Disaster Relief Resource Management Policies to Strengthen Disaster Victim Resilience

Moderating and Mediating Effects of the Core System

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Abstract

In this study, we applied the management core system concept to the disaster relief resource management policy and attempted to suggest qualitative changes and alternatives in the disaster relief resource management policy to strengthen the resilience of disaster victims. To achieve the research purpose, a survey was conducted and analyzed among general citizens. As a result of the analysis, first, positive perception of the disaster relief resource management organization was found to have a significant positive influence on disaster victims' resilience, and management characteristics and items had no significant influence. Second, the core system was found to have a moderating effect in the relationship between positive perception of disaster relief resource management characteristics and items and strengthening disaster victims' resilience, but this was not confirmed in the relationship with the management organization. Third, the core system was found to have a partial mediating effect in the process of influencing the positive perception of the disaster relief resource management organization and strengthening disaster victims' resilience, and this was not confirmed in the relationship between management characteristics and items. These research results suggest that policies and activities that reflect the components of the core system are important to strengthen the resilience of disaster victims.

Key words: Disaster Relief, Disaster Relief Resources, Disaster Relief Policy, Disaster Victims, Resilience, Core System

I. Introduction

The role of policies for disaster victims has become increasingly important as the number of people affected by disasters increases. Therefore, national and local governments have developed disaster relief systems, but they have not functioned properly, and disaster relief resources have not been quickly deployed. In addition, disaster relief resource management policies have not been systematic and continuous, even though they should be services necessary for disaster victims to return to normalcy, and have not provided satisfactory solutions to problems.

Therefore, this study was conducted to propose an alternative solution to strengthen the resilience of disaster victims by posing the question, "What is the disaster relief resource management policy that enables disaster victims to return to their daily life before the disaster and lead a continuous life?"

II. Theoretical Discussions

This study approaches disaster relief resource management policy from a welfare perspective and applies the core system, which is a component of disaster relief and disaster relief resource management policy, to the theoretical approach of resilience, which is the ability of disaster victims who are directly or indirectly affected by disasters to

return to their daily lives and lead a continuous life.

1. Disaster Victim Resilience

In the disaster field, resilience was first defined by Timmerman(1987) as "the capacity to absorb and recover from the occurrence of a hazardous event". Wildavsky(1998) defines it as "the capacity to learn and respond to unpredictable disasters in order to return to the original state of affairs"(Wildavsky, 1998: 69-81) and Bruneau et al. (2003) define it as "the ability of a social unit to minimize social disruption caused by disasters and to mitigate the effects of disaster risk" (Bruneau et al., 2003: 133-152). Cutter et al.(2008) define it as "the capacity of a social system to respond to and recover from disasters and the essential components that enable the system to absorb shocks and respond to events" (Cutter et al., 2008: 598-606).

This study operationalizes "disaster victim resilience" as "the ability of disaster victims who are directly or indirectly affected by a disaster to absorb, recover from, and respond to shocks in order to return to their daily lives and lead a sustainable life," reflecting the definition of disaster resilience and its characteristics of durability, reversibility, resource dependence, rapidity, and adaptability(Ha et al., 2014: 436-437; Jeon, 2014: 2; Jeon, 2015: 38; Jeon, and Choi, 2015: 476).

2. Disaster Relief Resource Operations and Management Policy

2.1. Disaster Relief Resource Management Organization

Disaster relief resource management organizations are "organizations that operate and manage disaster relief and disaster relief resource policies, and the direct participants in policy implementation are the central government, local governments, and basic local governments, as well as related relief agencies and organizations at the private level" (Choi, 2016: 73; Ministry of the Interior and Safety, 2022: 13).

Reflecting the findings of previous researchers, this study operationally defines "disaster relief resource management organizations" as the central government, regional relief centers, relief support organizations, and private relief organizations that operate and manage disaster relief and disaster relief resource policies.

2.2. Disaster relief resource management characteristics

Previous researchers have mentioned urgency, rapidity, accuracy, equity, transparency, timeliness, and integration as characteristics of disaster relief and explained their importance (Yang, 2014: 22; Lee, 2007: 72-73; Park, 2007: 50; Han, 2006: 164; Shin, 2016: 9; Lee, et al., 2012: 95, Kim, 2020: 73).

Reflecting the findings of previous researchers, this study categorized "disaster relief resource management characteristics" into sufficiency and sustainability, urgency and timeliness, transparency and equity, and professionalism and integration, and defined each characteristic as follows (Yang, 2014: 22; Lee, 2007: 72-73; Park,

2007: 50; Han, 2006: 164; Shin, 2016: 9; Lee et al., 2012: 95. Kim, 2020: 73).

First, sufficiency and continuity means that disaster relief resources are provided without interruption until people can return to their pre-disaster lives. Second, urgency and timeliness means that disaster relief resources are delivered quickly, to the right people, at the right time, and with the right items. Third, transparency and equity means that disaster relief resources are distributed equitably, with no questionable processes and procedures. Fourth, expertise and integration means that disaster relief is delivered by organizations with specialized expertise in disaster relief and that each disaster relief resource is meaningfully linked to the others.

2.3. Disaster relief resource management items

Disaster relief resources can be defined as "funds, materials, manpower, facilities, equipment, and knowledge or skills of individuals or groups that are mobilized to achieve the purpose of helping and protecting people in need due to an unexpected disaster."

This study applies the concept of types of relief specified in Article 4 of the Disaster Relief Act to classify disaster relief resources as emergency relief supplies, emergency relief funds, psychological recovery support, medical care, quarantine and sanitation, business support, temporary housing facilities, and volunteer and professional personnel, and operationally defines the material, financial, organizational, and human resources required for these as "disaster relief resource management items."

2.4. Disaster Relief Resource Management Core System

Previous researchers have defined the core system as "the center of a network that leads the entire system to achieve a common goal based on cooperation and collaboration through interconnection and interdependence," and categorized the components of the core system as follows (Lee, 2014: 23; Lee, 2015: 4; Cho, 2022, 35-61).

First, the values component is the operational direction that should be established to ensure that the disaster relief system operates in a desirable manner, which means respecting human life and dignity and implementing them to ensure the fundamental rights of human beings and their right to safety.

Second, the legal and institutional component is to secure legitimacy for the functioning of the disaster relief system and the achievement of its objectives, which means providing a legal basis for the existence and coexistence of all organizations, institutions, entities, and stakeholders involved in disaster relief, and enabling the mobilization, maintenance, and distribution of personnel, materials, and equipment necessary for disaster relief activities.

Third, the leadership element is essential to the operation and management of the disaster relief system to achieve disaster relief objectives and work collaboratively, and must be understood and considered to facilitate effective goal achievement and successful task performance based on desirable values and just laws and institutions.

Fourth, commitment (followership) is a virtue required of all participants in the disaster relief system, which means being independent of leaders, thinking critically, and participating actively and proactively to develop better disaster relief systems and disaster relief resource management policies.

Fifth, the competency (expertise) component refers to special knowledge or methods that can be acquired through

practice, training, research, etc. that can be measured in relation to performance standards in the disaster relief system, and personal characteristics that can be acquired or developed through experience, education and training required for good work performance.

Reflecting the definition and components of the core system, this study defines the "disaster relief resource management core system" as "the center of the network that leads the entire system to carry out rapid and efficient disaster relief based on cooperation and collaboration through interconnection and interdependence, and to strengthen the resilience of disaster victims."

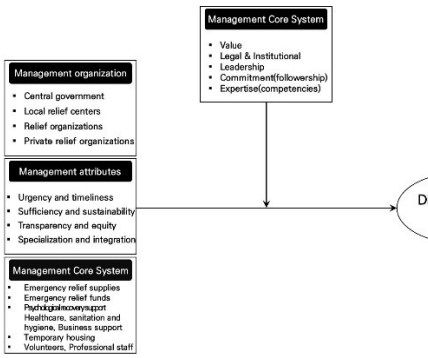
III. Setting up a research model and hypothesis

1. Research models for hypothesis testing

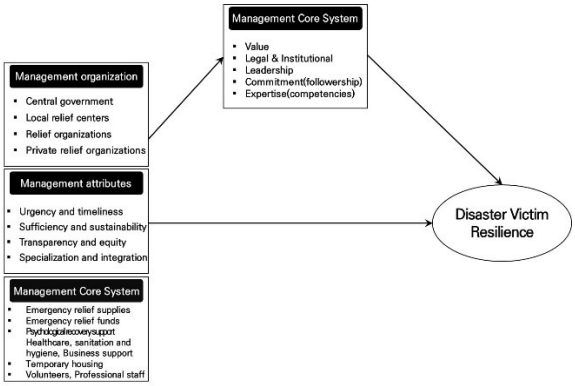
This study aims to test whether positive perceptions of the management organization, characteristics, and items of disaster relief resources affect disaster victim resilience, and to analyze the moderating and mediating effects of the management core system in this relationship.

As there are very few previous studies on the relationship between disaster relief resources and disaster victim resilience, to enhance the explanatory power of this study, we refer to previous studies that explain the relationship between disaster relief welfare support activities and resilience by approaching the capacity of disaster relief welfare support activities through the concept of social capital (Kim, 2020: 74) and previous studies that explain the relationship between the impact of core system components on community disaster resilience (Cho, 2022: 148).

The moderator effect test model is shown in <Figure 1>, and it is intended to test whether the moderator variable, core system, interacts with the predictor variable, disaster relief resource management policy, to affect the dependent variable, disaster victim resilience.



<Figure 1> Moderating Effect Models



<Figure 2> Mediated Effect Models

The mediation effect test is shown in <Figure 2>, and we wanted to test whether the predictor variable, disaster relief resource management policy, affects the mediator variable, core system, and the core system affects the dependent

variable, disaster victim resilience.

2. Data Collection & Analytics methods

2.1. Data Collection

To achieve the research objectives, a survey was conducted using a standardized self-administered questionnaire for general citizens, and data collection was conducted through an online survey method from November 29 to December 5, 2023. A total of 350 questionnaires were distributed and 309 were returned (95.1% return rate), and a total of 300 questionnaires were analyzed after excluding 9 questionnaires with missing or unreliable responses.

2.2. Analytics methods

For the analysis of the general citizen survey, the measurement of each question was based on a Likert 5-point scale, and six of the questions related to demographic characteristics and disaster relief and disaster relief resources utilized a nominal scale. The collected data was analyzed using the statistical package SPSS 27.0, and the specific analysis method is shown in <Table 1>.

<Table 1> Data analysis method

Classification	Analysis Content	Statistical Methods
Sample Characteristics	Demographic Characteristics	Frequency Analysis
General perceptions	Awareness of disaster relief policies	Frequency and Mean Analysis
Reliability	Consistency of items and variables	Reliability analysis
Validity	Construct validity between each factor	Factor Analysis
Correlation	Correlation between variables	Correlation Analysis
Hypothesis testing	Influence relationships between variables	Multiple & Hierarchical regression

IV. Results of empirical analysis

1. general characteristics of respondents

To examine the demographic characteristics of the survey respondents, we examined their gender, age, marital status, education, occupation, average monthly household income, and region of residence, and the characteristics of the respondents used in the analysis are shown in <Table 2>

<Table 2> Data analysis method

Category		Frequency (people)	Percentage (%)	Category		Frequency (people)	Percentage (%)	Category		Frequency (people)	Percentage (%)
Gender	Male	150	50	job	Agriculture/Forestry/Fishing/Livestock	1	0.3	Residence	Seoul	70	23.3
	Female	150	50		Self-Employment	15	5		Busan	21	7
Age Range	20's	60	20		Sales/Service Occupations	18	6		Daegu	18	6
	30's	60	20		Skilled/Journeyman	7	2.3		Incheon	15	5
	40's	60	20		General laborer	7	2.3		Gwangju	12	4
	50's	60	20		Clerical/Technical	143	47.7		Daejeon	9	3
	60's	60	20		Executive/Managerial	14	4.7		Ulsan	7	2.3
Marital status	Married	181	60.3		Professional/Freelance	29	9.7		Gyeonggi-do	80	26.7
	Single	117	39		Homemaker	35	11.7		Gangwon-do	8	2.7
	etc	2	0.7		Student	12	4		Chungcheongbuk-do	6	2
Education	Community college graduate (attended)	46	15.3		Unemployed	16	5.3		Chungcheongnam-do	11	3.7
	Community college graduate (attended)	44	14.7		etc	3	1		Jeollabuk-do	9	3
	College graduate (attending)	168	56	Household average monthly income	Less than 2 million won	23	7.7		Jeollanam-do	4	1.3
	Graduate from (attended) graduate school	42	14		2 to 3 million won	61	20.3		Gyeongsangbuk-do	6	2
					3 to 4 million won	64	21.3		Gyeongsangnam-do	18	6
					4 to 5 million won	33	11		Jeju Island	3	1
					5 to 6 million won	35	11.7		Sejong	3	1
					More than 6 million won	84	28				

2. Analyze the validity and reliability of variables

Reliability analysis was conducted to verify the internal consistency of the management organization, characteristics, items, core system, and disaster victim resilience of disaster relief resources, and the coefficient of Cronbach's α was calculated, and the values of the main variables were all very high, above 0.8, indicating excellent reliability, so the analysis proceeded without removing items.

To understand how the sub-factors of disaster relief resource management policies are categorized, a factor analysis was conducted on the 14 items. The analysis showed that the factorization model was appropriate, had high explanatory power, and the factors were clearly separated and the model was accepted.

Correlation analysis was conducted to check the correlation between the main variables of this study, disaster relief resource policy and core system and disaster victim resilience. The results of the analysis showed that the probability of significance between the variables was less than the significance level of .05, indicating that the variables were correlated with each other, and the statistical significance of each variable used in the analysis was proven and did not affect the model test.

3. Hypothesis testing

3.1. Impact of disaster relief resource management policies on disaster victims' resilience

Multiple regression analysis was conducted to test the impact of disaster relief resource management organization, characteristics, and items on disaster victim resilience, and the results are shown in <Table 3>. The regression model was statistically significant (F=19.998, p<.001), and the explanatory power of the regression model was 16.9%

(R2=.169, adjR2=.160). The significance test of the regression coefficients showed that management organization (β=.395, p<.001) had a significant positive effect on disaster victim resilience, while management characteristics and items had no significant effect.

<Table 3> management organizations, attributes, and items affect resiliency

Dependent Variable	Independent Variables	*B*	*S.E*	*β*	*t*	*p*	*VIF*
Disaster Victim Resilience	(Constant)	1.569	.328		4.782	.000	
	Organization	.409	.067	.395	6.118***	.000	1.486
	attributes	.059	.097	.046	.602	.547	2.056
	Item	-.059	.085	-.045	-.693	.489	1.511
F=19.998(p<.001), R^2=.169, $_{adj}R^2$=.160, D-W=1.754							

* p < .05, ** p < .01, *** p < .001

3.2. Analyzing the Adjustment Effectiveness of the Disaster Relief Resource Management Core System

3.2.1. Moderating effect of core system in management organization and resilience relationship

In the first stage regression, positive perceptions of the management organization explained 16.7% of disaster victim resilience (F=59.889, p<.001). In step 2, the addition of the moderator variable, core system, explained 59.4% (F=217.241, p<.001), a 42.7% increase in explanatory power compared to the step 1 model. In step 3, the interaction term between management organization and core system explained 59.5% (F=144.744, p<.001), an increase of .001% compared to the step 2 model. However, the interaction term between management organization and core system was not statistically significant (t=.702, p>.05), so the moderating effect of core system on the relationship between disaster relief resource management organization and disaster victim resilience was not confirmed.

<Table 4> Core systems in a resiliency relationship with a governing organization

Steps	Variables	Dependent Variables: Resilience					
		B	*β*	*t*	R^2	ΔR^2	*F*
1	Management organization(A)	.424	.409	7.739***	.167	.167	59.889***
2	Management organization(A)	.036	.035	.817	.594	.427	217.241***
	Core System(B)	.767	.753	17.666***			
3	Management organization(A)	-.053	-.051	-.395	.595	.001	144.744***
	Core System(B)	.664	.652	4.339***			
	A × B	.029	.164	.702			

* p < .05, ** p < .01, *** p < .001

3.2.2. Moderating effect of core system on management attributes and resilience relationships

In the first stage regression, positive perceptions of management characteristics explained 0.9% of disaster victim resilience (F=2.756, p<.001). In step 2, the addition of the moderator variable, core system, explained 59.3% (F=216.797, p<.001), an increase of 58.4% compared to the step 1 model. In Step 3, the interaction term of management characteristics and core system was added to explain 60.3%, which increased the explanatory power by 1% compared to the Step 2 model, and the increase was significant (F=150.022, p<.001). In addition, the influence of the interaction term was also significant (β=.841, p<.05), indicating that the core system has a moderating effect on the

relationship between disaster relief resource management characteristics and disaster victim resilience.

<Table 5> Core systems in a resiliency relationship with management attributes

Steps	Variables	Dependent Variables: Resilience					
		B	β	t	R^2	ΔR^2	F
1	Management attributes(A)	.125	.096	1.660***	.009	.009	2.756***
2	Management attributes(A)	.027	.021	.553	.593	.584	216.797***
	Core System(B)	.783	.768	20.662***			
3	Management attributes(A)	-.492	-.376	-2.483*	.603	.010	150.022***
	Core System(B)	.072	.071	.272			
	A × B	.165	.841	2.700*			

* p < .05, ** p < .01, *** p < .001

3.2.3. Moderating effect of core system on managed items and resiliency relationships

In the first stage regression, positive perceptions of management items explained 6.2% of disaster victim resilience (F=19.837, p<.001). In step 2, the addition of the moderator variable, core system, explained 59.8% (F=221.356, p<.001), an increase of 53.6% compared to the step 1 model. In Step 3, the interaction term between management items and core system was added to the model, resulting in an explanatory power of 60.5%, an increase of 0.7% compared to Step 2, and the increase was significant (F=151.055, p<.001). In addition, the influence of the interaction term was also significant (β=.634, p<.05), indicating that the core system has a moderating effect on the relationship between disaster relief resource management items and disaster victim resilience.

<Table 6> Core System in a resiliency relationship with a managed item

Steps	Variables	Dependent Variables: Resilience					
		B	β	t	R^2	ΔR^2	F
1	Managed items(A)	.321	.250	4.454***	.062	.062	19.837***
2	Managed items(A)	.097	.076	2.004*	.598	.536	221.356***
	Core System(B)	.767	.753	19.913***			
3	Managed items(A)	-.285	-.222	-1.574	.605	.007	151.055***
	Core System(B)	.269	.264	1.164			
	A × B	.122	.634	2.190*			

* p < .05, ** p < .01, *** p < .001

3.3. Analyzing the Mediating Effects of the Disaster Relief Resource Management Core System

In order to verify the mediating effect of the disaster relief resource management core system, the effects of management organization, management characteristics, and management items, which are components of disaster management policies, on the core system were analyzed in step 1; the effects of components on disaster victim resilience were analyzed in step 2; and the effects of components on disaster victim resilience were analyzed in step 3 by setting the components as independent variables and the core system as a mediator, and introducing the independent variables in a stepwise manner with disaster victim resilience as the dependent variable.

First, the mediating effect of the core system on the relationship between positive perceptions of disaster relief resource management organizations and enhanced resilience of disaster victims was found to be statistically significant

at step 1, with the effect of the independent variable, management organization, on the mediating variable, core system (β=.597, p<.001). In step 2, the effect of management organization on the dependent variable, resilience (β=.392, p<.001), was also statistically significant, confirming that positive perceptions of disaster relief resource management organizations affect disaster victim resilience. In the final step 3, the effect of the parameter core system on the dependent variable resilience was significant (β=.772, p<.001), and the effect of the management organization on resilience was significant (β=-.017, p<.001), although less than in step 2. This suggests that positive perceptions of the disaster relief resource management organization not only contribute to strengthening the resilience of disaster victims by itself, but also affect the core system, which ultimately affects the resilience of disaster victims.

Second, the mediating effect of the core system on the relationship between positive perceptions of disaster relief resource management characteristics and enhanced disaster victim resilience was not statistically significant at both level 1 (β=-.016, p=.799) and level 2 (β=.053, p=.485).

Third, the mediating effect of the core system on the relationship between positive perceptions of disaster relief resource management items and enhanced resilience of disaster victims was not statistically significant at both stage 1 (β=-.067, p=.357) and stage 2 (β=-.046, p=.483).

<Table 7> Mediating effects of the Disaster Relief Resource Management Core System

Steps	Independent Variables	Dependent Variable	B	$S.E$	β	t
Step 1	Organizations	Core System	.549	.062	.539	8.799***
	Attributes		-.020	.079	-.016	-.255
	Item		-.084	.091	-.067	-.923
F=33.112(p<.001), R^2=.251, $_{adj}R^2$=.244						
Step 2	Organizations	Resilience	.406	.067	.392	6.062***
	Attributes		-.060	.098	.053	.703
	Item		.069	.085	-.046	-.700
F=20.086(p<.001), R^2=.169, $_{adj}R^2$=.161						
Step 3	Organizations	Resilience	-.018	.052	-.017	-.345***
	Attributes		-.044	.059	-.034	-.742
	Item		.133	.068	.104	1.962
	Core System		.772	.043	.758	17.799***
F=110.333(p<.001), R^2=.599, $_{adj}R^2$=.594						

* p < .05, ** p < .01, *** p < .001

3.4. Hypothesis testing results

First, positive perceptions of the disaster relief resource management organization had a significant positive effect on disaster victim resilience, while management characteristics and items had no significant effect. Second, the moderating effect of core system was found in the relationship between positive perceptions of disaster relief resource management characteristics and items and enhanced disaster victim resilience, but not in the relationship of management organization. Third, the core system had a partial mediating effect on the relationship between positive perceptions of disaster relief resource management organizations and enhanced disaster victim resilience, but not on the relationship between management characteristics and items.

V. conclusion

As a result of the study, it was proven that the perception of the disaster relief resource management organization contributes to strengthening the resilience of disaster victims and also influences the positive perception of the core system, which is the five core elements of the disaster relief management system. In addition, it has been proven that the positive perception of the core system and the characteristics and items of disaster relief resource management have an effect on strengthening the resilience of disaster victims.

According to these research results, in order to actually strengthen the resilience of disaster victims, we need to formulate policies that can provide trust and satisfaction to create a positive perception of the disaster relief resource management organization, items, characteristics, and core system. and must be executed. Therefore, first, disaster relief resource management organizations must establish effective disaster relief resource management policies and systems through cooperative governance. Second, the characteristics of disaster relief resource management must be established to provide appropriate resources at the right time without interruption until life returns to before the disaster occurred, and the delivery process and procedures must be transparent and fair. Third, disaster relief resource management items should be organized and provided as disaster victim-centered items that take into account the situation and needs of disaster victims based on the type of disaster, characteristics of the area where damage occurred, and scale of damage. Fourth, we must establish laws and systems with expertise and capabilities in disaster and disaster relief to implement the value and philosophy of respect for human beings, and improve leadership that can lead this and the dedication (followership) that can follow the leader. do. Based on this, the disaster relief resource management policy, which has not developed over a long period of time, is designed to strengthen the resilience of disaster victims. Human rights are guaranteed based on the value and philosophy of respect for people, and long-term welfare relief and normal life can be continued. It must be converted into daily life relief.

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