

1 **Effects of Organizational Behavior on Information Selection in**  
2 **Planning Projects**

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20

## 1 Effects of Organizational Behavior on Information Selection in Planning Projects

2 Several important characteristics of organizations—boundary spanning activity,  
3 experience, project control, and resource commitments—are considered in this  
4 paper for their impact the selection of communicative-based information in  
5 planning projects. The analysis uses survey data from 183 local emergency  
6 planning committees in the United States who reported conducting hazardous  
7 materials commodity flow studies, a type of planning project. These data provide  
8 a unique opportunity to empirically measure planning processes and application  
9 of theoretical constructs using a national data set and a common framework. The  
10 research extends the understanding of theory and practice to planning  
11 organizations, processes, and disciplines, and can help local communities,  
12 practitioners, and researchers envision more-effective planning organizations.

13 Keywords: organizations, information, boundary spanning, experience, resources,  
14 structure

## 15 Introduction

16 The effects of organizational behavior on selection of communicative-based information  
17 sources in planning projects are examined in this paper. Quantitative, multivariate  
18 statistical methods were used to analyze how organizational measures of boundary  
19 spanning, experience, resource commitments, and structure affect selection of  
20 communicative information in emergency planning projects. The analysis also controls  
21 for the characteristics of communities that are conducting planning activities, other  
22 organizational factors, and the types of planning participants.

23 The setting of this research is the conduct of hazardous materials commodity  
24 flow study (HMCFS) projects by local emergency planning committees (LEPCs). In  
25 addition to persistent questions in planning about how to make planning processes and  
26 institutions more effective in general, recent disasters involving hazardous materials  
27 (e.g., West, Texas and Lac-Megantic, Quebec) call attention to how local communities

1 **plan for disaster prevention, response, and recovery.** LEPCs are multi-agency, multi-  
2 jurisdictional organizations with responsibility for local chemical hazards planning and  
3 ensuring community right-to-know in the United States. HMCFS projects are one type  
4 of planning activity in which LEPCs engage. HMCFS are information-based studies  
5 that identify transport of hazardous materials (HAZMAT) into, out of, within, and  
6 through specific areas. They can be used in both emergency and comprehensive  
7 planning applications, including but not limited to guiding emergency response training,  
8 identifying equipment needs, informing community development, and designating  
9 hazmat transportation routes.

10         The research uses data from a national survey of LEPCs about their HMCFS  
11 practices. The survey was conducted by Texas A&M University and Texas  
12 Transportation Institute in 2008. A subset of 183 cases from the survey responses is  
13 examined using multiple linear regression and binomial logistic regression techniques.  
14 Through its focus on planning organizations and information selection and use of  
15 multivariate quantitative analysis to evaluate behavior of a common setting of planning  
16 organizations from across the U.S., this paper contributes to planning research in its  
17 applicability and relevance to both theory and practice.

### 18 **The Planning Process and Conceptual Framework**

19 The literature suggests a variety of factors that theoretically impact planning activities.  
20 For example, Filion and Sanderson (2011) point out that the activity of planning can be  
21 segmented in three levels, the micro-level considers different on-going activities of  
22 planners, the middle level deals with decisions and processes, and the macro-level  
23 involves organizational structure and other institutional factors. A similar conceptual  
24 outline in considering the factors associated with community, planning organizations,  
25 planning participants, and the planning process is followed herein.

## 1 ***Community***

2 The characteristics of the community (and region) influence the planning process and  
3 provide context for planning activities. Community context can be expressed through  
4 social, economic, and environmental variables such as resources (Lindell & Whitney,  
5 1995; McEntire & Dawson, 2007; Perry & Lindell, 2007) which include a community's  
6 economic basis, the presence of and exposure to hazard and risk (Burby, 2003; Lindell  
7 & Meier, 1994; Lindell & Whitney, 1995; Peacock, Brody, & Highfield, 2005; G. O.  
8 Rogers, 1998; Templeton & Kirk, 2008), location such as state or region in which the  
9 community is situated (Starik, et al., 2000), and socio-economic characteristics (Lindell  
10 & Perry, 2004). Political attitudes and behaviors (Brunet, 2001; Lindell & Perry, 2001;  
11 Perry & Lindell, 2007; Rogers, Sorensen, & Morell, 1991; Somers & Svara, 2009;  
12 Webler & Tuler, 2002) and community attitudes and behaviors (Beierle, 2003; Dozier  
13 & Ehling, 1992; Irvin & Stansbury, 2004; Lindell & Meier, 1994; McEntire & Dawson,  
14 2007; Palenchar, et al., 2005; Paton, et al., 2010; Perry & Lindell, 2007; Rich, et al.,  
15 1993; Roberts, 2004; Somers & Svara, 2009; Webler & Tuler, 2002; Wheeler, 2000) are  
16 also characteristics of the community that can influence planning processes.

## 17 ***Planning Organization***

18 The characteristics of the planning organization also influence the planning process and  
19 are the focus of this paper. Measures that can be used to describe the organizational  
20 context include organization activity, boundary spanning, funding, innovation,  
21 knowledge and experience, membership, motivation, resources, and structure. This  
22 paper examines four measures of organizational behavior: boundary spanning,  
23 experience, resources, and structure. Boundary spanning relates to environmental  
24 scanning—a means by which organizations identify potential threats and opportunities

1 (Dozier & Ehling, 1992; Pflaum & Delmont, 1987)—and is a process or mechanism by  
2 which organizations interact with their environments (Adams, 1980), such as other  
3 organizations or community members, through formation of networks and searches for  
4 information. Boundary spanning can occur across physical, organizational, disciplinary,  
5 personal, and informational boundaries (Brody, 2003a; Kaufman, 1987; Warner, Lulofs,  
6 & Bressers, 2010; White et al., 2010). Thus, boundary spanning is another means by  
7 which organizations can obtain information, and identify and respond to threats.

8         Boundary spanning is considered key to the success of planning (Innes, Booher,  
9 & Di Vittorio, 2010) and organizational decision-making (Kaufman, 1987). Brody  
10 (2003a) finds that interorganizational coordination is the strongest of five indicators of  
11 plan quality for 30 local ecosystem management plans in Florida. Johnson, Pierce, and  
12 Lovrich (2011) report that the prevalence of boundary-spanning mechanisms in 344  
13 U.S. counties significantly increases collaboration in emergency management. White et  
14 al. (2010) used feedback from 308 water management professionals through boundary  
15 spanning processes to improve water resource modelling software in Arizona.

16         Webler and Tuler (2002) report on preconditions and moderating variables and  
17 outcome variables that were important in their participatory planning studies of  
18 environmental and natural resources in New England. The level of knowledge  
19 generated is among the outcome variables that is closely linked to information selection.  
20 Organizational preconditions and moderating variables they describe include density of  
21 interest groups, diversity of interest groups, other ongoing projects, experience with in-  
22 group-out-group communication, quality of social networks, and physical resources.  
23 These seem to be parallel to the concepts of organization and project membership,  
24 organization activity, boundary spanning, and resources that are considered herein.

1           The structure of a planning organization can affect how critical tasks are  
2 accomplished. Bacharach and Aiken (1977) found significant positive relationships  
3 among communications in local government organizations, organization structure,  
4 boundary spanning, and decentralization. Perry and Lindell (2007) report that “LEPC  
5 size, subcommittee structure, meeting formalization, meeting frequency, role  
6 formalization, and computer technology contributed to positive [planning] outcomes”  
7 (p. 105). Along with staffing and structure (presence of subcommittees), emergency  
8 planning resources were found to have significant relationships with emergency  
9 planning outcomes in Michigan LEPCs (Lindell & Meier, 1994). Johnson, Pierce, and  
10 Lovrich Jr. (2011) use data from 344 counties and find that organizational investment in  
11 knowledge systems and professionalism are significant positive predictors of  
12 collaboration in local emergency management.

13           Experience is another aspect of planning organizations that can affect how  
14 planning activities are conducted. Direct experience by organization members with  
15 emergency situations such as evacuations was found to be significantly related to  
16 effectiveness of Michigan LEPCs by Whitney and Lindell (2000) along with reward  
17 opportunity and role conflict among members. Rogers and Sorensen (1991) and  
18 Rogers, Sorensen, and Morell (1991) report that community adoption of computer  
19 technologies is related to the professionalism, vicarious experience, and volunteer  
20 participation of emergency management agencies, and also find a possible relationship  
21 with available resources.

## 22 ***Planning Participants***

23 Types of participants in LEPC planning processes differ by their community and  
24 organizational backgrounds, roles, experiences, communication skills, and perspectives  
25 (Brody, 2003b; Burby, 2003; Taylor, 1991). The participants who are engaged in

1 community planning efforts bring with them the socio-cultural contexts of the  
2 community and organizations they represent (Allison, 1971; Archer, 2002; Bates &  
3 Harvey, 1986; Byström, 2007; Byström & Hansen, 2005; Choo, 2007; Kleindorfer, et  
4 al., 1993; Taylor, 1991; Vatn, 2009)—they ‘stand where they sit’. For example,  
5 emergency responders (Archer, 1999; Cloud, 2008; Donahue, 2004; Fannin & Dabbs,  
6 2003; Geldbach-Hall, 2006; Grant & Hoover, 1994) and community planners (Bolan,  
7 1971; Dalton, 2007; Guzzeta & Bollens, 2003; Hemmons, et al., 1978; Howe, 1980;  
8 Howe & Kaufman, 1981; Johnson, 2006; Kaufman, 1987; Kuhn & Nelson, 2002;  
9 Lammers & Barbour, 2006; Matthews, 1993; Schön, et al., 1976) tend to have very  
10 different educational backgrounds and professional perspectives, as well as norms,  
11 values, and temperaments. Participants from some types of professions and  
12 organizations have predispositions to certain information sources (Heinström, 2003;  
13 Taylor, 1991) and decision-making approaches (Cloud, 2008; Johnson, 2006). Thus,  
14 different types of participants in planning processes affect how planning is carried out.

### 15 ***Planning Information***

16 Selection of planning information is a fundamental part of the planning process. The  
17 information that is used, and the value placed on its importance, will influence all  
18 subsequent steps in the planning process. Good information is the basis of good  
19 planning (APA, 2010; FEMA, 2010). Information is a strategically essential  
20 organizational input (Adams, 1980) and it is a prerequisite for generating knowledge  
21 and translating that knowledge into alternatives, policy, and action (Lindell & Perry,  
22 1992, 2004; Nijkamp, 1989). Planners use information to reduce uncertainty and  
23 equivocality (Daft & Lengel, 1986). The judgments of decision-makers are altered  
24 through communicative discussions and agreements about information and responses to  
25 new information, (Hanna, 2000); consultations with planning stakeholders shape

1 planning policies (Stephenson, 2000). Information can even sway decision-makers  
2 away from predisposed judgments (Wood & Vedlitz, 2007). This makes information a  
3 critical planning resource (Lindell, Prater, & Perry, 2006) and a force for innovation and  
4 change (Meyer, 2005) to help focus attention on problems and define policy agendas in  
5 federal and state government (Kingdon, 1995) as well as local government settings (Liu,  
6 Lindquist, Vedlitz, & Vincent, 2010).

7 Choo suggests that “information seeking and use has always been an intrinsic  
8 and important component of the theorizing in organization science about decision  
9 making, innovation, organizational sense-making, and knowledge creation” (Choo,  
10 2007, para. 1). Innes concludes (1998), “it is essential that the academy learn how  
11 information functions in the practice of planning...to define practices that are ethical  
12 and effective...[and] to understand and explain how and why plans are made” (p. 60).  
13 However, despite research on the role of information in planning practice and outcomes,  
14 there is little empirical research about the factors that affect how planning information  
15 gets selected in the first place.

### 16 *Conceptual Framework*

17 This research posits that the planning process is influenced directly by the planning  
18 participants, the planning organization, and community characteristics. The planning  
19 organization and community also act on the planning process indirectly through  
20 planning participants as well (Figure 1). This paper focuses on the direct relationships  
21 between planning organizations and information selection.

22

23 **Insert Figure 1 here.**

24



## 1 **Hypotheses**

2 Four hypotheses specify the expected relationships between organizational boundary  
3 spanning, experience, resources, and structure and the selection of communicative  
4 information in planning projects. Hypotheses 1 through 4 are considered in the context  
5 of other factors community, organizational, and participant levels:

- 6 • Hypothesis 1: An increase in organizational boundary spanning in planning  
7 projects increases the selection of communicative-oriented information.
- 8 • Hypothesis 2: An increase in organizational experience in planning projects  
9 increases the selection of communicative-oriented information.
- 10 • Hypothesis 3: An increase in organizational resources in planning projects  
11 increases the selection of communicative-oriented information.
- 12 • Hypothesis 4: An increase in local project control in organizational structures  
13 increases the selection of communicative-oriented information.

## 14 **Data Sources**

15 Secondary data are used from an electronic survey of HMCFS practices by LEPCs. The  
16 survey was administered by Texas A&M University's Hazard Reduction and Recovery  
17 Center and the Texas Transportation Institute in Summer 2008. The survey covered a  
18 wide range of issues concerning LEPCs, including whether and how the LEPC  
19 conducted HMCFS, HMCFS outcomes, and community, organization, and participant  
20 measures. The survey instrument was distributed via e-mail directly to 1,856 valid e-  
21 mail addresses for LEPCs and Tribal Emergency Response Commissions (TERCs) in  
22 36 continental U.S. states. Four hundred and ninety-seven surveys were received from  
23 LEPCs in these states, resulting in a  $(497/1,859=.267)$  26.7 percent crude response rate.  
24 In addition, 50 survey responses were received from LEPCs in six states for which the

1 survey was distributed by state emergency response commissions (SERCs), but out of  
2 484 LEPCs in these states, the total number of LEPCs that were sent or received  
3 requests for participation from their SERCs is unknown. Assuming all 484 LEPCs in  
4 these six states received the survey, the crude response rate would have been  $(50/484 =$   
5  $.103)$  10.3 percent. Thus, the actual survey response rate is between 23.4 and 28.7  
6 percent (Rogers et al., 2010).

7       The primary purpose of the survey was to identify best practices of LEPCs for  
8 conducting HMCFS project, and its focus was the most-recent HMCFS project  
9 conducted by the LEPC, reported on by 280 respondents. It can be argued that only  
10 15.1 percent of the communities that were given a chance to report about conducting an  
11 HMCFS did so, even though 57.8 percent of respondents who completed the survey  
12 reported that an HMCFS was conducted. LEPCs that did not conduct an HMCFS could  
13 not report on the planning processes or organizational involvement. The survey data  
14 were validated by examining responses to 21 different free-form questions. When  
15 responses to these questions suggested that the respondent ‘didn’t know’ about or  
16 ‘wasn’t involved’ in the HMCFS project, these cases were excluded to minimize  
17 measurement error and introduction of biased variance into the empirical analysis. This  
18 process resulted in retaining 183 cases that form the research sample, for which a) the  
19 responses on key variables were sufficiently specified, and b) there appears to be a  
20 reasonable expectation that the respondent was familiar with the planning process and  
21 was able to respond to questions about how it was conducted.

22       The LEPC survey data were augmented with other secondary sources including  
23 *Census 2000* and *American Community Survey* data from the U.S. Census Bureau, the  
24 U.S. Department of Agriculture Economic Research Service’s *2004 County Typology*,  
25 and community cost-of-living data as compiled by City-Data.com.

## 1 **Variables**

### 2 *Dependent Variable*

3 Respondents, acting as informants for their organizations, were asked about the types of  
4 communicative information that were used in the HMCFS projects. Did they use  
5 interviews with transport carriers, industry representatives or emergency responders?<sup>1</sup>  
6 An ordinal communicative information selection variable was created by a summation  
7 of these variables, to create an ordinal (0-3) scale. A binary communicative information  
8 selection variable was also created by an evaluation of whether any communicative  
9 information sources were selected. The frequency distribution of the CI selection  
10 ordinal variable is provided in Table 1.

11

12 **Insert Table 1 here.**

13

### 14 *Independent Variables*

15 A large number of variables were available from the survey data and other secondary  
16 sources that correspond to relevant independent measures. Principal component  
17 analysis was run on variables associated with theoretically critical measures. The two  
18 concrete variables with the highest loading were selected to represent each underlying  
19 concept. The resulting parsimonious solution ensures that the important theoretical  
20 concepts are afforded the opportunity to play a role in the final analyses and statistical  
21 models. Using specific variables enhances the ability to explain their effects on  
22 information selection in readily-interpretable ways for policy makers. However, this  
23 approach also limits the ability to represent concepts as completely as could potentially  
24 be accomplished using a greater number of independent and contextual variables.

1           Organizational boundary spanning is represented by reports that 1) the *LEPC*  
2 *has ever asked another LEPC for a copy of its HMCFS* or 2) *communities/ regional*  
3 *planning agencies requested the HMCFS* was a motivating factor for conducting the  
4 study. As organizations engage each other about how they conduct planning projects,  
5 not only can they obtain additional information and data that may be relevant to their  
6 jurisdiction, they also learn about alternate perspectives and ways of doing things. This  
7 vicarious experience can in turn affect who is involved in planning projects and the  
8 information sources that are used. When an organization is engaged from its internal  
9 constituencies or other locally-affiliated agencies that request planning information, it is  
10 potentially exposed to different perspectives about community needs and expectations  
11 that may affect how the organization engages in those planning projects.

12           Organizational experience is represented by reports 1) of the *number of years in*  
13 *which the LEPC conducted HMCFS*, 2) that *other HMCFS examples were used to guide*  
14 *how the HMCFS was conducted*, and 3) that *contractor knowledge/experience with the*  
15 *process was used to guide how the HMCFS was conducted*. The number of planning  
16 projects that the organization engages in over time is not only an indicator of a culture  
17 or pattern of activity, but also provides both a baseline of information and knowledge  
18 and experience about how better to conduct the project. Other project examples can  
19 function not only as guidance mechanisms to how planning projects can be conducted,  
20 but they can also function as sources of data or channels to other sources of data that the  
21 organization might not otherwise consider. If a contractor is utilized to assist the  
22 organization with conducting planning projects, the knowledge and experience of that  
23 contractor has implications for who is involved in the planning projects, the means by  
24 which the project is accomplished, and information sources that are utilized.

1           The two organizational resources variables with the strongest relationships with  
2 funding are the natural log transformations of 1) the *2007 total LEPC funding per*  
3 *thousand population* and 2) the *amount of non-local funding received for the most-*  
4 *recent HMCFS per thousand population*. Organizational funding provides a means of  
5 engaging in planning activities, and helps the organization promote involvement of its  
6 participants. Non-local funding, such as through grants, is a primary means by which  
7 LEPCs are able to conduct HMCFS projects, since most LEPCs are all-volunteer and  
8 have low levels of sustained resources. LEPC effectiveness in obtaining non-local  
9 funding for HMCFS projects may affect who is involved in the project, the amount of  
10 effort that goes into the project, and the types of information that are able to be  
11 obtained.

12           In addition, organizational resources are represented by reports that 3) *local*  
13 *community staff time was available* for participating in the HMCFS and 4) *budget to*  
14 *hire a contractor was unavailable* for their participation in the HMCFS. Since LEPCs  
15 are primarily volunteer-based organizations, and many LEPCs use time from members  
16 and other participants as ‘in-kind’ matching funds for federal grants, local community  
17 staff time availability represents a potentially important organizational resources, as  
18 well as demonstrating local interest and commitment to the project. The lack of budget  
19 availability for hiring contractors also represents a resource limitation. LEPC  
20 participants are constrained by time requirements of their professional and personal  
21 responsibilities; the lack of budget for hiring a contractor substantially affects the type  
22 of information that can be collected for HMCFS projects.

23           Organizational structure is represented by reports that 1) an *LEPC is a partly or*  
24 *totally regional jurisdiction* and 2) *LEPC members or associates conducted the HMCFS*  
25 *project*. Compared with primarily municipal and county-level LEPCs, a regional LEPC

1 will typically include a greater number of jurisdictions (multiple municipalities or  
2 counties) and broader area. This in turn can affect how the LEPC works across  
3 administrative boundaries. That LEPC members or associates conducted the HMCFS  
4 project generally suggests a greater level of involvement of the LEPC organization in  
5 the HMCFS than if another entity such as a federal agency, contractor, or other entity  
6 conducted the project. This in turn may affect specific aspects of the project, such as  
7 who participated, or which types of information were selected.

### 8 ***Contextual Variables***

9 Contextual variables represent other key measures associated with the planning context.

10 Contextual variables for the community include:

- 11 • *Absolute value of difference between percent of jurisdiction that voted*  
12 *Republican and voted Democrat for U.S. President in 2008,*
- 13 • *Level of agreement that conducting HMCFS has had support of local*  
14 *politicians,*
- 15 • *Banking and insurance sector is major area employer,*
- 16 • *Mining or raw materials sector is major area employer,*
- 17 • *Jurisdiction is significant HazMat origin,*
- 18 • *Level of perceived hazmat transport incident risk for roads,*
- 19 • *LEPC region is in Midwest U.S.,*
- 20 • *LEPC is in Texas,*
- 21 • *Jurisdiction population, and*
- 22 • *Percent of population that is White.*

23 In addition to the independent variables described above, other contextual variables for

1 planning organizations include:

- 2 • *The frequency of formal LEPC meetings (times/year),*
- 3 • *The participation of transportation carriers in the LEPC,*
- 4 • *The participation of ‘Other’ group representatives in LEPC,*
- 5 • *A primary reason for the HMCFS is that the HMCFS seemed a good way to get*  
6 *a handle on HazMat flows,*
- 7 • *A primary reason for the HMCFS is that the SERC suggested the LEPC conduct*  
8 *an HMCFS, and*
- 9 • *LEPC has mechanisms or specific functions for evaluating new ideas about*  
10 *HazMat.*

11 Contextual variables for planning participants include:

- 12 • *Local planning agency/authority employees participated in HMCFS, and*
- 13 • *HazMat responders participated in HMCFS.*

14 Table 2 provides a summary of dependent, independent, and contextual variables used  
15 in the analysis.

16

17 **Insert Table 2 here.**

18

## 19 **Methods and Empirical Model**

20 A multiple linear regression (MLR) model is used when the form of the dependent  
21 variable is ordinal. A binomial logistic regression (BLR) model is used when the form  
22 of the dependent variable is binary. Although MLR is not generally suggested for fewer

1 than five categories in a dependent variable (Allison, 1999; DeMaris, 2005), it is used  
2 for this research as an initial assessment of relationships between the communicative  
3 information selection dependent variable and independent and contextual variables.  
4 Significant relationships are assessed using BLR on the binary form of the  
5 communicative information selection dependent variable. In this way, although use of  
6 MLR violates assumptions regarding the form of the dependent variable, the results can  
7 be compared against those obtained using a method that is appropriate to the dependent  
8 variable form, BLR, albeit with more-truncated forms of the dependent variables.  
9 Finally, variables that are not significant are excluded from specified models to develop  
10 reduced models of communicative information selection.

11 The empirical model for this research, shown in Figure 2, builds on the  
12 conceptual model in Figure 1. Together, sets of measures and variables associated with  
13 the community and region, LEPC organization, and HMCFS participants form a  
14 sequential ('hierarchical') order as described by Cohen, Cohen, West, & Aiken (2003)  
15 that reflects a posited causal priority from most-distal to most-proximal to the  
16 dependent variable of this study, communicative information selection. The ordering of  
17 these sets of measures and variables is the authors' interpretation of their relationships,  
18 based on theory, literature, and practical experience.

19

20 **Insert Figure 2 here.**

21

## 22 **Findings**

23 Table 3 lists regression coefficients and model outcomes for a sequential MLR analysis  
24 of the level of CI selection, using the variables listed in Table 2.



1

2 **Insert Table 3 here.**

3

4 The linear regression model which includes community and organizational variables  
5 explains approximately 14 percent of the variance in the amount of CI selection,  
6 adjusted for number of variables in the model. With the addition of community planner  
7 participation in the HMCFS to the model, around 18 percent of the variance in level of  
8 CI selection is explained. The CI selection dependent variable is ordinal and has a  
9 limited scale (0-3), and use of multiple linear regression for this dependent variable  
10 results in violations of regression assumptions (normal distribution and  
11 homoscedasticity of regression residuals).

12 With the moderate number of cases in the regression model (over 100), the lack  
13 of normality in regression residuals is less problematic and heteroscedasticity of  
14 regression residuals is the more concerning of these violations. Thus, the effects of  
15 organizational variables in HMCFS projects on CI selection are tested using an alternate  
16 method to provide confirmation of linear regression outcomes. Binomial logistic  
17 regression is used to measure effects of independent and contextual variables on the  
18 binary form of the dependent variable, where a score of one is assigned if any  
19 communicative information source was selected, and a score of zero is assigned if no  
20 communicative information sources were selected (Table 4).

21

22 **Insert Table 4 here.**

23

24 Two variables that are significant in the full MLR model—that the LEPC is a regional

1 jurisdiction and that the LEPC jurisdiction is a significant HazMat origin are not  
2 significant in the BLR models (the latter of these was retained in the reduced binomial  
3 model to provide greater stability of model performance). The direction of relationships  
4 is consistent for all other significant variables. Predictive ability of binomial regression  
5 models can be measured using the increase in percentage of cases that are correctly  
6 predicted in specified regression models over base or unspecified regression models  
7 (Garson, 2011). The variables that are included in the binomial logistic regression  
8 models increase their predictive ability from around 50 percent for unspecified models  
9 to around 66 percent for the full binomial logistic regression model.

#### 10 *Summary of Findings*

11 Table 5 summarizes the direction and importance of relationships between independent  
12 and contextual variables and binary and ordinal measures of the selection of HMCFS  
13 communicative information. The direction of relationships is based on the direction  
14 (positive or negative) of relationships between independent or contextual variables and  
15 dependent variable. The rank importance is given by the rank based on the beta  
16 coefficients for each variable, relative to other variables in the most-specified models.  
17 The relative importance for each variable in Table 5 is based its importance across  
18 regression models for binary and ordinal measures of HMCFS communicative  
19 information selection. A greater emphasis is given outcomes for the binary CI variable  
20 in assigning relative importance. This is because analysis of the binary variable using  
21 BLR is appropriate for the form of that dependent variable, whereas the analysis of the  
22 ordinal variable using MLR results in violations of the statistical tests.

23

24 **Insert Table 5 here.**

1

2 The results provide partial support for Hypothesis 1. An LEPC that had ever asked  
3 another LEPC for a copy of its HMCFS had a significant positive effect on selection of  
4 communicative information, and was of medium relative importance. However, that  
5 community/regional planning agencies requested the HMCFS was not significant in the  
6 models of communicative information selection.

7 The results also provide partial support for Hypothesis 2. That contractor  
8 knowledge/experience with the process was used to guide the HMCFS was a significant  
9 positive predictor of level of communicative information selection, and was of medium  
10 relative importance. However, the number of years in which the LEPC has conducted  
11 HMCFS, and that other HMCFS examples were used to guide HMCFS were not  
12 significant predictors of communicative information selection. The results do not  
13 support Hypothesis 3. None of the four organizational resources variables have a  
14 significant effect on the selection of communicative information in HMCFS projects by  
15 LEPCs.

16 The results support Hypothesis 4. That the LEPC is a regional (municipal or  
17 county) jurisdiction has a significant negative effect on level of communicative  
18 information selection, but was of lower relative importance. Also, that LEPC members  
19 or associates conducted the HMCFS has a significant positive effect on communicative  
20 information selection, and was of medium relative importance.

## 21 **Discussion and Recommendations**

22 Organizational boundary spanning is a factor of medium importance that influences  
23 how LEPC's conduct HMCFS projects. The boundary spanning variable of whether the  
24 LEPC has ever asked for a copy of another jurisdiction's HMCFS has a significant

1 positive effect on CI selection in HMCFS projects and is a predictor of medium  
2 importance. There are multiple potential explanations for this relationship. First, that  
3 the LEPC has reached out to other organizations to request copies of planning studies,  
4 an act of communication in itself, suggests there are organizational norms that facilitate  
5 external communications and the level of CI selection. This may also indicate the  
6 importance of a boundary-spanning function in LEPCs for promoting communicative  
7 action, consistent with findings by Brody (2003a) and Johnson et al. (2011). Second, in  
8 communicating with other LEPCs to request copies of their HMCFS, the requesting  
9 group may have interviewed emergency responder, industry, or transport carrier  
10 personnel associated with that LEPC about HazMat transport and obtained information  
11 that is also relevant to its jurisdiction. In this way, the act of requesting external  
12 information may identify potential channels and sources of information that were not  
13 previously considered or available.

14 LEPC use of contractor knowledge and experience with the HMCFS process to  
15 guide how the HMCFS was conducted also has a significant positive effect on  
16 communicative information selection and is of medium importance. This variable  
17 suggests that technical ‘know-how’ for conducting planning projects is important.  
18 Along with the role of LEPC requests for other jurisdictions’ HMCFS, it also suggests  
19 that vicarious experience plays an important role in CI selection, consistent with  
20 positive results of vicarious experience in chemical hazards planning (Rogers &  
21 Sorensen, 1991).

22 Several possible reasons explain why the conduct of an HMCFS by LEPC  
23 members or associates has a significant positive effect on CI selection. First, since  
24 LEPC members are participating in the project, they can have direct control over the  
25 information that is selected. LEPC members who know other HazMat transportation

1 stakeholders in industry, transportation carriers, and emergency responders can  
2 approach them directly for information requests. In this way, LEPC members might  
3 also act as channels to, or sources of information. As LEPC members engage in  
4 increased communication with stakeholders and constituents about HazMat  
5 transportation, the norms and values of LEPC participants (their presumed desire to do a  
6 ‘good job’) can also contribute through this action. It may be an indicator of  
7 organizational investment in the HMCFS project. Rather than simply avoiding the  
8 project altogether, or waiting until scarce funds for hiring a contractor are available, the  
9 LEPC members take it upon themselves to conduct the project.

10         A variable associated with the LEPC organization structure—that the LEPC is a  
11 regional jurisdiction—has a significant negative effect on level of CI selection (but not  
12 on whether CI was selected) and is of lower relative importance. A more-extensive  
13 jurisdiction creates the potential for control of projects to be negotiated across multiple  
14 entities. It also creates greater challenges for interacting with diverse and distributed  
15 emergency responders, industry representatives, and transportation carriers, which  
16 would be consistent with observations by Margerum (2008) and Innes et al. (2010). It  
17 may be that the perceived task complexity of collecting interview information from  
18 diverse sources in regional LEPCs is simply too great to effectively obtain information  
19 via interviews. On the other hand, it might be expected that a regional jurisdiction  
20 would have a greater capacity for boundary-spanning across the respective communities  
21 that it encompasses, which would suggest an associated increase in CI selection.  
22 Unfortunately, the number of regional jurisdiction LEPCs in this sample was limited  
23 leaving this area for further investigation.

24         None of the resource-related variables were significant predictors of  
25 communicative information selection in HMCFS projects by LEPCs. While this

1 appears counter-intuitive, an explanation might be due to the nature of communicative  
2 information selection through consultative discussions with planning stakeholders,  
3 compared with other types of information that can be collected for HMCFS projects. In  
4 particular, traffic surveys that result in collection of technical data can be resource  
5 intensive. Such data requires either personnel or funds to hire a contractor to obtain the  
6 data. Comparatively, interviewing local HazMat transport stakeholders generally  
7 requires less time and funding (assuming limited interviews in terms of number,  
8 duration, and processing which might be expected for lay personnel). In this case,  
9 organizational resource needs would largely be mitigated for communicative  
10 information selection.

11 Overall, the maximum level of variance explained in regression models  
12 predicting communicative information was 18 percent for linear regression on level of  
13 CI selection, and 23 percent (as measured by Nagelkerke pseudo  $R^2$ ) for whether CI was  
14 selected. This suggests that the variables that contribute significantly to the selection of  
15 CI described herein are collectively only a small part of the important factors that  
16 explain the variance in communicative information selection. The lower amount of  
17 explained variation in the regression models is also consistent with observations of  
18 Innes (1998) about the difficulty of isolating and describing the role of information in  
19 communicative planning—and by extension the factors influencing communicative  
20 information selection.

21 Recommendations for emergency planning, listed in Table 6, are based on the  
22 premise that planning organizations can choose how they address uncertainty, that the  
23 methods they choose impact the quality of planning outcomes (Kartez & Lindell, 1987),  
24 and that more communicative information and diverse information in planning  
25 processes can lead to better planning outcomes. Table 6 summarizes significant

1 organizational independent variables from this research in terms of their potential for  
2 change that can positively affect information selection in HMCFS projects, and their  
3 likelihood of positive change. Policy targets identify variables that are more amenable  
4 for addressing change through policy, and policy recommendations identify specific  
5 mechanisms by which positive change in information selection behavior might be  
6 enabled.

7

8 **Insert Table 6 here.**

9

10 Many recommendations are associated with ensuring that emergency planning guidance  
11 is made available by federal and state agencies to local planners, and ensuring that local  
12 planners utilize and implement procedures and recommendations outlined in the  
13 guidance. Other recommendations suggest development of additional planning  
14 guidance that is focused on membership, communication, and knowledge retention in  
15 volunteer and emergency planning organizations, and providing resources and processes  
16 by which local entities can implement such guidance. A key element of this is that local  
17 entities seek out knowledge and information from other planning organizations, and  
18 identify multiple personnel within planning organizations and consortiums such as  
19 LEPCs that are likely to be involved on a long-term basis. These personnel can  
20 function as storehouses of knowledge and experience within the organization and help  
21 transfer that knowledge to other members.

## 22 **Limitations**

23 This study has several limitations that are important to recognize. First, the sampling of  
24 the study limits the generalizability of the results. Although the generalizability of this

1 research to all LEPCs is limited by the sampling and response framework, it is  
2 generalizable to those LEPCs, emergency planning agencies, and planning consortiums  
3 that are actively engaged. Thus, the sample is representative of a population whose  
4 behaviors can better inform and be informed by planning theory and practice.

5         The use of secondary data limits the ability to evaluate planning and information  
6 selection measures with variables that might be optimally suited to the research  
7 questions and methods. For communicative information selection, reliance on three-  
8 level ordinal scales as dependent variables in linear regression models resulted in  
9 heteroscedasticity of regression residuals and created a significant potential for error if  
10 responses were incorrectly specified. This limitation was addressed by using binary  
11 logistic regression as a second method of evaluating information selection behavior.  
12 Although survey respondents might have been less likely to recall the exact sources of  
13 information that were selected, it is likely they could recall whether or not any  
14 communicative information sources were selected.

15         It is possible that other variables might be used to represent the measures that  
16 were included in this research, and this is an area for further investigation. These  
17 limitations are considered in light of the general correspondence of research results with  
18 other research.

19         Another limitation of this research is its ability to account for variance in the  
20 measures of planning information selection using the specific measures and variables  
21 that were included in the regression models. Only a low to medium amount of variance  
22 in level of information selection was explained, which suggests there are other  
23 important measures that need to be considered to fully explain information selection in  
24 HMCFS projects. A related limitation is that only main effects with the dependent  
25 variable were evaluated, albeit in a sequential manner. While more-distal variables are



1 interpreted as acting through more-proximal variables, it is likely that some variables  
2 are interacting, and effects of those variables may be attenuated or not identified  
3 altogether using only main effects models.

4       Finally, a greater number of valid cases would help address another potential  
5 limitation of the study, its power to conclude that relationships that do not appear to be  
6 significant are in fact not significant. Although a power analysis was not performed for  
7 this study, the use of a less-restrictive two-tailed significance criterion of  $p \leq 0.10$  for  
8 contextual variables gives greater confidence in the power of the analyses. A greater  
9 number of cases could improve that confidence.

## 10 **Conclusions and Future Research**

11       This research is one of the first empirical studies to use quantitative,  
12 multivariate analyses of a national-level sample for evaluating specific actions of  
13 planning organizations in a consistent and shared context. Statistical calculations use  
14 multiple linear regression and binomial logistic regression to evaluate relationships  
15 between the dependent variables and the independent and contextual variables.  
16 Regression models use sequential ordering of variables, from sets of variables that are  
17 most-distal to those that are most-proximal to information selection dependent  
18 variables.

19       This research helps address gaps in the literature and empirical evidence about  
20 the influences of organizational behaviors on planning processes, as well as  
21 communicative planning, planning information, and applicability of planning theories to  
22 emergency planning practice. In addressing these gaps, this research uses evidence  
23 which grounds it in a real planning environment, focuses it on what planning  
24 organizations do, and informs it by actual planning practices (Krizek, Forsyth, &  
25 Shively Slotterback, 2009). While doing so, this research uses theoretical constructs

1 that help identify key issues, predict their effects, measure research outcomes,  
2 generalize results to other settings, and develop treatments to enhance planning practice  
3 (Webler & Tuler, 2002).

4         The outcomes of this research are not especially surprising. However, the  
5 importance of this research lies not in novelty of the outcomes, but its importance is  
6 rather based on empirical evidence across a national sample of planning organizations  
7 in a consistent context. Through its extension of theory to planning practice in general  
8 and to a venue of practice that is not traditionally considered in planning studies  
9 (emergency planning), this research contributes to the overall field of planning  
10 knowledge. The outcomes address the theory of planning in multiple ways. They are  
11 relevant to planning processes, they explain planning practices, and they can be used to  
12 guide planning and decision making. They speak to the practices of planning  
13 organizations by describing ways in which community planning processes are effective  
14 and can be improved. In doing so these outcomes help address calls for research on  
15 institutional arrangements that promote collaborative action among various planning  
16 stakeholders (Innes, Booher, & Di Vittorio, 2010).

17         A wide range of related future research topics could be beneficial to planning  
18 research and practice. Such topics could further illuminate how institutional norms and  
19 values influence information and decision-making preferences. Future research might  
20 follow the planning process over time, examining how information perceptions change  
21 as information is collected, used, and implemented by planning organizations to  
22 generate knowledge and alternatives. Studies could further examine how local  
23 perceptions and knowledge of risk influence the emergency planning process, or  
24 evaluate the roles that information plays in different aspects of emergency planning.  
25 Future research might also examine difference in organizational behaviors and

1 outcomes in multinational settings. Do planning organizations in other countries face  
2 similar constraints and exhibit similar behaviors, for example with respect to emergency  
3 planning, that they do in the United States?

4 More broadly, future research could extend planning theory and practice to other  
5 types of information and settings. For example, this study examined effects of  
6 organizational behavior variables on use of locally-sourced communicative information  
7 in planning projects, but other types of information such as technical, non-local, and  
8 prior-studies information could be examined as well. Future studies might also identify  
9 relationships and associated constructs between information selection and planning  
10 organization behaviors in other venues, not just traditional planning domains such as  
11 land use, environmental, or transportation planning.

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17 *Materials Commodity Flow Data and Analysis* for this research.

## 18 Notes

19 1. The authors recognize that the method (interviews) and sources (three stakeholder types)  
20 of communicative information included in this research may not fully represent the nature  
21 of deliberative discourse/dialogue, or the extent of diverse stakeholders typically  
22 envisioned by planning theorists. Because of constraints and limits to public participation  
23 in emergency planning, there are practical limitations which hinder collection of  
24 subjective information from a broad range of potential community stakeholders. In  
25 practical terms, this method of engagement and these three stakeholder types represent the  
26 method and stakeholders that LEPCs are most likely use when engaging in  
27 consultation/discourse. This is confirmed by the authors' own experiences and survey  
28 responses where informants had the opportunity to indicate 'other' sources of information  
29 for their HMCFS projects. Although free-form responses did not identify use of other

1 communicative-based information sources in HMCFS projects, further research is needed  
2 to identify the degree that LEPCs seek communicative-based information from a broad  
3 range of emergency planning stakeholders.

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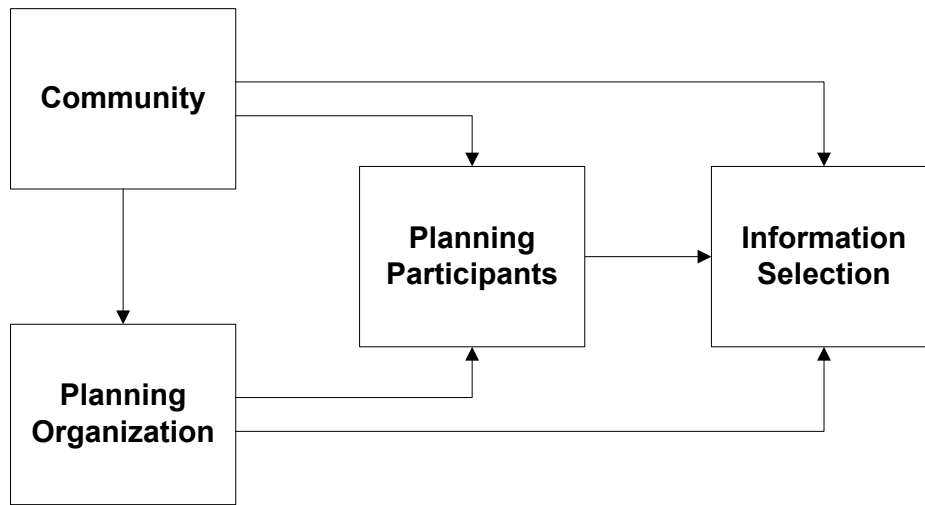


Figure 1. Conceptual model of information selection in local emergency planning organizations.

Table 1. Frequency distribution of CI selection ordinal variable.

<b>Number of Selected Communicative Information Sources</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
0	94	51.4	51.4	51.4
1	54	29.5	29.5	80.9
2	24	13.1	13.1	94.0
3	11	6.0	6.0	100.0
Total	183	100.0	100.0	