Can Reshape Work and Public Sector Strategies* and *Imperative #2: Use IT for Strategic Innovation, Not Simply Tactical Automation*, are available at www.ksg.harvard.edu/stratcom/hpg

ed implementation to technologists. However, as IT became deeply embedded in strategy and organizational processes, general managers took a renewed interest in technology implementation efforts. In addition, as projects missed timelines and budgets, leaders recognized the complexity involved and the strong project management tools and skills required, including financial controls, human resource management, time allocation, project review, and oversight.

Of the top 10 factors listed by The Standish Group as "factors that cause projects to be challenged," only two (Technology Incompetence and New Technology) are "technology" problems. The rest require project-management and change-management skills.

- Lack of user input
- Incomplete requirements and specifications
- Changing requirements and specifications
- Lack of executive support
- Technology incompetence
- Lack of resources
- Unrealistic expectations
- Unclear objectives
- Unrealistic timeframes
- New technology

Source: The Standish Group, *CHAOS*, 1995.

While technological complexity and project management must still be addressed, it has recently become clear that the most significant challenges are related to interpersonal and organizational politics. Today, almost all IT projects undergo a technical-feasibility study to uncover potential problems and to ensure that the project can work technologically. Furthermore, almost all IT projects today include a financial assessment to clarify the financial costs and revenues associated with the project. What remains rare, however, is for those planning IT projects to undertake an equally rigorous up-front assessment of behavioral and organizational feasibility. Will the people involved in the project have the knowledge and skills, including change-management skills, to do what is required? Will they have the incentives required to support new behaviors? Understanding such "people" factors is just as important as understanding the "technology" factors.[3]

Without a strong response to the challenges of change management, implementation risks are substantially higher than they need to be.

Potential

"...the real potential of IT will never be gained if the more challenging projects are ignored."

WHAT TO AVOID: LIMITING IT PROJECTS BY SIMPLY AUTOMATING EXISTING PROCESSES

Since IT projects that involve significant organizational change are hard to implement, it is tempting to focus on lower-risk projects that simply automate existing processes. However, given the integral role IT now assumes in organizational strategy and processes, focusing on these projects ignores the organizational-change challenges associated with all IT projects today.

Moreover, the real potential of IT will never be realized if enterprise-wide investments, workflow reengineering, and other challenging initiatives are ignored. New technologies must not be used simply to automate existing workflows but, rather, to reorganize work and strategy in ways that fundamentally transform government operations—integrating workflow across (and outside) government in recognition that citizens interact with government as a single enterprise. Leaders need to understand and appreciate the value that can be created when technology is used to redesign workflow from an enterprise perspective. While such changes will often be difficult to implement, their potential benefits may very well justify the risks involved. The goal is to balance risk against return—not merely to minimize risk.

Organize

"Organize your major IT projects first and foremost as organizational change initiatives."

SUCCESSFUL IMPLEMENTATION: MANAGING CONFUSION AND CONFLICT

Successful IT implementation requires that leaders and other stakeholders combine their knowledge of what to do with the motivation needed to get it done. If participants are too confused, they will not know what to do or how to do it. If they are too conflicted, they will not believe that the project is in their interest. To manage these problems, leaders need strong interpersonal and political skills as well as the organizational authority needed to make these skills effective.

For leaders, a first step is to understand the patterns of confusion and conflict associated with a given project. Different patterns will then require different types of leadership (see Figure 1).

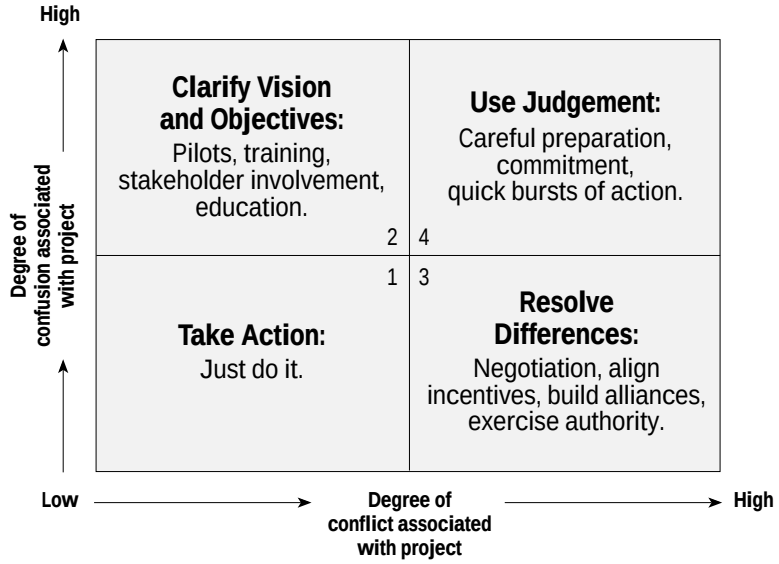

Figure 1: The Implementation Leadership Matrix

Projects with low levels of confusion and conflict: Projects in the bottom left quadrant of the matrix are relatively straightforward—and also relatively rare. Most stakeholders understand and support the work to be done. The guideline here is to "just do it." This advice is especially important for infrastructure that will be valuable regardless of how the strategic vision is eventually shaped. Life in the public sector is too difficult to let the easy ones get away. Unfortunately, as mentioned above, most public-sector technology efforts do not fall in this quadrant—which is probably why you are reading this report in the first place.

High confusion projects: When confusion is high (top left quadrant), serious work is required to clarify the vision. Leadership for these projects is largely an educational and communicative challenge; you must work with those directly affected by the project to define and communicate the vision, the business objectives, and the implementation requirements. In doing so, you may find that planning exercises, training programs, pilot projects, and other tools are useful for helping stakeholders move from confusion to clarity. Public relations and marketing can also be powerful tools. Guidelines #2 and #3 (below) should be especially useful when confusion is high.

High conflict projects: When the problem is conflict rather than confusion (bottom right quadrant), leaders must work to understand the sources and strength of opposition and then move to resolve differences. Leaders must understand how quickly stakeholders can absorb change and then provide the right amount of pressure to achieve that rate of change. In many cases, IT-enabled work may overcome conflicts by producing enough efficiency to create win-win-win situations for service recipients, taxpayers, and employees alike. In settings where serious opposition remains, however, leaders may need to use their skills and authority to overcome, rather than convert, those in opposition. Guidelines #4 and #5 (below) should be especially useful when conflict is high.

Projects with both confusion and conflict: Unfortunately, some of the most valuable IT initiatives—e.g. enterprise or other cross-boundary projects with significant changes in workflow—involve high levels of both confusion and conflict (top right quadrant). While the benefits of such initiatives may be large, overcoming the barriers that hamper cooperation across organizational boundaries is difficult. Good judgment is especially essential in settings that are both confusing and conflicted, and discretion can be at least as important as valor. Stopping or cutting back can be the wise road in some cases. In other cases, however, the leader must motivate the group to fight through uncertainty and opposition. Careful preparation and commitment is critical. Likewise, implementation should be quick and forceful, in order to reach a relatively safe position where value has been created and supporters feel justified and encouraged to maintain support. Guidelines #6 and #7 are specifically directed at these challenges.

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While there are many opportunities to create value through simple automation, more substantial value is created primarily by enabling people to transform how government does business internally (within enterprise boundaries) and externally (with key stakeholders). As such transformations often require people to change their responsibilities and their relationships with each other, they also tend to generate confusion and conflict. Understanding the challenges of confusion and conflict will not ensure successful implementation, but ignoring them will certainly guarantee failure. Leaders need to arm themselves with the tools, strategies, skills, and authority needed to cope—first and foremost by organizing major IT projects as organizational change initiatives.

Succeed

"To succeed, leaders must understand and resolve issues of confusion and conflict."

GUIDELINES FOR IMPLEMENTING SIGNIFICANT IT-BASED INITIATIVES IN THE PUBLIC SECTOR

Having committed to addressing the behavioral challenges associated with IT, and having identified potential sources of confusion and conflict for a particular project, what can you do to implement successfully? Consider the following seven guidelines in developing your agenda.

1. Copy without embarrassment: Look, learn, and do.

Problem. Given the size and contentious nature of most public sector environments, change is always difficult, with risks increasing significantly when projects are based on untested models.

What to avoid. Do not make IT implementations any harder than they need to be by getting captured by the "not invented here" mentality. Do not blithely assume that the particular circumstances of your organization make the experience of others irrelevant. By all means copy, but do so carefully, focusing on the critical success factors that can be gleaned from those you are copying from.

What to do. Keep things as simple as possible by aggressively learning from others and building on standards set elsewhere. When software has evolved to become a commodity, be sure to buy rather than build—looking at application service provider (ASP)-based solutions for enterprise systems. Consider adapting your work processes to fit the software rather than customizing the software to fit the way you presently work. A strategy that follows the pioneers quickly—while avoiding their mistakes—can work wonders to gain value at relatively low risk.

An Example. NASIRE's Open-Source Application Development Project. Members of NASIRE's Open-Source Application Development Project (Arkansas, Georgia, New Jersey, Pennsylvania, and Washington) are in the planning stages of a project that will conduct pilot exchanges of public-domain e-government components and applications.[4] These pilots will serve as the foundation for a catalog or clearinghouse of government-specific components and applications assembled by states and their corporate partners in the implementation of e-government initiatives. In addition to these pilots, a small group of engineers and technicians are also developing a concept for a proposed inter-state application development environment. In this environment, staff from different jurisdictions will work together to support the development of e-government applications. While still in the early stages,

this project highlights the potential value of sharing and reusing knowledge, components, and applications.[5]

For more information about NASIRE's Open-Source Application Development Project, visit www.nasire.org/hotIssues/dg/index.cfm

An Example. Reusing Software Code at the U.S. Department of Defense. Writing quality software takes a significant amount of time and effort. Recognizing that the reuse of proven code could save time and money while simultaneously improving quality and reliability,[6] the U.S. Department of Defense launched the Software Reuse Initiative. This initiative explores and documents the benefits of software reuse, promoting reuse throughout the DoD. For example, the Army Tactical Command and Control System (ATCCS) reused code across five systems at an estimated cost savings of $479.9 million. Similarly, the Navy experienced a 26 percent reduction in required labor hours to develop and maintain its Restructured Tactical Data Systems.[7] Reusing code is not always simple, but it can be extremely effective.[8]

For more on the Software Reuse Initiative, see dii-sw.ncr.disa.mil/reuseic

An Example. Australia Post and SAP.[9] Once Australia Post decided to use SAP as its enterprise financial-control and materials-management system, implementation required less than six months. A critical success factor was their commitment to keeping application modifications to a minimum. Rather than customizing the software to match their business processes, Australia Post reorganized their business to work with the application. This decision also created downstream benefits by making subsequent system enhancements much easier to implement.

2. Mobilize and maintain broad support in shaping the vision.

Problem. Many public organizations use steering committees as up-front overseers to guide and prioritize e-government efforts.[10] But implementation also requires participation and support from many stakeholders. Unfortunately, stakeholders are often busy with their own concerns and may be largely in the dark about what needs to be done and why. Confusion can easily bring implementation to a halt.

What to avoid. The most common mistakes derive from a vision and/or business plan that has not been sufficiently clarified. You need a unifying vision, both to inspire stakeholders and to guide the day-to-day decisions of the project team. While the vision will evolve over time, it should be suitably aligned with defined business objectives. If not, the scope of the project is likely to change so often that nothing will get completed.

What to do. Clarify the vision and business case to market the project and mobilize support. Engage others in shaping the project, coming back to the vision and business case when support is waning. Keep supporters actively engaged to keep the project focused and energized throughout implementation. Never stop communicating.

An Example. The Texas Electronic Government Task Force. Electronic government means many things to many people. Yet, for any specific initiative to succeed, everyone involved must agree upon a single vision and a defined set of business objectives. When the membership of the Texas Electronic Government Task Force was defined, it not only included members from across state government, but also from local governments, businesses, and the public. By bringing diverse stakeholders together, the Task Force was able to create a shared vision for Texas Online. Building on this success, the Texas Online Commission (which succeeded the Task Force) was established to ensure that a broad set of overseers continued to play an active role in guiding and supporting the project team.

For more information on the Texas Electronic Government Task Force and the Texas Online Commission, see www.dir.state.tx.us/egov

An Example. A Transition Organization for Singapore's TradeNet. When Singapore decided to build an industry-wide IT platform to facilitate the processing of trade documentation (TradeNet), leaders realized that no single organization could accomplish the trade process redesign independently—management and execution of the trade process extends across many government agencies and private companies. Two high-ranking and powerful public leaders—Philip Yeo, chairman of both the Economic Development Board and the National Computer Board, and Yeo Seng Teck, chairman of the Trade Development Board—assumed responsibility for gaining commitment from the necessary parties and for providing project leadership. In order to keep stakeholders involved and engaged, they established the TradeNet Steering Committee specifically to represent the interests of stakeholders to the TradeNet project. This quasi-governmental committee proved instrumental in bringing the varied interests together and maintaining focus on a shared vision and set of business objectives throughout the design of TradeNet. During the implementation phase a formal organization—Singapore Network Services (SNS)—was formed from the Steering Committee membership to become the ongoing management unit.[11]

An Example. Driving E-government in the United Kingdom. As Prime Minister of the United Kingdom, Tony Blair has actively promoted a vision of the nation as a leader in e-commerce and e-government. The organization of his executive branch clearly reflects his intention to keep the country's leadership engaged in implementing this vision. In fact, there are three executive leaders responsible for driving the e-government agenda: the e-Minister is responsible for daily political leadership across government and for advancing the government's objectives on e-commerce; the Minister for e-Government has responsibility for the delivery of e-government objectives, including the objective to have all services online by 2005; and the e-Envoy focuses on the business community, promoting UK e-commerce abroad and ensuring that the benefits of e-commerce are spread throughout society. The Prime Minister also receives monthly progress reports on the UK Online strategy to ensure that the dialogue continues throughout implementation.[12]

3. Engage users, including citizens, in making objectives operational.

Problem. The size, complexity, and culture of systems development efforts has often led to limited input from users. This, in turn, has resulted in poor design trade-offs and an absence of user buy-in.

What to avoid. Do not assume you understand what the user thinks. Imposing too many choices on users is a serious problem if the resulting system is not user-friendly. Equally dangerous, however, is involving users in an undisciplined process that takes forever and becomes overly political.

What to do. Establish channels in the development process for incorporating the knowledge and concerns of stakeholders in a disciplined way, being sure to solicit input from those who will be directly involved in using the system. When engaging users do not simply ask them what they think but, instead, give them enough instruction and time to form a considered opinion before they offer their input. While this process may initially slow things down, it will save time later when fewer aspects of the system need to be reengineered. Better designs are created when downstream users can react before upstream mistakes are finalized. Better trade-offs are also made when the interests of all stakeholders are visible during the implementation process. Train people how to use the system as soon as possible, both to encourage adoption and to resolve problems early.

An Example. Co-location and the San Diego Water Department (SDWD). When the San Diego Water Department was implementing a computer-based system to support the field crews that maintain the county's massive water and sewer infrastructure, it decided to co-locate the development team with those who would actually use the system. As Analyst Brian McKee noted, "We went from our ivory tower… and set up right next to the valve-fitter guys. We had a team of tech guys out there, and we went on a lot of ride-alongs to find out what they did. As we developed the product, we showed them the initial screens and told them that if there's anything on here that you're not going to use, we'll get rid of it. So they started scratching things off. Now, when you look at the screen, it's only got the data on there that they're interested in looking at." Members of the crew also noted that moving the development team to the field made a big difference. Engaging the field crews in the development process gave them experience with the system that proved invaluable when it came time for the full roll-out.[13]

An Example. Evolutionary Prototyping. The example above demonstrates the methodology of "evolutionary prototyping." This methodology enables the implementation team and user community to educate each other. Best used when users do not know what the technology can do for them, evolutionary prototyping moves through an iterative succession of simulations or prototypes in arriving at a final system. Users work with the latest prototype and offer feedback on what works for them and what seems to be missing or inadequate. The learning loop is complete when the implementation team redesigns the next prototype based on real user feedback.[14]

An Example. Washington State's Digital Academy. The Digital Academy is a place where agency staff, private-sector experts, and citizen-users collaborate to design, build, and launch web-based public services. Conceived as a laboratory for learning, the Academy gives staff a chance to get outside their home environment and interact with those who will use their applications on a daily basis. Early implementation efforts include "e-form" and "e-permit" applications.

For more information, visit the Academy at www.wa.gov/dis/e-gov/academy

An Example. The People's Panel. As the UK government developed an online application for citizens to notify various government departments of a change of address, they enlisted the help of the People's Panel, a sample of 5000 citizens representing a cross-section of the UK population. During several half-day workshops, a sample from the People's Panel was asked to use several prototype applications and offer feedback on each. The government has since used the People's Panel to understand citizen demand and to prioritize projects for electronic services. By using this representative sample, the government can not only get input from users, but also from those who are not currently using electronic service delivery channels.

For more information about the People's Panel,
visit www.cabinet-office.gov.uk/servicefirst/index/pphome.htm

4. Assemble a diverse team under a project manager with organizational authority.

Problem. Significant IT initiatives almost always involve changes that have the potential to disrupt the work and organizational relationships among groups and individuals.

What to avoid. Do not entrust the project to a team narrowly staffed by technologists and consultants or without the expertise and authority needed to influence front-line personnel and other stakeholders.

What to do. All development teams must have the technical and business expertise required to implement a new IT project. Successful teams also include "boundary spanners" that represent the interests of and have the power to influence key stakeholder groups that must come together. Form a balanced project team, including people with knowledge and influence over the business operations to be affected. When teams include members from different organizations, project leaders must actively encourage discussion of interests and cultural differences. For projects involving workflow redesign, it is usually wise to put a respected line manager in charge. The project manager must have the respect of team members as well as access to the organizational resources and incentives needed to resolve conflicts.[15] It is also helpful to assign an independent, well-respected person or group to assess the quality of results when milestones are reached. Feedback from these quality assessments can be used to build team strengths and address team weaknesses.

An Example. John Koskinen and Y2K. We have learned a great deal over the years about how to successfully implement technology-related initiatives. In particular, the experience with Year 2000-readiness has drawn attention to the importance of politically-grounded project management. It is widely acknowledged that, as Chair of the President's Council on Year 2000 Conversion, John Koskinen's use of his broad managerial skills and political position were instrumental in mobilizing the incredibly detailed activities required to solve Year 2000 issues. At the same time, Year 2000 issues required managers and technical employees throughout government to work together in cohesive teams. According to Anne Reed, former CIO at the U.S. Department of Agriculture, this experience has helped forge stronger relationships between the business staff and technology staff—relationships that are helping advance more recent e-government initiatives.[16]

An Example. Training and Certifying IT Project Managers. Recognizing that managing IT projects requires strong project-management skills, governments in Michigan, Minnesota, and Kansas City now offer courses to employees to build the necessary IT project-implementation competencies. In Michigan, for example, employees can take courses on software risk management, IT contracting, and project leadership/communication. State employees in Minnesota can also take a course that covers how to use customer needs to frame goals, how to develop a project team, and how to evaluate project results. Similarly, the city of Kansas City, Missouri, requires all the assistant directors, business analysts, programming leaders, and internal business consultants in the IT department to take a week-long certified course from the Project Management Institute.

For more information about the programs in Michigan, Minnesota, and Kansas City, visit

Michigan www.state.mi.us/cio/opm/
Minnesota www.doer.state.mn.us/tdrc/courses/pj_manage.htm
Kansas City www.kcmo.org/index.htm

An Example. Managing Cultural Differences to Launch My California. In January 2001, the State of California recast its fragmented web presence and launched *My California*—a powerful Internet portal that was built in 110 days using some of the best web technology on the market. For a state where the Governor did not have an email address the previous year, a number of factors were critical to the project's success, including deadlines set by the Governor and the advice of Silicon Valley executives on the Governor's Web Council. According to Arun Baheti, Director of eGovernment for the State of California, "one of the most gratifying and important success factors was the way in which the development team came together." With over 100 people drawn from more than 15 different organizations (many of them competitors), the number of different organizational cultures coming together could have torn the project apart. Working together in a single space, however, the amalgamation of talent soon developed a culture of its own. Individuals began physically

reorganizing themselves by functional teams, mixing members from different corporate organizations. As these teams worked together, old cultural differences gave way to a new integrated team perspective. Isolating factors that make such a meshing possible is always difficult and inevitably context specific. What seems clear in this case, however, is that the existence of a firm deadline and the visible commitment of the CEO from each organization (including the Governor), along with a multi-organizational team composition, encouraged development of a shared goal and a common set of values that quickly brought the implementation team together.

For more information, visit *My California* at my.ca.gov

An Example. Using "War Rooms" to Coordinate Canada's SIGNET Renewal Project. In 1998, testing confirmed that SIGNET—the computing environment that allows the Canadian Department of Foreign Affairs and International Trade and eleven other departments to exchange messages around the world—was not Year 2000-compliant. One of the critical success factors of the project designed to correct this problem was ongoing communication within a mixed team of consultants and staff responsible for user education, implementation, development and infrastructure, and quality assurance. To provide this communication, twice-weekly "war room" exercises opened the floor to any team member who saw a problem that needed to be addressed. Since senior management always attended these meetings, action steps were quickly identified and approved.[17]

5. Maintain pressure for progress, accelerating the cycle of innovation.

Problem. People have a tendency to avoid the tough work of organizational change and to smooth things over to keep relationships comfortable. As a result, they will not progress as fast as they would if placed under a certain amount of pressure, even though they may well resent such pressure when it is applied.

What to avoid. Seeking only to preserve smooth personal relations may lead to a flawed implementation. Seeking to resolve conflicts by relying too heavily on the leader's formal authority may also hinder an implementation.

What to do. Apply pressure by setting firm but realistic deadlines. Help everyone understand the urgency of the situation by presenting real comparative data when you have it, using internal and external benchmarks to motivate change. While using pressure for change is often essential, periods of pressure and change need to be balanced by periods of relief and stability.

An Example. The Push for Electronic Service Delivery. Over the last year, many governments have announced aggressive goals for delivering services online. For example, the Australian government aims to have 100 percent of its services available electronically by the end of 2001, while the U.S. government is aiming for October 2003 as the date for enabling citizens to do business with the government electronically. While it is unclear whether these goals are realistic, it is clear that governments are using public expectations,

private-sector accomplishments, and inter-governmental comparisons to apply pressure and to accelerate the cycle of innovation. As Prime Minister Tony Blair noted in moving the British government's target date forward,

"I want the UK to be the world's leading Internet economy. Businesses and individuals across Britain are responding to this challenge, getting the UK online. I am determined that Government should play its part, so I am bringing forward our target for getting all Government services online, from 2008 to 2005." [18]

An Example. Leveraging Public Report Cards. When Governing Magazine publishes its extensive report cards on U.S. cities and states, those who do well are quick to tout their accomplishments. Far from resting on their laurels, however, officials in Phoenix, Arizona —after finding out they received an "A" and ranked first in the nation in 2000—stressed the need to start preparing for the next test. As City Manager Frank Fairbanks noted, "Whatever we did yesterday, we've got to do better tomorrow."[19] After receiving a B+ in 2001, Iowa Governor Tom Vilsack used the grading process to push for improvement, noting that, "While we're pleased with the results, we can continue to improve the way we invest tax dollars and achieve results Iowans value."[20]

An Example. Using Citizen Feedback to Drive E-Government in New Jersey. During the fall of 2000, New Jersey conducted surveys and focus groups to understand the impact of the Internet in New Jersey and to identify how the state might use the Internet to serve its citizens. The results have proven to be a powerful tool in illustrating the importance of e-government, in creating a sense of urgency, and in driving the e-government agenda forward. State officials have been able to press for support and funding of e-government initiatives by highlighting results that show 76 percent of New Jerseyans support the idea of state government giving residents the option of Internet-delivered services, with a majority preferring to contact government through the Internet (as opposed to by telephone or in person) for services such as recreational activities and educational programs.

6. Kaizen: Implement in short, quick bursts or building blocks.

Problem. While large IT projects tend to take a long time to implement, potential supporters often have short attention spans or are distracted by other issues. Projects that cannot be implemented within a political cycle are thus vulnerable to death by delay.

What to avoid. Do not exacerbate project risks by succumbing to the temptations of grand designs and scope creep. At the same time, do not avoid all large projects without carefully assessing whether the returns may be worth it.

What to do. Whenever possible, break up larger projects into smaller ones with short timeframes and deliverables that are visible and motivating. These small building block projects should have a demonstrated benefit in the short term while also advancing progress toward accomplishing longer term objectives. Dedicate staff for intensive work on these short projects.

Make changes in similar "bursts," linking the bursts to breakthrough service and productivity improvements. Reward staff for successfully meeting short deadlines.

An Example. Pennsylvania's "Value Bursts." Pennsylvania's e-government strategy calls for the Office for Information Technology to focus on projects that can be completed in 90-day increments. Development teams are given 90 days to meet their milestones, thereby achieving a minimal level of functionality that demonstrates value. Future upgrades are also made in 90-day increments. For example, the state's PAOpen4Business web site is being developed within this framework. Phase 1 put the forms necessary for starting a business on the web site, phase 2 created an online "entrepreneur interview" to help prospective entrepreneurs find information and filing requirements. Future 90-day "bursts" will complete the posting of all related forms online and will integrate data across state agencies.

An Example. Online Drivers' License Renewal in Tennessee. On August 28, 2000, the State of Tennessee announced that it had awarded a contract to the National Information Consortium (NIC) to build a front-end interface for a new Internet portal. Looking to generate momentum, Tennessee stipulated that NIC had to deliver an application for renewing drivers' licenses within the first 45 days of the contract. Exactly 45 days after the contract was signed, Governor Sundquist was the first person to renew a drivers' license online in the State of Tennessee, and, in the first week alone, more than 1000 people either renewed their license or registered a change of address. As the state and NIC futher develop Tennessee's Internet presence, they continue to launch applications in short bursts of time. Learning from this experience, Tennessee is following a similar strategy for IT systems outside of their portal initiative. For example, future development of their TennKids system —a distributed system supporting multiple state and local agencies in serving the social needs of children—will be developed in "modules" of no longer than four months.

7. Use a "slow trigger, fast bullet" approach for the toughest projects.

Problem. Some IT projects promise enormous value if implemented, but they can be inherently risky and not easily broken down into safer pieces. These "bet the farm" projects raise challenges somewhat similar to those facing General Eisenhower as he prepared his troops to invade Europe during World War II. Certainly, the levels of confusion and conflict to be confronted on D-Day were immense, but the offensive would not have been successful if it had been split into smaller pieces over a longer period of time.

What to avoid. The classic mistakes are either missing the big opportunity due to a lack of nerve or acting impulsively without the backup needed to see things through. Either choice risks failure—not only of the project at hand but of related projects as well.

What to do. Before you begin implementation, thoroughly gauge reality to assess the motives of stakeholders and the degree of support and opposition you will face. Prepare as fully as

possible for predictable problems and develop a team fully committed to success. This is the "slow trigger." Then, when you commit to implementation, go as fast as possible to a place where the project has produced visible value that can sustain supporters. This is the "fast bullet." As did Eisenhower (and also Colin Powell during the Persian Gulf conflict), attack massively, and do not get stuck on the beach.

An Example. E-government in Manitoba, Canada. In 1995, while other jurisdictions were launching individual electronic services through kiosks and early web sites, a group of government officials in Manitoba were crafting a larger vision of how electronic services might revolutionize the relationship between government and citizens. Partnering with IBM, this group knew that the time was not ripe for the kind of revolutionary change they envisioned. Over the next three years, however, they continued to work with IBM to articulate the vision, define the business processes, understand the technologies, and lay out the structure they would need. Finally, with all the pieces in place, Manitoba tendered an e-government contract to begin implementing their revolutionary vision. By laying a foundation for their vision, rather than focusing on incremental experiments, Manitoba was able to move quickly and produce value early once the decision to go forward was made.

An Example. One EASE E-Link in New Jersey. One EASE E-Link (OEL) is a single point of entry for doing business with social-service agencies in New Jersey. The product of a cooperative effort between three state departments, OEL currently allows more than 2000 case managers and 800 social service agencies in 17 of New Jersey's 21 counties to identify the services for which a client is eligible; identify service providers; share client information; and, in the near future, complete certain applications. According to OEL Director Bill Kowalski, however, the key to achieving success for this large and politically complicated project was starting with a smaller pilot project. When the idea of sharing information between the state and social service agencies was first broached in the mid-1990s, there was general enthusiasm among the key stakeholders. However, after a consultant's report indicated the project would require significant financial and human resources commitment waned, and the project nearly died. Working together, undeterred individuals from three state departments crafted a common vision for OEL and launched a smaller pilot project with Atlantic County, NJ. As the pilot evolved, proponents of OEL used the success of the pilot to win support from the Governor and other political stakeholders. Once this support was secured, OEL's proponents were then able to use the groundwork laid with the pilot to move quickly and offer its services to every county in the state. While the value of "starting small to prove the concept" was not lost on OEL's proponents, Kowalski notes that they were still overly aggressive with the state-wide rollout of OEL. Despite the success of the pilot, there were still technical and organizational challenges that needed to be worked out before expanding the project so quickly.

For more information visit One EASE E-Link at www.oel.state.nj.us

An Example. Throwaway Prototyping. Throwaway prototyping involves producing a simulation system that can be used for testing. For example, in the One EASE E-Link (OEL) project (above), the project team was not sure if the pilot being used in Atlantic County, NJ would serve the needs of the social services community. Trying a prototype with some basic functionality can help identify the direction the project should take. Based on insights from experience with the first prototype, the project team may decide to develop another throwaway prototype with different options. Alternatively, the prototype may prepare the team enough to commit to a fully functional version of a new system. As it turned out, the client-server technology on which the original prototype for OEL was based proved to be unacceptable. Fortunately, Internet technology was gaining prominence at the time, enabling the implementation team to throw the old pilot away and try a new one.[21]

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Over the past decade, public sector leaders have improved their ability to manage significant IT implementations. Traditional project management tools and methodologies have helped, especially with problems of sheer size and complexity. The key challenges that remain, however, are typically associated with the politics of organizational change, not technology. To succeed, leaders must understand and resolve issues of confusion and conflict. Seven guidelines are summarized in Figure 2.

1. Copy without embarrassment: Look, learn, and do.
2. Mobilize and maintain broad support in shaping the vision.
3. Engage users, including citizens, in making objectives operational.
4. Assemble a diverse team under a project manager with organizational authority.
5. Maintain pressure for progress, accelerating the cycle of innovation.
6. Kaizen: Implement in short, quick bursts or building blocks.
7. Use a "slow trigger, fast bullet" approach for the toughest projects.

In sum: Leaders must respond to the organizational and behavioral challenges of major IT implementations.

Figure 2: Guidelines for Implementing IT Initiatives in the Public Sector

"Make explicit that which is often overlooked or dismissed."

NEXT STEPS

What can you do to prepare for the next significant IT implementation? In general, you need to proactively manage the confusion and conflict associated with IT implementations. To apply the above guidelines to your own setting, consider the following next steps.

1. Assess your track record on IT implementations. Before making or even proposing change, understand where you are today. Is your organization successful in implementing IT initiatives on time and within budget? How does your success compare to that of your peers? Do your current practices address the organizational and political dimensions of IT implementation?

2. Explicitly address organizational and political issues. More than likely, your current methodology considers financial and technical feasibility as part of the implementation planning process. Go beyond these to also discuss how you will use a vision and business objectives to maintain support and keep your project focused. Demand a clear statement of how the development team will be assembled, how conflicts will be resolved, and how users will be engaged in the process. In short, make explicit that which is too often overlooked or dismissed.

3. Prepare for a future dominated by enterprise and other cross-boundary projects. We are moving from just putting things on the Internet to initiatives that require enterprise-wide integration and organizational restructuring. These new initiatives are more difficult, raising the levels of potential conflict and confusion. But now is not the time to shy away. Highlight the value of IT and maintain pressure for progress. Adopt strategies that plan across boundaries, then move to demonstrate value in steps that are as quick and decisive as possible.

Brief advice for a variety of stakeholders can be found in Figure 3.

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As governments move further into electronic service delivery, implementation challenges will continue to grow. We need leaders who can accurately assess and effectively address organizational and political barriers.

This report offers guidelines for meeting these needs. We hope that public leaders—and their many overseers in the public at large—will find these guidelines useful.

Subsequent reports of the Harvard Policy Group on Network-Enabled Services and Government will explore other imperatives for the year 2000 and beyond. Our next report will examine how to improve budgeting and financing to identify and fund promising IT initiatives, especially cross-boundary and multi-year projects.

The President. As enterprise-wide projects become more important, highlight the need for public leaders to stay engaged and to effectively address challenges associated with organizational and political barriers. Maintain pressure for fast development cycles, looking for quick demonstrations of value.

Legislators. Provide disciplined but realistic oversight, focusing on keeping projects in line with their business objectives. Demand to see more than just financial planning.

Governors. Emphasize the need for your executive team to work together in an enterprise-wide planning process. Actively participate in setting the vision and business objectives for e-government.

Local government leaders. In addition to developing an enterprise-wide plan (see Governors above), work to establish the ties that make cross-jurisdictional implementations possible.

Judges. Justice is one of the areas that has seen a fair amount of success in implementing large, cross-boundary IT initiatives. Share the knowledge gained from these successes and maintain the pressure for progress.

Budget directors. Along with the CIO, you need to lead the enterprise planning process. Give project managers the authority they need for implementation, holding them accountable for business results, not just finances.

Agency and program heads. Implementations will succeed or fail based on your ability to manage the confusion and conflict of organizational change. Assemble a balanced development team, make sure the vision is clear, and keep the project moving forward quickly and decisively.

Chief Information Officers. Along with your CFO, build a strong executive team for enterprise planning. Use methodologies that ensure your managers address the organizational change dimension of IT implementations.

Technology community. Use your extensive experience with IT-based institutional reform to help governments become more realistic about what it takes to implement; developing application service provider (ASP)-based, enterprise solutions may be an important strategy.

Associations and interest groups. Make fast follower strategies as productive as possible by aggressively identifying and sharing best practices.

The press. Follow up to see if the promises of e-government have been implemented, reporting realistically on the successes as well as failures.

The public. Look for results, not just promises: easier access, better customization, greater productivity, better overall value. These are the signs of effective implementation.

Figure 3: Advice for Stakeholders: How to Implement IT Initiatives in the Public Sector

Appendix A

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Mr. Will Pelgrin, Esq.	*Executive Deputy Commissioner, Office of Technology, State of New York*
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Hon. Barbara Todd	*Commissioner, Pinellas County, Florida*
Mr. Richard J. Varn	*Chief Information Officer, State of Iowa*
Hon. J.D. Williams	*Controller, State of Idaho*
Mr. Terry Wood	*Councilman, City of Jacksonville, Florida**
Mr. Robert J. Woods	*Commissioner of Federal Telecommunication Services, U.S. General Services Administration**
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Appendix B

READINGS AND RESOURCES

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The OECD Programme on Public Management and Governance is undertaking a project to explore the management of large public-sector IT projects. Information about the project as well as reports submitted by participating countries can be found at www.oecd.org/puma/Risk/index.htm

The Standish Group produces an annual report (*CHAOS*) that includes detailed information on IT project success and failure. For more information, visit the Standish Group web site at www.standishgroup.com

Appendix C

GLOSSARY

Asynchronous Communication—A communication pattern in which the two (or more) parties involved are not communicating at the same time. Telephone conversations are an example of synchronous communication—both parties must be on the telephone at the same time. An email message is an example of asynchronous communication—one party can send a message and the other can read it hours or days later.

Broadband—A general term for high-volume, multiple-channel telecommunications capacity available via a single medium (e.g. a wire or cable). While narrowband (the equivalent of one telephone voice channel) is adequate for the transmission of text and numerical data, broadband connections allow the efficient and reliable delivery of voice, data, and video over one integrated network. Because multimedia content is seen as vital to businesses and consumers alike, electronic networks are increasingly moving to broadband, which in turn will have important long-term implications for commercial development and civic life.

Database—A set of data structured to support the storage, retrieval, and analysis of information, often custom-designed for specific business applications. Databases are central to information processing since they allow new and more efficient ways of assembling records and organizing work. A key step in developing databases is implementing consistent definitions or standards so that data can be meaningfully shared among users. Examples include standard charts of accounts for financial data, standard methods of coding geographical information, and standard templates for archiving audio and video material. (See also: Standards.)

Digital—Data that has been created, transmitted, or stored as a string of signals coded as "1"s (on) or "0"s (off). Data in digital form (text, numbers, graphics, voice, video, etc.) can be stored and processed by computers and communicated at high speed over electronic networks with complete accuracy and reliability. Exact copies of digital data can be made in which the nth copy is indistinguishable from the original.

E-government—A term commonly used to describe the interaction between government and citizens over the Internet. E-government has evolved rapidly from merely publishing or disseminating government information electronically, to online interactions and transactions between government and citizens. As governments begin to reorganize and integrate their work processes to take advantage of computer networks, e-government may come to define a new or transformed relationship between citizens and government enabled by networks.

Electronic Benefits Transfer (EBT)—Refers to the transfer of government benefits (funds or resources) to individuals through the use of a card technology. Individuals access their benefits through Automated Teller Machines or retail point-of-sale terminals.

Electronic commerce (or e-commerce)—Transactions where money is exchanged for valuable goods and services with either the money and/or the goods and services transported over computer networks.

Encryption—The act of scrambling information into a form called a cipher, usually to keep it from being read or modified by unauthorized parties. This is achieved through the use of algorithmic "keys" that scramble the information at one end and unscramble it at the other. Computer-based encryption can be used both for purposes that society wants to prevent (criminal and terrorist communications) as well as those it wants to support (private and secure social and commercial communications).

Fast Follower(ship)—In the context of innovation diffusion, a fast follower is one who adopts an innovation shortly after the initial innovator (or first mover), but appreciably before the majority of those who eventually implement the innovation. For a more detailed discussion of innovation diffusion see Everett M. Rogers, *Diffusion of Innovations*, Third Edition. New York: The Free Press, 1983.

Geographic Information System (GIS)—A set of hardware and software tools used to gather, manipulate, and analyze geographically referenced data. GIS are used by many government agencies. For example, transportation departments use GIS to determine the most efficient corridors for highway construction, and housing departments use GIS to help select the best locations for urban renewal projects.

Geographic Positioning System (GPS)—A system that uses satellites and small, portable receivers to determine the physical position of an object or person. Increasingly ubiquitous, GPS are used to track the locations of airplanes, boats, cars, and even individuals to within an accuracy of a few meters.

Hardware—Broadly, the physical components of information technology: computers, peripheral devices such as printers, disks, and scanners, and the cables and switches that link digital networks. The key components of computer hardware are microprocessor chips, which have doubled in productivity every 18 months, as measured by instructions executed per dollar (a phenomenon referred to as Moore's law). (See also: Software.)

HTML—Hypertext markup language. See: World Wide Web.

Information infrastructure—The interdependent capacities and standards for digital communication and data processing (both hardware and software) that support the flow of information, much as a highway infrastructure supports the flow of vehicles. (Hence, the vernacular catchphrase, "Information Superhighway," as a general reference to the interconnected system of computer networks exemplified by the Internet.) The ongoing expansion of this information infrastructure raises vital issues about when and how to establish and refine the technical standards on which it operates, including important related questions about funding, security, privacy, and collective democratic values.

Information technology (IT)—The umbrella term that encompasses the entire field of computer-based information processing: computer equipment, applications and services, telecommunication links and networks, digital databases, and the integrated technical specifications that enable these systems to function interactively. (See also: Information infrastructure.) The rapid development and expansion of these technologies over the last twenty years has ushered in the current historical period widely referred to as the "Information Age" or "Information Revolution," comparable in economic and social magnitude to the Industrial Revolution of the early 19th century. The profound transformations brought about by computer networking have made information processing (rather than industrial manufacturing) the key factor in economic productivity and global commerce, thereby supplanting large segments of the traditional blue-collar labor market with a white-collar force of information or knowledge workers.

Internet—The vast network-of-networks that uses open rather than proprietary standards to support computer-based communications at an incredibly large and efficient worldwide scale. Originally developed by the U.S. Defense Department for use in research in the 1960s, the Internet has become the foundation of our information infrastructure, an ever-expanding universe of network services and applications organized in geographically dispersed rather than centralized form.

Kaizen—Originally defined in Masaaki Imai's book *Kaizen: The Key to Japan's Competitive Success*, *kaizen* refers to a process of continuous improvement through small sustainable steps.

Knowledge-based economy—A term used to describe an economy in which the defining factor of production is knowledge. The 19th century saw the rise of the industrial-based economy in which goods were produced in large industrial manufacturing plants. Today, a growing number of people produce, use, and share knowledge in their day-to-day work. Since information can be expressed digitally, computer networks have enabled the rapid growth of the knowledge-based economy.

Leadership—Any act by an individual member on the behalf of a group, with the intent to get the group to better meet its goals. Leadership for previously known problems relies heavily on authority and technical expertise, while leadership for new or adaptive problems relies on getting the group to confront the inadequacies of its old values and routines, and thereby develop more effective solutions. In general, the challenges of the information age (which involve a high degree of confusion and conflict resolution) call for adaptive leadership.[22]

Marginal cost—The cost of the next in a series of products. Typically, first products cost more because of the expenditures required to set up the production process, with the unit cost then falling over time as the volume of activity increases. For most manufactured goods, however, diminishing returns-to-scale eventually cause marginal costs to rise. With information-technology products, by contrast, the dynamics are dramatically different: extremely high set-up costs (hundreds of millions of dollars for some software products) followed by almost zero costs for extra copies and no diminishing returns-to-scale for extremely high production volumes. Pricing policies for information goods are thus markedly different than for traditional industrial goods, and pricing policies in the economy at large are likely to change as the Information Age progresses.

Network—A set of communication paths (or channels) and the points (or nodes) they connect, including switches to determine which channel will be used when more than one is available. Computer networks, like telephone networks, can be thought of as telecommunications highways over which information travels. Networks benefit greatly from economies of scope and scale. Digital networks typically use packet-switching rather than circuit-switching to greatly increase efficiency and throughput. (See also: Switching)

Open-source—Computer programs that are distributed as open-source are distributed along with access to the source code—the program instructions as written by the programmer. Once distributed, the author of the program must allow users to modify the code and redistribute it freely, while users are prohibited from selling the program or any derivative thereof without the accompanying source code. The open-source nature of the program is usually protected by an open-source license such as the GNU General Public License (GPL). The rationale behind open-source is that a larger community of programmers will use, improve, and develop the program.

Pen-based Computer—A computer that the user interacts with via an electronic pen or stylus rather than a keyboard or mouse. Most PDAs (see below) or hand-held computers are pen-based computers.

Personal Digital Assistant (PDA)—A small hand-held computer that can be carried around by an individual, and that is most commonly used for personal management tasks such as storing phone numbers, reading email, or scheduling. As wireless technologies continue to develop, PDAs are also being used to communicate over networks.

Portal (or Internet Portal)—On one level, a gateway or single point of entry through which the user can access related information from a variety of sources. For example, many governments are launching portals as a single point of entry to government information. It is interesting to note, however, that as governments adjust to the concept of a single point of entry, they are beginning to rethink how they interact with constituents. Rather than organizing the user's experience around agency boundaries, they are breaking down these boundaries to organize information and interactions around the user's needs.

Productivity—The ratio of goods produced in relation to the resources expended in production. Increasing living standards largely depend upon increasing productivity. Production processes that use information efficiently will typically be much more productive overall than older industrial production methods. This is the principal driving force behind the commercial, social, and political changes catalyzed by information technologies.

Prototype—A pre-production, functioning model of a system or application. A prototype is generally used for the evaluation of design, performance, or production potential.

Public goods—Goods with impacts that "spill over" beyond those directly involved in buying and selling, thus weakening market forces as the mechanism for efficient resource allocation. Computer-based services have the potential of providing many positive spillovers to the public sector, since the marginal cost of IT production over time is virtually zero. One of the paramount political questions of the Information Age is where to draw the boundary between public and private benefits and, therefore, who should pay.

Scope Creep—The gradual accumulation of new or expanded requirements after a project plan (project scope) has been agreed upon by all parties. Scope creep is a significant risk to implementation success as it increases cost and extends project timelines.

Server—A computer program that provides services to other programs or computers. This term is also used to describe the computer on which such a program operates. In the "client-server" network model, client programs make requests from servers connected to the same network. On the World Wide Web (see below) a browser acts as a client program, making requests for files or other information from web servers. These servers can be located any place in the world that is connected to the Internet.

Slow Trigger, Fast Bullet—An analogy used to describe an implementation strategy in which careful project planning and preparation (the slow trigger) is followed by swift and decisive action steps (the fast bullet) that quickly move the project to a stage that safely demonstrates value.

Smart Card—A small electronic device or token (often the size of a credit card) that stores information in a memory chip. Information can be added, read, or changed using a smart card reader.

Software—A catchall term for the sets of instructions (programs) used to operate computer hardware. Software production and maintenance today has become a primary determinant in the success or failure of business and government organizations.

Source Code—See: Open-source.

Standards—In the context of electronics, standardized technical specifications allow functions to be coordinated by automatically adhering to the set standard. Thus, standards for the voltages used for signaling allow devices to "talk to one another" in a consistent format, and standards for financial accounting allow for the meaningful aggregation and analysis of financial databases. With information technologies there is an inherent tension between the creation of new capabilities through innovation (a few people trying new ways to do things) and the subsequent applications of those capabilities through standardization (many people following established ways of doing things). Determining when and how to set standards is therefore a critical leadership issue, as is deciding whether such standards should be "open" for use by the general public or whether they should be protected by copyright or patent statutes.

Switching—The engineering mechanism that designates alternate channels or paths in a telecommunications network. Historically, telephone networks have used circuit-switching, where an entire channel between two connections is made available for the duration of the communication. Most computer networks, by contrast, have been designed to use packet-switching, which breaks up the transmitted data into individual units or "packets," each of which contains the destination address of the data. The packets are then independently routed through the network and reassembled by the computer at the destination address. Packet-switching allows data from multiple users to efficiently use the same path on the network. Major developments are now underway to enable packet-switched networks to carry digital voice and video more effectively.

Total Quality Management (TQM)—A management philosophy that became popular in the 1980s and 1990s. TQM is focused on continuously improving the performance of all individuals and processes in achieving customer satisfaction.

World Wide Web (www or Web)—Standardized tools and software that allow non-technical users to find, display, and communicate text, graphics, voice, and video located on the Internet. The Web's fundamental components include HTML (hypertext markup language), pointers or hyperlinks (that rapidly access specific material that may reside on computers halfway around the world), and browsers (software that allows users to display and interact with Web content). Web technology is credited with democratizing the Internet by simplifying and streamlining key networking tools and functions for the general public.

END NOTES

[1]According to a report by The Standish Group, in 2000, only 28% of all IT projects were deemed to have accomplished their objectives within the allotted budget and timeframe. The Standish Group International. *CHAOS.* West Yarmouth, MA: The Standish Group International, 2001. For more detail, see www.standishgroup.com

[2]*Executive Guide: Improving Mission Performance through Strategic Information Management and Technology*, U.S. General Accounting Office (GAO/AIMD-94-115, May 1994); *Assessing Risks and Returns: A Guide for Evaluating Federal Agencies' IT Investment Decision-making*, U.S. General Accounting Office (GAO/AIMD-10.1.13, February 1997); *Information Technology Investment Management: A Framework for Assessing and Improving Process Maturity*, U.S. General Accounting Office (GAO/AIMD-10-1-23, May 2000); *The Enhanced Framework for the Management of Information Technology Projects*, Canadian Treasury Board, 1996 (www.cio-dpi.gc.ca/emf/Publications/Publicationsplash_e.html).

[3]In a Research Note titled "Identifying and Assessing E-Government Inhibitors" (November 2000), Gartner Group recommends that leaders include social and political issues in an early analysis of factors that might delay or derail e-government initiatives.

[4]Project members will report early results to NASIRE's 2001 mid-year conference in May 2001.

[5]A similar initiative was undertaken by IBM between 1995 and 1998; the San Francisco Project created a core set of frameworks for common business needs (warehousing, accounting, order processing) that could be extended and customized to meet the needs of individual businesses. In essence, the San Francisco Project provided 40 percent of the business functionality (that which was common for all businesses), allowing individual businesses to develop the other 60 percent (that which is customized and the basis of competitive advantage). Such sharing is significantly easier with the evolution of object-oriented programming.

[6]In a 1991 report, the Software Engineering Laboratory of the National Aeronautics and Space Administration's Goddard Space Flight Center estimated that the reuse of software code resulted in a 35% reduction in effort needed to deliver a line of code and an 87% increase in quality (reduction of errors). See U.S. General Accounting Office, *Issues Facing Software Reuse* (B-252542, 1993). In a 1996 report sponsored by the Department of Defense, researchers documented significant reductions in cycle time, cost, and risk as well as improved return on investment from software reuse. See Applied Expertise, Inc, *Software Reuse Benchmarking Study: Learning from Industry and Government Leaders*, January 1996 (dii-sw.ncr.disa.mil/reuseic/lessons/benchmark/html).

[7]Department of Defense Software Reuse Initiative, *Software Reuse Executive Primer*, April 1996 (dii-sw.ncr.disa.mil/reuseic/pol-hist/primer).

[8]Recently *CIO Magazine* reported that a private company, Code Power, is going to sell reusable source code. Partners in the venture include Sun, Oracle, and Globix. John Edwards, "Source Code Sell-Off," *CIO Magazine*, 1 January 2001.

[9]Originally founded as *Systemanalyse And Programmentwicklung*, *SAP* has since been renamed *Systeme, Anwendungen, Produkte in der Datenverarbeitung* or *Systems, Applications and Products in Data Processing*.

[10]NASIRE estimates that 25 states in the U.S. had such committees. Eric Kulisch, "The art of the deal," *civic.com*, 4 December 2000.

[11]For more detail about the implementation of Tradenet, see the Harvard Business School case study written by John King and Professor Benn Konsynski, "Singapore TradeNet (A): A Tale of One City," 1990, Case Number (9-191-009). Also see the accompanying Teaching Note written by Professor Lynda Applegate, "Singapore Series," 1995, Case Number (5-195-025).

[12]For more detail about the United Kingdom's e-government efforts, see www.e-envoy.gov.uk.

[13]For more detail see the Kennedy School of Government case study written by Ed Barker, "Swimming in San Diego: Hand-held Computing and Enterprise Systems in the San Diego Water Department," 2000, Case Number (unassigned).

[14]Steve McConnell, *Rapid Development* (Redmond, WA: Microsoft Press, 1996), pp. 435-40.

[15]The value of a diverse development team with clear authority can also be seen in Kim Clark and Steven C. Wheelwright's discussion of development teams in the private sector. Clark and Wheelwright describe the potential of 'heavyweight' development teams—teams with effective leadership, strong problem-solving skills, and the ability to integrate across functions—in driving change in mature organizations. See Kim B. Clark and Steven C. Wheelwright, "Organizing and Leading "Heavyweight" Development Teams." *California Management Review*, Spring 1992.

[16]*Government Executive* magazine, through its web site GovExec.com, has chronicled three years of coverage of the Y2K issue and the leadership John Koskinen provided as "Y2K Czar." See especially the articles from 2-5-98, 3-19-98, and 5-1-98 when Koskinen was sounding the battle cry for a comprehensive, enterprise-wide approach to the problem (www.govexec.com/tech/year2000). For a discussion of lessons learned from Y2K see also Colleen O'Hara, "Lessons Learned: The real Year 2000 fallout? It taught IT managers how to manage big problems." *Federal Computer Week*, 10 January 2000 (fcw.com/fcw/articles/Manlessons.asp).

[17]For more detail about the implementation of the SIGNET Renewal Project, see Government of Canada, Enhanced Management Framework Division of the Chief Information Officer Branch, Treasury Board of Canada. "Management of Large Public IT Projects: Canada." Country Report Submitted to the OECD Expert Meeting, October 2000. (www.cio-dpi.gc.ca/emf/new-nouveau/lrg-public-it-grnd-ti/lrg-public-it-grnd-ti_e.html)

[18]British Cabinet Office, "Government to speed up introduction of online services," Press Release, 30 March 2000.

[19]Anonymous, "City Deserved Grade A," *The Arizona Republic*, 01 February 2000, B6.

[20]Office of Governor Tom Vilsack, "Iowa Earns B+ in State Management Survey," 30 January 2001.

[21]Steve McConnell, *Rapid Development* (Redmond, WA: Microsoft Press, 1996), pp. 569-73.

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