

Relationship between Inter-Agencies Collaboration and Effective Disaster Management: Moderating Role of Effective Leadership

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Abstract

The purpose of this research is to develop a model related to disaster management. It focuses on the role of inter-agencies collaboration for describing disaster management. Furthermore, the interaction effect of inter-agencies collaboration and effective leadership on disaster management is also tested. Correlation and regression analysis were conducted to check the relationship among variables. Based on empirical findings, it is suggested that effective disaster management largely depends on the level of inter-agencies collaboration. Additionally, it is argued that effective leadership strengthens the relationship between inter-agencies collaboration and effective disaster management. Various agencies like National Disaster Management Authority (NDMA), provincial Disaster Management Authority (PDMA) and District Disaster Management Authority (DDMA) need more attention towards interactions and collective work. Hence, inter-agencies collaborations are pertinent to achieve effective disaster management. This research discusses an implementation approach based on solid theoretical foundations to achieve the effective disaster management through inter-agencies collaboration and effective leadership.

Keywords: Inter-agencies collaboration, Disaster management, Effective leadership

Introduction

Effective disaster management plays an important role during the unanticipated natural events which brings serious injuries of people, damage of infrastructure and property, and threat to the survival of human being (Pearson and Clair 1998). Although, disasters are mostly unexpected, governments and other key stakeholders need to develop a comprehensive and integrated system of managing disasters so as to minimize the resulting damages (Granville, Mehta and Pike 2016).

Disaster management has received a worldwide scholarly attention in the current decade (Kapucu and Ustun, 2018). Disaster management enables to handle the worse situations arise due to unexpected natural events (Granville, Mehta and Pike, 2016). Research in the area of disaster management is lacking to produce any evidence of using comprehensive indicators in measuring

effective disaster management. This makes the need to study effective disaster management in developing economies and the intention of study at hand is to address this need.

The increasing importance of effective disaster management has generated various studies on its determinants and outcomes. Number of studies highlighted numerous antecedents of effective disaster management e.g. resource capability (Kusumasari, Alam and Siddiqui 2010), communication networks (Kapucu, 2006), and social networks (Jaeger et al., 2007). In addition, the most important element that has a substantial effect on effective disaster management is the mechanism through with various agencies collaborate with each other's during the time of disaster to obtain access to required resources and make continuous improvement, that is, inter-agencies collaboration (Jaeger et al., 2007). Yet, very limited research offered a comprehensive

view on the relationship between inter-agencies collaboration and effective disaster management in developing economies. A systematic relationship between inter-agencies collaboration and effective disaster management of developing economies is still lacking.

This paper also examines that to what extent effective leadership moderates the relationship between inter-agencies collaboration and effective disaster management. Kapucu and Ustun (2018) state that the leaders must be especially trained in the skills of crisis leadership to effectively handle the situations of crisis and emergency. Sullivan, Williams and Jeffares (2012) documented that at all levels of disaster management, leadership is essential as it helps in achieving the disaster management goal. Leader is important for disaster management as leader can initiate, guide, and lead action (Lester, 2007). The current study also investigates the strengthened role of effective leadership for the relationship of inter-agencies collaboration and effective disaster management.

In this study we aimed to empirically explain: to what extent inter-agencies collaboration shapes effective disaster management? To what extent effective leadership strengthens the relationship between inter-agencies collaboration and effective disaster management. In order to achieve these objectives, the study has been divided into different sections. Section two discusses the literature review. Section three explains the overall methodology of the study. Results and discussion are presented in the section four and five respectively.

Literature Review

Inter-agencies collaboration and effective disaster management

Disasters, as defined by Pearson and Clair (1998), are unanticipated natural or man-made events involving the injury of people, damage of infrastructure and property, and threat to the survival of organizations. Although, disasters are mostly unexpected, governments and other key stakeholders need to develop a comprehensive and integrated system of managing disasters so as to minimize the resulting damages. Granville, Mehta and Pike (2016) state that there are four phases of disaster management i.e. prevention, preparedness, response and recovery. Prevention is required before the disaster actually takes place. It is mitigating the impact of disasters by following specific building code etc.; preparedness ensures that necessary emergency preparations exist and are functional before the occurrence of disaster; response includes activities immediately after disaster i.e. effective and efficient reaction to a disaster; while recovery includes the restoration efforts for the community in the short and long-term (Granville, Mehta & Pike, 2016). Iqbal, Sardar, Lodhi and Hasan (2018) state that disaster management requires planning for risk reduction and disaster onset and distribution, evacuation and emergency response, rescue and relief, and reconstruction. During the disaster, different agencies like security and law enforcement agencies, district administration, and Disaster Management Authorities continuously collaborate for making the effective disaster management (Kapucu, 2006).

As there are several stages involved in an efficient and effective disaster management process, there

is a strong need to develop collaboration among agencies involved in various efforts at every stage from preparedness to rehabilitation. Salmon, Stanton, Jenkins, and Walker (2011) particularly emphasize the need to develop collaboration among military and civilian actors during the process. Multi-agency collaboration, according to them, is a key issue that needs to be addressed for effective disaster management. Chen et al. (2008), however, argue that in the situations of emergency there is greater uncertainty, chances of abrupt and unexpected events, risks of mass casualties, urgency and time pressure, resource shortage, large scale impact as well as damage and disruption of infrastructure. Collaboration among stakeholders in such situations becomes even more challenging. Furthermore, as stated by Waugh and Streib (2006), government agencies, non-governmental organizations, volunteers, and first responders all start immediately responding to a disaster emergency without any coordination among each other. However, the most effective approach is to set up integrated efforts by military, government, non-governmental and local organizations. Therefore, in the current study we hypothesized that inter-agencies collaboration positively influences disaster management.

H1: Inter-agencies collaboration has positive relationship with effective disaster management.

Moderating Role of Effective Leadership

Collaborative effort of all the key stakeholders is imperative to effective disaster management but they are difficult to achieve especially without effective leadership. While explaining

the disaster management efforts after hurricane Katrina in the United States, Waugh and Streib (2006) note that one of the key elements responsible

for in-effective response to the disaster (Katrina) was the lack of effective leadership. They further state that the leadership style which is open, affiliated and democratic is more suitable (Waugh & Streib, 2006) as hierarchical decision making lacks the flexibility and speed required during rapidly changing circumstances in a situation of disaster (Goldsmith & Eggers, 2004). Kapucu and Ustun (2018) state that the leaders must be especially trained in the skills of crisis leadership to effectively handle the situations of crisis and emergency.

In the light of this literature review, it could be argued that effective disaster management efforts not only require collaborative efforts of all the stakeholders but effective leadership to ensure smooth collaboration. Therefore, in the current study we hypothesized that effective leadership strengthens the relationship between inter-agencies collaboration and effective disaster management.

H2: The relationship between inter-agency collaboration and effective disaster management is moderated by effective leadership.

Methodology

Population of this study were the employees of all the agencies (armed forces, UN agencies, government departments, NGOs and media) acting as stakeholders in disaster management as defined by Pakistan's National Disaster Management Authority. As data was collected from employees of different agencies that are part of disaster management program, so unit of analysis of this study will be individual. Different stakeholders/agencies were selected by using the historical data; purposive sampling technique was used to identify the relevant persons and collection of the required data from employees of those agencies.

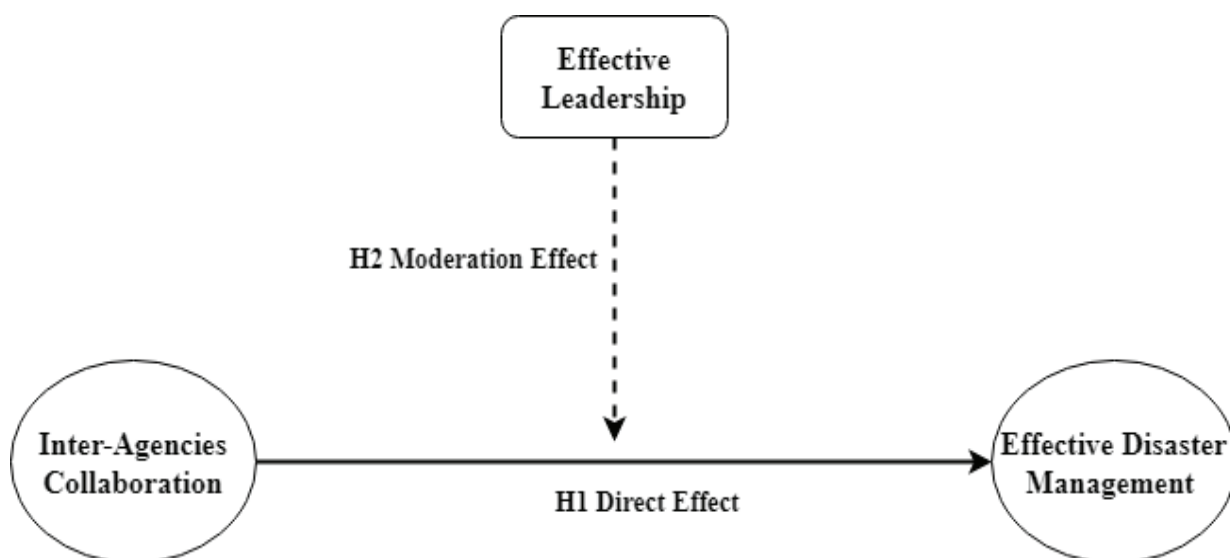


Figure 1. Theoretical Framework

Questionnaire consists of two major parts. Part A includes five questions highlighting control variables such as agency size, agency age, and agency type. Part B consists of questions measuring all variables i.e. independent variable, moderating variable and dependent variable. All the items of each variable were scored on five point Likert scales from 1 to 5. Standardized scales adapted from the previous studies were used in the current study for measuring all the proposed variables of the study.

Inter-agency Collaboration

Independent variable inter-agency collaboration was measured with a 17-item scale adapted from Morrissey, Johnsen and Calloway (1997). These items generated coefficient of Cronbach's α of 0.81.

Effective Disaster Management

Effective disaster management was measured with 11-items scale. These items were developed and formulated from the work of Kirschenbaum (2004) and generated an alpha value of 0.84.

Effective Leadership

The moderating variable effective leadership was measured with a 12-item scale developed and used by Rosete and Ciarrochi (2005). These 12-items generated coefficient of Cronbach's α value of 0.86.

Results

This study employed the tests of correlation, regression and moderation analysis. Correlation is used to measure the degree of association or the degree of connectivity between two variables. Regression analysis is used to test the impact of variables on dependent variable i.e. effective disaster management. Moderation analysis is conducted by using a three-step linear regression model. Moreover, the slope analysis was also conducted to confirm the results of linear regression (Bauer and Curran, 2005).

Descriptive statistics and Correlation

Table 1 shows the results of descriptive statistics and correlations among variables. According to descriptive statistics, average respondent

reported a higher score on effective disaster management. The average level of inter-agencies collaboration and effective leadership was 3.7 and 3.4 respectively. The correlations matrix confirmed positive and significant correlations among dependent, moderator and independent

variables. The results in Table 1 confirmed the correlation between inter-agencies collaboration and effective disaster management ($r = 0.23, p < .001$), and effective leadership and effective disaster management ($r = 0.13, p < .001$).

Table 1
Summary of Descriptive Statistics

Variable	Mean	SD	1	2	3	4	5
Agency age	3.2	.79	1				
Agency size	0.3	.86	.09	1			
Agency type	2.7	.82	.12*	.01	1		
Inter-Agencies Collaboration	3.7	.91	.07	.10*	.08	1	
Effective Disaster Management	3.8	.93	.01	.05	.04	.23*	1
Effective Leadership	3.4	.88	.06	.01	.02	.13**	.28**

Testing Direct Effects

Table 2 shows coefficient values derived from regression analysis. Supporting hypothesis 1, Model 2 in Table 2 provides the results for the effect of inter-agencies collaboration on

effective disaster management. The coefficients of regression shown in Model 2, inter-agencies collaboration is a direct and significant predictor of effective disaster management ($\beta = 0.23^{***}$ SE= 0.035). Thus, study Hypothesis 1 is confirmed.

Table 2
Results of OLS Regression for the Direct Effect of Inter-Agencies Collaboration.

Variables	Effective Disaster Management	
	Model 1	Model 2
Controls		
Agency age	0.014 (0.056)	0.006 (0.046)
Agency size	0.085 (0.103)	0.080 (0.078)
Agency type	0.063 (0.066)	0.057 (0.036)
Predictors		
Inter-Agencies Collaboration		0.23*** (0.035)
R ²	0.032	0.38
Adjusted R ²	0.019	0.34
F-value	1.94*	20.65***
Durbin-Watson	1.676	2.096

Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Unstandardized coefficients reported. Standard errors in parentheses.

Testing Moderation

Table 3 presented the regression results of the “PROCESS” suggested by Hayes (2013). In order to exclude the multicollinearity concern, we create the interaction terms based on mean-

centralized moderator. The results shown that inter-agencies collaboration, effective leadership, and their interaction were all positively related to effective disaster management ($\beta = 0.34, 0.23, 0.14; p < 0.001$).

Table 3
Regression Results of PROCESS.

Path estimated	Dependent variables
	Effective Disaster Management
Control	
Agency age	0.008 (0.067)
Agency size	0.017 (0.068)
Agency type	0.009 (0.079)
Predictors	
Inter-Agency Collaboration	0.34*** (0.047)
Effective Leadership	0.23*** (0.052)
Inter-Agency Collaboration * Effective Leadership	0.14*** (0.052)
R ²	0.42
F-statistic	61.216***

Note. Table values are path estimates from the estimated model. Entries are unstandardized coefficient estimates. Standard errors in parentheses. Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Furthermore, we conducted slope analysis as suggested by Aiken et al. (1991); Fig.3 presents the outcomes of slope analysis. The results provided in Table 3 and Fig.3 revealed that inter-agencies collaboration increases the disaster management when effective leadership is high, or inter-agencies collaboration decreases the disaster management when effective leadership is low. The results in Table 3 provided that Hypothesis 2 i.e. *inter-agencies collaboration accelerates disaster management through moderating role of effective leadership was accepted*.

Discussion and Conclusion

The current study proposed a research model that incorporates and tested the direct effect of inter-agencies collaboration and effective disaster

management. This study revealed that inter-agencies collaboration is directly related to the effective disaster management. The findings of the study specify that inter-agencies collaborations are significant predictors of effective disaster management. Furthermore, we also incorporate moderating role of effective leadership on inter-agencies collaboration and effective disaster management.

Regarding H1 i.e. “inter-agencies collaboration has positive relationship with effective disaster management”, we find a positive relationship between inter-agencies collaboration and effective disaster management. The findings are consistent with previous studies.

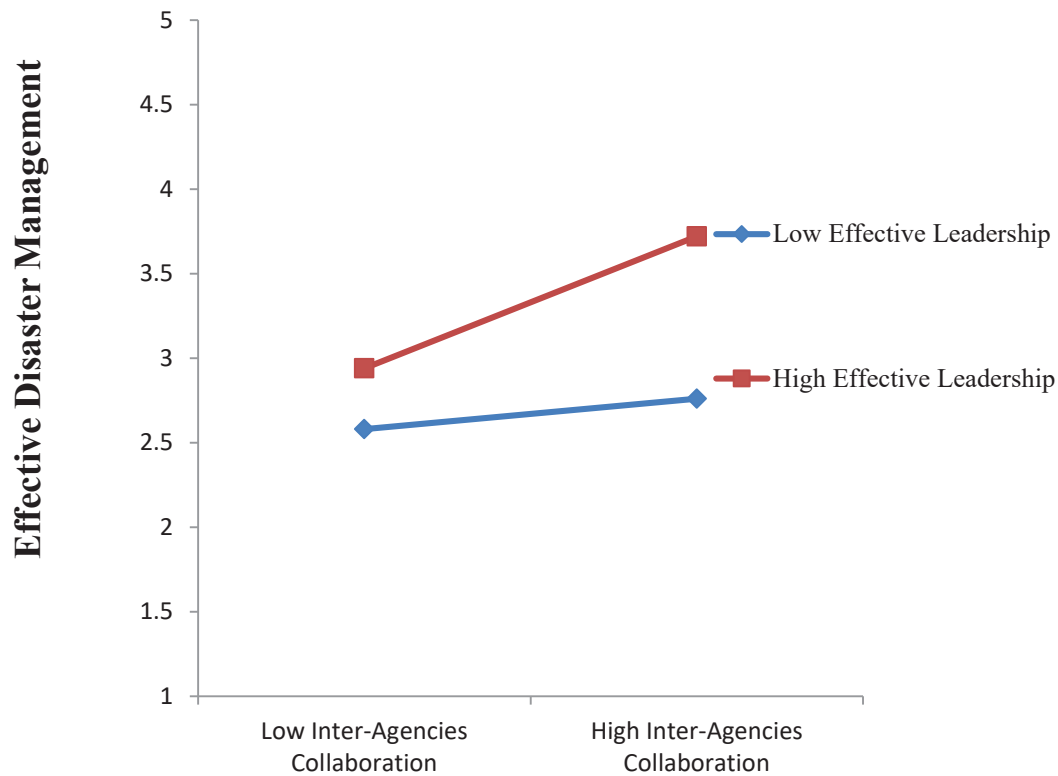


Figure III. Slope analysis inter-agencies collaboration X effective leadership on disaster management

Regarding H2 i.e. “the relationship between inter-agencies collaboration and effective disaster management is moderated by effective leadership”, we also find that effective leadership positively moderated the relationship between inter-agencies collaboration and effective disaster management.

Conclusion

The purpose of the current study was to find out the direct effect inter-agencies collaboration

and effective disaster management as well as moderating role of effective leadership. The findings suggested that inter-agencies collaboration has positive effect on the effective disaster management. Furthermore, effective leadership plays moderating role for the positive relationship between inter-agencies collaboration and effective disaster management.

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