Web Technology and City Apps

Feasibility of Strategies for IT Innovation in Local Government

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EXECUTIVE SUMMARY

In this paper, we analyze information technology (IT) innovation strategies across the United States and assess their applicability to the City of Lebanon, NH. Through collaboration with Lebanon's City Manager, Greg Lewis, we identify three goals that align with both community needs and the local government's capabilities. First, Lebanon seeks to enhance communication between citizens and government. Second, the City wants to optimize its web interface to increase accessibility and integrate mobile applications. Finally, Lebanon seeks to increase its website viewership and application use by residents.

To perform this study, we first analyze Lebanon's current programs and their statuses. We compare these to programs of cities with similar demographic and/or governmental profiles in New Hampshire. Then we analyze examples of IT innovation in local governments across the United States. We note that a comprehensive strategy contains three factors — a clear, publicly available strategic plan that details strategies and goals; a highly structured IT department; and a web-based presence. Having identified these key features, we select four localities (Montgomery County, Maryland; the City of Rockville, Maryland; the Town of Gilbert, Arizona; and Chesterfield County, Virginia) with comprehensive, clearly defined IT optimization strategies.

Altogether, these case studies offer useful and informative indicators of what the next steps may look like for tech advancement in Lebanon. Based on our targeted analysis of these cases, we construct a set of considerations pertinent for accomplishing the City's technology goals. At the broadest level, Lebanon could create an official overarching strategy to establish an explicit direction for its e-government. More specifically, Lebanon has a range of potential options, from the creation of digital dashboards to a more aggressive maintenance of various social media channels, for the strategy's implementation. Lebanon may wish to consider these options as it expands its use of digital technology.

1. INTRODUCTION

1.1 Information Technology in Local Governments: An Overview

E-government refers to the systems and strategies in which governments use technology, such as websites or e-mail, in order to connect with, respond to, and provide services for citizens.[1] This allows for efficient transactions, convenient information delivery, and the online provision of services. Many local governments in the U.S. maintain a web interface where citizens can complete tax or parking payments, file licensing or auto registration, and access documents, announcements and records. These governments realize gains from efficiency through mobility and standardization. Services that once required multiple government employees and days to complete can now be quickly processed and catalogued electronically. Additionally, technological advancements are necessary to satisfy the demands of today's citizens for convenient, responsive online solutions to everyday tasks.[2] Yet beyond these two basic

incentives for investment in technology, governments have realized additional advantages by expanding IT infrastructures.[3]

- **eAdministration — improvements in internal governmental processes.** Both citizens and governments benefit from faster electronic information dispersal, transactions, and general business. By integrating all documents, emails, calendars, and contact data within a single online system, employees can communicate more efficiently with citizens and one another. Removing the "middleman" reduces administrative burdens and allows more valuable allocations of resources.

- **eCitizens — rapid and widespread dissemination of information.** Councils and committees can upload agendas, announcements or videos from meetings in real-time to make them available for public display and discussion. "Open data" initiatives release both aggregate statistical profiles and raw exportable databases. They can increase public awareness and facilitate independent analyses that, in turn, inform policy and performance. Having accessible online data also increases transparency and accountability of governmental officials and employees.

- **eSociety — improved citizen participation in the democratic process.** The impact of e-government on civic participation is two-fold. First, online access to information facilitates public awareness about policy challenges and electoral cycles. This may motivate and inspire increased involvement in these stages of governance. Second, e-government provides the opportunity for public feedback in decision-making processes, through online surveys and satellite discussions.[4]

Participation in e-government generally exhibits four stages. On a basic level, governments initiate an internet presence ("website presence stage"). They then provide mechanisms for communication between government and citizens through email or online postings ("interaction and communication stage"). Next, governments create the capacity for citizens to transact governmental business, including applications, registration, and payments, online ("transactional stage"). Finally, the "transformational stage" involves interactive, open source, and wireless/mobile phone applications.[5] IT transformation also often incorporates Geographic Information Systems (GIS), crowdsourcing, and "Web 2.0" features, such as social networking, blogs, and video sharing.[6]

Many local governments in the U.S., including Lebanon, NH, have entered the transactional stage, and some are experimenting in the transformational stage. Thorough evaluation of these practices is difficult because they vary widely across cities, counties, and towns and many programs are still in their infancy. We assess the design and implementation of strategies in the third and fourth stages and analyze their feasibility and potential modifications for Lebanon, NH. Given that Lebanon, NH has a comparatively substantial website presence and communication capacity, the City wishes to determine what strategies can effectively sustain long-term innovation in the final two stages of e-government development.

1.2 State of the City: Lebanon, NH

For its size and geographic location, Lebanon has a robust information technology department. It has already made substantial investments in e-governance and maintains a significant online presence. Efforts are currently underway to enhance the quality of governance through online communications and social media. The city is active on Twitter, updates its city manager blog regularly, and posts YouTube videos. IT support in Lebanon is a private entity that the city retains in-house to manage all technology needs. The two primary actors in revitalizing and maintaining Lebanon's infrastructure for tech-based outreach are the department director and the webmaster. Overall, Lebanon's online footprint and institutional configuration provide a strong base from which to expand.

2. USES OF TECHNOLOGY IN OTHER NEW HAMPSHIRE CITIES

2.1 General Observations

Many local governments use digital tools to communicate with citizens, but most have not fully taken advantage of online opportunities. For instance, all have websites that are updated consistently. However, the use of other tools like social media or case-specific e-newsletters is inconsistent. Most towns provide access to relevant city information and documents, as well as useful links and calendars for citizens and businesses. Key challenges across the board include the number of subscribers for social media (attracting more likes and followers), the creation of an intuitive user interface (matching visual appeal with ease of use), and the maintenance of town announcements (ensuring that updates occur in real time).

2.2 Case Specific Practices

The following is a summary of the ways in which other New Hampshire communities have begun to use digital technology to interact with their citizens. Each city has developed strategies that stress different aspects of digital communication. The details are as follows:

- **Berlin —** Berlin makes it easy for citizens to subscribe via email to the specific information they want. Residents can sign up for email alerts on a wide-variety of city interests — examples include "City News," "Parks and Rec Notices," and "School Announcements" — in one centralized location. Facebook is used to showcase not only town events, but also town history. The heavy focus on photos, which have been shown to increase citizen engagement, puts a more personable "face" on city government.

- **Claremont** — The city of Claremont has a section of its website titled "How Do I? Help Center," that directs visitors to a frequently asked questions page. Links for citizen support are located on the front page, reducing barriers and providing answers quickly. The "Notify Me" section supplies email alerts. There are more than a dozen

specifications that can be selected by a subscribing citizen. This is done via a transaction-based e-newsletter software tool.

- **Concord** — Concord has a user interface for its website that works to create a streamlined user experience. Citizens do not need to travel through many links to access important information, and most can be accessed via one-click directly from the homepage.

- **Dover** — The city of Dover allows citizens to complete their vehicle registration online, and makes navigation of the site simple and automatic. The city includes a "most requested information" list on the front page of the website, providing quick access to important links, forms and contacts. The "Find My Rep" feature on website allows citizens to easily find and contact their local representative by typing in a street address.

- **Keene** — To allow citizens to remain updated on city dialogue, Town Meeting videos are all uploaded online. Similar to the Claremont "How Do I?" section, Keene provides links to FAQs on every page of the website. Keene maintains separate Facebook pages for Public Works, Parks and Rec, and the Keene Public Library. While this creates a challenge in driving growth of subscribers, it has allowed the city to communicate with more niche markets and be more useful in its delivery of content.

- **Manchester** — The city of Manchester has included a donation and volunteer link that is easily accessible from the homepage, allowing people to quickly and easily donate to specific town projects.

- **Nashua —** Nashua prominently features grant applications on its front page, as well as other engaging town activities such as art events. Another portion of the site entitled "Citizen Services Requests" allows citizens to easily report local concerns and requests that are then sorted and filed to be addressed by appropriate city departments. The city also provides a live stream of government TV on its website.

- **Rochester** — Rochester uses Facebook most actively, with pages for eight different town organizations. While there is still room for growth in followers for each page, the separation of City departments can offer a more tailored and useful experience for residents. Rochester uses Facebook most actively, with pages for eight different town organizations. While there is still room for growth in followers for each page, the separation of City departments can offer a more tailored and useful experience for residents.

These strategies are summarized according to types of use, in Figure 1. As that chart shows, many cities have developed strategies for addressing eCitizens and eSociety. However, there may be opportunities for innovation and leadership in eAdministration, which is not as fully developed.

Figure 1: Typology of Digital Technology Strategies

City	eAdministration	eCitizens	eSociety
Berlin		- Email alerts tailored to specific city interests	- Facebook page showcasing town events and history
Claremont	- Transaction-based e-newsletter software	- "Notify Me" feature enables customizable email bulletins	- "How Do I?" section of website directs visitors to FAQ page
Concord		- "one-click" access to information directly from homepage	
Dover	- Citizens can complete vehicle registration online	- "Most requested information" on front page	- "Find My Rep" connects citizens with elected officials
Keene		- Town Meeting video recordings posted online - Link to FAQs present on every website page	- Separate Facebook pages for various service departments
Manchester			- Homepage hosts links to donate and volunteer
Nashua	- Electronic system for sorting and filing requests	- Live stream of government TV provided online	- "Citizen Service Requests" feature permits reporting of local concerns
Rochester			- Facebook pages for eight different town organizations

3. OVERVIEW OF INNOVATIVE PRACTICES

Technology innovation in local governments involves both *internal* processes (changes in governmental approaches and business) and *external* processes (outputs, e.g. web portal, mobile applications). The adoption of technology must be paired with supportive policies and governance structures to implement streamlined IT applications effectively. In this context, value-adding web design can form the foundation of an e-communication system that enhances responsiveness to citizens, transparency, and online transactional efficiency and ease of use.[8]

Through our analysis, we determine that policies with three main characteristics constitute the best practices for local governments seeking to expand web-based and mobile technology. These practices, outlined below, are utilized to differing degrees and with varying methods in the case studies.

a. **Strategic Plan** – For long-term planning, the priorities of all IT operations could be aligned with the administration's strategic goals, the community's needs, and the area's technological capacities. These plans could be treated as "living documents," revised and reevaluated as needed.[9]

b. **Coordinated IT Governance Structures** – The Chief Information Officer (CIO) is the primary IT advisor, who reports directly to the Chief Administrative Officer of a town, city, or county.[10] The CIO directs and oversees the design, execution, and evaluation of IT initiatives. An IT advisory committee structure facilitates communication and coordination across agencies. The CIO joins with the government's executive directors and directors of critical agencies (e.g. Health and Human Services, Public Safety, and Energy), who then provide direction, resources, and necessary insight.

c. **Model Web-based Presence –** For basic services, a model website is comprehensive and accessible.[11] It presents and archives the budgets and financial information, as well as meeting schedules and minutes. The website lists council members and administration officials with full contact information. Information on zoning ordinance, permit processing, and current contracts is also available. The processes for requesting and accessing public records are clearly defined, while lobbying practices and expenses are disclosed. Tax revenue data is accessible, and residents are able to pay taxes online.

We further identify a "model" website as one that provides these basic services:

a. **Citizen Engagement –** The government disseminates information and solicits citizens' opinions. The website offers multiple formats for citizens to give feedback, including social media, streaming reports, and video/mobile applications.

b. **Open Government** – This is the political doctrine that opens government and state administration to scrutiny and oversight at all levels.[12] Governments provide access to raw data that is relevant to performance and public interest in a readable online format. Through the website's open data system, anyone can download data, perform their own policy analyses, and make conclusions about government performance.

c. **Online/Mobile Service Delivery** – Access to services on mobile devices is a key to facilitating effective, efficient service delivery. The processes of request, provision, and feedback are seamlessly integrated on multiple technological devices. This means a citizen can choose to use a mobile app, personal computer, text, or phone call to accomplish tasks in a standardized way and can switch between devices easily.[13]

Unfortunately, the newness of e-government trends provides little opportunity to examine final outcomes and precludes the possibility of a cost-benefit analysis for most innovative technology programs.

4. CASE STUDIES

4.1 Montgomery County, Maryland — Population 989,794

4.1.1 Strategic Plan & IT Governance

Montgomery County has an organization "umbrella" that oversees all department-level projects, including software innovation, time-recording data systems for payrolls, public safety and HHS modernization projects, and others.[14] A technology platform called CountyStat facilitates cross-departmental cooperation on large county-level projects.[15]

4.1.2 Web-Based Presence

Montgomery County designates four main categories that constitute its web-based presence: (1) *access*Montgomery, which offers information about services, performance reports, internal audits, budgets, contracts, and other items, (2) *data*Montgomery which includes various disaggregate data sets, (3) *engage*Montgomery which has options for citizen feedback, exchange of ideas and concerns, and participation in live online discussions, and (4) *mobile*Montgomery involving the county's mobile apps and sites.[16]

For example, Montgomery County maintains a "results-based accountability system" known as CountyStat, which presents formatted data from third parties such as the U.S. Census Bureau and the FBI.[17] To evaluate performance, CountyStat contains progress plans from all departments and offices, a data retrieval dashboard, and a calendar of weekly meetings.[18] The selected indicators, which depict affordable housing, transportation networks, childhood educational attainment, crime and poverty rates, and other variables, reflect both agency performance and quality-of-life in Montgomery County. Moreover, they can be compared to benchmarks from 45

![The Nelson A. Rockefeller Center at Dartmouth College logo] **The Nelson A. Rockefeller Center at Dartmouth College**
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comparable counties nationally.[19] Departmental performance reports disseminate information quickly and effectively, first with a concise table that specifies what each department does (and for whom), as well as how much a given activity costs. This table is followed by simple graphs and explanations of "The Story Behind the Performance" and "Restricting Factors." To support this system, Montgomery County created a Rotational Fellowship Program, which trains County employees to cultivate and improve their data analysis, their presentation skills, and their understanding of performance assessments.

Montgomery County also supports a central contact center for its "MC311" project, which provides a 3-1-1 phone number for non-emergency information and services.[20] Requests made by phone or online can then be tracked on the county website. For example, citizens can quickly access real-time updates on community events or emergency situations, such as a flu epidemic or dangerous snowstorm.

Overall, the CountyStat system, as well as the accessibility of other county information, provides key advantages for Montgomery County. Regular monitoring and assessment enforces outcomes-focused departments, encourages transparency and accountability, and provides citizens with important information for decision-making. Using information obtained from the county's open data initiatives, Montgomery County citizens can engage policymakers and access county services electronically. Through the *engage*Montgomery crowd-sourcing platform, they can submit concerns, participate in Virtual Town Hall Meetings with the County Executive, the Director of the Department of Recreation, or the Director of the Office of Consumer Protection, as well as read related transcripts and written responses.[21]

*Mobile*Montgomery offers a listing of the county's mobile sites and apps, along with instructions. For example, with *BookMyne*, citizens can access library accounts and information and locate and reserve library materials, while *ParkNOW!* allows them to pay for parking remotely and monitor when parking meters expire. *Ride on Real Time* integrates mobile apps, texting, and GIS and Web operations to determine a person's location, identify bus routes and maps to the nearest routes, provide arrival times, along with other capabilities.[22] Of note, Montgomery County's website reorganization and advancements into the transformational stages of e-government have been very recent in 2012 and 2013 and therefore lack thorough evaluation; however, these innovations are predicted to create "greater service improvements and efficiencies in the future."

4.2 Rockville, Maryland — Population 62,334

4.2.1 Strategic Plan & IT Governance

Rockville's five-year plan frames a concrete vision for IT innovation and the city's short and long-term strategic concerns. The document provides a roadmap for the city based on input from its network of stakeholders and acknowledgement of its resources. It establishes which priorities deserve the most urgent attention given the ability of developments in IT to improve efficiency, effectiveness, responsiveness, transparency and accessibility.[23]

Most importantly, Rockville has chosen to define the terms on which it will measure the performance of this five-year plan clearly and systematically. It classifies *goals* as "the City's main area of focus for information technology" that "indicate the results that the City needs to achieve;" *objectives* as "the activities or action steps needed to obtain the results envisioned by the goals;" and *strategic initiatives* as the components that "break down the objectives into their more specific parts and activities."[24]

At the top of Rockville's list is communication and collaboration.[25] Here, Rockville has two objectives: first, to enhance multiple channels of communication and collaboration, and second, to enhance its mobile computing communication system.

For the IT department consulting service, the plan cites a need for expertise, coordination, and accountability. Rockville's plan focuses on the importance of consulting services, research and development, communication with staff and the public, and policy implementation.[26] The objectives are first to improve IT best practices through targeted technology applications in each department and then to progress into the future with research and development.

A third goal of Rockville's five-year plan is to improve its information and document management. Given that government at all levels uses, creates, receives, maintains and distributes vast quantities of information, these documents must be conveniently accessible for citizens and staff alike.[27] As part of Rockville's effort to "go green," it has highlighted cataloging and archiving as two principal planks of its five-year plan.

Yet another piece of the Rockville plan is software integration and interaction. The city has discovered that universal software platforms can help to streamline interdepartmental interaction by reducing redundancy and facilitating communication. Accordingly, the city is focusing on eliminating these gaps and increasing quality of service for all users.[28]

The final section of Rockville's plan seeks to emphasize the essential role that IT has assumed in local government and the funding that it deserves. It asserts that while the efficiency gains from continuous IT investment might not always be easy to quantify, they are substantial and necessary for governing in the 21st century.[29] At the same time, the plan recognizes the need for flexibility and for regular reassessment.

4.2.2 Web-Based Presence

The Rockville plan follows up the city's systematic approach to IT Governance with targeted strategies to address the challenges of citizen engagement and efficient management. To improve communication and collaboration, Rockville plans to expand its website's capacity for two-way communication, interact directly with citizens through social networking sites, and encourage dialogue at city meetings. The city is also seeking to create a virtual private network (VPN) over which its employees can remotely access information and be responsive to residents even when they are not in the office.[30]

Rockville plans to improve IT consulting services by consistently reassessing how each city department can best use technology. The city also wants to use its various media outlets to

communicate its progress. Rockville hopes to investigate various forms of smart computing technology, from water meters and traffic lights to security and data collection, all of which could optimize service quality by helping staff to make better informed decisions more quickly.[31]

To increase the availability of documentation, Rockville will standardize the format and access points of frequently requested information and continue the shift towards online record-keeping. Rockville envisions an online "dashboard" for the dissemination of this information that creates an intuitive and pleasant user experience.[32] Furthermore, Rockville estimates that all of these standardization efforts will have added benefits in terms of coordination, ease of access, and informed decision-making when working with other localities on public policy issues.

Finally, the five-year plan suggests three routes for promoting better service delivery through software integration. First, it highlights the possible improvements to citizen relationship management. Given the ease with which departments can coordinate via web-based systems, Rockville should be able to better track constituent complaints so that they do not get lost in the shuffle. Second, the plan seeks to utilize GPS and tracking systems to monitor government vehicles in real time. Third, Rockville will continue to expand its interactive voice response systems to give citizens the ability to check the status of personal or community concerns at any time.[33]

4.3 Gilbert, Arizona — Population 211,951

4.3.1 Strategic Plan & IT Governance

In Gilbert, a communications team created in 2012 consists of a Media and Community Relations Administrator, two Digital Journalists, and a Multimedia Specialist, all under the guidance of a Chief Digital Officer.[34] According to Chief Digital Officer Dana Berchman, the organizational changes were intended to emphasize technology rather than conventional public information tools such as press conferences. Gilbert developed and launched its first mobile app in 2012, which allows for reporting of neighborhood problems like overgrown weeds or barking dogs. The Chief Digital Officer intends to increase mobile app functionality to provide access to crime statistics and tourist information.

Frequent collaboration with other local government agencies and external stakeholders allows the Communications team to implement effective and useful structural changes to IT operations. Within the Communications Department itself, policies to enhance digital coordination include shared calendars, email mailing list, a digital toolkit for sharing effective methodologies, and training sessions about how to use communication tools.

In 2012, Gilbert expanded its IT governance structure to include a Social Media Advisory and Research Taskforce, which meets quarterly to discuss current social media trends.[35] The taskforce comprises social media leaders from town institutions and local businesses, including ASU Polytechnic, Chandler-Gilbert Community College, Dignity Health, Deep Space Marketing, Gilbert Chamber of Commerce, Gilbert Farmers Market, Phoenix-Mesa Gateway Airport, and the Fire, Police, and Parks and Recreation Departments.

Gilbert's webpage outlines a very comprehensive and clearly defined strategic plan to "Be a Technology Leader."[36] A table with the 2012 and 2013 goals has four columns: 1) *Department/Contact* with a link to the email address of the head contact person, 2) *Goal* with highly specific goals and timelines (e.g. "Increase the number of files available electronically from 1450 to 4000 by 12/1/12"), 3) *Expected Outcome(s)* with a short summary of the desired outcome as well as the result if completed (e.g. "Development Services staff members exceeded their goal early by increasing the number of files available electronically from 1450 to 4160"), and, 4) *Status* which may include the following: "In progress, on track;" "Completed, at or above target;" "Completed, below target;" or "On hold."

4.3.2 Web-Presence

The web innovation strategy for Gilbert highlights four primary focus areas: Open Government, Access, Engagement, and Industry.[37] As of February 2013, this strategy has not been fully implemented and is therefore unable to be evaluated comprehensively. Nevertheless, it underscores the features of a comprehensively designed strategy with breadth and depth in regard to each of the innovative practices described above.

To increase transparency and efficiency, Gilbert intends to use its website as a platform for open information. In September 2012, the Town expanded accessibility of Public Records by including new sections, such as Resolutions and Ordinances and provided in the minutes for all Council & Boards and Commissions meetings.[38] The Communications office will establish a "digital newsroom," which will distribute public service announcements and information on legislation in accordance with information provided in Public Records. Additionally, a planned website redesign project aims to make the portal more "citizen-centric" with improved search functions, a goal of getting to information in "three clicks or less," and accessibility at multiple ability levels in order to ensure usability and customization. Consolidated resources will also be promoted with the launch of a "Town Apps hub" hosting mobile applications including Town-created apps and external apps.[39]

To achieve its goals in the focus areas of Access and Citizen Engagement, Gilbert is pursuing two overarching policies. First, Gilbert seeks to expand free public Wi-Fi and to establish a system that highlights businesses and public spaces where free Wi-Fi is available. The Town of Gilbert webpage will work with business and government broadband providers to create additional wireless hotspots.[40] These policies drive citizen engagement by reducing the "digital divide" that marginalizes those without technological resources and Internet access. To that end, in collaboration with Internet providers, Gilbert will host public signup events to support residents in obtaining Internet access. Second, the Town is leading an expansive social media campaign to include Facebook, Twitter, WordPress, Flickr, Tumblr, Vimeo and YouTube, featuring live video streams and links to departments and individual governmental officials.[41] Social media will also be a primary tool by which the Town of Gilbert seeks feedback through "community-led discussions, with the Town playing an informative, supportive role in the background." Finally, to enhance overall citizen involvement in strategic IT planning, Gilbert has sought feedback on communication efforts through a digital survey, which closed on January 31, 2013.[42]

4.4 Chesterfield County, Virginia — Population 320,277

4.4.1 Strategic Plan & IT Governance

In 2010, the Center for Digital Government recognized Chesterfield as the best overall county Web portal in the country.[43] This followed a website redesign that introduced a citizen GIS mapping application and the community development information system, both of which got direction from steering committees with citizen members. The new web interfaces stresses user-friendliness. Citizens are connected to government through social media and interactive mapping. Additionally, constituents can personalize their online experiences with various language translations and font sizing choices. Another aspect of Chesterfield's redesign was a new organization of the Information Systems Technology Department to reduce redundancy and increase collaboration. The department uses mobile technologies, telework, and hosted solutions to respond quickly to citizen demands. Finally, Chesterfield implemented a dedicated Internet channel to promote transparent governance. County board and commission meetings are now streamed live on the Internet, which allows constituents to view meetings anytime, anywhere.[44]

5. OPTIONS FOR LEBANON

5.1 Strategic Direction

How does the preceding discussion apply to Lebanon? This section will attempt to classify the aforementioned innovative practices according to their consistency with the city of Lebanon's goals for its technology strategy. In doing so, it will suggest not just particular technologies or programs, but also a framework for implementation. We have already delineated innovation strategies as either internal or external. Below, we will suggest that these can be further broken down into *strategic* or *specific* changes. Given that Lebanon's priorities are to increase both the level of two-way communication and resident exposure to its digital communications, there are a host of strategic and specific options available. However, it is also essential to remember the inherent limitations of our case studies — the unfortunate reality of being on the cutting edge is that we primarily examine larger geographic areas that have varying ability to finance big information technology endeavors.

First, Lebanon might consider adopting a more explicitly comprehensive approach to IT management in line with the ideas laid out in "Best Practices." The city already has a "master plan" that looks ahead to 2030 on other policy dimensions, which could be mirrored to develop a coherent strategy for technology use as Lebanon heads forward into the 21st century. These would be strategic-level changes — for example, creating a plan for the administration of digital services that sets short, medium and long-term goals for implementing projects and measuring success; designating a Chief Information Officer to oversee the coordination and execution of various technology initiatives; and a detailed, transparent model for public representation of government that stresses citizen engagement, open access to data and the integration of

communication channels. Before delving into the optimization of specific policy sectors or technology channels, there are general questions that Lebanon could reflect on:

- How does the city envision the development of its technology infrastructure over the next year or two or five? Some thought could be given to plotting a strategic direction with clear benchmarks to indicate progress.

- What responsibilities will be assigned to the Chief Information Officer? How will this office balance immediate concerns with the need for guidance and perspective on the department's the long term priorities?

- How can Lebanon use its various digital platforms to promote a culture of citizen engagement, open government and top-notch service delivery in all of its endeavors?

Choosing a policy direction is essential to producing outputs that make citizen-government interactions more efficient. Some explicit examples of successful IT governance strategies come from the case studies described above.

- Montgomery has an intriguing "umbrella" structure for IT governance. Headed by a steering committee whose purpose is to organize all tech-related projects and monitor progress, it is a truly collaborative management effort that emphasizes interdepartmental cooperation while keeping an eye on the county's strategic direction.

- Rockville takes a deeply structured approach to IT management. The city's explicit delineation of goals, objectives and strategic initiatives provides a useful framework for thinking about what to strive for and how to judge performance. Meanwhile, its repeated justification of proposed action, consciousness of scope and identification of necessary ingredients reflects concern for both immediate and future demands.

- While Gilbert's communications team may be an unrealistic model for Lebanon in terms of size, each position created in Gilbert designates an important field of digital strategy for Lebanon to address.

- Chesterfield's award-winning website redesign was directed by a steering committee with citizen members, which reflects the municipality's attention to the trajectory of its IT service provision as well as concern for citizen input.

5.2 Policy Specifics

For specific policy ideas, the best practices that we have collected from around the country provide a wide menu from which to choose. Some of the ideas that are most relevant to Lebanon, based on practicality of implementation and the value they could add in terms of citizen engagement, include:

- Montgomery County's "MC311" project is a reporting service by which residents can request or provide information via telephone.

- Rockville is pursuing a citizen "dashboard" as the centerpiece of its IT strategy. This will serve as an aggregator for city news, important and digitally enabled documents and records, and updates on IT services and projects, as well as a forum for customer relationship management.

- Chesterfield County, VA has language and font features on its website that enable users to choose their language and font size for more accessible dissemination of information. The county streams board and commission meetings on the internet, which is a step beyond Lebanon's practice of posting meeting minutes and audio clips.

- Gilbert, AZ has enabled all of its public areas with free wireless internet and pursued an aggressive social media strategy on Facebook, Twitter and Foursquare.

Regarding social media strategy, Lebanon might reevaluate how it uses avenues like Facebook and Twitter with regards to two-way communication. For example, tweeting frequently to update followers is a great way to keep citizens informed, but only if the account has a substantial following. To attract more followers, and utilize social media as a two-way street, Lebanon might think about:

- Making an effort to follow as many city residents as possible. Borrowing from the Obama campaign's philosophy, residents are more likely to become active on Twitter regarding city events if they know that tweeting at the city of Lebanon's account will garner attention or a response. This should help to build citizen engagement by making them feel important and included.

- Twitter as a news aggregator. Conceptualizing Twitter in this manner would allow the city government to cull information about its residents in new and exciting ways. By identifying residents who tweet frequently and provide accurate information, Lebanon can use Twitter as a monitoring mechanism on both a daily basis and in times of emergency.

What relevant policy prescriptions can we derive from other localities in New Hampshire? The case-specific survey detailed above does not highlight many major trends apart from the universal challenges that municipalities face in crafting a coherent and comprehensive IT strategy. Our examination of these other cities demonstrates that there is considerable variance in prioritization and degree of implementation. Nevertheless, there are many strategies these communities utilize that Lebanon might consider:

- An email subscription service tailored based on residents' specific interests. (*Berlin, NH; Claremont, NH*)

- An image-heavy Facebook page providing control over the message presented to constituents. (*Berlin, NH*)

- A website designed to immediately push visitors toward the information they need most. (*Claremont, NH; Concord, NH*)

- Digitized services such as the registration of motor vehicles and the identification of local representatives. (*Dover, NH*)

- Posted video recordings of Town Meetings online. (*Keene, NH*)

- Compartmentalized constituent demands through separate Facebook pages for different city departments and services. (*Keene, NH*)

- Online donations opportunities and volunteer signups prominently linked on homepage. (*Manchester, NH*)

- A front page encouraging engagement, publicizing city events, and allowing citizens to initiate requests for service. (*Nashua, NH*)

5.3 Implementation Challenges

With limited resources and a need for efficiency, localities also need to assess the challenges that they will face when implementing and managing a comprehensive digital communication strategy. These challenges cover topics ranging from addressing concerns about citizen access to services provided, how to increase exposure and engagement with constituents, and ultimately how to best manage and maintain digital channels in a productive and value-adding manner.

a. **Constituent Access to Technology** — Lebanon could work to increase the number of digital communication channels and improve access to them, in order to maximize the reach and efficacy of technology platforms. This includes but is not limited to:

- Increasing access to free or low-cost Wi-Fi

- Creating applications for multiple platforms and devices

- Designing user friendly tools that do not discriminate based on technological competence

b. **Increasing Scale** — Lebanon currently publishes content and provides avenues of communication with residents in a more substantial way than many of its counterparts in New Hampshire. Even so, the current number of citizens accessing these digital channels

is small — Lebanon's Twitter account has just 212 followers and its YouTube account's viewership is equally sparse. To ensure that efforts to maintain active digital communication channels with constituents are worth the energy and resources utilized, it's important for the City of Lebanon to address the challenges of increasing citizen engagement and exposure. This includes but is not limited to:

- Increasing followers on social media channels.

- Attracting subscribers to e-newsletter options.

- Building a base of subscribers to text message-based town alerts.

- Promoting the download and use of any applications or web resources published by the City.

c. **Management and Consistency of Communication** — as Lebanon looks into new ways of communicating with residents via digital channels, it will be important to ensure that channels are actively updated with a consistent message across platforms. Failing to publish content and important information may lead to decreased citizen engagement and permanent abandonment of utilizing digital tools to access town information. Strategies for managing digital communication and creating a cohesive vision across platforms include but are not limited to:

- Maintenance of various digital platforms and channels, ranging from publishing content on a social media site to responding to resident requests via email, etc.

- Effective content strategy and scheduling to ensure that information published to residents is both useful and accessible.

- Restructuring of the City of Lebanon's IT team in order to most efficiently delegate management responsibilities.

6. CONCLUSION

If Lebanon chooses to pursue the technology goals discussed in this paper, valuable precedents from across the country could inform both specific and strategic level decisions. These best practices can be implemented to overcome common areas of difficulty, such as constituent access to technology, citizen engagement, and IT management. At the same time, these strategies and programs must be tailored to the needs and resources of Lebanon. The city may not need or be able to reach the scale or scope of larger municipalities like Montgomery or Rockville. Nevertheless, this analysis provides an overarching theme of highly organized IT governance along with a host of particular policy options.

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