# INFORMATION TECHNOLOGY AND ADMINISTRATIVE REFORM: WILL THE TIME AFTER E-GOVERNMENT BE DIFFERENT?

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August 2003

Paper prepared for the Heinrich Reinermann Schrift fest, Post Graduate School of Administration, Speyer, Germany. September 29, 2003.

## PREAMBLE

This symposium honoring Professor Dr. Heinrich Reinermann offers an excellent opportunity to explore the relationship between information technology and administrative change. For many years Professor Reinermann has been a leading proponent of application of information technology to the reform of government operations. IT has been seen as an instrument of administrative change for decades, together with more traditional reforms such as performance and program budgeting, centralized accounting, the executive budget, civil service reform, and the professional executive (e.g., council-manager plan). Since he joined the Speyer School in the 1950's, Professor Reinermann has considered information technology as perhaps the most important tool for improving the decision capability of public administrators and for supporting administrative reform and change more broadly. He foresaw that IT would become a key part of public administration's concern, and he was right. His ideas and writings on this subject have had great impact, showing up in master's theses, doctoral dissertations, and professional writings of mature scholars of public administration around the world.

We first met Professor Reinermann during his 1988 Speyer Congress on Computers in Public Administration. Since then his professional life took a path quite different from ours. We had started our work on IT in government during a time when the UC Irvine Graduate School of Administration included public administration as central part of a generic model of administration. Much to our disappointment, our school shifted its focus to that of a conventional business school when our work on IT in

public administration was achieving its widest recognition. Eventually, we broadened the focus of our research to include business and other organizations, in some ways losing touch with our roots in public administration. In the mean time, Professor Reinermann and the Speyer School remained steadfast in their devotion to public administration. In many ways, this devotion kept our attention at least somewhat tied to public administration. We are grateful to Professor Reinermann and to Speyer for this.

During another Congress organized by Professor Reinermann in Speyer in 1995, we had the honor of re-examining our 1988 presentation. We were able to incorporate into out analysis the early developments of the Internet and what we learned by studying business organizations. The symposium today presents us with a similar opportunity. This symposium honors Professor Reinermann's many contributions to understanding the potential role of computers and other information technologies to public administration. A few of the many people whose lives he touched directly as colleague, mentor and thought leader through his writings are with us for this purpose, drawn by our fundamental interest in information technology and administrative change.

The Internet and e-government applications have sparked a great deal of discussion throughout government at all levels. This is an opportune time to look once again at the relationship between information technology and administrative change. Our paper examines the theoretical ideal of information technology as instrument of administrative change, and examines the extent to which that ideal has been achieved in the U.S. It then draws conclusions about the findings and why they should be expected with future applications of information technologies—in the time after e-government. It

concludes with discussion of the early evidence about newer applications for automated service delivery, 24x7 e-government and e-democracy.[1]

[1] E-government usually refers to the use of IT within government to achieve more efficient operations, better quality of service and easy public access to government information and services. For example, Senators Lieberman and Thompson define e-government as a way "to better use IT advances to achieve greater effectiveness and to provide citizens easy, electronic access to government programs, services and information." E-democracy usually refers to greater citizen participation in democratic processes.

# COMPUTERS AND ADMINISTRATIVE REFORM:

# WILL THE TIME AFTER E-GOVERNMENT BE DIFFERENT?

## INTRODUCTION

We are very pleased to have our paper included in this symposium honoring Professor Reinermann, and grateful to the organizers for this opportunity to participate. As we have done before in 1988 and 1995, we will focus on the role of information technology in administrative reform. As Professor Reinermann knows, we always endeavor to be provocative. We will challenge the conventional wisdom of futurists, promoters and idealists who promote technology. This paper is not futuristic; it is rooted in research and experience. It is not promotional; it is based on a healthy skepticism about the potential benefits of technology. It is not ideological; it is grounded in the realities of management motives and behavior. It lays bare the key assumptions of the idea that information technology will lead administrative reform, and challenges them in the light of research that we and our colleagues have done in this area.

Our studies over the past thirty-five years have focused on information technology in government and business organizations. Our work has spanned all levels of government as well as numerous business sectors in three major world regions—North America, Europe, and Asia-Pacific. Throughout our research careers we have been motivated by the question of whether information technology is a catalyst for administrative reform. Webster's International Dictionary defines a catalyst as "an agent that precipitates an action," and to catalyze as "to alter or transform significantly."

Webster also says that reform means "…to induce or cause to abandon an evil manner of living and follow a good one" or "…to change from worse to better" or simply "…to change for the better."

The verdict on the question we have been pursuing has been elusive. Some researchers argue strongly that IT has the capability to bring about administrative reform. For example, Fountain (2002:45) in writing about the role of IT in government, argues that "Technology is a catalyst for social, economic and political change at the levels of the individual, group, organization and institution." This is an old idea: in a classic 1958 *Harvard Business Review* article, Leavitt and Whisler forecast that "Management in the 1980's" would be profoundly different due to application of information technology: the traditional pyramidal hierarchy would be replaced by a lean structure resembling an hourglass, and productivity would soar through the elimination of most middle managers. Since 1958 firms have made huge investments in IT, and they have become more productive and leaner at *all* levels. Leavitt and Whisler's hour glass structure failed to materialize, although some of their predictions have been fulfilled. The question of whether IT leads to reform remains elusive.

Administrative reform involves the making of dramatic, fundamental or radical *change in form*, and not just a *change in degree* as implied by the phrase "continuous improvement." Reform can be fast and disruptive or slow and incremental . Reform through IT is usually meant to refer to rapid changes in form versus slower changes in degree. In 1988 and 1995 we argued that information technology does not tend to produce rapid changes in form, at least not in government organizations. In fact, IT

application tends to reinforce existing administrative arrangements. Moreover, we concluded that IT *per se* could not drive reform (Kraemer and King, 1985; Kraemer, 1995; King and Kraemer, 1998). If one interprets these conclusions to mean that no change is possible, we have been proven wrong – there have been many important changes over the past 15 years. However, if one interprets our predictions to mean that change would not occur as the proponents of IT and administrative reform suggested, then we have been proven right.

We are now at the dawn of a new century. Has anything changed since seven years and fourteen years ago that would cause us to change our views? On one hand, everything is different. The IT world that surrounds US public administration has changed markedly. Technology diffusion within the society has been pervasive, with personal computers and the Internet extending to over one-half of all American households. Internet-based e-business and e-government services are rapidly connecting businesses, households and governments thereby creating a much richer and more subtle IT environment. Of adults using the Internet, 67% have visited a government web site, with 57% visiting a federal government site, 54% a state government site and 42% a local government site (Dean, 2002). Nearly all federal agencies and most state governments[2] provide some information or services on the web. About four-fifths of city and county governments have web sites, although most lack formal strategic plans or goals for e-government.[3] About two percent offer financial services (tax, bill, parking ticket and license/permit paying) whereas about five times more governments offer non-financial

[2] Fountain, 2001, p. 5.
[3] 2000 ICMA Electronic Government Survey of 2900 cities greater than 10,000 in population and 850 counties (cited in Patricia Fletcher presentation, "Where the rubber meets the road", May 31, 2002.

services (requests for services, government records, maps). Yet, hope springs eternal: Forrester Research estimates that by 2006 governments will receive 15 percent of their total financial collections over the web.[4]

The IT infrastructure within public administration has also changed dramatically. There has been larger investment in technology at all government levels. This technology has greater capabilities and is more diffused throughout government agencies. Technical expertise is stronger and also more widely spread. Governments have created structures and processes to deal with the technology, successfully institutionalizing within public administration ideas such as Management Information Systems and Information Resource Management, end user computing and web management functions. There is greater "readiness" for administrative reform and for approaches such as reengineering than ever before.

It seems likely then that we would retract our earlier claim that IT has had little effect on administrative reform, given the changes that have occurred. On the contrary, we believe even more strongly than before that IT is not a catalyst for administrative reform in government. Machaevelli's fifteenth century admonition about the perils of administrative reform is as applicable today as then. IT continues to be a useful instrument of administrative and incremental change, but it is no more capable today of bringing about institutional change and administrative reform than it was fifteen years ago. To elaborate on this theme, we recapitulate four key propositions of the reform hypothesis, and discuss the empirical evidence related to each. We then assess the results

[4] Forester Research, 2000.

of this comparison, and raise caveats relevant to our analysis. Finally, we conclude with observations about how best to think of the relationship between IT and administrative reform.

## REFORM THROUGH INFORMATION TECHNOLOGY

Much of the literature on information technology as instruments of administrative reform claims that IT has the potential for dramatically changing organizations.[5] The problem with this argument is that it is almost never backed up by evidence. Proponents of the reform position recognize this point, but they respond with the claim that the potential of IT is not being realized because top managers fail to utilize the technology properly: they fail to "distribute" the technology efficiently, "empower" lower level staff, "re-engineer" the organization along with computerization efforts, and become hands-on "knowledge executives" themselves. This complaint has merit; much of the benefit IT could bring to organizations is lost due to poor management. However, this does not explain the failure of the reform hypothesis. It merely shifts the argument onto different grounds.

We argue that the reform hypothesis is fundamentally misguided because it assumes that organizational elites want their organizations to change, and that they are willing to use IT to accomplish such change. The empirical evidence suggests that IT has been used most often to reinforce existing organizational arrangements and power

[5] This literature spans more than thirty years and is illustrated by the National Performance Review of 1993. From Red Tape to Results: Creating a Government that works Better and Costs Less, and

distributions (Attawell and Rule, 1986; Danziger, et.al., 1982; Dutton, et al., 1987; Kraemer and King, 1979; Laudon, 1974; Perry and Kraemer, 1979; King and Kraemer, 1998; Holden, 2003), and that this trend will continue into the foreseeable future (Fountain, 2001, 2002; Holden, 2003). For example, Fountain (2002: x-xi) initially assumed that the Internet "…would overwhelm organizational forms and individual resistance and…would lead to rapid organizational change." However, after researching the use of the Internet in US federal agencies, she concluded that "…even the most innovative uses of IT typically work at the surface of operations and boundary-spanning processes and are accepted because they leave the deep structure of political relationships intact."

Decisions about IT use are made by top managers and their direct their subordinates. They use IT in the broad interests of the organization, but those broad interests usually intersect with their own interests. They use IT to enhance the information available to them; to increase their control over resources; to rationalize decisions to superiors, subordinates and clients; to provide "visible deliverables" with the aid of the technology; and to symbolize professionalism and rationality in their management practices. These aims do not necessarily work against the welfare of the organization simply because they work for the welfare of managers. Yet, such aims usually are not associated with, and are frequently antithetical to, organizational reform.

In the following sections we will review four key components of the reform hypothesis, and provide the contrasting results of research that call those components into

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Reengineering through Information Technology (accompanying report of the NPR). Washington, DC: US

question. We do not claim that our account is universally applicable. The empirical results are drawn primarily from the experiences in the United States, which is the realm we know best. It is possible that the experience in other countries has been quite different. Nevertheless, given the traditions of governmental reform in the US, and the fact that the US arguably leads the world in the levels of organizational (including governmental) investment in IT, one would expect the reform hypothesis to be strongly corroborated in the US context. The fact that it is not bears consideration.

## IT AND ADMINISTRATIVE REFORM: THE US EXPERIENCE

Our account of the reform hypothesis in US public administration begins with some facts about the extent of IT application. US public organizations have been applying IT unabated since digital computers were first introduced in the early 1950's. Picking only one era for closer examination – the mid to late 1980's – it is possible to see the magnitude of US investment in the technology. Federal agencies had over 20,000 mainframes and minicomputers, and even in those early days of the microcomputer had over 200,000 installed. Federal agencies alone employed more than 100,000 IT specialists, and spent over fifteen billion dollars annually on computerization (GSA, 1985, 1986; OTA, 1985). State and local governments had well over 3,000 mainframes and minicomputers and more than 40,000 microcomputers, employed 35,000 IT specialists, and spent over eight billion dollars annually on IT (Kraemer, King, Dunkle, Lane and George, 1986, NASIS, 1989, Caudle and Marchand, 1989). That level of

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Government Printing Office.

investment has grown substantially in the years since.[6] In short, US public administration has been an enthusiastic supporter of IT.

Fortunately for our purposes, US public administration has been a fertile ground for research into the extent and effects of IT use (Bretchsneider, 1990; Caudle, 1990; Caudle and Marchand, 1989; Danziger, et. al., 1982; Danziger and Kraemer, 1986; Dutton and Kraemer, 1978; Dutton and Guthrie, 1991; Kraemer and King, 1986; Kraemer, King, Lane and Dunkle, 1989; King and George, 1991; Kling, 1979; Fountain, 2002; Holden, 2003). The empirical findings are somewhat fragmented and sometimes contradictory, but they nevertheless come together on key points related to this inquiry. We cite those findings in the comments below.

**Reform Proposition 1.** *Computers have the potential to reform public administrations and their relations with their environments.*

A good example of this was Gibson and Hammer's (1985) claim that "...today's applications of information technology can dramatically change the way individuals, functional units, and whole organizations carry out their tasks." As a case in point, computer technology was seen as an instrument of administrative reform at the federal level in projects of the U.S. Department of Health, Education and Welfare, and in many state and local governments as well in the mid and late seventies (Kling, 1978). These were efforts to create Information and Referral (I&R) systems to consolidate the many

[6] By 2002, federal government spending for IT was $45 billion annually (OMB, 2003), with $45 million

public and private local agencies that served large urban areas. I&R systems were believed to help by sharing information about clients, needs, resources, and performance among all participating agencies, improving both service delivery to clients and the allocation of social service resources. Additionally, such systems might facilitate administrative consolidation, central budgeting, and performance monitoring in ways that administrative reforms had failed to accomplish. Despite huge investments, however, this strategy for services integration failed because the local social service agencies failed to see the benefits to them from the reforms. The I&R systems had no power to bring about services integration indirectly, and they expired along with the whole reform effort.

IT can help effect some reforms such as centralization of budgeting and accounting systems that allow greater citizen and elected official control over government resources (Kraemer, King, Dunkle and Lane, 1985). Computerization often required recalcitrant finance directors and department heads to reveal long-established practices that did not meet the expectations of professional financial controls. Also, second generation financial automation brought sophisticated capabilities for cost accounting and billing on a fee-for-service basis, and have helped government managers enact new means of enhancing revenues in the face of fiscal limitations set by citizen referenda. It can be argued that important administrative practices such as centralized accounting and budgeting and services integration that might have failed in the face of organizational growth and decentralization if not for application of IT. However, such reform effects typically mirror the reform efforts of the early 20th century, which sought to increase professionalism in government management. They tend not to be mentioned

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set aside for e-government projects, increasing to $150 million by 2006 (Forman, 2003).

in the rhetoric of the reform hypothesis.

> *Finding on Reform Proposition 1: Experience with information technology and administrative reform has shown that the technology to be useful in some cases of administrative reform, but only in cases where expectations for reform are already well-established. IT application does not cause reform.*

**Reform Proposition 2.** *Information technology can change organizational structures, and thus is a powerful tool for reform*.

This proposition is grounded in the belief that information technology can directly impact the data structures of public administration enforcing or relaxing traditional hierarchical forms. Mainframe-based computerization was seen as reinforcing hierarchical organizational structures by consolidating data and expertise, while microcomputers were seen as facilitating organizational decentralization through distribution of data and expertise throughout government.

The empirical evidence suggests that the main impact of IT application has been to reinforce existing structures of communication, authority and power in organizations, whether centralized or decentralized (Laudon, 1974; Dutton and Kraemer, 1977, 1978; Robey, 1981; Danziger, Dutton, Kling and Kraemer, 1982; George and King, 1991; Kraemer, 1980; King, 1983; Attewell and Rule, 1984; Pinsonneault, 1991; Pinsonneault and Kraemer, 2002). This finding is consistent in research on computerization in both cities and federal agencies. In the case of local governments, it is true regardless of the

form of government. Computerization in city manager governments reinforces the power and control of the professional manager; in strong mayor governments it reinforces the elected mayor; in commission governments it reinforces the power of individual commissioners.

The reform proponents argue that these findings are mainly based on the era of centralized mainframe computing. Yet the research shows that even in the mainframe era decentralized government organizations had decentralized mainframe computing arrangements (King, 1983). Moreover, even when focused on microcomputers the data do not support the proposition (Kraemer, King, Dunkle and Perry, 1992; Kraemer, King, Dunkle, Lane and George, 1985). Microcomputers have been used extensively for local text processing and other functions that do not support core government functions. To the extent that microcomputers do relate to core functions, it is through their use as intelligent terminals providing user access to centralized computers that support the large-scale processing tasks central to the government's operations.

Even if IT itself is indifferent to power distribution, senior organizational leaders are not. Recent research suggests that use of IT is correlated with both increases and decrease in the number of middle managers in organizations, but the changes are contingent on particular organizational conditions that influence the views of senior leadership (George, 1986; Klatsky, 1970; Pinsoneault, 1990; Pinsonneault and Kraemer, 2002). When middle managers in government organizations are given control over IT deployment decisions they tend to use the technology to increase their numbers. In contrast, when top managers are in control, they tend to use the technology to reduce the

number of middle manager especially when environmental triggers such as fiscal stress stimulate the need for change.

IT has had little discernible effect on organization structure, and seems to yield somewhat greater centralization in already centralized organizations in support of existing organizational arrangements. Other organizational structures also appear to be compatible with IT application, including matrix organizations involving dual authority arrangements. There is no good evidence to support or refute this idea in government organizations, but one would assume that IT application in the context of these newer organizational forms would also be used to reinforce those structures--it would not change them (Vitalari, 1988).

*Finding on Reform Proposition 2: IT application has brought relatively little change to organization structures, and seems to reinforce existing structures.*

**Reform Proposition 3.** *Properly used, information technology will be beneficial for administrators, staff, citizens and public administration as a whole.*

Proponents of this proposition argue that information technology has the potential to decentralize administration, reintegrate and enhance work life, open access to data within the government and with citizens outside, and rationalize decision making on complex problems through computerized modeling. Such changes, it is hoped, will further democratize government by bringing citizens more fully into planning and administration activities of the government itself, especially in areas of citizen concern.

There is little dispute that IT is beneficial to the organizations that use it, especially in the area of productivity (Lehr and Lichtenberg, 1998; Lee and Perry, 1998; Jorgensen, Ho, and Stiroh, 2003). In the case of government, such benefits come mainly from long-standing applications to structured and repetitive tasks at the core of government operations: the day-to-day transaction-oriented information processing of administrative agencies concerned with producing bills, recording payments, paying vendors and employees, recording public documents, answering citizen inquiries, and so forth (Danziger and Kraemer, 1986). These applications meet real needs of public agencies and they represent substantial investments. They are not bold, innovative moves to reform public agencies; they are simply useful adaptations of the technology to improve administrative performance. They reinforce the conservative values of governmental efficiency and social control inherent in US government for decades. However, they do not serve the needs of special citizen groups such as the poor, the homeless, the aged, or the handicapped (Kraemer and Kling, 1985).

There have been relatively few examples of IT applications aimed at broader, more liberal citizen service provision. One is Santa Monica, California's PEN system -- a public information utility designed to provide information, electronic mail, and conferencing among citizens and the city government through networked microcomputers located in public places and via remote links from people in their workplaces and homes. In many ways, the PEN system did achieve its goals, but it did so in the context of a city with legendary biases of political liberalism. In their case study of the PEN system, Dutton and Guthrie (1991) describe it as "reinforcing the values and

interests of a liberal democratic community supportive of citizen participation." The technology was used to reinforce community values – in this case liberal democratic values – not to reform them.[7] Once again, the empirical evidence suggests that those who control IT deployment and application determine whose interests are served by the technology.

> *Finding on Reform Proposition 3: The benefits of information technology have not been evenly distributed within government organizational functions: the primary beneficiaries have been functions favored by the dominant political-administrative coalitions in public administrations, and not those of technical elites, middle managers, clerical staff, or ordinary citizens.*

**Reform Proposition 4.** *The potential benefits from information technology are under-realized due to a lack of managerial understanding of what the technology can do, and unwillingness of managers to pursue the potential of the technology when they do understand it.*

There is no question that some managers are more effective than others at applying IT successfully, but this has little to do with the reform hypothesis. The proposition states that managers lack the understanding necessary to motivate application

[7] In a recent analysis of e-democracy in four municipalities in Sweden, Gronlund (2003) concluded that the various e-democracy initiatives reinforced the current procedures of formal politics by complementing them with increased direct communication with citizens rather than citizen participation and influence. Moreover, he concluded that this should be seen as a measure designed to reinforce the politicians' position rather than the citizens, as the agenda was set by the politicians.

of IT. In fact, IT is being widely applied in government with the full approval of all levels of the managerial hierarchy. Moreover, governments with professionalized administrations are actually more likely to adopt and apply IT (Danziger, Dutton, Kling and Kraemer, 1980; Dutton and Kraemer, 1977). The issue is not that managers fail to understand the potential of IT: they understand that potential perfectly well when it comes to their own interests, and they exploit it aggressively in the pursuit of those interests. Those interests are in line with more traditional and conservative values of government in the US, as noted above. In the occasional instances in which a government organization pursues a different political agenda, IT is applied toward those ends.

*Findings on Reform Proposition 4: Government managers have a good sense of the potential uses of IT in their own interests, and in cases where their interests coincide with government interests, they push IT application aggressively.*

## ASSESSMENT

The US experience with IT in government fails to support the reform hypothesis. The benefits of IT use are largely focused on administrative efficiency, and not on reform of administrative organization, practices, or behavior. We see two underlying assumptions that govern the reform hypothesis as it has been articulated: that reform is required in government, and that IT can be used to carry out such reforms. We question both of these assumptions.

The reform hypothesis suggests that reform is necessary without specifying why. Government organizations may be flawed and subject to improvement, but that does not mean that are doing a poor job at their objectives. Most government organizations are bureaucracies with hierarchically organized distributions of authority, resources and responsibility flowing downward to work units, and information about organizational performance flowing back upward as a means of control. Most government managers want to keep organizations that way, for good reasons. The bureaucratic form is highly refined from many decades of continuous study and improvement. It has evolved a comprehensive set of conventions that work quite well at doing complicated tasks with reasonable performance on a sustained basis over many years. Government managers understand this form of organization, which makes them expert at using it to accomplish governmental objectives. None of this suggests that managers are averse to performance improvements – indeed, the US research clearly shows senior government managers are strongly supportive of efforts to improve efficiency, productivity, and organizational control. What about the current system is broken? The reform hypothesis does not say.

IT application in the US actually fits the agenda of improved government within the established bureaucratic model. For example, computerization in financial systems provides new information and control mechanisms simultaneously to senior executives, central financial managers and department heads. Subordinates using such systems might find themselves under greater financial surveillance from their supervisors, but they also gain greater control over the details of their budgets, especially with respect to patterns of spending through real-time, accurate information about current balances. These systems allow managers at any level to enact immediate and across-the-board

changes affecting subordinates, such as the elimination of funds for all "open" positions, enactment of budget cuts, assignment of overhead expenses, and so forth (Kraemer, Dutton and Northrop, 1980). This effect of IT use is not power-neutral: it reinforces the general hierarchical structure of bureaucratic organization even while giving managers at each level greater leverage over the operations below.

Even in cases where there are good reasons to reform government, the application of IT has a poor record as a lever for change. The short-run impacts of IT use have been far less pervasive and dramatic than forecast. Orientations, tasks, and interactions among managers and workers might change, but the changes in standard operating procedures tend to be modest. It is more common that IT is made to conform to existing behavior and practice than to change such practice. Two sets of case studies covering thirty years of computing in cities (Kraemer, King, Dunkle and Lane, 1987) and federal agencies (Westin and Laudon, 1986) indicate that reform has been limited mainly to the information processing function within organizations, and not to the broader aspects of organizations. The indirect influence of information technology to achieve genuine reform within the political-administrative system is far less powerful than the direct intervention of legislative and judicial change. In theory, IT might lead to new administrative structures; in practice, it does not and it probably should not.

## IMPLICATIONS AND CONCLUSION

Proponents of the reform hypothesis can respond to the foregoing analysis with two objections. First, it can be claimed that much of the evidence presented in the

analysis is from studies of government IT application prior to the 1990's, when the Internet became a major force. Second, it is possible to point to the transformation of business organizations using IT during the dot.com boom and argue that similar changes can affect government. Both are fair observations, and deserve appropriate responses.

It is true that much of the research cited in the arguments above was done in the 1960's, 1970's and 1980's, and that important changes occurred between the 1990's and the present.[8] Nevertheless, the studies cited were very careful to account for the actual changes that might be associated with the application of IT to specific tasks in government organizations, and not to changes that were specific to particular technologies. The reform hypothesis was an explicit focus of much of this research, and every effort was made to find evidence for the hypothesis. These systematic studies refuted the hypothesis in fundamental ways that were relevant not only for the thirty year period of the studies, but more generally into the 1990's. The studies done since that

[8] It is striking that systematic, empirical research on the impacts of IT in government is almost absent after the 1980s, as new public administration scholars shifted the emphasis from understanding social consequences to IT management in government (cf. *Government Information Quarterly*, 1996; Garson, 2000, 2003; Social Science Computer Review, Spring 2003). It was difficult to find research articles dealing with the use and impacts of IT in public organizations in leading journals of public or business administration, or in books, reports, working papers or other documents from research institutes, public administration departments and government agencies. Based upon the institutional homes of the authors reviewed in this article, there also appears to be fewer researchers and research centers focused on the study of public sector computing and communications. Within the U.S., the dominant centers of research appear to be at Irvine, Harvard, SUNY Albany, Syracuse and Maryland (Baltimore).. In general, if one looks broadly at the literature on IT and public organizations, there has been a shift away from serious study of the impacts of IT towards the promotion of new uses and the management of IT.

The new uses being promoted range from multimedia to the Internet, to the latest hot Web sites to e-government and e-democracy, and take the form of tutorials, workshops, training seminars, and promotional writings. But, there is very little empirical research on the use, impact or management of these newer developments. In addition, the teaching of computers and communications in public management seems to also have devolved from concern with higher forms of computer and communications literacy (NSPAA, 1986) to a service function concerned primarily with the teaching of general purpose (word processing, spreadsheets, database) and special purpose (personal, budgeting, or other functional uses) computer applications (Waugh, et al., 1995).

time (e.g., Fountain, 2002) corroborate the basic findings of that earlier work—IT has not reformed public administration.

The argument that recent experience in business proves the power of IT to reform organizations is worth considering carefully. As noted earlier, IT has brought major productivity gains to business organizations (Jorgensen, Ho, and Stiroh, 2003), and in most cases those gains are specifically tied to changes in the ways organizations do business (Brynjolfsson and Hitt, 2003). A good example is seen in the personal computer industry (Dedrick and Kraemer, 2003). Competitive market forces required firms to change the organization of their activities from vertical, supply-driven models to virtual, demand-driven models to better match supply and demand and avoid the cycles of excess inventory and product shortages that had plagued PC companies. Dell Computer pioneered this change, which just happened to fit well with the capabilities of the Internet, and was soon copied as it took market share from the other vendors. PC makers reorganized their activities around information processes--order management, planning and coordination and customer relationship management. This allowed them to substitute information for inventory and to respond to market signals more quickly and effectively. IT did not directly create new value in the PC industry; it allowed information processes to be redefined in ways that improved efficiency and added value to the customer.

While this dramatic example is compelling, it is important to note that the catalyst of industry change was a company – Dell Computer – that was a relative newcomer to an industry that had already been destabilized by eroding profitability and intense

competition. Dell did not so much reform the PC industry as create an entirely new and superior model for the industry. Other dramatic examples of business change associated with IT use, such as Wal-Mart, Amazon.com and e-Bay, show a similar pattern of forcing dramatic re-thinking of the whole business enterprise. There is much to be gained from studying these radical shifts in business processes, but it is also wise to note that many companies that tried to change other industries failed completely and disappeared when the dot.com boom went bust.

Business organizations are driven mainly by market forces, which encourage radical innovation and can be characterized by Schumpeter's "gales of creative destruction." Government organizations, in contrast, are driven by political/institutional forces that are not and cannot be subjected to destructive changes without severe consequences for their constituents. This does not mean that governments have nothing to learn from the changes seen in the business world. If nothing else, the examples from business prove that even well-established production systems such as those in business can be changed dramatically in a relatively short period of time to produce results that are of benefit to consumers. At minimum, these examples provide hope that government services can be improved in ways that bring benefits to citizens through careful application of IT. For that to happen, the leadership of government organizations must establish the broader goals of the reform efforts, develop new models of electronic governance and electronic service delivery, and then bring IT carefully into consideration. Today's e-government initiatives are part of a broader government reform agenda that emphasizes customer service and greater responsiveness to citizens (National Performance Review, 1993; Executive Office of the President, 2003). If this is indeed

the will of the existing governmental power structure, it is likely that IT can play a role in the reform.

In order to understand its implications, the use and impact of IT in government needs to be studied and analyzed on a continuing basis. The paucity of systematic, empirical studies from the 1990's onward is disturbing especially reports of massive information systems failures by the US General Accounting Office. Public administration scholars and others need to the big issues of IT and high level institutional change.

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As noted at the beginning of this paper, Heinrich Reinermann has been an outstanding champion of the need to improve government in all respects. He also has been a true believer in the power of information technology to facilitate such reforms. His zeal in this is driven by the hope for better government, and his exhortations have the laudable character of spurring public administrators to think more creatively and carefully about the possibilities that new technology bring to the age-old quest for better government. Throughout our years of association with Professor Reinermann it has been our honor and pleasure to challenge him at every turn, to question his ideas and to force him to answer. In this he has been a most worthy adversary, and a most gracious colleague. We must leave for future scholars the question of deciding which of the arguments that have circulated among us were right and which were wrong. We believe, nonetheless, that history will recognize Professor Reinermann as a man of insight and courage who would never settle for good when better was possible.

## REFERENCES

Bretschneider, Stuart, 1990. Management information systems in public and private organizations: An empirical test, Public Administration Review 50(5): 536-545.

Brynjolfsson, Erik and Lorin M. Hitt. The catalytic computer: Information technology, enterprise transformation, and business performance. First International Conference on the Economic and Social Implications of Information Technology. January 27, 2003, Washington DC.

Caudle, Sharon L., 1990. Managing information resources in State government, Public Administration Review 50(5): 515-524.

Caudle, Sharon L. and Donald A. Marchand, 1989. Managing Information Resources: New Directions in State Government. Syracuse: School of Information Studies, Syracuse University.

Danziger, James N., William H. Dutton, Rob Kling and Kenneth L. Kraemer, 1982. Computers and Politics. New York: Columbia University Press.

Danziger, James N. and Kenneth L. Kraemer, 1985. People and Computers. New York: Columbia University Press.

Dean, Joshua, 2002. E-government hits the mainstream survey says. GovExec.com.

February 26. http://govexec.com/dailyfed/0202/022602j1.htm

Dedrick, Jason and Kenneth L. Kraemer, 2003. Redefining processes and organization with IT. Irvine, CA: CRITO, University of California, Irvine. Working paper.

Dial, O.E. 1968. Urban information systems: a bibliographic essay. Cambridge, MA: Urban Systems Laboratory, Massachusetts Institute of Technology.

Dutton, William H. and Kendall Guthrie, 1991. An ecology of games: The political construction of Santa Monica's public electronic network, Informatization in the Public Sector, 1(4): 279-301.

Dutton, William H., and Kenneth L. Kraemer, 1977. Technology and urban management: the power payoffs of computing, Administration and Society 9(3):304-340.

Dutton, William H., and Kenneth L. Kraemer, 1978. Management utilization of computers in American local Governments, Communications of the ACM, 21(3): 206-218.

Dutton, William H., Jay G. Blumler and Kenneth L. Kraemer, 1987. Wired Cities: Shaping the Future of Communications. Boston, MA: G.K. Hall.

Executive Office of the President, 2003. E-Government Strategy: Implementing the

President's Management Agenda for E-Government. Washington D.C: EOP, April.

Forman, Mark (2003) Memorandum for the chief information officers re Procedures for requesting funds from the e-government fund. OMB, May 12.

Fountain, Jane F., 2001. Building the Virtual State: Information Technology and Institutional Change. Washington, DC: Brookings Institution Press.

Fountain, Jane E.,2002. Information, Institutions and Governance. Cambridge: John F. Kennedy School of Government, Harvard University.

Garson, G. David (ed.), 2000. Handbook of Public Information Systems. New York: Marcel Dekker, Inc.

Garson, G. David (ed.), 2003. Public Information Technology: Policy and Management Issues. Heresy, PA: Idea Publishing Group.

General Services Administration, 1986. Automatic Data Processing Inventory. Washington, DC: General Services Administration.

George, Joey F. and John Leslie King, 1991. Examining the computing and centralization debate, Communications of the ACM 34(7): 63-72.

Government Information Quarterly, 1996. Symposium on the role of information technology in the federal government: policies strategies and issues, Government Information Quarterly, 13(1): 11-100.

Gronlund, Ake, 2003. Emerging electronic infrastructures: exploring democratic components, Social Science Computer Review, 21(1) Spring: 55-72.

Holden, Steven H., 2003. The evolution of information technology management at the federal level: implications for public administration. In G. David Garson (ed.), Public Information Technology: Policy and Management Issues. Hershey, PA: Idea Group Publishing, pp. 53-73.

Jorgensen, Dale. W., Mun S. Ho, and Kevin J. Stiroh. Lessons from the US Growth Resurgence. First International Conference on the Economic and Social Implications of Information Technology. January 27, 2003, Washington DC.

King, John Leslie, 1983. Centralized vs. decentralized computing: Organizational considerations and management options. ACM Computing Surveys, 15(4) December, 319-345.

King, John Leslie, and Kenneth L. Kraemer, 1985. The Dynamics of Computing. New York: Columbia University Press.

King, John Leslie and Kenneth L. Kraemer, 1986. The dynamics of change in computing

use: a theoretical framework, Computers, Environment and Urban Systems 11(1/2):5-25.

Kling, Rob, 1980. Social analyses of computing: theoretical perspectives in recent empirical research, Computing Surveys, 12(1): 61-110.

Kling, Rob, 1974. Automated welfare client tracking and service integration, Communications of the ACM, 21(6): 484-493.

Kraemer, Kenneth L., 1980. Computers, information and power in local governments. In Abbe Mowshowitz, ed., Human Choice and Computers, 2, pp. 213-235. New York: North-Holland Publishing Company, 1980.

Kraemer, Kenneth L., and John Leslie King, 1979. A requiem for USAC, Policy Analysis 5(3):313-349.

Kraemer, Kenneth L., and John Leslie King, 1986. Computing and public organizations, Public Administration Review, 46(Special Issue):488-496.

Kraemer, Kenneth L., and John Leslie King, 1987. Computers and the Constitution: a helpful, harmful, or harmless relationship? Public Administration Review, 47(1):93-105.

Kraemer, Kenneth L., and Rob Kling, 1985. The political character of computerization

in service organizations: citizen interests or bureaucratic control, Computers and the Social Sciences 1(2): 77-89.

Kraemer, Kenneth L., William H. Mitchel, Myron E. Weiner, and O.E. Dial, 1974. Integrated Municipal Information Systems. New York: Praeger Publishers.

Kraemer, Kenneth L., and James L. Perry, 1979. The federal push to bring computer applications to local governments, Public Administration Review 39(3): 260-270.

Kraemer, Kenneth L., John Leslie King, Debora Dunkle, Joseph P. Lane, and Joey F. George, 1986. The Future of Information Systems in Local Governments. Irvine, CA: Public Policy Research Organization.

Kraemer, Kenneth L., John Leslie King, Debora Dunkle, and James L. Perry, 1992. Distributable computing and organizational democratization: A test of conventional wisdom. Irvine, CA: Center for Research on Information Technology and Organizations, University of California, Irvine.

Laudon, Kenneth, 1974. Computers and Bureaucratic Reform. New York: John Wiley and Sons.

Lee, Geunjoo and James L. Perry, 1998. Are computers boosting productivity?: a test of the paradox in state governments. Irvine, CA: CRITO, University of California, Irvine. Working paper.

Lehr, William and Frank R. Lichtenberg, 1998. Computer use and productivity growth in US federal government agencies, 1987-1992, The Journal of Industrial Economics, 46 (June): 257-279.

Lenk, Klaus, 1980. Computer use in public administration: implications for the citizen. In Abbe Mowshowitz, ed., Human Choice and Computers, 2, pp. 193-212. New York: North-Holland Publishing Company, 1980.

Meyers, Charles A., ed., 1967. The Impact of Computers on Management. Cambridge, MA: MIT Press.

Mitchel, William H. 1968. An approach to the use of digital computers in municipal government. PhD dissertation. Los Angeles: School of Public Administration, University of Southern California.

National Association for State Information Systems (NASIS), 1989. Information Systems Technology in State Government. Lexington, KY: Council of State Governments.

National Performance Review, 1993. From Red Tape to Results: Creating a Government that works Better and Costs Less, and Reengineering through Information Technology (accompanying report of the NPR). Washington, DC: US Government Printing Office.

Norris, Donald and V. Webb, 1983. Microcomputers, Baseline Data Report. Washington D.C.: International City Management Association.

Northrop, Alana, Kenneth L. Kraemer, Debora Dunkle and John Leslie King, 1990. Payoffs from computerization: lessons over time, Public Administration Review, 50(5): 505-514.

Office of Technology Assessment, 1985. Automation of America's Offices. Washington, DC: U.S. Congress.

Pinsonneault, Alain, 1990. The Impact of Information Technology on the Middle Management Workforce: An Empirical Investigation. Unpublished Ph.D. Dissertation, Graduate School of Management, University of California, Irvine, CA.

Pinsonneault, Alain and Kenneth L. Kraemer, 2002. Information Technology and Middle Management Downsizing: A Tale of Two Cities, Organization Science, 13(2) March-April: 191-208.

Perry, James L., and Kenneth L. Kraemer, 1979. Technological Innovation in American Local Governments. New York: Pergamon.

Reinermann, Heinrich, 1985. Speyerer Thesen zu 'Verwaltung und Automation', der ftaedtetag 3 (March): 197-199.

Reinermann, Heinrich, 1986. Verwaltungsinnovation und Informationsmanagement: 92 Speyerer Thesen zur Bewaeltigung der Informationtechnischen Herausforberung. No. 42, Heidelberger Forum. Heidelberg: R.V. Decker and C.F. Muller.

Robey, Daniel, 1981. Computers, information systems and organizational structure. Communications of the ACM, 24:679-687.

Rushinek, A. and S. Rushinek, 1985. The effects of sources of applications programs on user satisfaction: an empirical study of micro, mini, and mainframe computers. Paper presented at the ACM Conference on End User Computing, Management Information Systems Research Center, University of Minnesota, May 2-3.

Social Science Computer Review, 2003. Special Issue: E-Government, Social Science Computer Review, 21(1) Spring: 3-72.

Vitalari, Nicholas, 1988. The impact of information technology on organizational design and the emergence of the distributed organization. Irvine, CA: Public Policy Research Organization, University of California.

Weiner, Myron E. 1969. Service: the objective of municipal information systems. Storrs, CN: Institute of Public Service, University of Connecticut.

Westin, Alan and Kenneth Laudon, 1986. Information technology and the Social

Security Administration: 1935-1990. Research Monograph completed for Office of Technology Assessment, United States Congress. Panel on Information Technology and Democratic Government. Washington, D.C.: Office of Technology Assessment.

Westin, Alan and Kenneth Laudon, Forthcoming. Information Technology and the Social Security Administration. Cambridge, MA: Harvard University Press.

Whisler, Thomas L. 1976. The impact of information technology on organizational control. In Charles A. Meyers, ed., The Impact of Computers on Management, pp. 16-40. Cambridge, MA: MIT Press.