DIGITAL GOVERNANCE SUCCESS FACTORS AND BARRIERS TO SUCCESS IN PRAGUE

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ABSTRACT. In 2010 a series of case studies were conducted in Prague, Czech Republic, examining the implementation and management of digital governance. These best practice case studies were chosen from among Prague's twenty-two administrative districts and through those findings this article discusses critical success factors and barriers to successful implementation of digital government initiatives. A qualitative review of both critical success factors and barriers is discussed at the individual, organizational, and strategic levels and the paper concludes by highlighting strategies managers can take to increase e-government performance. When considered together, the critical success factors, barriers to implementation, and key factors identified in the case studies further add to the growing literature of digital governance and performance management.

INTRODUCTION

The study of e-government has continually advanced worldwide to identify best practices in performance management and increase the

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effectiveness of municipal and state governments. Quantitative studies have attempted to capture this growing field of knowledge by underscoring overall rankings of municipalities and federal practices of e-government. This research attempts to build on the study of digital governance through case study findings of best practices utilizing existing theories and frameworks for IT management. The following study examines the implementation and management of digital governance in Prague, Czech Republic.

The research begins by reviewing relevant literature, and describes local government best practices in e-government in the City of Prague. The best practices were chosen from among Prague's twenty-two administrative districts and were identified by the City of Prague's IT Department and Rutgers University's E-governance Institute. The article further discusses critical success factors and barriers to successful implementation of digital government initiatives as identified by stakeholders from the best practice districts. Both critical success factors and barriers to implementation are discussed at the individual, organizational, and strategic levels. The article concludes by highlighting strategies managers can take to increase e-government performance and improve the implementation of technology in the daily activities of the government.

LITERATURE REVIEW

For several years, e-government has been touted as the technological elixir to address managerial and governance challenges in government. Public administration as a field of study has a long history of studying the impact of technological innovations on the management of government. Melitski (2006) argued that public information system management is an important topic and demonstrated that advances in technology management in the public sector parallel those in the private sector. According to Garson (2004), the implementation of e-governance in the United States promises three major developments: First, there is an overall transformation of the way in which the government conducts business. Second, new, improved, and transformed governmental processes reduce transaction costs, resulting in substantial savings for the public sector. Third, in the future, the continuing loss of social capital in the U.S. is reversed through increased electronic networking. Yet, the breadth of the term's usage creates problems for

practitioners attempting to match their challenges with potential solutions.

Largely through descriptive research, e-government scholars have attempted to describe the development of the phenomena through historical lenses. For example, in the mid- to- late 1990s, governments first began publishing information on the Internet as static web pages. Often these pages represented a project champion's view of the Internet rather than an organizational perspective. Initially, when websites were newly developed by government agencies and municipalities, they were "little more than dressed up search engines" (Gant & Gant, 2002, p. 2); since then, however, they have improved rapidly and incorporated multiple functions. Eventually governments began thinking about design and user friendliness from a citizen's perspective.

Today, such sites are the new face of government and administrators are working towards ensuring that the transformation to e-governance enhances the relationship between government and citizens. After the turn of the century, public IT managers armed with consultants touting their e-commerce experience began championing the importance of privacy, security and the ability to transact business – or deliver interactive services to citizens online. Lastly, researchers have suggested that if e-government is to be successful, it needs to engage citizens in policy deliberation. Further, researchers argue that, if truly successful, the Internet holds the potential to engage citizens in ways never before attained in disenfranchised communities.

As a result of this historical narrative, early e-government research described developmental stages where governments publish content to the Internet, interact with citizens, offer transactional services, and discuss policy (Layne & Lee, 2001; Moon, 2002). These suggested a staged approach to the study of e-government, beginning with developing a webpage, to having fully integrated online services that encompasses all parts of society. The website offers higher levels of technical sophistication at every stage and, ultimately, will lead to the phenomenon of a "one-stop government" for citizens. Recognizing the conflicting underlying assumptions of such models some have sought to differentiate e-government and e-governance. Calista and Melitski (2007) differentiated e-government and e-governance by suggesting that e-

government is about transactional services and akin to e-commerce, while electronic governance addresses democratic governance and encourages participatory discourse between citizens and government.   Yet while researchers sought to develop theories explaining digital governance, practitioners remained detached from the scholarship, as it offers little assistance in matching managerial challenges with potential solutions (Gray, 2001). The breadth of e-government research and the lack of normative practitioner -based research further contribute to the problem. These concerns parallel those expressed about the duality of social capital theory, which on one hand seeks administrative efficiencies and improved organizational performance while at the same time expressing the importance of strategic partnerships and relationships between organizations and individuals (Halpern, 2005; Putnam, 1995; Rose, 2000).

To narrow the scope of e-government research, Wilson and Howcroft (2002) suggested three broad barriers to successful technology implementation: project failure, system failure, and user failure.   Similarly, Heeks and Bhatnagar (1999) suggested the following broad types of barriers to implementation: technical, people, management, process, cultural, structural, strategic, political and environmental. More recently, Goldfinch (2007) identified four implementation problems: over-enthusiasm, unrealistic assumptions about organizational control, lack of valid performance indicators and benchmarks, and lack of public accountability through inappropriate contracting out of technology.

Additionally, researchers have examined factors that contribute to successful implementation of technology initiatives. Becker et al. (2004) examined four critical success factors in e-government: organizational responsibility, awareness, budgetary funding and capacity to change. Further, Gil-Garcia and Pardo (2005) identified success factors in five broader categories: environmental, institutional, organizational, data-related, and technological.

Consistent with previously applied research examining managerial challenges and potential solutions, this research examines both critical success factors and barriers to success from three perspectives: Individual, Organizational, and Institutional. In examining individual factors, researchers built on applied psychology models of planned behavior (Ajzen, 1991; Fishbein & Ajzen, 1975).

To adapt these theories to technology adoption at the individual level, researchers examined individual factors to determine why individuals adopt technology in the workplace (Davis, 1989; Melitski et al., 2005). Still others suggested the importance of adequately training employees (Garson, 2003). Furthermore, scholars are now evaluating approaches to make technology more user-friendly (Brown 2003; Dawes & Pardo, 2002; DeLone & McLean, 2003).

At the organizational level, researchers have examined project management skills (Mahler & Reagan, 2003; Melitski, 2003) and the importance of planning (Bajjaly, 1999; Landsbergen & Wolken, 2001; Kim and Kim, 2003). Leadership within project management teams represents another organizational approach (Jiang & Klein, 2000; Regan & O'Connor, 2001). Research also suggested the presence of IT champions within the organization as a major factor leading to the adoption of e-government. These individuals possess high levels of motivation towards e-government and tend to support innovative changes in organizations (Hannah, 1995). Several studies point to the importance of institutional communication as a critical organizational success factor (Caffrey, 1998; Dawes & Pardo, 2002; Jiang & Klein, 2000). The size of the organization is an important success factor since larger organizations have a higher number of professionals from diverse fields, resulting in technical innovation (Norris & Moon, 2005). Additional success factors include the type and structure of government, organizational resources, and organizational professionalism (Brudney & Selden, 1995).

Lastly the strategic researchers suggested that technological applications represent multiple competing strategic values centers (Yang & Melitski, 2007). Clear measurable objectives, goals and benchmarks that are linked to institutional goals and missions also represent strategic approaches (Caffrey, 1998; Flowers, 1996; Kim & Kim, 2003). While project level management support is critical, strategic support is no less important. Strategic support for technology initiatives was found in support by executive leadership (Edmiston, 2003; Mahler & Reagan, 2003; Roy, 2003) and legislative support (Chen & Perry, 2003; Garson, 2003; Melitski, 2003; Roy, 2003). Governments with greater support from stakeholders in the organization will have higher levels of e-government than those with lesser political support, particularly because organizations with tight fiscal budgets can still be innovative if the leadership (e.g., elected

officials, top executive officers) is committed to pursuing innovative solutions as an organizational goal (Ho & Ni, 2004).

RESEARCH METHODOLOGY

This study examines the best practices in digital government, as well as critical success factors and barriers to success at the local level in Prague, Czech Republic. Prague represents an interesting case as it has placed a high priority on developing its electronic government capacity. For example, Prague showed marked advances in the international ranking conducted in 2003, 2005, 2007 and 2009 by Rutgers University's E-governance Institute. Between 2007 and 2009, Prague's ranking in the survey rose from fifteenth in the world to second behind only Seoul, South Korea. Prague's progress between 2007 and 2009 represents the largest improvement among the top 20 cities surveyed in both 2007 and 2009. Prague's performance improvement distinguishes it, making it identifiable as a case for further study. It should also be noted that this further research was conducted in collaboration with, and was supported by, the City of Prague's Central IT Department.

Our study was conducted via case studies involving semi-structured interviews with 13 digital government stakeholders. The interviewees represented stakeholders from five best practices representing administrative districts in the City of Prague during January 2010.   The five best practices among Prague's 22 administrative districts were identified by the E-governance Institute in conjunction with the City of Prague's central IT Department. Best practices were identified using Rutgers University's E-governance Institute's World E-gov Survey Instrument. The instrument was applied by IT managers in the City of Prague's central IT Department to each of the districts and the results were compiled by the E-governance Institute. The World E-government Survey has five digital government categories that it uses to evaluate local government websites from around the world: Privacy and Security; Usability; Content; Services and Citizen Participation

Since 2000, the E-governance Institute's digital government survey has been used to evaluate the performance of local government websites globally. The Institute has evaluated 100 cities from around the world every other year since 2001. The instrument evaluates five categories that are linked to literature in e-government

(Calista et al., 2010; Carrizales et al., 2006; Melitski et al., 2005). The next section briefly describes the digital government categories studied in the survey.

The security and privacy category examined each district website for privacy policies, existence of digital authentication, encryption, data management, and the use of cookies. To examine usability, the survey reviewed the user friendliness of the website's design including its branding, the length of homepages, the use of targeted audience links and site searching capabilities. Content measures assess the availability, timeliness and accuracy of public documents reports, publications and multimedia materials available on a public website.

In addition, the service category measures the presence of transactional services where citizens can purchase items such as permits, process applications or register for items like licenses. Also, the services measure study transactional services between business and government, in addition to citizen-to-government interactions. Lastly, citizen participation metrics study online civic engagement and policy deliberation that is conducted or facilitated by the website. Table 1 (below) shows the number of total measures used in each of the five e-governance categories. Based on the 98 total measures a raw score of 219 points is possible and each category is weighted so that it represents one fifth, or twenty points, of the one hundred possible digital government points in the survey.

TABLE 1
The Survey Instrument

Digital Governance Category	Number of Measures	Raw Scores	Weighted Scores
Privacy and Security	18	25	20
Usability	20	32	20
Content	20	48	20
Services	20	59	20
Citizen Participation	20	55	20
Total	98	219	100

Based on the survey results, the E-governance Institute identified the district with the highest scores in each category as best practices. Table 2 (below) shows each of the best practice districts along with its area, population, survey score (overall), and the category in which it was identified as a best practice.

TABLE 2
Prague District Best Practices

Districts	Area (hectares)	Population	Overall Score	Best Practice
Praha 1	554	30,343	41.8	Content and Services
Praha 5	2750	83,573	36.96	Privacy and Security
Praha 6	4151	100,600	39.26	Citizen Participation
Praha 14	1351	44,639	35.2	Services
Praha 16	931	8,201	41.63	Usability

Each of Prague's administrative districts is referred to by a particular number. The districts' overall average in population is 51,198. The smallest district in population is Praha 19 with 6,149 people and the largest district with 130,287 people is Praha 4. In all, only four districts in the City of Prague (Praha 4, 6, 8 and 10) have more than 100,000 residents. The best practices appear to have wide population variation. For example, only one of the best practices has a population of over 100,000. At the same time only two best practices (Praha 1 and 16) had populations under 35,000; and two districts (Praha 5 and 14) had populations between 40,000 and 90,000. While not statistically significant, the results do not suggest a relationship between increased population and greater e-government performance as previous research suggests (Kaylor et al., 2001; Scott, 2005).

RESULTS: BEST PRACTICE CASES AND KEY FINDINGS

Once best practices were identified, interviews were conducted with stakeholders from each best practice District. Each best practice represents a case for which key findings are derived based on the

qualitative interviews. This section summarizes each case and suggests key findings, which are integrated into a broader discussion of success factors in the conclusion. In the categories of Content and Service, Praha 1 was identified as a best practice. The District also demonstrates the importance of a strong alliance and partnership between the district manager, representing the mayor's office and the Internet Communication and Technology (ICT) department.   Findings from the case suggest that routine citizen feedback improves the design of services provided on the website. Furthermore, Praha 1 demonstrates that project management principles of clearly defining roles and gathering consensus among departments in the District help ease development and implementation of digital government projects.

Praha 16 is a best practice in the area of Usability. The District's case is illustrative of digital governance's ubiquity as small local governments demonstrate equally innovative online programs. Praha 16 is one of Prague's smallest administrative Districts with only 8,201 residents. The District attributes its success in website usability to the decentralized control of the site's content and the dedication of each department within the District, not solely the IT department.   The basic framework for Praha 16's website was designed by an outside vendor, and it is managed on a day-to-day basis by managers in the District's departments.   The District attributes its success to a loosely structured process for gathering citizen input in the design, functionality and overall usability of the website.

The best practice identified in the category of Citizen Participation was Praha 6, one of the largest administrative Districts in the city and the only best practice identified in this research with over 100,000 residents. The District employs several innovative programs to engage its citizens online. For example, the District recently implemented a Multimedia Messaging Service (MMS) based on push technology, increasing the efficiency of service provision to citizens. While the District is legally mandated to respond to public inquiries and information requests within thirty days, Praha 6 is able to be more responsive to citizens by reducing response time to three days. A key finding in the case of Praha 6 highlights the importance of leadership in the implementation of new programs. In this case, leadership not only includes developing a vision for the future, but

also building a process where local officials, District employees and citizens are allowed to participate and shape the decisions of digital government.

Praha 5 is the best practice for the area of Privacy and Security. The District's success demonstrates the importance of working and partnering with private service providers in order to deliver high quality e-governance to citizens. The privacy and security of Praha 5's website is largely outsourced to a private company, but the case represents how local governments need to be able to manage partnerships with industry to successfully meet citizen needs. The District's vendor is charged with designing and hosting the site, while content is provided by Praha 5. A key finding in this case is the importance of succession planning, as several elected officials have served as mayor, but each recognizes the importance of a quality presence online and each has recognized the importance of privacy and security.

The best practice for the category of Services is Praha 14. Praha 14 differentiates itself from the other best practices in that it is the only district identified as a best practice that manages and maintains all aspects of its website internally without the assistance of external vendors and contractors. The District's webmaster is the site's originator and champion and a full-time employee of the district. Where possible, Praha 14's site leverages existing technologies and makes use of open source software, like Linux, and mySql, to support its site. Further the source code for most of its online services has been written internally. Praha 14 offers GPS mapping services, an appointment scheduling application; incorporating RSS feeds for up-to-date content, and allows citizens to comment in an online forum. Key findings from Praha 14 include the importance of highly trained IT managers, maintaining professional networks for public administrators, and the need for digital governance advocates or "champions" within the District. In addition, the case illustrates how local governments can remain innovative by developing new IT initiatives internally despite stagnant budget allocations.

DISCUSSION: BARRIERS AND CRITICAL SUCCESS FACTORS

As a part of each interview, managers were also asked to identify critical success factors and barriers to successful implementation of e-government initiatives by participating in a card sorting or q-

methodology (Stephenson, 1953) technique. Card sorting techniques allow study participants to express their attitudes toward statements on each card. Participants are asked to select cards that are most consistent with their views. The results reflect each individual's worldview toward the set of topics identified, and the compiled results allow researchers to develop a profile of attitudes toward a particular set of topics (Brewer et al., 2000; Brown & Ungs, 1970).

Participants in this research were given two stacks of twenty cards to sort. The first set of cards represented twenty success factors identified from academic literature on successfully implementing technology projects in the public sector. Participants were asked to identify between five to seven factors most important in their agency. The second stack of cards identified twenty barriers to successful implementation of technology projects as identified in the academic literature. Again, managers were asked to identify the biggest barriers to successfully implementing e-government projects in their districts. Barriers or success factors were printed on one side of the card in the native language of Czech, and the English translation appeared on the opposite side of each card.

Barriers to Success

The compiled results of the card sorts and frequency distributions are described in the paragraphs that follow. Figure 1 (below) shows the frequency distribution of the barriers to success identified by study participants. The most commonly identified barrier was the need for additional training or education of staff, which was identified by four of the five best practice districts. The following barriers were chosen by two of the districts: staff qualifications or background and not enough staff to implement a project. Other barriers identified by more than one district include lack of time spent on planning and overly complex projects. Finally, several barriers were identified by only one district; these include lack of infrastructure, poor managerial support, poor support from elected officials, inappropriate training and poor communication.

Next, we examine barriers to the successful implementation of digital government at the individual, organizational and strategic levels. Managerial barriers at the individual level include personnel issues, such as a lack of training, education, or motivation;

FIGURE 1
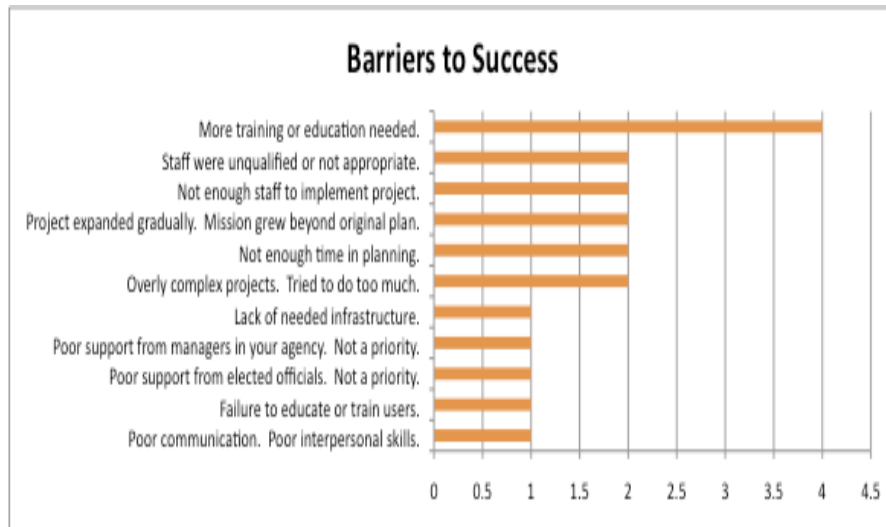
organizational barriers occur when resource constraints, coordination, communication or culture of the group or project are not taken into consideration; and strategic barriers involve political and other external limitations that may inhibit success. Technical barriers at the micro or individual level address issues like information and data integrity, while organizational-level technical barriers include the complexity and integrity of project systems (including hardware and software). At the strategic level, technical barriers include broader infrastructure needs, systems integration, information architecture, and congruence between strategic goals and core technologies.

Table 3 (below) categorizes each barrier according to individual, group or organization, or strategic framework. From the responses, managerial barriers at the organizational level are the most common barriers identified by study participants. At the organizational level, critical organizational barriers include lack of support, planning, communication and resources. Interestingly, of the eleven barriers to success identified, only two were technical in nature (contrary to managerial): overly complex projects and lack of needed infrastructure.

TABLE 3
Individual, Organizational and Strategic Barriers to Success

Individual	Organizational	Strategic
- Lack of training or education (5). - Unqualified or inappropriate staff (2) - Lack of organizational resources or staff (2)	- Lack of support from managers (1) - Lack of planning (2) - Poor communication internally (1) - Overly complex projects (2)	- Poor support from elected officials (1) - Mission creep (2) - Lack of needed infrastructure (1)

Note: Frequencies for each critical success factor appear in (parentheses).

Success Factors

Increasingly, citizens have come to expect access to digital government without having to travel to government offices during specified business hours. Further, digital government holds the potential for increasing agency efficiency and effectiveness by increasing citizen access to services and participatory opportunities online. For this reason, it is critical to examine factors that contribute to the success of digital government. Again, study participants were asked to choose from 20 critical success factors identified in academic literature in e-government.

Figure 2 (below) shows frequency distributions for critical success factors identified in the research. The most commonly identified success factor by participants in the study was adequate budget and timeframe, which was the only success factor (or barrier) identified by all five exemplar districts. Three success factors were identified by the majority (three of five) of districts, including effective communication, user friendliness, and managerial support. Six success factors were identified by more than one district, and these include citizen involvement, adequate infrastructure, effective performance measurement, professional project management, clear project design, and support from elected officials. Finally, seven success factors were identified by only one best practice district: managerial accountability, the ability to recruit and retain quality

FIGURE 2
Frequency Distribution of Critical Success Factors

employees, the use of reputable or known technologies, clear implementation plans, phased implementation, goal clarity and motivated employees.

Similar to barriers, critical success factors can be divided into three levels: individual, group/organizational and strategic (Table 4). As with the barriers, managerial success factors address social, cultural, behavioral, leadership and visionary factors. Technical success factors involve data integrity, appropriate systems design, reliable systems (hardware and software) and congruence between project objectives and core technologies. At the individual level, managerial success factors are related to factors that enable employees to better achieve their intrinsic goals. Managerial factors that address organizational concerns represent leadership

TABLE 4
Individual, Organizational and Strategic Success Factors

Individual	Organizational	Strategic
- User-friendliness (3) - Motivated employees (1) - Recruitment and retaining of good employees (1)	- Budget and time (5) - Managerial support (3) - Effective communication (3) - Performance measures (3) - Appropriate system design (2) - Managerial Accountability (1) - Clear implementation plan (1) - Professional project management (1) - Phased implementation (1)	- Citizen Involvement (2) - Political support (2) - Adequate infrastructure (2) - Goal clarity (1) - Reputable or known Technology (1)

Note: Frequencies for each critical success factor appear in (parentheses).

characteristics that successful managers use to effectively coordinate agency activities. Finally, strategic level factors that fall into the managerial category address external factors needed for agencies to fulfill their strategic vision.

As with the barriers to success identified by the districts, the critical success factors focus on elements of managerial success at the organizational level. Of the twenty critical success factors available, seventeen were selected by managers at least once, indicating some inconsistencies. However, of the seventeen selected, nine were organizational. Participants identified three critical success factors at the individual or micro level and five factors at the strategic level. The emphasis on group and organizational factors is understandable, as half of the original success factors and barriers fall into the group and organizational category, with the other half of the factors split between the individual and strategic levels.

CONCLUSION

When considered together--the critical success factors, barriers to implementation, and key factors identified in the case studies--our study suggests a compelling story that is instructive for public administrators and elected officials alike. Because of the parity

between barriers to success and critical success factors, it is possible to discuss affirmative recommendations for managers implementing technology management initiatives in government.   For example, at the individual level, training and ensuring that employees have adequate access to continued professional development was identified as the most critical factor.

The case of Praha 16 supports this finding by suggesting that agencies need a dedicated group of trained individuals working toward e-governance goals across all departments within the Praha; not just the IT department. Further, the Praha 6 case suggests that before new programs are implemented, project leaders need to engage municipal government employees across multiple departments. In other words, for digital government to succeed, public organizations need well-trained, committed individuals both in the IT department and in other departments throughout the municipality. Furthermore, study participants highlighted the importance of hiring adequate numbers of motivated and qualified staff. At the individual level, our research indicates the importance of developing information systems in ways that are perceived to be user-friendly in order for the systems to be adopted internally within the organization.

At the group or organizational level, the results suggest that new technology projects must not be overly complex and adequate planning must be conducted to ensure proper implementation. Further, communication between managers and internal and external stakeholders is critical. The Praha 14 case illustrates the importance of working with limited resources to create a culture of success throughout the organization as the implementation of new programs occur through communication, research, and hard work. This is confirmed by the identification of critical success factors that involve institutional "buy-in" for new initiatives to achieve goals.

At the organizational level, the research suggests that managers must also be held accountable for implementing their projects, and they should engage in professional project management that properly allocates organizational resources like staff time and budgetary costs. To hold managers accountable, our study indicates that managers should develop integrated performance measurement systems that link agency missions to measurable performance outcomes. It is important to note that performance measurement need not only

address efficiency measures, but also measures of quality. For example, because of the dynamic nature of the Internet, the case of Praha 1 recommends professional project management in Prahas to ensure quality of the changes to agency websites. Praha 5 demonstrates that managers within organizations need to engage in succession planning to account for potential changes in agency leadership.

At the strategic level, Praha 5 demonstrates that e-governance initiatives need adequate infrastructure to fulfill the high expectations for privacy and security by citizens. From a technological perspective, known or core technologies must be leveraged with current technologies used by the organization. Agencies must ensure that mission creep does not occur. Digital government projects must have clear goals and objectives from the start that managers can use to guide them in the implementation process. If the scope of projects is allowed to grow beyond original goals, the success of the innovation will be compromised.

It is incumbent upon managers to engage citizens in the development of new initiatives. Citizens should not only be engaged in digital governance, but they should also be a part of the planning process for developing new digital government initiatives. This was illustrated in the Praha 1 case study, which suggests that routine citizen feedback helps to continually improve the design and types of service provided by public websites. The case of Praha 16 further suggests that citizen influence in design and usability is critical for the overall functionality of digital government. Strategically, project champions, representing both government executives and elected officials, are essential for institutional buy-in and resource allocation. For example, the Praha 6 case illustrates the need for executive leadership in the successful implementation of e-governance. Further, the case of Praha 14 shows the essential nature of personal relationships between public managers and elected officials who are e-governance champions.

The approach taken by this article is innovative for its holistic view of digital governance. Like Bolman and Deal (2003), which recommends that managers consider organizational changes from multiple lenses or frames, this research advocates a similar approach for digital governance. The study integrates existing digital governance frameworks chiefly from strategic, organizational and

individual perspectives and suggests that managers examine information technology initiatives from each perspective. This study acknowledges that different approaches are necessary for digital governance initiatives to succeed. Public managers need to critically analyze potential barriers to implementation from different points of view as well as success factors. While success strategies may overlap between frames, it is essential for technology managers implementing digital governance programs to consider multiple perspectives for building success, achieving goals, and ultimately serving the public interest.

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