A Research about Experimental Considerations of IT/ICT into Public Administration: Conceptual Framework

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Abstract – Being the largest producer of technical and professional manpower, India is an active participant in the development and use of information and communication technologies. Despite this, the education sector is deprived of the benefits of ICTs. The analysis shows that the ICTs offer vast potential for their use in Public Administration. Both theorists and practitioners of public administration continue to debate the extent to which public institutions and organizations are likely to be transformed by the burgeoning adoption of information technology (IT). Among those who believe that there will be a substantial, even a revolutionary, transformation, are scholars who emphasize the concept and impact of "informatization." This article focuses on the implications for public administration of the public sector's increasing reliance on IT. It is argued that IT, like information itself, is a vital resource for achieving organizational objectives. The use of IT by public organizations predisposes them to change in particular ways. As a resource, IT has inherent predispositions (e.g., requiring certain skills and investments) that lead to changes in organizational structures and management (e.g., increased dependence on the private sector). Overcoming obstacles to the potentially powerful impact of these IT predispositions will require both short-term reforms (e.g., improved partnering skills) and longer-term reforms (e.g., changes in organizational culture).

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INTRODUCTION

Theorists and practitioners of public administration continue to debate the extent to which public institutions and organizations are likely to be transformed by the burgeoning adoption of information technology (IT). Scholars who emphasize the concept and impact of "informatization" are among those who believe that there will be a substantial, even a revolutionary, transformation. Interpreted broadly, this term refers to the process by which "public service organizations - and thus the administrative organization of the state - are becoming strategically and centrally dependent upon the changing flows of informational resources which are made possible by powerful combinations of information and communication technologies."'

This article focuses on the implications for public administration of the public sector's increasing reliance on IT. It is argued that IT, like information itself, is a vital resource for achieving organizational objectives. The main

argument is that the use of IT by public organizations predisposes them to change in particular ways. As a resource, IT has inherent predispositions (e.g., requiring certain skills and investments) that lead to changes in organizational structures and management (e.g., increased dependence on the private sector through partnering and contracting). We begin by examining the concept of informatization. This is followed in the paper by an explanation of the increasing importance of IT as a public-sector resource.

The paper examines the impact of IT predispositions on the structure and management of public organizations. Should we, as public administration educators, care about including information and communications technology in the curriculum? The question is not new, but it has taken on a new sense of urgency in the present context, especially when the 2009 Network of Schools of Public Policy, Affairs, and Administration (NASPAA) standards do not even mention information technology (IT). When the first set of standards was created in the 1970s, IT

education was in its infancy in public administration schools. In 1985, NASPAA's Ad Hoc Committee on Computers in Public Management Education highlighted the significance of computer education for public administrators. The NASPAA standards have since evolved from being input-oriented to output-oriented. The 2009 standards are arguably outcome-oriented, shifting from an emphasis on specific subject area knowledge to core competencies. IT is not explicitly reflected in the competencies. This JPAE issue examines the role of IT and related skills in public administration pedagogy. We suggest that NASPAA consider forming an ad hoc committee again to consider the inclusion of IT in the public administration curriculum. Otherwise, we will forfeit the strides made in the last three decades.

Why should we care about teaching IT in public administration schools? The most basic answer is that we live in a digital world. At the 2014 NASPAA conference, the authors in this issue began a conversation with other leading scholars about IT in the context of the 2009 NASPAA standards. The Internet boom has moved IT from handling only internal management processes to becoming a key tool in interacting with public organizations' external constituencies (an interface called electronic government, or e-government). Research on IT and e-government has proliferated over the last decade. The E-Government Reference Library (EGRL) at the University of Washington saw a fivefold increase in such research between 2005 and 2015 and lists eight journals that specialize in IT and e-government. Only a very small share (3.4%) of this research, however, appears in mainstream public administration journals (Moon, Lee, & Roh, 2014). Research on IT is marginalized in public administration and management (Buffat, 2015; Pollitt, 2011). IT's absence from the 2009 NASPAA standards also indicates the lack of importance given to IT competency in public administration education. We hope this JPAE issue will spur further conversation about whether and how to include IT and e-government training in public administration schools.

There are at least four reasons why we should care about including IT in public administration education. First, IT is a large force reshaping the public sector, to borrow Alasdair Roberts's (2014) wording. The change has not been instantaneous—it has evolved in spurts since World War II. Computers were adopted for increasing efficiency in accounting and financial operations in the 1950s. Payroll, budgeting, tax billing, and inventory management were among the early areas where the impact of computers on work became noticeable. The introduction of the personal computer in the 1980s transformed public offices, including a myriad of applications for word processing, accounting, design, and enterprise management. Computers became

the means of increasing internal organizational efficiency, but with mixed results.

The Internet, which has grown by leaps and bounds since the 1990s, is arguably one of the most significant innovations affecting the 21st century. It is transforming our daily lives in ways we have yet to fully comprehend. Communication costs have decreased and wireless devices have proliferated. E-mail has supplanted snail mail; social media platforms have become pervasive; online transactions are routine; and data management using cloud computing is a hot topic, as are big data. The disruptive effects of the Internet are evident in the so-called sharing economy, where mobile devices have enabled peer-to-peer services. The digital economy has both destroyed jobs and created new ones. The effects are palpable in public organizations, where routine jobs are being phased out.

Government at all levels (federal, state, and local) and branches (legislative, executive, and judicial) is the biggest single investor in and user of Information Technology. Given its enormously varied missions, government employs a vast range of information technology applications which have dramatically changed the way government is conducted and will continue to affect the way citizens and businesses expect government to function in the 21st century. Government is also a powerful incubator, creator, influencer, precursor, and director of information technology programs, initiatives, and trends. The creation of the Internet and the National Science Foundation's current multiyear Information Technology Research and Digital Government programs are examples of this kind of government involvement in Information Technology development.

The close and complex relationship between information technology and government is beginning to become a major focus of academic research in fields such as public administration, organizational behavior, information science, and technology innovation. Though at first glance the "e-Government" initiatives as well as the underlying technologies in government practice may resemble those known from the private sector under the labels of "e-Commerce" or "e-Business," the research agenda for e-Government cannot be assumed to be identical to its private-sector counterpart. In practice the implementation of e-Government technologies and processes in the public sector also follows different priorities and requirements, as do the organizational and political implications of e-Government which may have even more far-reaching impacts than those of the private sector.

Public administration obviously finds itself at the doorsteps of a major mid- to long-term transformation with respect to

how governmental business is done (interbranch, inter-level, intra-branch, and intra-level) but also regarding the government-to-business (g2b) and government-to-citizen (g2c) relationships. The availability of enabling information technology is at the core of this transformation. Unlike the private sector, however, the public sector enjoys fewer degrees of freedom when it comes to system changes. The e-Government minitrack (along with the neighboring e-Policy minitrack) is chartered with advancing a research agenda that helps better understand the particular challenges and alternatives citizens and governments face when transforming traditional modes of governing and government into technology-enabled modes of the 21st century. The following seven papers contribute to this end.

PUBLIC ADMINISTRATION AND IT

Public administration is concerned with the goal of advancing management and policies of government. Public administration is what takes place after the election, in which the day-to-day business of governing actually occurs. Public administration also deals with management of public programs and is the study of government decision making, the analysis of the policies themselves, the various inputs that have produced them, and the inputs necessary to produce alternative policies.

IT is the study, design, development, application, implementation, support, or management of computer-based information systems, particularly software applications and computer hardware. IT deals with the use of computers and computer software to securely convert, store, protect, process, transmit, input, output, and retrieve information. IT can contribute toward the operational and strategic activities of the public sector organization. Moreover. IT can provide cost reduction, management support, strategic planning, cost-reduction applications, management support, and. most importantly, outreach to constituencies such as citizens, policymakers, employees, and contracts.

Essentially, public administration and IT deal with the use of information systems to shape organizational change in government. Much of the literature on public administration and IT argues for the transformation of government through IT. This book focuses on how IT has influenced almost every functional area of public administration, with a specific focus on organizational change.

THEORIES OF IT AND PUBLIC ADMINISTRATION

Here we review the three common theories of public administration and IT. Each theory examines the impact of technology on social and organizational change.

Technological Determinism - One important driver of change in information systems is the theory of technology determinism. This implies that when a new technology appears it creates change and will be adopted by public administration.

For example, the automobile created suburbia, and the birth control pill produced a sexual revolution. Therefore, inventions sometimes are viewed as taking on a life of their own, causing dramatic social and economic change. For example, technology determinisms can be seen through the implementation of enterprise resource planning systems in government; these systems connect business functions such as human resources and purchasing. Many vendors and consultants stress the benefits of enterprise resource planning systems regardless of the organizational context. This is most exemplified in the statistics that vendors often quote, explaining the reduction in costs and increases in performance of the public sector organization as a result of enterprise resource planning implementation. This type of "selling" of the technology for the sake of changing the organization is known as the technology determinism theory.

Reinforcement Theory - Another theory of technology and social change is the reinforcement theory. This theory argues that administrators implement IT if it supports their view of the organization change. This theory comes from the political science literature that examines why voters seek out candidates with which they agree. Therefore, citizens choose candidates that have a similar position to them on the issues. The theory applies for the adoption of IT in the public sector; technology is adopted if it agrees with the view of the public manager on the future direction of the organization. For example, if the chief information office, the highest IT executive in an organization, does not believe a new information system will work in the organization, he or she most likely will not adopt the system.

Sociotechnical Theory - The third and most important perspective from the point of this book is the sociotechnical perspective. This sociotechnical perspective argues that organizations are made up of people in the social system that use tools, techniques, and knowledge to shape the organizational change. The sociotechnical system states that technical change is influenced by the demands of the external environment that impacts information systems change in an organization. The sociotechnical perspective is the most commonly used theory in public administration to demonstrate the impact of technology on organizational change. This perspective is unique and important for this book because it implies public managers need to know IT from both the

technical perspective, understanding the technology that is being implemented, and the social perspective. The closing case study at the end of this chapter shows the impact of the change in baby boomer population and IT use as seen through the Social Security Administration.

THE INFORMATION AND COMMUNICATION TECHNOLOGY

Historically, India was deprived of the benefits of the great industrial revolution2. The world is now at the threshold of the next revolution, this time it is in information and communication technologies (ICTs)3. The recent developments in new ways to capture, store, process, and transport and display information are having profound impact on the way the societies are organized. These capabilities are reliable, inexpensive and present vast potential for networking and sharing of information in digital form across national and international boundaries. These features combined with advanced telecommunications have created unprecedented kind of infrastructure often called cyberspace and information highways.

Established networks like Internet attract a broadening base of participants, and they interconnect nationally and globally through information highways. It is postulated that the long-term impact of the ICTs on the social and economic scene of the world communities will be far stronger and deeper than ever before. From ICT revolution emerges a new kind of economy - the information economy - in which information is the critical resource and the basis for technological advancement, competition and governance. Old ways of governance are being challenged and sometimes reformulated.

Some governments have gone to the extent that certain international transactions will be handled only in the electronic form. Electronic commerce (e-com) transgressing all national and international boundaries is emerging as a new form of economic activity, even though some developing countries are not fully prepared for this. Information technology and telecommunications in developing countries can transform old challenges and create unprecedented possibilities for sustainable economic development, just as it did for business and the industrial world during the industrial revolution. Unlike the industrial revolution, the developing countries present potential for leapfrogging in the applications of ICTs. These developments dictate, for all countries, a major agenda of structural adjustment and change in the style of management, control and governance. Advanced countries are rapidly pursuing their version of the agenda, and developing countries like India must do so at the earliest, or risk their exclusion from a global economy and

severe disadvantage in the competitiveness of their goods and services in the international market.

The World Development Report for 1998 has most appropriately focused on 'Knowledge for Development'. The report highlights various attributes of knowledge that differentiate the developing countries from the developed. The report highlights that acquiring knowledge is as important as its absorption and communication. It also shows the widening disparities between the developed and developing countries as far as the development and application of ICTs is concerned. Estimates have shown that in 1993 there were approximately 173 million computers in the world and nearly 43 percent of these computers were being in use in USA alone. Another 40 percent of computers were used in the other 17 large industrialized and developed countries such as Japan, Germany, UK and France. This leaves nearly one-sixth of the computers, in use in the remaining 200 countries of the world. The developing countries therefore face an uphill task to develop and deploy the large scale IT applications in education, research and administration.

Education, as a producer of knowledge, is frontrunner and spearheading ICT related developments. The curriculum in developed countries, at all levels of education, has been redesigned and places greater emphasis on the use of ICTs. The educational systems of developing countries are still recovering from the shock waves of the ICT revolution that has already taken place in the developed world during the last two decades. Can the developing countries face the challenges which the last decade of the present millennium poses? These questions cannot skip the attention of development planners in developing countries even with a vision of 3-5 years. The second role for the education sector is to use these technologies for improving its managerial efficiency and effectiveness. The education sector, perhaps the most mismanaged social sector, is characterized by managerial inefficiencies of high order. The present paper surveys the salient features of the IT policy in India and examines the important issues in its application in educational planning and management.

INFORMATION TECHNOLOGY AS A RESOURCE

A focus on financial and human resources management continues to dominate general management concerns in the public sector. However, the relative importance of information management (IM) is increasing at an accelerated pace - and managing IT is an integral part of the broad task of IM in general. The elevated importance of IM - and of IT as well - is formally acknowledged in the federal government's 2003 Policy oiz the Marragenzent of Governmenf Infornzatioii. This policy describes information in the digital age as a valuable asset that the government

must manage as a public trust. The policy also requires federal government institutions to "use electronic systems as the preferred irieaiis of creating, using and managing information."" Information technology will be the central resource in meeting this requirement.

Information and information technology are both becoming increasingly important public-sector resources and they are tightly intertwined. They can be viewed as commodities that are bought and sold in the marketplace, but they can also be viewed, in the organizational context, as resources that are vital to the daily tasks of individuals within the organization and consequently to its overall ability to meet its objectives.

Information is a less tangible resource than most physical goods and consumer commodities and it means different things to different managers. Its many forms include business data, voice conversations, still images, motion pictures, and multimedia presentations. A processing manager might conceive of information in terms of data, a records manager in terms of records and reports, and a senior manager in terms of conversations and written documents. Information technology is a more tangible resource than information; it refers to any equipment or interconnected system of equipment that includes all forms of technology used to create, store, manipulate, manage, move, display, switch, interchange, transmit or receive information in its various forms.

Contemporary IT allows information to be exploited to a far greater degree than older technological and material-based alternatives. This fact underpins the shift from the industrial to the information economy. In the industrial economy, the methods of production are material-based and resource-intensive; they consume considerable amounts of time, labour, capital and physical materials. In the information economy, the methods of production are not centred on "hard" resources but rather on the availability of information. Production processes consume less time and energy and require a more highly skilled workforce.

Public administration is an information-intensive activity. Indeed, information is an indispensable resource that is both the raw material for, and a product of, virtually all government activities. Such activities as making health or Defence policy, collecting taxes, providing social security services and conducting medical research are grounded in information. Moreover, the policy-making, decision-making and communication processes that pervade government's service, regulatory and research functions rely heavily on information. The transfer of information that occurs in these processes entails information flows between and among all of the many actors in the political system.

These information flows involve the collection, production, dissemination and exchange of information - and IT is the resource that is enabling these flows to take place with increasing ease, rapidity and repercussions. Information technology is the driving force of the informatization process. The infrastructure provided by increasingly sophisticated and powerful IT is making information more usable and valuable. The value of the World Wide Web, for example, lies in its capacity to provide immediate and widespread access to information.

As a resource like IT becomes increasingly preferred and prominent in an organization - a development that has been formally mandated by the federal government's Policy on the Management of Government information noted above - it influences virtually all aspects of its environment. The extent of this influence on the organization and on the organization's consequent transformation depends to a substantial degree on the nature of the resource itself. Information technology is a resource with certain inherent predispositions. When a public organization uses IT extensively, these predispositions tend to lead to structural and managerial change.

CONCLUSION

The changes in the structures and processes of public organizations that are influenced by the three IT predispositions are closely related to the major features of informatization set out at the beginning of this article. Especially notable is the impact of the predispositions in respect to

1. The adjustment or change of the organizational structure in which information technology is introduced (e.g., integrated structures for service delivery, the reduction of middle-management positions);

2. The development of information policies as a differentiated area of decision-making in the organization (e.g., the creation of chief information officer in many governments, new policies on the management of government information); and

3. The introduction of specific expertise in the field of information technology through functionaries or consultants with specific tasks in this field (e.g., reliance on private-sector skills, the use of public-private partnerships).

The three IT predispositions also influence the movement of public organizations between the bureaucratic and post-bureaucratic models of public organization.

Dealing with constraints on the advance of informatization will require both short-term reforms (e.g., improved partnering skills, innovative approaches to ISD) and longer-term reforms (e.g., changes in privacy legislation, changes in organizational culture.

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