

Organizational Risk Perception of Disasters: Do Risk Managers Matter?

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ABSTRACT

Previous research on risk perception suggests that individual neglect of disasters is likely due to an inability to process information about low-probability, high-consequence threats and moral hazard.⁽³⁾ As a result, it is important to study the quality of organizational responses to disasters, since they may be crucial to compensating for the frailty of individual choice. Preliminary evidence suggests that an organizational risk manager is important in disaster planning,⁽⁴⁾ but there is no empirical evidence (to our knowledge) that having a designated risk manager leads to the adoption of risk-reducing measures in organizations. Additionally, there is limited research on the relationship between risk perception and the adoption of risk-reducing measures at the organizational level. The goal of this study is to empirically answer two questions. (1) “Does having a risk manager in an organization predict the adoption of risk-reducing measures?” (2) “What is the relationship between risk perception and the adoption of risk-reducing measures at the organizational level?” Using data collected from a sample of public, private, and non-profit organizations in the Memphis/Shelby County area, Tennessee in 2006, we find that organizations with risk managers adopted more risk-reducing measures than organizations without risk managers and that risk perception is a significant predictor of risk-reducing measures. This study builds on a small, but growing literature on how organizations perceive risks and respond to them.⁽⁸⁻¹³⁾

KEY WORDS: Organizational risk perception; risk manager; mitigation and preparedness measures; hazards; disasters

1. INTRODUCTION

The colossal nature of disaster-induced losses is, indeed, worrisome as the annual losses, measured globally, and the number of victims of disasters continue to increase each year.^(1, 2) For instance, in 2011, disasters worldwide killed 30,773 people and caused an unprecedented \$366.1 billion in economic losses.⁽²⁾ With regard to the number of disaster victims, in 2011, the number of disaster victims (244.7 million) surpassed the 2001 to 2010 average of 232 million.⁽²⁾ In light of the magnitude and persistent increases in disaster losses, there is a pressing need to study ways of stemming disaster losses. Although it is difficult or impossible to change the magnitude and frequency of disasters, mitigation and preparedness activities can help ameliorate disaster impacts.

Natural and man-made disasters (e.g., earthquakes and chemical spills) can lead to concentrated harm in a localized area where organizations are potentially impacted. Previous research suggests that neglect of disasters by individuals is likely due to an inability to process information about low-probability, high-consequence threats and moral hazards.⁽³⁾ Since previous research suggests that individuals may not respond optimally to the risks of natural and man-made disasters, it is especially important to study the quality of organizational responses, since they may be crucial to compensating for the frailty of individual choice.

Preliminary evidence suggests that an organizational risk manager is important in disaster planning,⁽⁴⁾ but there is no empirical evidence (to our knowledge) that having a designated risk manager leads to the adoption of risk-reducing measures in organizations. Additionally, researchers have extensively studied risk perception at the individual level.⁽⁵⁻⁷⁾ However, there is limited research on the relationship between risk perception and the adoption of risk-reducing measures at the organizational level. Against the backdrop of a lack of empirical evidence in

these two lines of research, the goal of this study is to empirically answer two research questions.

(1) “Does having a risk manager in an organization predict the adoption of risk-reducing measures?” (2) “What is the relationship between risk perception and the adoption of risk-reducing measures at the organizational level?”

To answer this question, we use data collected from a sample of public, private, and non-profit organizations in the Memphis/Shelby County area, Tennessee in 2006. The results suggest that risk managers do matter when it comes to reducing the risks faced by organizations. More importantly, the results show that organizations with risk managers adopted more of both active and passive risk-reducing measures than organizations without risk managers. As expected, the results also indicate that risk perception is a significant predictor of risk-reducing measures. Our study adds to a small but growing literature on how organizations perceive risks and respond to them.⁽⁸⁻¹³⁾

The following section discusses relevant literature on risk perception at the individual and organizational levels. We then present our methodology and data collection procedures. Next, we present the results, discuss the implications of the results, and offer some policy recommendations. Finally, we conclude by highlighting the limitations of our study and outlining an agenda for future research in risk reduction at the organizational level.

2. LITERATURE REVIEW

2.1. Disasters and Organizations

One of the fundamental goals of organizations is survival.⁽¹⁴⁾ Survival is so important that organizational theorists have devoted much time to studying how organizations manage to survive.⁽¹⁵⁾ Disasters constantly threaten this goal by causing organizational disruption,⁽¹⁶⁾ loss of

sales and property taxes,⁽¹⁷⁾ and loss of services from public organizations and nonprofits, consequently, undermining the economy and support systems of communities.⁽¹⁶⁾ For example, the impact of Hurricane Katrina on colleges and universities in the Gulf Coast area was severe – it resulted in temporary closures at Tulane University, Dillard University, and Loyola University New Orleans.⁽¹⁸⁾ In fact, between 2005 and 2006, Tulane University, Xavier University, and Loyola University New Orleans lost more than 10 percent, 12 percent, and 26 percent in revenues, respectively, as a result of Hurricane Katrina.⁽¹⁸⁾ In addition, a survey conducted after Hurricane Katrina by the Mississippi Center for Nonprofits indicated that 67 percent of nonprofit organizations in the Biloxi-Pascagoula metro area suffered losses of paid staff members or volunteer staff, 77 percent reported total building loss or major building damage, and 93 percent reported losses of programs or services.⁽¹⁹⁾ The impacts of Hurricane Katrina on organizations are at the extreme end of a long continuum of losses attributable to various disasters.

The challenge for organizations is to find ways of ensuring continuity during and after disasters. Organizations stand a better chance of surviving disasters and continuing their day-to-operations if they have preparedness and mitigation strategies in place before disasters strike.⁽²⁰⁾ The unit of analysis in this study is the organization because organizations are an important decision-making unit in the community and they may be able to compensate for some of the well-known deficiencies in individual perception and management of risks. Furthermore, if organizational risk perception and management is plagued by similar deficiencies, then one cannot expect organizations to overcome frailties in personal or household decision making about risk.

2.2. Disaster Research at the Organizational Level

Although there is a large body of research on disasters conducted at the individual, household, and community levels, little research has been conducted at the organizational level.^(21, 22) Fortunately, a small body of pre-disaster research at the organizational level is beginning to emerge due to the foundational work of Quarantelli, Lawrence, Tierney, and Johnson.⁽²³⁾ These researchers examined how chemical companies and government agencies in 18 U.S. communities plan for chemical emergencies.⁽²³⁾ After this foundational study, other researchers have conducted organizational level studies. In fact, a few years after this foundational study, Drabek⁽²⁴⁻²⁷⁾ investigated how businesses in the tourism industry carry out evacuation planning and Mileti *et al.*⁽²⁸⁾ studied how 54 businesses in eight San Francisco counties adopt earthquake preparedness measures. Furthermore, Barlow⁽²⁹⁾ investigated the impact of Iben Browning earthquake prediction on 20 businesses in the St. Louis area and Dahlhamer and D' Souza⁽³⁰⁾ investigated the determinants of business disaster preparedness in Memphis/Shelby County, Tennessee and Des Moines/Polk County, Iowa. Finally, Webb *et al.*⁽²²⁾ examined the preparedness and disaster experiences of businesses in different parts of the country, including Memphis, Tennessee. More recently, other organizational level studies have emerged.^(4, 11, 13, 31-34) Despite the emergency of this latest crop of research on mitigation and preparedness at the organizational level, more organizational studies are needed.

2.3. Determinants of Mitigation and Preparedness (Risk-Reducing) Measures

2.3.1. Risk Manager

An organizational risk manager is defined in this study as a designated employee (full-time or part-time) charged with designing, adopting and/or implementing a wide range of risk

management programs. The risk manager assesses organizational vulnerability to disasters and communicates potential risks and planned responses to organizational members through videos, pamphlets and e-mails.⁽³⁵⁾ Prior studies have established the important roles risk managers play in managing the risks faced by organizations.⁽⁴⁾ Others have examined the roles of risk managers in corporations.⁽³⁵⁾

While organizations may hire risk managers with the expectation that they will adopt risk-reducing measures and, consequently, reduce their organizations' risks from both man-made hazards (e.g., terrorist attacks and chemical spills) and natural hazards (e.g., earthquakes and tornadoes), the expectation may not become reality. Risk managers may be too dislocated from the core functions of the organization to exert a significant influence. Moreover, if employees and core-business managers have low risk perceptions, it may be difficult for the risk manager to raise perceptions enough in the organization to support implementation of measures to reduce risk. And risk managers, even if present, may lack the necessary resources (including leadership support) to effectuate change. To the best of our knowledge, there is no empirical evidence that having a risk manager leads to the adoption of risk-reducing measures.

2.3.2. Risk Perception at the Organizational Level

Some researchers have examined risk perception at the household⁽³⁶⁾ and organizational levels.⁽³³⁾ However, most previous research on risk perception has focused on individual risk perception and how risk perception relates to individual choice and then contributes to societal conceptions of acceptable risk.^(5, 6) With regard to the type of risks, previous researchers have studied risk perception of technological risks,⁽³⁷⁾ environmental or natural hazards,⁽³⁸⁻⁴¹⁾ and a combination of the two.⁽⁴²⁾

2.3.3. *Organizational Size*

Researchers have found that larger organizations are more likely to mitigate and prepare for disasters than smaller organizations.^(23-27, 32) In fact, research has shown that, among a variety of independent variables that have been tested, firm size is the most consistent⁽³⁰⁾ and important⁽²²⁾ predictor of organizational mitigation and preparedness. The most straightforward interpretation as to why larger firms devote more to disaster mitigation and preparedness than do smaller firms is that larger firms have more resources available to them.^(28, 30, 43) Resource availability has been found to be a significant predictor at the organizational level, as well as the household⁽⁴⁴⁾ and community^(45, 46) levels. But firm size may also act merely as a surrogate for a variety of other variables that are difficult to measure (e.g., planning horizon of executives, presence of professionalized boards of directors with a stake in the organization's future, and so forth).

2.3.4. *Ownership Pattern*

In addition to size, there are differences in ownership patterns—whether the organization is a single firm or a franchise—with respect to the adoption of mitigation and preparedness measures. Empirical evidence suggests that franchises do more to mitigate and prepare for disasters than single firms. For instance, Drabek⁽²⁴⁻²⁷⁾ found that firms that were part of a larger chain engaged in more disaster evacuation planning than single firms did. This finding is in line with that of Quarantelli *et al.*,⁽²³⁾ who found that national chemical companies engaged in more preparedness than single local chemical firms. Dahlhamer and D'Souza⁽³⁰⁾ provide an explanation for this finding by arguing that this difference may be due to the mandates given by corporate headquarters to local chapters to engage in disaster preparedness.

2.3.5. *Organizational Sector*

Evidence in the disaster literature indicates that some sectors engage in more mitigation and preparedness than others. For instance, Drabek^(24, 27) found that there was a significant relationship between business type and disaster evacuation planning, with lodging businesses having more extensive disaster evacuation plans than restaurants, entertainment businesses, and firms in the travel industry. Similarly, in their study of 54 firms on preparedness for earthquakes in San Francisco, Mileti *et al.*⁽²⁸⁾ found an indirect relationship between firm type and earthquake preparedness. Further, Dahlhamer and D'Souza⁽³⁰⁾ found that businesses in the finance, insurance, and real estate sector, do more to prepare for disasters than businesses in other sectors. This finding may be explained by the higher degree of regulation and oversight in this sector,⁽²²⁾ though adequate measures of regulation and oversight have not yet been developed to test this hypothesis.

2.3.6. *Concern about Disaster Impact*

A body of research on risk and disaster visualizations suggests that information on the potential impacts of disasters can motivate people to take steps to reduce their risks.⁽⁴⁷⁾ In other words, a high level of concern about the impact of disasters may lead to greater engagement in preparedness activities.⁽⁴⁸⁾ For example, Showalter's⁽⁴⁹⁾ study of the effect of Iben Browning earthquake prediction found that concern over loss of life and personal injury was positively correlated with respondents' willingness to engage in preparedness activities.

2.3.7. *Organizational obstacles*

Organizations must address both internal and external obstacles to disaster mitigation and preparedness. However, in this study, our focus is on internal obstacles to disaster mitigation and

preparedness, which we define as factors inside the organization, that inhibit the ability of organizations to mitigate and prepare for disasters. The internal obstacles considered in this study fall into three major categories; lack of information, lack of management and organizational members' support, and lack of financial resources.

The acquisition of information is an important ingredient to disaster preparedness⁽⁵⁰⁾ because it allows organizations to make choices about how to allocate resources toward mitigation, preparedness, response, and recovery. It is also important that management and organizational members support the adoption of mitigation and preparedness measures. The policymaking process, where policy entrepreneurs must mobilize support for their issues, demonstrates this well.^(46, 51-53) Finally, a lack of financial resources is likely to reduce the ability of an organization to adopt disaster mitigation and preparation measures.^(54, 55)

2.3.8. *Determinants not in our Study*

There are some determinants of organizational mitigation and preparedness that we did not have measures for in our study. One such determinant is previous experience. Barlow⁽²⁹⁾ and Drabek^(25, 26) both found that previous experience with disasters positively predicted future preparedness for disasters. Another determinant is whether a business leases or owns the property where they operate. A study by Dahlhamer and D'Souza⁽³⁰⁾ found that businesses that owned their property engaged in more preparedness measures than businesses that leased their properties. Finally, the age of the organization was not considered in this study. Research in this area has been inconsistent; Drabek⁽²⁴⁾ found that organizations that have been in existence for at least 6 years were more likely to have extensive disaster evacuation plans, while Quarantelli *et*

al.⁽²³⁾ found that older chemical firms were less likely to prepare for disasters than newer chemical firms.

2.4. Hypothesis

The goal of this paper is to empirically answer two research questions. (1) “Does having a risk manager in an organization predict the adoption of risk-reducing measures?” (2) “What is the relationship between risk perception and the adoption of risk-reducing measures at the organizational level?” To answer these two questions, we offer and test the following hypotheses:

H1: An organization with a risk manager is more likely than an organization without a risk manager to adopt mitigation and preparedness measures.

H0: An organization with a risk manager is less likely than an organization without a risk manager to adopt mitigation and preparedness measures.

H2: Organizational risk perception leads to the adoption of mitigation and preparedness measures.

H0: Organizational risk perception does not lead to the adoption of mitigation and preparedness measures.

3. METHODOLOGY

3.1. Data Collection

Data were collected from the Memphis/Shelby County area, Tennessee in 2006. One of the authors was a member of a research team that collected these data from a sample of public, private, and non-profit organizations. The research team began by conducting exploratory

interviews with 15 different organizations in Memphis/Shelby County, Tennessee. Interviewees were asked open-ended questions about the type of actions their organizations had taken in respect to risk, as well as their attitudes toward hazard risk management and risk information. The interviews were conducted either in person or via telephone in the spring and summer of 2006. Each interview took approximately 30-60 minutes. Following those interviews, the research team processed the responses and returned them to the interviewees to verify accuracy. The results of the exploratory interviews were then used to develop the survey instrument utilized in phase two.

In the fall of 2006, a survey was mailed to 733 organizations in Memphis/Shelby County, TN. The survey was in two parts; the first consisted of questions regarding risk issues in organizations and the actions organizations were taking to address risks, the second part contained questions about demographic information of the respondents. The survey was distributed using a stratified sampling technique. With the help of the Memphis Regional Chambers of Commerce, the research team queried an online reference service, *ReferenceUSA*, using “number of employees” as a key index variable to allow organizations of all sizes in the Memphis Metropolitan Area to be surveyed and represented in sufficient numbers. The categories ranged from no employees to over 9,999 employees. The research team re-categorized the number of employees into seven distinct categories (1-9, 10-19, 20-49, 50-99, 100-249, 250-499, and ≥ 500). From these categories, the research team randomly selected 100 organizations from each of the first six categories, all 101 organizations from the seventh category, and then added 32 utility companies in Memphis/Shelby County area for a total of 733 organizations.

The survey was administered using a modification of Dillman’s total design method.⁽⁵⁶⁾ Using the letterhead of the University of Memphis, the team mailed a letter to each of the 733

organizations describing the study and seeking participation. Following this, the research team mailed the first batch of surveys and follow-up postcards. Then, a second batch of surveys was sent out. The survey was addressed to the owners and risk managers of these organizations. Of the 733 organizations, 227 returned the survey (response rate of 31 percent) and 10 declined to participate in the study, citing reasons such as, “business is not being fully operational” and “due to the private nature of our business”, among other reasons.

3.2. Uniqueness of Data

The data collected by the research team and used in this study is unique in two ways. First, most studies on disaster preparedness focus on specific hazards.⁽⁴⁴⁾ Our data, however, contains information on mitigation and preparedness measures for multiple types of man-made and natural hazards. Secondly, very few researchers have collected data on organizational behavior in relation to disaster preparedness and mitigation measures. One reason for this is that organizations are wary about providing such information for fear of potential consequences of releasing such information.⁽⁵⁷⁾ In sum, our data contain the information necessary to have a comprehensive understanding of risk reduction among Memphis/Shelby County organizations.

3.3. Dependent Variables

Risk-reducing measures. We operationalize risk-reducing measures by 10 disaster mitigation and preparedness activities (see Table I). We measure these activities by the question, “Has your organization engaged in any of these activities over the past year?” Respondents could either answer “yes” or “no”. We generate a 10-item index (Cronbach’s alpha = .88) by summing together the responses for each organization. We also develop an alternative formulation of the 10 mitigation and preparedness activities – active and passive measures to address disaster risks

(see Table I). Additionally, we add the active measures together (Cronbach's alpha = 0.81) and the passive measures together (Cronbach's alpha = 0.83). Active measures are those activities that involve an organization actually doing something to address its risks, not just discussing which actions to take. Passive measures are activities that involve an organization simply discussing or mentioning risk-reducing measures to be taken. We assume that active measures are more capable of reducing the impacts of disasters on organizations than passive measures. As a result, organizations that adopt active hazard adjustments may stand a better chance of surviving disasters in comparison to those that only enact passive hazard adjustments.

Table I. Active and Passive Risk-Reducing Measures

Risk-Reducing Measures
<i>Active</i>
<ol style="list-style-type: none"> 1. Attended disaster meetings/training courses outside your organization 2. Held disaster-related workshops/training within your organization 3. Arranged site visits by consultants or experts to better prepare for disasters 4. Provided information to customers/members of the community on issues related to disasters 5. Assessed or evaluated vulnerability to disasters or estimated potential losses from disasters 6. Engaged in non-structural mitigation measures (e.g., securing computers) 7. Engaged in structural mitigation measures (e.g., strengthening parts of a building)
<i>Passive</i>
<ol style="list-style-type: none"> 1. Mentioned a potential disaster in an organizational meeting 2. Discussed in an organizational meeting short-term responses to disasters 3. Discussed in an organizational meeting long-term strategies for recovery from disasters

3.4. Independent Variables

Presence of a risk manager – We measure this variable by asking the following question in the survey, “Does your organization have a risk manager?” Respondents could either answer “yes” or “no”. This independent variable is dichotomous, and so, we create a dummy variable – 1 for organizations that have a risk manager and 0 for organizations that do not have a risk manager.

Risk Perception – We measure this variable by asking the following question in the survey, “Using the thermometer scale below, please indicate the extent to which you perceive the following disasters are a worry for your organization”, on a scale of 100 (a great deal of worry), 50 (moderate worry), and 0 (no worry at all). The survey contained 15 different disasters (Bird flu/pandemics, chemical spills, drought, earthquakes, extreme heat, extreme winds/tornadoes, fires, flooding, hurricanes, ice storms, severe storms, terrorist attacks, toxic releases, violent crimes, and water pollution). We create an index by adding together the responses for all 15 disasters. The 15-item index has a Cronbach’s alpha of 0.89.

3.5. Control Variables

We control for the following variables that the literature on risk reduction say are important predictors of risk-reducing measures – *concern over disaster impacts, organizational obstacles, ownership patterns of organizations, organizational size, and organizational sector (education, health, and wholesale/retail trade sectors)*.

Concern over Disaster Impact – We measure this variable by asking the following question in the survey, “Please indicate the extent to which the following disaster impacts might adversely affect your organization” (1=minor adverse impact and 5=major adverse impact). The

13 disaster impacts are: (i) damaged reputation, (ii) disruption in supplies or deliveries, (iii) inability to communicate with employees, (iv) inadequate number of employees, (v) loss of commercial goods, (vi) loss of customers, (vii) loss of data, (viii) loss of life, (ix) loss of life support (food, water, etc.), (x) loss relative to competitor's loss, (xi) power outage, (xii) structural damage, (xiii) transportation disruption. We create an index, mean disaster impact, for this variable by adding together the values for all 13 disaster impacts (Cronbach's alpha = 0.81) and dividing by 13.

Organizational Obstacles – We measure this independent variable by the survey question, “Please indicate the extent to which the following statements are obstacles to disaster planning in your organization”: (a) lack of financial resources to prepare for disasters, (b) lack of support from upper-level management within your organization, (c) lack of support from mid- and lower-level organizational members, (d) lack of information about the frequency and magnitude of disasters, (e) lack of convincing information about the potential impacts of disasters, (f) unclear organizational benefits from disaster planning and mitigation. The scale of the variables is 1 to 5 (minor to major obstacle). We develop an index, the mean of all the obstacles by adding together the values for all the obstacles (Cronbach's alpha = 0.85) and dividing by six.

Ownership Pattern – Memphis Regional Chambers of Commerce provided the information on whether an organization is a single firm or part of a franchise.

Organizational Size – We operationalize this variable by the number of full-time employees in an organization. Memphis Regional Chambers of Commerce provided the information on organizational size.

Organizational Sector – Memphis Regional Chambers of Commerce provided the information on the sector which an organization belongs to.

3.6. Statistical Analysis

We assume that there are some organizations in our sample that are against the adoption of mitigation and preparedness measures and regard these organizations as having negative values for mitigation and preparedness measures. We also assume that there are some organizations in our sample that engaged in more than 10 mitigation and preparedness measures over the past year. For instance, some organizations might have stored water and food in addition to adopting all 10 mitigation and preparedness measures. We have restricted the sample by bounding the dependent variable between zero (lower limit) and 10 (upper limit). In other words, the dependent variable is censored from both left and right, meaning that one cannot observe organizations that are below zero or above 10.

We estimate a Tobit regression to answer the two research questions. Tobit is the appropriate technique for analyzing censored samples because it will take in to account organizations that engage in negative and above 10 mitigation and preparedness measures. We also estimate an Ordinary Least Square (OLS) regression in order to compare the OLS results with the Tobit results. Finally, we estimate a Logit regression to understand the relationship between individual mitigation and preparedness measures and risk manager as well as between individual mitigation and preparedness measures and risk perception. Logit is appropriate in this case because of the binary nature of the responses (“yes” or “no”).

4. RESULTS

According to Table II, organizations in our sample adopted an average of 4.7 out of 10 risk-reducing measures. In addition, about 44 percent of organizations in our sample have a risk manager and about 56 percent do not have a risk manager. With regard to risk perception, the mean risk perception is about 457 out of a maximum of 1365.

Table II. Descriptive Statistics for Dependent and Independent Variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
Risk-Reducing Measures	206	4.7427	3.2710	0	10
Risk Manager	207	.4444	.4981	0	1
Risk Perception	224	456.9018	285.3145	0	1365
Single Location	218	.7798	.4153	0	1
Employee Size	215	5.7860	2.0758	1	11
Mean Disaster Impact	220	3.6426	.7615	1	5
Mean Obstacle	212	2.5118	1.3729	0	5
Educational Sector	225	.08	.2719	0	1
Health Sector	225	.1556	.3632	0	1
Whole Sale/Retail Sector	225	.1511	.3589	0	1

Table III presents the results of the OLS and Tobit regressions. The results of the Tobit regression are similar to those of OLS; both models show that having a risk manager significantly increases the likelihood of adopting risk-reducing measures. Taking the OLS result as an example; holding all other variables constant, the presence of a risk manager leads to a 2.06 increase in the number of risk-reducing measures adopted. The other variable of interest, risk perception, has a positive and significant relationship with the adoption of risk-reducing

measures in both models. Again, taking the OLS results as an example, holding all other variables constant, a unit increase in risk perception increases the number of risk-reducing measures adopted by 0.0017. Single location, mean obstacle, and wholesale/retail sector have negative and significant relationships with risk-reducing measures. In addition, employee size and educational sector have positive and significant relationships with risk-reducing measures.

Table III. Ordinary Least Square and Tobit Regression Results

Variable	OLS	Tobit
	Coefficient (Std. Error)	Coefficient (Std. Error)
Risk Manager	2.0557*** (.3842)	2.2243*** (.4640)
Risk Perception	.0017** (.0007)	.0022** (.0009)
Employee Size	.4927*** (.0859)	.5924*** (.1045)
Single Location	-1.3013*** (.4465)	-1.5855*** (.5404)
Mean Disaster Impact	-.0439 (.2564)	-.1096 (.3127)
Mean Obstacle	-.3681*** (.1282)	-.4195*** (.1556)
Educational Sector	1.1815* (.6348)	1.2820* (.7606)
Health Sector	.4678 (.4737)	.6820 (.5662)
Wholesale/Retail Sector	-1.7014** (.4808)	-2.2959*** (.6015)
Constant	2.3222** (1.08612)	1.9943 (1.3142)
Observations	180	180
Adj. R² (Prob. > F = 0.0000)	.5311	
Pseudo R² (Prob. > Chi² = 0.0000)		.1539

***p < 0.01 **p < 0.05 *p < 0.1

Table IV, which presents the results of the active and passive analysis indicates that there is a significant and positive relationship between having a risk manager and the adoption of both

active and passive measures. In addition, organizational risk perception leads to the adoption of both active and passive measures.

The results of the 10 Logit regressions (see Table V in the Appendix) indicate that having a risk manager significantly increases the likelihood of adopting risk-reducing measures in all but two risk-reducing measures. Additionally, risk perception is a significant determinant of risk-reduction in four of the 10 risk-reducing measures.

Table IV. Logit Outputs for Active and Passive Measures

Variable	Active Measures	Passive Measures
	Coefficient (Std. Error)	Coefficient (Std. Error)
Risk Manager	1.7946*** (.3488)	1.2485* (.5092)
Risk Perception	.0016* (.0006)	.0020* (.0009)
Single Location	-.8298* (.4058)	-1.7452** (.6114)
Employee Size	.4082*** (.0795)	.5435*** (.1178)
Mean Disaster Impact	-.0810 (.2366)	.0136 (.3341)
Mean Obstacle	-.3065** (.1171)	-.3375** (.1712)
Educational Sector	.7143 (.5697)	1.0404 (.8221)
Health Sector	-.1204 (.4324)	1.5089** (.6326)
Whole Sale/Retail Sector	-1.6900*** (.6363)	-1.6294** (.6384)
Constant	.8093** (.9925)	-1.7082 (1.3717)
N	182	186
Pseudo R2 (Prob. > Chi2 = 0.0000)	0.1614	0.1931

***p < 0.01 **p < 0.05 *p < 0.1

5. DISCUSSION

Hiring a risk manager comes with the expectation that a risk manager will help an organization to reduce its risks from natural and man-made hazards. In fact, Ward⁽³⁵⁾ argues that risk managers are in charge of developing and implementing risk management programs within organizations. Unfortunately, we are not aware of any study that empirically shows that hiring a risk manager leads to the adoption of risk-reducing measures. The results of our analyses provide empirical evidence to support the assertion that hiring a risk manager does, in fact, lead to the adoption of risk-reducing measures in organizations. Furthermore, hiring a risk manager is associated with the adoption of both active and passive measures. Our results also suggest that organizational risk perception leads to the adoption of risk-reducing measures. This result is in agreement with previous findings on risk perceptions.⁽³³⁾ Finally, our result indicates that organizational risk perception is associated with the adoption of both active and passive measures.

Our results are interesting because they suggest that risk managers make a big difference when it comes to adopting risk-reducing measures in organizations. And that risk managers are not just talking about risk reducing measures to adopt, but that they are also involved in more proactive measures that can actually reduce the impacts of disasters on organizations. The significant relationship between risk-reducing measures and the presence of risk managers in organizations leads us to recommend that organizations interested in reducing their risks should consider hiring a risk manager if they can afford it. For organizations who cannot afford to hire a risk manager, the federal, state, or local government should consider providing risk management services at no cost to such organizations with the ultimate goal of helping organizations reduce their disaster risks.

The significant and negative relationship between adoption of risk-reducing measures and organizational obstacles suggests that risk managers are confronted with some obstacles in their bid to reduce organizational risks. An appropriate recommendation in this regard might be for organizations to pay attention to these obstacles with the goal of reducing their impacts on the risk manager. If an organization is successful in doing so, the risk manager may be more effective at managing the organization's risks from both man-made and natural disasters.

6. CONCLUSION

For low-probability, high-consequence events that can impact entire organizations, it is important to understand organizational preparation for such events. In this study, risk-reducing measures are 10 mitigation and preparedness measures that could help to diminish organizations' losses from natural and man-made disasters. The purpose of this study is to determine whether a designated risk manager is associated with a stronger portfolio of risk-reducing measures and whether organizational risk perception predicts the adoption of risk-reducing measures. The results are encouraging. They indicate that hiring a risk manager leads to the adoption of risk-reducing measures and that a risk manager is associated with the adoption of both active and passive measures. In addition, the results show that organizational risk perception is associated with the adoption of risk-reducing measures.

There are some limitations to our study. First, although we postulate that risk managers are a causative agent, it could be that the presence of a risk manager is endogenous, and is partly induced by the number of risk-reducing measure in the organization. In other words, organizations with lots of risk-reducing measures may be more likely to hire a risk manager than organizations with few risk-reducing measures. This is because the former have more resources

at stake in risk management than the latter. A much more complex research design – and possibly an experimental design – is necessary to resolve this matter. Second, because our study is based on Memphis/Shelby County region, our results may not be easily generalizable to other parts of the country. Third, our measure of “the presence of a risk manager” may not be accurate because some organizations might spread their risk management function across multiple jobs. If they do so, it is not clear that our survey instrument captured such arrangements. Fourth, we did not control for some variables that are significant determinants of risk-reduction like past disaster experience, age of the organization, and whether an organization leases or owns the business property where it operates.^(30, 44, 58) As a result, our analyses may suffer from some omitted variable bias.

Despite these limitations, we are confident that our study adds to the small, but growing literature on organizational perception and management of risk. Future research should examine whether the type of risk manager matters (e.g., full-time versus part-time and placement within the organization) and whether the resources allocated to risk managers have an impact. By isolating which aspects of the risk manager’s role are most important, research can provide clues about how a culture of risk management may be infused in all units within their organizations.⁽³⁵⁾

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APPENDIX

Table V. Logit Outputs for Individual Risk-Reducing Measures

Variable	Attend Meeting	Mention Disaster	Held Work Shops	Short-term Response	Long-Term Recovery	Attend Meeting	Provide Information	Vulnerability Assessment	Non-Structural Mitigation	Structural Mitigation
Risk Manager	1.1466*** (.3978)	.9053* (.4628)	1.4906*** (.4243)	.5826 (.4529)	.8980** (.4091)	1.9044*** (.4457)	.8940** (.4006)	1.4388*** (.4021)	.3784 (.3669)	.9651** (.4157)
Risk Perception	.0019** (.0008)	.0006 (.0008)	.0021** (.0009)	.0011 (.0008)	.0019** (.0008)	.0012 (.0008)	.0020** (.0008)	.0006 (.0007)	-.0007 (.0007)	.0008 (.0008)
Single Location	-.3678 (.4887)	-1.3468** (.5864)	-.7334 (.5293)	-1.7111*** (.6120)	-1.0903** (.5347)	-.9303* (.4879)	-.5686 (.4490)	-.6832 (.4934)	-.6206 (.4375)	-.1269 (.4704)
Employee Size	.3926*** (.0991)	.3050*** (.0985)	.4230*** (.1068)	.4630*** (.1034)	.4280*** (.1053)	.2614** (.1049)	.0372 (.0937)	.1800** (.0910)	.2662*** (.0823)	.1652* (.0983)
Mean Disaster Impact	-.0696 (.2859)	.1917 (.2872)	-.3686 (.3097)	.0431 (.2924)	-.1744 (.2975)	-.1140 (.3065)	-.1275 (.2878)	-.1364 (.2758)	.2991 (.2451)	-.1058 (.2810)
Mean Obstacle	-.2336* (.1411)	-.0386 (.1510)	-.4501*** (.1565)	-.2062 (.1527)	-.4196*** (.1515)	-.3017** (.1515)	-.0581 (.1389)	-.1343 (.1359)	-.0454 (.1231)	-.3943*** (.1457)
Educational Sector	.4758 (.6569)	.8398 (.8491)	.4712 (.6785)	.6877 (.7480)	.5658 (.6396)	.1319 (.6304)	1.8633*** (.6732)	.9558 (.8389)	.2246 (.6025)	-.4782 (.6452)
Health Sector	.5528 (.5268)	1.2505** (.6244)	.4320 (.5649)	1.4095** (.6209)	.5533 (.5382)	-.5896 (.5952)	-.6852 (.5531)	-.2515 (.4888)	.4233 (.4685)	-.7021 (.5570)
Whole Sale/Retail Sector	-1.4182** (.6363)	-1.2381** (.5279)	-2.0194*** (.7499)	-.5296 (.5378)	-2.0163*** (.7540)	-.8842 (.7205)	-1.2010* (.6849)	-1.6554*** (.5546)	-.4156 (.4618)	-1.5905** (.8037)
Constant	-2.6412** (1.2230)	-.9086 (1.1940)	-1.1712 (1.2333)	-.8989 (1.1898)	-1.4578 (1.2131)	-2.2035* (1.2629)	-1.3924 (1.1478)	.0635 (1.1480)	-1.5688 (.9973)	-1.2945 (1.1265)

***p < 0.01

**p < 0.05

* p < 0.1