Social media use in local government: Linkage of technology, task, and organizational context

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ABSTRACT

Social media technologies have begun to enter the governmental workplace as tools to accomplish improved public service and engagement. Widespread recognition of the potential of social media technology for achieving public outcomes does not match our understanding about how and why specific tools are being used for specific purposes. This paper makes use of newly collected national survey data from local government managers in five different agencies to address the questions: which social media tools are being used, for which tasks or purposes; and what organizational characteristics influence the coupling of task and technology. Findings reveal patterns of social media tool application for particular purposes, although organizations do not all use social media tools in the same way. Moreover, regression analysis shows that different organizational factors – work characteristics, innovativeness, technology and management capacity and stakeholder influence – predict each of the four technology–task couplings — social media for dissemination, social media for feedback on service quality, social media for participation, and social media for internal work collaboration. This study demonstrates that social media tools are not a monolithic group and calls for greater research attention to the complex interactions among social media technology, task and organizational context.

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1. Introduction

As governments seek to engage citizens, promote transparency and advance public service, social media technologies have been incorporated into the governmental workplace and have been seen as effective tools to promote public goals. Social media comprises a set of Web 2.0 technologies that enable stakeholders and government to communicate, collaborate, and engage in governance. The specific technologies include social networking applications, microblogging and wikis, among others (Kaplan & Haenlein, 2010; Kietzmann et al., 2011; Welch, 2012b).

While there is widespread recognition of the potential for these tools for achieving public outcomes, there has been little research to understand how and why these tools are becoming integrated in the public sector and it is not clear how successful they are (Mergel, 2010). Most studies on the use of social media consider Web 2.0 tools as a homogeneous block, without fully recognizing the diversity of their technical characteristics and variation in purposes for which they are applied. To date, there has been no effort to describe how social media technology and task are joined and to understand what organizational characteristics predict how technology and task are coupled.

Studying the linkages between technology, task and organizational context is fundamental for understanding how governments are actually using social media. This exploratory study makes use of newly

collected national survey data from managers in five different agencies to better understand the types of social media that public managers use and the purposes for which they use them. Specifically, we ask:

1. How widespread is the use of social media technologies in local government agencies? Which technologies are used? How does use vary by agency type?
2. For which tasks do agencies apply social media technologies? Which social media technologies are used for the different types of purposes? Do different agencies use social media technologies for different purposes?
3. What organizational factors determine the coupling of social media technology?

The article is divided in five parts. In the first, we present our theoretical framework, which looks at the interaction between technology, task and organizational context. Based on socio-technical theory and the social media literature, we present several propositions. Next, we present the data, variables and methods of analysis. The last two sections present the findings and conclusions discussing implications of the findings for research and management.

2. Social media and the socio-technical system

Different theories have been devised to understand the relationship between the human and the technical aspects of technology usage. Kling and Scacchi (1982) provide a useful distinction between two

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groups of such theories: one group follows the *discrete-entity model*, while the other follows the *web model*. The first group focuses on the social and the technical aspects of the use of technology as separate, pre-defined phenomena. These theories recognize that the social and technical aspects may affect one another, but they do not consider the underlying social context of the work practices and the organization of labor within the organization. They mostly follow what has been called the technological and organizational imperatives (Markus & Robey, 1988). When focused on the impact of technologies, they see "the main repercussions of a new technology as direct translations of technical attributes into social attributes (*e.g.*, faster data flows mean faster and better decisions)" (Kling & Scacchi, 1982, 2). In the case of social media, many studies have emphasized the technology, by studying its features or functionalities (Kaplan & Haenlein, 2010; Kietzmann et al., 2011, 2012).

By contrast, *web model* theory considers the connections between the technical aspects and the underlying social and political factors of the organization. It examines "the interaction between people and technology as part of a larger social and technical mosaic in which the development and use of the focal technology is embedded" (Kling & Scacchi, 1982, 3). The social structure and the technological features form a "work system" (Trist & Bamforth, 1951), which Bostrom and Heinen (1977) described as being made of "two jointly independent, but correlative interacting systems — the social and the technical" (p. 17), conveying what is known as the socio-technical system (STS). The technical system comprises "the processes, tasks, and technology needed to transform inputs to outputs", whereas the social system refers to "the attributes of people (*e.g.*, attitudes, skills, values), the relationships among people, reward systems, and authority structures." (Bostrom & Heinen, 1977).

This paper approaches the phenomenon of social media usage from the STS standpoint. As shown in the model (based on Nunamaker et al., 1989b) in Fig. 1, use of social media can be seen as the interaction of elements of the technical and the social systems. The technical system is represented by the interaction of *technology* and *task* (Bostrom & Heinen, 1977). Social media tools, similar to other computer-based communication tools, are flexible enough to allow for different usages, making research on the joint coupling of technology and task a fundamental step for understanding how and why social media tools are being integrated into work practices. The type of task being performed has been found to affect different outcomes regarding technology usage (Goodhue & Thompson, 1995; Nunamaker et al., 1989a; Yaverbaum, 1988).

Within the technical system, the *technology* component is represented by the many social media tools in use (*e.g.*, Facebook, Twitter). This study examines ten different social media tools (Table 1 below). The *task* component comprises the possible purposes for

which the tools can be applied. This study addresses four common tasks associated with social media use: 1) *external dissemination of information*, which is the one-to-many, broadcast-like communication, often described as a "push" strategy (Mergel, 2010); 2) *request of feedback on service quality*, which refers to a two-way communication between organizations and citizens regarding services provided; 3) *collaboration on internal work tasks*, referring to the use of Web 2.0 tools for knowledge-sharing and collaboration within the organization (McAfee, 2006); and 4) *facilitation of participation by citizens and external stakeholders*, referring to a higher degree of communication and collaboration with citizens (Arnstein, 1969). The coupling of technology and task provides a more complete picture of how social media is integrated into organizational work systems.

Previous studies on social media have looked at how specific social media tools are being used (Unsworth & Townes, 2012; Waters & Williams, 2011), but they have not incorporated factors related to the social system, the third element in the STS-based model proposed. As this paper uses the organization as the unit of analysis, the social system refers to the organizational context, comprised of factors as varied as external pressure, organizational readiness (Iacovou, Benbasat, & Dexter, 1995), level of centralization, interdepartmental dependency (Heintze & Bretschneider, 2000), among others. Based on the propositions and the data collected for this paper, this study focuses on four organizational dimensions: work characteristics, innovativeness, external stakeholder influence and technological capacity and management. These four dimensions are expected to affect the expression of technology–task coupling in the technical system, and thus help explain what organizational factors affect different possible couplings.

2.1. Work characteristics

Each coupling of technology and task represents a different technical configuration, and should vary according to the nature of the organizational work. Work characteristics such as routineness, complexity and external interaction affect the purposes for which social media are used. Several studies have looked at the routineness dimension as a key factor in describing the work systems of organizations (Lee et al., 2010; Perrow, 1967). Perrow (1967) defines non-routine work as the "exceptional cases encountered in the work, that is, the degree to which stimuli are perceived as familiar or unfamiliar" (pp. 195–196). Routineness can prevent the adoption of new technology, as it may reduce exchange of new information among workers and may decrease the time available for the development of new practices (Li & Feeney, 2012). Work complexity, in its turn, refers to the amount and diversity of knowledge the worker has to deal with in decision-making (Tung 1979). Complexity and routineness are separate concepts, but they may correlate. As Lee et al. (2010) argue, "[c]omplex issues tend to evade easy routinization in the problem solving process, and typically need to be handled by persons with more advanced professional education and experience. Simple problems will be more subject to a programmed and
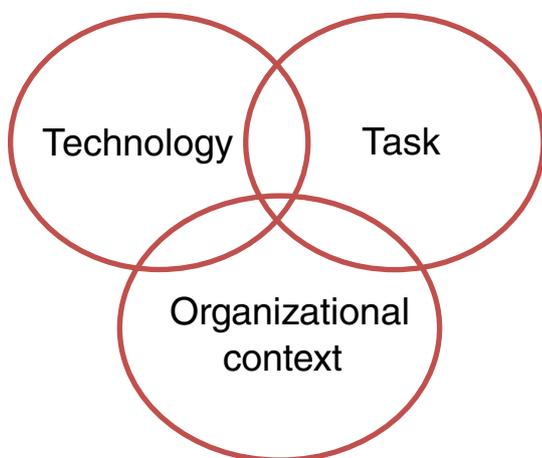

Fig. 1. Theoretical model. Based on a modified version of Nunamaker et al. (1989a,b).

Table 1
What social media technologies do local government agencies use (of those that use SM technologies)? n = 696.

	Mean	Std. Dev.	n	% Don't know	% missing
Facebook	0.92	0.27	683	0.01	0.17
Twitter	0.78	0.41	635	0.04	0.21
YouTube	0.59	0.49	570	0.08	0.26
LinkedIn	0.50	0.50	535	0.12	0.27
Govloop	0.09	0.28	398	0.25	0.37
Skype	0.28	0.45	492	0.15	0.31
Flickr	0.17	0.38	429	0.21	0.35
IM (Google Talk, Blackberry messenger, MSN, other IM)	0.56	0.50	519	0.13	0.28
MySpace	0.11	0.31	458	0.17	0.34
GoogleDocs	0.26	0.44	418	0.20	0.37

structured conversion process compared with complex ones" (p. 290). The third characteristic refers to the extent the organizational work involves exchange of information with external entities such as citizens and other organizations. The demand for external communication is expected to increase the communication needs of the organization. It is difficult to predict the specific effects that the work characteristics will have on a particular technology–task coupling. Nevertheless, it is useful to offer an exploratory proposition that broadly anticipates these interactions.

Proposition 1. *Application of social media technology for a particular task will depend on the characteristics of work in the organization.*

2.2. Innovativeness

The second dimension refers to the degree of innovativeness, which can be broadly defined as the propensity to accept innovations. These, in turn, can be understood as the "the generation, acceptance, and implementation of new ideas, processes, products or services. Innovation, therefore, implies the capacity to change or adapt" (Thompson, 1965, 2). Different studies have looked at how attitudes towards change may influence adoption of innovation (Damanpour, 1991; Pierce & Delbecq, 1977). It has also been proposed to be a determinant for the implementation of e-government initiatives (Feeney & Welch, 2012; Kim & Bretschneider, 2004; Moon & Norris, 2005). The specific effect of innovativeness on technology–task pairs is not possible given the variation in possible couplings. Nevertheless, the following proposition is offered:

Proposition 2. *Application of social media technology for a particular task will depend upon the innovativeness of the organization.*

2.3. External stakeholder influence

The third dimension, external stakeholder influence, refers to "the impact external associations exercise on the organization" (Kamal, 2006, 214). The source – citizens, the media or other governmental organizations – and degree of influence across organizations is likely to affect the expression of different combinations of technology and task. Pressure from civic society, for instance, may provoke organizations to disseminate more information, in an effort "to be where the people are" (Mergel, 2010, 7). Yang and Callahan (2007) have found that bureaucrats are responsive to external pressures for citizen involvement. Influences from political bodies are of a different nature, though. In a study of the relationship between transparency and participation, Welch (2012a) has found that city influence is negatively associated with transparency, and has suggested that "as city government seeks greater control over the organization, managers and other employees are less likely to provide explicit information that could further loss of control" (106). Alternatively influence from governmental bodies may restrict or discourage an organization from providing more information than strictly necessary. Given this, external stakeholder influence may also affect the interaction of technology and task. Although it is not clear exactly what these effects may be, it is possible to offer an exploratory proposition:

Proposition 3. *Application of social media technology for a particular task will depend upon the influence exerted by different stakeholders on the organization.*

2.4. Technological capacity/management

The fourth dimension is that of technological capacity and management, which refers to the extent to which information technology is integrated into agency processes, the availability of technology for the employees, and the presence of dedicated IT management in the organization. One important aspect of social media is that it does not always require big capital investments by the organization. Even though institutional capacity has been found to drive e-government initiatives (Tolbert et al., 2008), the adoption process of Web 2.0 tools is different from that of general enterprise systems (Raeth et al., 2010). These new tools are usually freely available to the employees through the internet access provided by the organization. Hence the most relevant type of capacity for the application of social media usage is human resource skill and ability; the knowledge the user has or the support she may receive from dedicated IT personnel. Indeed, previous studies have proposed that adoptability of technology correlates with personnel skills (Kamal, 2006; Perry & Danzinger, 1980). While the specific effects of technology capacity and management on pairings of tasks and technology are difficult to determine, it is possible to propose:

Proposition 4. *Application of social media for a particular task will depend on the technology capacity and skills of the organization.*

3. Research methodology

3.1. Data

Data used here comes from a 2012 national web survey of local governments in the United States on information technology and civic engagement. A total of 2500 city managers were invited to take part in the survey. The survey was administered to top managers in five positions – City Manager/City Administrator, Director of Community and/or Economic Development, Finance Director, Director of Parks and Recreation, Deputy Police Chief – in 500 cities ranging from 25,000 to 250,000 in population. As larger cities are fewer in number and because larger cities are often early adopters due to greater financial and technical capacity for e-government, all 184 cities with a population over 100,000 were included in the study. The remaining 316 cities were randomly selected on a proportionate basis depending on city size from the total population of 1002 cities with populations under 100,000. Standard protocols were developed to collect names and contact information of respondents online or by phone and to electronically verify the email addresses prior administration of the survey. The survey was administered online using Sawtooth Software® between February 21 and May 5, 2012. A total of 703 responses were received for a final response rate of 29% (AAPOR, 2008).

The survey applied a piping function to electronically forward survey responses from initial questions about social media technologies in use in the agency to secondary questions about the tasks for which agencies apply the technologies. Specifically, we provided a list of social media technologies from which individuals selected those in use in the organization. The selected technologies were then populated as rows in subsequent questions in which the columns contained six different tasks for which the agencies could apply the technologies. Four tasks are used in this study: to disseminate data externally; to get feedback on service quality; to enable collaboration in internal work tasks; and, to enable or facilitate participation by citizens or external stakeholders. These questions provide the basis for operationalizing the concept of technology–task coupling as respondents clicked on whether the agency uses a specific technology, such as Facebook or Twitter, for a particular task, such as dissemination. The survey also contained standard organization and management questions that are important for explaining technology–task couplings.

3.2. Variables, model and method

The analysis conducted here makes use of several constructed discrete technology variables. *Social Media Use* is an indicator of whether the organization uses social media. Four discrete variables capture the interaction (or coupling) between Social Media Use and tasks. These are named *Social Media Dissemination*, *Social Media*

Feedback, *Social Media Internal Collaboration*, and *Social Media Participation*. Descriptive statistics are presented for each of these variables in the findings section as are logistic regression results for estimations using the four interactive measures as dependent variables.

The following equation reflects the theoretical discussion and the propositions identified above:

Social Media Task Interaction

$$= f \begin{pmatrix} \text{work characteristics, innovativeness, external stakeholder} \\ \text{influence, technology capacity and management,} \\ \text{organization size, department type, city size} \end{pmatrix}$$

In this equation, *work characteristics* include: a) level of participation allowed by external stakeholders in organizational activities; b) level of routineness of work; c) extent of data exchange with other stakeholders, and d) extent of external communication. *Innovativeness* is operationalized as the level of perceived encouragement of innovative activity in the organization, while *external stakeholder influence* is measured using three types of stakeholder groups: local government, state and federal government, and others including media, businesses, advocacy groups and public opinion. *Technology capacity and management* variables include whether or not the city has an intranet, whether information technology is managed by an individual in the department, speed of computer support, percent computer use in the organization, perceived website quality, and whether or not the agency has established online transactions with citizens. Controls for organization size, department type and city size are also included in the model. Many of these variables combine multiple measures. All variable names and measures are presented in Appendix A, as are the Chronbach alpha reliability coefficients. Regression analysis was conducted using STATA 10®.

4. Findings

The first part of this section presents descriptive statistics that help understand how widespread social media technologies are and which technologies are used. Additionally, this section will examine the types of tasks for which agencies use social media technologies, which technologies are used for which tasks, and whether different agencies use social media technologies for different purposes. The second part of the findings section will present the logistic regression estimation findings for models explaining technology–task couplings.

4.1. Descriptive analysis

There is broad use of social media across local governments in the US. Of the 791 survey respondents,[1] 696 (88%) answered "yes" to the question "To the best of your knowledge: does your organization use social media for any purpose?" where social media was defined in the following way: "Social media is defined as having the characteristic of being social and interactive in nature — allowing, but not requiring, two way information exchange between individuals or groups of individuals, such as between individual public employees and citizens. Examples of commonly used social media tools include: blogs, Facebook, Twitter, YouTube, etc."

Among the 696 local governments that use social media technologies, most report using Facebook (92%), Twitter (78%), YouTube (59%), instant

Table 2
For what tasks do local government agencies use social media technologies? (n = 696).

	Mean	Standard deviation	Disseminate	Feedback	Internal coordination
To *disseminate* information externally	0.91	0.29			
To get *feedback* on service quality	0.45	0.50	0.37*		
To enable *internal collaboration* on work tasks	0.60	0.49	0.47*	0.31*	
To enable or facilitate *participation* by citizens or external stakeholders	0.66	0.47	0.54*	0.39*	.32*

* p < 0.01.

messaging (56%), and LinkedIn (50%).[2] The remaining technologies are less widely used. Table 1 presents the descriptive statistics including the percent of respondents who do not know and the percent missing data. It is important to note that the social media technologies that have the lowest means – Gov Loop, Flickr, MySpace, Skype and GoogleDocs – also have the highest level of don't knows and missing data. This may indicate that a distinction could be made between those technologies that have been broadly recognized and integrated and those that are less recognized or adopted on an *ad hoc* basis by individuals or small groups in the organization.

Local governments use social media for multiple purposes. As noted in the data section above, respondents who reported using social media were asked about the purposes for which the technology is used. Table 2 presents the mean results for those respondents who indicated they used social media for each of four different activities. Most (91%) use the technology to disseminate information, although more than 40% of respondents claim that they use the technology for the other three purposes. The correlations in Table 2 show moderate linkages across technology–task couplings (all significant at p < 0.01). Certainly, these findings provide initial evidence that agencies are using social media for a range of different tasks and actively blending the technologies into organizational processes in a variety of ways.

Beyond these general results, it is also possible to examine how the different social media technologies are applied for different purposes and how social media technology is taken up by different types of government agencies. Fig. 2 shows the layering of social media technology by use. Clearly the lower four technologies show little variation across types of task. But the upper six lines show a general pattern in which social media technologies are more frequently used for dissemination, internal collaboration and, to some extent, participation. They are less frequently applied to feedback. Fig. 3 presents the use of social media (all technologies combined) by task and agency type. This graph indicates that the relationship between technology application (technology–task coupling) and organization type, where some organizations (*e.g.* the mayor's office) are more likely to use the technology for all purposes, while others (*e.g.* finance agencies) are less likely.

In sum, the descriptive analysis presents both a divergence in the application of technologies across tasks as well as consistent patterns

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[1] Of the total 845 reporting organizations, there were 791 useable responses. Of the 54 responses not included here, 12 organizations did not know if social media was used and the rest were missing.

[2] To examine the reliability of the social media use data reported in the survey, we compared reported Facebook use with advertised Facebook use. Of the total of 845 cases, 628 affirmed using Facebook. From the 628, we randomly selected 50 to verify their Facebook presence by: either their advertised use of Facebook (presence of Facebook logo) on their homepage at the time of the survey using the Internet Archive — http://web.archive.org; or an official profile on Facebook created before the end date of the survey. Of the 50, 40 were confirmed. The 10 unconfirmed responses could be due to inaccurate responses, but they may also be due to 1) use of Facebook without the logo or location of the logo on a different page of the website; or 2) the use of Facebook without an official profile (*i.e.* through personal profiles). The analysis allows us to be confident in the use of the survey reported Facebook data as a basis for the analysis.

Fig. 2. What is the distribution of tool use by function for social media users?

Table 3
Regression model descriptive statistics.

Variable	n	Mean	Standard deviation	Minimum	Maximum
Social media variables					
Social media dissemination	791	0.80	0.40	0.00	1.00
Social media feedback	791	0.40	0.49	0.00	1.00
Social media internal collaboration	791	0.53	0.50	0.00	1.00
Social media participation	791	0.58	0.49	0.00	1.00
Work characteristics					
Work routineness	791	3.46	0.64	1.00	4.67
Participation level	791	3.15	0.76	1.00	5.00
Extent data exchange	791	4.31	2.44	0.00	7.00
Percent external communication	791	10.36	4.61	0.00	23.75
Innovativeness	791	3.12	0.77	1.00	5.00
External stakeholder influence					
Local government influence	791	3.54	0.82	1.00	5.00
State & federal influence	791	2.51	0.94	1.00	5.00
Civil society influence	791	2.69	0.74	1.00	5.00
Technology capacity/management					
City intranet	791	0.77	0.42	0.00	1.00
Website quality	791	2.60	0.64	1.00	5.00
Online transactions	791	0.74	0.44	0.00	1.00
Percent computer use	791	90.92	17.92	5.00	100.00
Internal IT manager	791	0.60	0.49	0.00	1.00
Computer support	791	3.63	0.68	1.00	4.00
Controls					
Size (logged)	791	3.69	1.48	0.00	9.82
Mayor's office	791	0.18	0.38	0.00	1.00
Economic development	791	0.22	0.42	0.00	1.00
Parks & recreation	791	0.22	0.41	0.00	1.00
Finance	791	0.15	0.35	0.00	1.00
Police	791	0.24	0.43	0.00	1.00
City size (logged)	791	0.22	0.42	0.00	1.00

that appear to be associated with organizational characteristics. The next part of this section will further investigate the organizational factors that predict social media technology–task couplings. The variables used in the regression estimations are presented in Table 3.

4.2. Regression estimation results

Four logistic regression models were estimated for each of the four discrete dependent variables capturing social media task couples. These include social media for dissemination, feedback, participation and internal collaboration, which are presented in order in Table 4. All four models are significant (chi-square < 0.001) and the pseudo r-squared for all models hovers between 8 and 11%. Although the pseudo r-squared value is not high, it is reasonable given the specific nature of the dependent variable and the exploratory nature of the study.

There are several broad observations that can be made from the results overall. First, there are significant variables in three or four categories of organizational determinants – work characteristics, innovativeness, stakeholder influence, and technology capacity and management – for each technology–task couple. This indicates that these general categories could continue to develop more specific explanatory concepts. Second, there are some variables that are consistently significant across three or four of the technology task couples. These include *innovativeness*, the *extent of data exchange*, *civil society influence*, and the existence of an *IT manager*. *Mayor* or city administration offices and *parks and recreation* offices are also more likely than *police* (reference group) to have established each of the four technology–task couples.

Third, some variables have no or little effect on any of the dependent variables. For example, the level of perceived *work routineness* is never

Fig. 3. Proportion social media use by agency type.

statistically significant in any of the models, nor is *local government influence*. Several of the technology capacity variables and organizational *size* also play a limited role across the board. It is possible that the distributed, accessible, and malleable nature of a social media technology–task coupling makes it less dependent upon raw resources and more dependent upon local IT human resources, innovative culture, and technology–task opportunities.

The fourth broad observation concerns the similarities and differences across the different models. Estimation results for *social media dissemination* and *social media participation* appear to be similar, even though these are often considered to be fundamentally different activities. This compares to the substantially different *social media feedback* model. These general findings indicate that more needs to be done to understand how public managers are conceptualizing the different categories of interaction. This should be done both through theory development and improved measurement. Finally, it is clear from the descriptive and regression findings that social media use for internal collaboration is both widely applied and determined by a unique set of indicators. Further work on this specific coupling could be a topic of future research.

Beyond these broad observations, model by model analysis provides detailed understanding of how organizational factors affect social media technology–task couplings. For the *dissemination* model, results show that larger *sized*, more *innovative* organizations having lower pressure from *state government*, greater pressure from *civil society*, an established *intranet* and a dedicated IT manager are more likely to use social media to disseminate information externally. *Participation*, which is a work characteristic that is significant in other models, is conspicuously absent from the dissemination model. The findings have some face validity as dissemination is fundamentally a one-way communication process intended to push information out to stakeholders, but not necessarily engage responses from them. The odds ratios for the statistically significant independent variables provide an estimation of their effect on technology–task. For example, organizations that have an *IT manager* in the department are 1.86 times more likely to use social media to
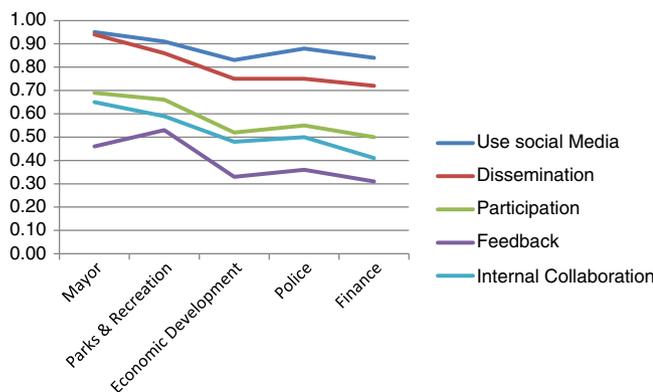
Table 4
Logistic regression estimation results.

	Social media dissemination				Social media feedback				Social media participation				Social media internal collaboration			
	Coef.	SE	OR	p	Coef.	SE	OR	p	Coef.	SE	OR	p	Coef.	SE	OR	p
Work characteristics																
Work routiness	0.09	0.18	0.91		0.11	0.15	0.90		0.17	0.14	0.85		0.03	0.14	0.97	
Participation level	−0.09	0.13	1.09		0.28	0.11	0.75	***	0.02	0.11	0.98		0.24	0.11	0.72	***
Extent data exchange	0.08	0.05	1.08	*	0.09	0.04	1.10	**	0.12	0.04	1.12	***	0.10	0.04	1.11	***
Percent external communication	−0.00	0.02	1.00		0.03	0.02	1.03	*	0.01	0.02	0.99		−0.02	0.02	1.02	
Innovativeness	0.33	0.15	0.72	**	0.28	0.13	0.76	**	0.20	0.13	0.82		0.33	0.13	0.72	***
External stakeholder influence																
Local government influence	−0.18	0.14	0.83		−0.19	0.11	0.83		−0.08	0.12	0.92		−0.08	0.11	0.92	
State & federal influence	−0.20	0.12	0.82	*	−0.12	0.10	0.89		−0.28	0.10	0.76	***	−0.13	0.10	0.88	
Civil society influence	0.31	0.16	1.36	**	0.15	0.13	1.16		0.22	0.13	1.24	**	0.21	0.13	1.25	*
Technology capacity/management																
City intranet	0.53	0.24	1.69	**	−0.11	0.22	0.89		0.43	0.21	1.54	**	0.33	0.21	1.50	
Website quality	−0.02	0.16	1.02		0.11	0.13	0.89		0.04	0.13	0.96		0.28	0.13	0.76	**
Online transactions	0.04	0.24	1.05		0.17	0.22	1.19		0.30	0.20	1.35		0.18	0.21	1.19	
Percent computer use	0.01	0.01	1.01		0.00	0.01	1.00		0.00	0.01	1.00		0.01	0.01	1.01	
Internal IT manager	0.62	0.20	1.86	***	0.38	0.17	1.46	**	0.55	0.16	1.74	***	0.44	0.16	1.55	***
Computer support	−0.15	0.15	1.16		0.15	0.12	0.86		0.07	0.12	0.93		−0.11	0.12	1.11	
Controls																
Size	0.10	0.10	1.11		0.04	0.07	1.00		0.00	0.08	1.00		0.04	0.07	1.04	
Mayor's office	2.04	0.45	4.57	***	0.38	0.29	1.47		0.72	0.30	2.04	**	0.81	0.29	2.24	***
Economic development	0.30	0.34	1.35		−0.17	0.29	0.84		−0.09	0.29	0.92		0.04	0.28	0.96	
Parks & recreation	1.07	0.39	2.93	***	0.67	0.30	1.96	***	0.55	0.31	1.73	*	0.53	0.31	1.70	*
Finance	0.40	0.36	1.49		0.18	0.31	1.19		0.00	0.31	1.00		0.08	0.31	1.08	
City size	0.20	0.36	1.22		0.20	0.36	1.22		0.20	0.36	1.22		0.30	0.14	1.36	**
Constant	−0.54	1.44			−1.01	1.70			0.03	1.18			−0.25	1.17		
Log likelihood	−348.31				−491.12				−482.98				−494.01			
Psuedo R-squared	0.12				0.08				0.10				0.10			

*** p < 0.01.
**   p < 0.05.
*   p < 0.10.

disseminate information, while *mayor* or city administration offices are more than four times more likely to use social media to disseminate information.[3]

The *feedback* model provides a quite different set of results. More *participative* organizations that *exchange data* and *communicate* more with external groups are more likely to use social media to obtain feedback on service quality. The *external stakeholder influence* variables have no statistically significant effects and whether the respondent is in the mayor or chief administrator office is no longer a key determinant. *Innovativeness* is still significant, but *internal IT manager* is the only *technology capacity/management* variable of relevance. Overall, use of social media for feedback on service quality may depend more upon the extent to which the organization is actively engaged with external groups as customers or clients, not with how much those groups have broad political influence on the organization. It is difficult to know whether lack of influence is also the reason why the mayor/chief administrator offices drop out, but certainly, it is critical to have an innovative work environment and the local IT capacity to implement such feedback efforts.

In the *participation* model, *data exchange*, *external influence* and *IT capacity and management* are important predictors of social media to enable or facilitate participation by citizens or external stakeholders. Hence expression of this technology–task couple requires both engaged work with and greater influence by civil society groups. Having an IT manager and access to an established Intranet are both important, as they were in the dissemination model. Also similar to the dissemination model, state and federal influence is negatively associated with social

media for participation. Influence from state, federal and courts may indicate greater legal or regulatory oversight, which may reduce agency willingness to be open, transparent and participative.

Finally, the social media for *internal collaboration* model presents an integrated picture in which *participation* and *data exchange* with external groups, *innovativeness*, *civil society influence*, and *technical capacity and management* predict the use of social media to enable internal collaboration on work tasks. Larger cities are also more likely to use Facebook for internal collaboration. This combination of internal and external factors attests to a complex context that underlies the use of social media technology for internal collaboration. For organizations to undertake the use of social media for collaboration it may be necessary for them to have work processes that are already highly integrated, political attention to recognize different constituencies, and local technical ability to implement the technology in ways that organize input and reduce rather than increase complexity.

5. Conclusion

This study goes well beyond validating prior research showing that approximately 80% of public sector organizations have a social media presence (Bonsón et al., 2012; Snead, 2013) and suggests that future work develop more complex designs to understand use of social media technology in government.

By applying socio-technical systems theory, the study explored the interrelationships between different types of social media technology and different activities undertaken by the organization. The study found that while there are some overall patterns of usage, there is also a good deal of variability in the use of different social media tools for different purposes, and that the variability depends on type of department or agency. Moreover, regression analysis showed that

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[3] Odds ratios are reported in Table 4. However, due to space limitations they are not described in the text for other significant variables.

different organizational factors predict the use of social media technology for different tasks. Some organizational features, such as innovativeness and external influence, were associated with multiple couplings, while others did not predict any couplings. Organizational size, for instance, which has long been associated with adoption of innovation was not found to be associated with any of the two-way technology–task pairings (dissemination, feedback, participation, internal collaboration) studied here.

Several concluding observations can be made. The research clearly demonstrates the substantial variability and malleability of social media technology. Having a social media icon on a webpage does not demonstrate usage, but rather indicates the potential application of a particular tool for a variety of potential uses for both internal and external organizational activities. Moreover, the study of technology–task couples provides only one means of operationalizing the complex interplay between highly malleable technology and complex organizational systems.

For practitioners, the findings indicate that managers will need to develop clearer strategies that connect tools with work purposes, before they are able to take advantage of social media as a means of communication, collaboration and stakeholder engagement. Findings also show that different organizational factors influence use of social media for different purposes. As such, practitioners may be able to leverage organizational capacities to strengthen particular uses of social media, or use information about constraints to overcome difficulties related to specific applications of these technologies. One relevant finding for practice, for example, refers to the fact that an internal IT manager is positively correlated with all four models, indicating the capacity needed to implement these tools successfully. Another example refers to the opposite effects of state and federal influence

(negative) and civil society (positive) on the use of social media. Practitioners wanting to promote use of social media should take into account the external influences over their organizations, and thus develop strategies accordingly.

Limitations of the data in this study do not enable the development of other types of important variables such as how widely the technology–task couple is applied, which structures or sub-groups use it, or what effect the coupling has on organizational processes, relationships with external groups, or other outcomes. To address these issues, other research designs are likely needed: longitudinal data collection and analysis, collection of data on lower level users (as opposed to the top managers in this study), social network analysis to examine structure and resource flows, and richer qualitative case study analysis to provide more nuanced understanding of organizational integration and reliance on social media technology for different purposes.

Acknowledgments

Appendix A. Variables and measures

Variable name	Survey question	Values
Social media technology	Please indicate which of the following social media tools your organization uses for any purpose: Facebook; Twitter; YouTube; LinkedIn; Gov Loop; Skype; Flickr; Google Talk, Blackberry Messenger, MSN or other instant messaging tools; MySpace; Google Docs	Each coded as 1 = Yes; 0 = No
Social media use	If the individual selected one of the social media technologies or identified others, then they were coded one, otherwise they were coded 0.	1 = Yes; 0 = No
Social media dissemination	Interactive variable: social media use and "For what purpose does your organization use the types of tools you named?:" To disseminate information externally.	1 = Yes; 0 = No
Social media input	Interactive variable: social media use and to provide input on planning and policy.	1 = Yes; 0 = No
Social media feedback	Interactive variable: social media use and to get feedback on service quality.	1 = Yes; 0 = No
Social media internal collaboration	Interactive variable: social media use and to enable collaboration in internal work tasks.	1 = Yes; 0 = No
Social media external coordination	Interactive variable: social media use and to enable collaboration and coordination on projects with citizens.	1 = Yes; 0 = No
Social media participation	Interactive variable: social media use and to enable or facilitate participation by citizens or external stakeholders.	1 = Yes; 0 = No
Work routineness (Chronbach alpha = 0.66) (scale reversed for regression analysis)	People here do the same job in the same way every day. (reverse coded) One thing people like around here is the variety of work. Most jobs have something new happening every day.	1 = Strongly agree; 5 = Strongly disagree
Participation level (Chronbach alpha = 0.88) (scale reversed for regression analysis)	Over the past year, how often did members of the public contribute the following to your organization? *Seven items*: input on long range plans; input on service priorities; feedback on service quality; formal oversight of your organization; feedback on department decisions; input on improving department; management and operations; input on employee conduct	1 = Very often; 5 = Never
Extent data exchange	Please indicate if your organization shares or exchanges data with the following types of organizations: Sum of seven items: other local governments (city, town, county) in your state; local governments in other states; state agencies; federal agencies; contractors; private, for-profit organizations; private, not-for-profit organizations	1 = Yes; 0 = No
Percent external communication	Considering your typical work week, please indicate the percentage of your direct communications (*e.g.* phone calls, e-mails, voicemails, and meetings) that are dedicated to the following individuals. Sum of three percentages: with your organization's clients, customers, and the public; with state and federal political officials such as the governor's office, legislature, and federal agencies; with consultants	0–100%
Innovativeness (Chronbach alpha = 0.83) (scale reversed for regression analysis)	Most employees in this organization are not afraid to take risks. Employees in this organization are rewarded for developing innovative solutions to problems. This organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.	1 = Strongly agree; 5 = Strongly disagree

(continued on next page)

Appendix A (*continued*)

Variable name	Survey question	Values
	This organization has a strong commitment to innovation. People who develop innovative solutions to problems are rewarded.	
Local government influence (Chronbach alpha = 0.74)	Please indicate the level of influence that the following institutions or individuals exert over your organization. *Three items*: Mayor; Mayor's council; other city departments	1 = No influence; 5 = Very strong influence
State & federal influence (Chronbach alpha = 0.83)	Please indicate the level of influence the following institutions or individuals exert over your organization. *Four items*: Governor; state legislature; state courts; federal government	1 = No influence; 5 = Very strong influence
Civil society influence (Chronbach alpha = 0.84)	Please indicate the level of influence the following institutions or individuals exert over your organization. *Three items*: business groups; advocacy groups; public opinion; media	1 = No influence; 5 = Very strong influence
City intranet	Does your local government or department have an intranet (a web server accessible only to local government employees)?	1 = Yes; 0 = No
Website quality (Chronbach alpha = 0.86) (scale reversed for regression analysis)	Thinking about your city's website, please indicate your level of agreement or disagreement with the following statements: *Seven items*: the city's website is easy to navigate; the information on the city's website is up-to-date; residents and citizens tell me our website is very useful; I think that the city's website should have more information relevant to citizens and external stakeholders (reverse coded); the city website is poorly managed (reverse coded); citizens and residents are often frustrated with the way content is organized on our website (reverse coded); citizens and residents complain about our website (reverse coded)	1 = Strongly agree; 5 = Strongly disagree
Online transactions	Please indicate if your department currently offers the following online services or not. If any of the three are true: online payment for services including fees and fines; online delivery of local government records or department information to citizens who request information; online requests for services that your department is responsible for delivering	1 = Yes; 0 = No
Percent computer use	Approximately what proportion of the employees in your department use a computer for their work?	0–100%
Internal IT manager	Who is responsible for maintaining and improving your department website and e-government services?: A designated person in our department.	1 = Yes; 0 = No
Computer support (scale reversed for regression analysis)	When you have a problem with your computer or the internet, usually how long does it take for technology services to resolve it?	Within: a few hours (1); a day (2); a few days (3); a week or more (4)
Size	About how many full-time employees work in your department?	Log of whole number
Mayor's office	Determined by sample design	1 = Yes; 0 = No
Economic development	Determined by sample design	1 = Yes; 0 = No
Parks & recreation	Determined by sample design	1 = Yes; 0 = No
Finance	Determined by sample design	1 = Yes; 0 = No
Police	Determined by sample design	1 = Yes; 0 = No

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