

Leadership Improvement in Public Crisis Management: A Study of China Petrochemical Corporation

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Abstract: In the current society, public crises are everywhere, and public crisis management has become a hot spot of public concern. Exploring and improving the leadership improvement path in public crisis management is conducive to reducing the degree of harm of public crises. This paper is based on 437 survey samples of China Petrochemical Corporation (Sinopec Group), centering on the category of crisis leadership, using an ordered logistic regression model to test 9 measurement variables such as personal charm, context sensitivity, system thinking, crisis communication, action interaction, team inspiring, shared vision, changing opportunity and organization learning are significantly related to the improvement of crisis leadership, and analyze the problem of the improvement path of leadership in public crisis management. In this way, we summarize the core power and effective execution power of leadership in public crises, and points out the main paths from the management concept to the collaborative governance concept, the establishment of a collaborative governance structure, and the shaping of a collaborative governance mechanism. In order to reduce the losses caused by public crises, provide theoretical basis and practical reference.


1 INTRODUCTION


In recent years, the frequent occurrence of various public emergencies has caused serious threats to China's economic development and is not conducive to long-term stability of society. As the main body of public crisis management, leading cadres are particularly important for the handling of public crises (Orazi, Turrini, & Valotti 2013). The emergence of different types of emergencies has raised many new challenges for leadership improvement. The adjustment and emergency response capabilities of leading cadres need to be further improved (Wang 2013). At the same time, in the context of economic globalization, the frequency of public crises is getting higher and higher, and the

scale of the spread is also continuing to expand, and the harm generated is also growing (Yao, & Gong 2012). In the process of China's social and economic development and progress, development is the top priority, and safety is the first responsibility (Wang, 2014). Gradually exploring and improving the public crisis management method, optimizing the leadership structure, and having certain scientific and effective in public crisis management are of great significance for public crisis management (Zhao, & Li 2011), and the improvement of leadership can greatly reduce the number of public crises, reduce the scale of public crises, and contribute to the long-term stability of society (Amabile, Schatzel, Moneta, & Kramer 2004). In this context, this paper deeply studies the leadership improvement methods in public crisis management, which has important practical and

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theoretical significance for improving leadership execution and accelerating China's economic development.

2 LITERATURE REVIEW

We refer to the comprehensive literature research method of Chen & Lin (2020), use Web of Science (WoS) as the citation database, and select SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI in the WoS core collection as data retrieval Source, using the keywords "Public Crisis Management" AND "Leadership" (including the researcher keyword "DE", and the research content to add the keyword "ID"), the literature accumulation time span is 1994-2021, obtained from the subject search. There are 674 documents and 9 highly cited documents. Different from the large volume growth shown in the domestic literature, WoS published research results on public crisis management and leadership related topics and the degree of attention has been increasing year by year after 2006. See the citation report for details (see Figure 1). In the era of human society, crises and conflicts exist in all aspects, and crisis management has become the focus of public attention. Along with the economic integration and political integration, the process of gradually advancing to the global community, and the gradual acceleration of the pace of economic development, the crisis of civilization has become the main product of China's economic development and adjustment, from the government to the individual. Master public crisis management methods and effectively deal with public crises (Zhu 2013). In recent years, China's public crisis has occurred frequently, and various crises have gradually emerged diversely. Some sudden crises pose a serious threat to human security and social stability. Public crisis management not only tests the organizational communication ability, decision-making ability and activity execution ability of department leaders, but also tests the psychological endurance of leaders to a certain extent, and poses a greater challenge to the improvement of leaders' ability. The ability of relevant leaders to improve and leadership has become the key to the management of public crisis (Wang 2010). In the management of public crisis, the response to the crisis first needs to understand the law of the development of the crisis and the source of the occurrence. The learning of the crisis effect becomes a prerequisite for crisis management. Among them, in the process of public crisis management, action learning as an advanced learning method has

undoubtedly become the management method with the greatest practical value of crisis management. In the process of public crisis management, the action learning process is a two-cycle process focusing on action and learning. Relevant government departments can improve leadership, rational strategic planning, reshape organizational culture, and improve social public crisis management capabilities (An 2013). Nowadays, countries around the world have begun to study leadership improvement methods and specific practices. And with the gradual complication of adjustments, the relevant institutions have proposed new tasks and tasks for leadership improvement. By considering the global crisis and the challenges faced, we will analyze the problems that may be faced by future leadership improvement, and propose that future leadership improvement should focus on social phenomena and improve all aspects of leadership from different dimensions (Wu, & Zhang 2014). The rapid transformation of Chinese society requires the inclusion of public leadership in specific education development plans. By defining the specific concepts of public management capacity, and from the perspectives of supervision and implementation, crisis management, strategic decision-making, communication and collaboration, and innovation, this paper discusses the main ways to improve public management capacity. On this basis, the six foreign universities are the main research objects, and the comparative analysis of leadership training and promotion methods is carried out. It is found that, these different approaches also lead to unique leadership development approaches, while highlighting leadership development. Moreover, the use of public leadership in public crisis management has a significant regulatory effect on public crises and, to a certain extent, reduces the number of public crises (Peng, Wang, Xue et al. 2015).

3 PRELIMINARY

Once a crisis occurs, it will have a more serious impact and bring some adverse effects to the public. In general, public crises suddenly erupt, and it is difficult to predict before the crisis erupts, and there is no law at all. If the relevant leaders did not do the relevant preventive measures in advance, or did not foresee the occurrence of the crisis before the crisis, this would bring unimaginable consequences after the crisis. In social life, some public crises have certain control ability, and some are beyond control (Peters 2021). Before the public crisis occurs, raise the awareness

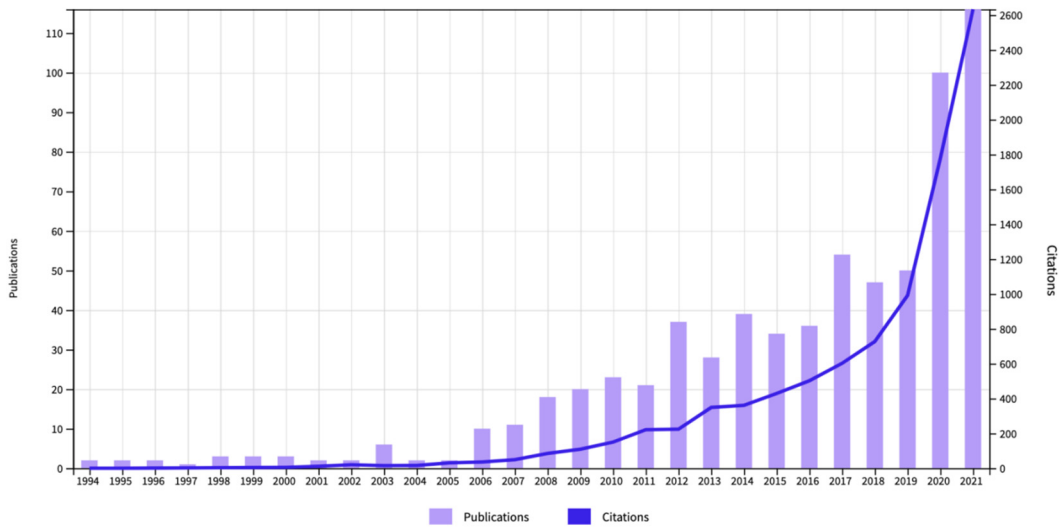


Figure 1: Citation report of research on topics related to public crisis management and leadership.

of public crisis led by relevant departments. Public crisis forecasts should be made in advance. Preparing in advance before the crisis is also conducive to the relevant departments in the prior to all precautions. At present, after the public crisis, the government that dominates the public crisis is generally the government department. Before the crisis broke out, government leaders led a thorough crisis response plan. In the event of a crisis, the public will see the leadership of departmental leaders, all of whom want to minimize the damage caused by public crises. Therefore, before the crisis occurs, it is the primary task of the government leaders to make good preparations in advance to avoid the crisis.

Before the crisis broke out, there were four main tasks that government leaders needed to do, as shown in Figure 2. Establishing public crisis awareness is the premise of public crisis management, which is the basis of leadership improvement before the crisis. At present, China is in a period of stable development, and the frequent occurrence of natural disasters has gradually increased the difficulty of public management. Therefore, government leaders need to have a strong sense of public crisis, be sensitive to

public crises, and avoid overconfidence leading to public crises. Moreover, relevant leaders should also adapt to the development needs of the situation, continue to learn the corresponding public crisis knowledge through relevant channels, understand the causes of some public crises, and understand the prevention and control measures of public crises in advance, so as to solve the public crisis. Do the appropriate preparations.

The occurrence of public crises has a very large uncertainty, which may have a greater impact on the public after the outbreak. In addition to public crisis awareness, government leaders need to make public crisis predictions. In order to reduce the public crisis after the outbreak of many harm. Relevant leaders must use statistical information to make appropriate crisis predictions within the corresponding time frame. Moreover, in this process, the leader can understand the information about the public crisis on some self-media platforms, and can capture and judge the time and place where the crisis may occur according to the clues of some crises. Then, combined with past experience in public crisis management, anticipate some public crises that may



Figure 2: Ways to Improve Leadership before the Outbreak of Public Crisis.

occur in advance, and infer the development trend of future public crises. According to the judgment results, the pre-preparation of the crisis warning is prepared by collecting the information related to the previous or existing public crisis, and the degree of public crisis harm is minimized, and do the following two aspects:

3.1 Establishing a Sense of Public Crisis is a Starting Point for Leadership Advancement before the Outbreak

In the process of public crisis management, leadership transforms consciousness into a corresponding mechanism by maintaining a certain sense of public crisis and then using relevant practical activities. In this process, leaders are required to make public crisis warnings. In the course of a crisis, leaders should deploy relevant strategic work through the situation on the ground to clarify the possible hazards that may occur after the crisis. Such results may be related to ways to prevent crises. Through a certain forward-looking and public crisis warning, the department leaders can reduce the losses caused by the public crisis to the public. Of course, before the leader plans, there are many dynamic environments that need to be faced. In the process, the leadership's perception of some environments will affect the implementation of the entire plan. Doing a good job of public crisis warning can effectively prevent and even resolve the emergence of public crises and reduce the harm of public crises. Moreover, department leaders should do public crisis warning, be able to coordinate the specific work of the department, save a lot of people, goods and financial resources, which is conducive to maintaining social order, and it's conducive to the government's leadership.

3.2 Prevention is the Best Way to Deal with Public Crisis Management

Relevant prevention work is in place, and in the event of a public crisis, it can be faced in a more relaxed way to resolve the crisis. Doing a good job in public crisis plans can help the public to take appropriate measures to deal with public crises before the public crisis. In this process, government leaders should attach great importance to the preparation of public crisis plans, and comprehensively consider the local situation, and prepare corresponding plans for the possible situation of different crises. When preparing

the plan, it needs to be meticulous and accurate, and must not miss any information that may cause public hazards. At the same time, public crisis plans can also provide some public crisis management methods to control public crises in detail.

4 EMPIRICAL TEST

4.1 Operational Definition

We adopt the maturity scale of Cui (2014) and take 9 operational definition indicators, including personal charm, context sensitivity, system thinking, crisis communication, action interaction, team inspiring, shared vision, changing opportunity, and organization learning as observation variables. To test the relevance of this dependent variable in crisis leadership promotion. We use the Likert 8-point scale to measure the efficiency of crisis leadership. The larger the value, the more we agree with the impact of crisis leadership.

Refer to the Peer Esteem Snowballing Technique (PEST) sampling method of Chen and Lin (2020), and use the staff at or above the level of section manager or team lead of China Petrochemical Corporation (Sinopec Group) as of December 31, 2020 as the sample frame. 100 respondents were sent via WeChat push, and the questionnaire was sent to each respondent within 1 hour of getting the first response. Among the 100 interviewees, 34 interviewees participated in the survey and the interview invitation was forwarded to others in the sample frame they knew. The invitation letter is verified through guidelines and settings to minimize isomorphism, and the invitation letter is requested to be forwarded to other groups of people in the sample frame as much as possible. Within half a year (January 1, 2021-June 30, 2021), a total of 468 questionnaires were received. After the samples were inspected and screened, the total number of samples was 437.

4.2 Descriptive Analysis

4.2.1 Response Deviation Test

Since the questionnaire survey lasted for 180 days, this study first conducted a response bias test on the samples based on the recommendations of Chen et al. (2020). The top and bottom 27% of the samples were divided into high and low groups, using SPSS 25.0 for MAC software, running descriptive statistics (see Table 1), independent sample t-test (see Table 2) and

other operations, based on the argument that delayed responders and non-responders are more similar than initial responders, according to the time series of sample recovery, The independent sample's t test method was used to calculate the degree of discrimination. The non-response deviation was

evaluated by comparing the initial responders and late responders. The independent sample t-test results showed that there was no significant response deviation and the sample was acceptable. Sample statistics description:

Table 1: Group statistics.

Group	Statistic	Repeated sampling ^a				
		Deviation	Mean	difference 95% confidence interval		
				Lower	Upper	
	N	118				
Initial response	Average	5633.143	-.0321	6.434	5351.476	5914.790
	S.D.	31.089	-.218	5.891	29.535	32.643
		N	118			
Delayed response	Average	5732.141	.0318	6.053	5445.534	6018.748
	S.D.	32.172	-.230	5.291	30.563	33.781

a. Based on 1000 repeated samples

Table 2: Independent sample verification.

Class	Levene's test for equality of variance			T-test for the equality of means						
	F	Sig.	t	df	Sig.(two-tailed)	M.D	S.E	difference 95% confidence interval		
								Lower t	Upper	
Sum	with equal	116.677	.001	43.133	132	.000	6.166	0.180	3.124	7.244
	No equal			43.133	132	.000	6.166	0.180	3.124	7.244

4.2.2 Demographic Information

Table 3: Demographic information.

SN	Position	Frequency	%
1	Section manager/ Team lead	124	28.375%
2	Manager/ Senior Staff Engineer	97	22.197%
3	Senior Manager/ Principal Engineer	76	17.391%
4	Director	67	15.332%
5	Senior Director	56	12.815%
6	Vice President	11	2.517%
7	CEO/President/ General Manager	6	1.373%
Total		437	100.00%

4.2.3 Descriptive Statistics

1) The Cronbach Alpha coefficient is between 0.901-0.977, and the coefficient will not increase if any item is excluded. The correlation coefficients between the factors are all less than the square root of AVE, showing high discriminative validity.

According to the Kaiser (1960) criterion, the factors were eliminated, the cumulative variance explanation rate was 76.314%, and the item standardized factor load was between 0.745-0.910; the critical ratio significance verification showed that the p-values < 0.001, significant at the 1% level.

4.3 Regression Analysis

4.3.1 Establishment of Measurement Model

In order to further answer the question of "leadership improvement path in public crisis management", we designed an empirical model, focusing on the factors that influence leadership improvement in public crisis management. The empirical model constructed using the ordered logistic regression model is as follows (See Formula 1):

Among them, y represents the efficiency of leadership improvement in public crisis management; j represents the quantitative level of the influence factors of leadership improvement in public crisis management ($j=1, 2, 3, 4, 5, 6, 7, 8$); i represents the first i samples; $P_{i,j}$ represents the cumulative probability of y of the i -th sample taking the first j values; x represents the independent variable of the leading factors in public crisis management; ε represents the random error term; α is the constant term; β is the variable coefficient; PC means Personal Charm, CS means Context Sensitivity, ST means System Thinking, CC means Crisis Communication, AI means Action Interaction, TI means Team Inspiring, SV means Shared Vision, CO means Changing Opportunity, and OL means Organization Learning. At the same time, the model also controls the gender (Gender) variable of the sample. We conduct empirical analysis through ordered logistic regression. If the regression coefficient β of the independent variable should be significantly positive, it indicates that the influence of the factors that influence the improvement of leadership in public crisis management is more obvious.

$$\text{Logic } (P_{i,j}) = \alpha_j + \beta_1 PC_i + \beta_2 CS_i + \beta_3 ST_i + \beta_4 CC_i + \beta_5 AI_i + \beta_6 TI_i + \beta_7 SV_i + \beta_8 CO_i + \beta_9 OL_i + \beta_{10} Gender_i + \varepsilon_{i,j}$$

Formula 1.

4.3.2 Analysis of Ordered Logistic Regression Results

Table 4 shows the orderly logistic regression analysis results of leadership improvement efficiency in public crisis management. The models M1-M10 in Table 4 reflect the test results of the factors that influence the efficiency of leadership in public crisis management. M1 reflects the influence of control variables on the efficiency of leadership improvement in public crisis management. It can be seen from Table 4 that gender is not significantly related to the improvement of leadership efficiency in public crisis management. M2 reflects the influence

of Personal Charm on the improvement of leadership efficiency in public crisis management. It can be seen that Personal Charm has a significant positive impact on the improvement of leadership efficiency in public crisis management, that is, the greater the degree of Personal Charm, the better the improvement of leadership in public crisis management. obvious. By analogy, we can find that six independent variables such as Context Sensitivity, Crisis Communication, Action Interaction, Team Inspiring, Changing Opportunity, and Organization Learning reflect the influence of leadership improvement in public crisis management in M5, M6, M7, M9, and M10. Significantly positive correlation. The regression results of M2, M4, and M8 show that Team Inspiring and Shared Vision have no significant impact on the efficiency of leadership improvement in public crisis management. However, we also found that in M3, System Thinking has a significant negative impact on the efficiency of leadership improvement in public crisis management.

5 ANALYSIS AND DISCUSSION

After the outbreak of the public crisis, the decision-making and execution of leadership is crucial (Brooke, Irina, & Emina 2020). Government leaders need to be able to make quick decisions in a short period of time based on the situation generated by public crises. They need to have crisis identification capabilities, rapid decision-making capabilities, and decision-making research capabilities. The level of leadership decision-making ability in this process will directly affect the treatment effect of public crisis. At the same time, after the leaders make relevant decisions, the specific tools and tools adopted at the moment will also affect the quality of previous decisions. As far as the public crisis breaks out, the leadership's decision-making process mainly includes public crisis identification ability, public crisis information analysis ability, public crisis decision-making ability, public crisis coordination ability and public crisis decision-making research ability (as shown in Figure 3).

Table 4: Ordered Logistic regression analysis.

Independent variable	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
Personal Charm		0.210								
Context Sensitivity			-0.371**							
System Thinking				0.194						
Crisis Communication					0.520***					
Action Interaction						0.638***				
Team Inspiring							0.579***			
Shared Vision								0.314		
Changing Opportunity									0.462**	
Organization Learning										0.534***
Gender	0.312	0.164	0.093	0.246	0.194	0.210	0.083	0.305	0.144	0.288

*, **, *** indicate significance at the level of 5%, 1%, and 0.1%, respectively.



Figure 3: Leadership Improvement Path in the Outbreak of Public Crisis.

5.1 Public Crisis Identification Capabilities

Before the different departments, in response to the public crisis, a corresponding monitoring system will be established. In the event of a public crisis, the relevant department leaders can use the decision-making system to use the relevant information within the system, combined with the current situation of the public crisis, to identify the various symptoms of the public crisis, and then prevent the possible public crisis. Prevent and effectively resolve public crises. Government leaders have strong public crisis identification capabilities and can play a preventive role in the crisis. This also requires leadership and has certain decision-making experience and strong crisis identification capabilities.

5.2 Public Crisis Information Analysis Capabilities

Information plays an important role in the public crisis. Because the public crisis will bring certain difficulties to the government leadership decision-making. Therefore, public crisis information analysis

capability is also a key link in the public outbreak process. Leaders need to keep collecting and analyzing relevant information and maintain certain sensitivity to some information. Moreover, in view of the causes and specific conditions of the public crisis, relevant leaders should collect, screen and analyze some public crisis information. At this stage, with the rapid development of scientific information technology, the time for people to capture information is getting shorter and shorter. The most obvious feature is that the spread of the Internet has gradually accelerated. This requires government leaders to effectively combine some of the latest information, make scientific decisions in a short period of time, and then deal with public crises.

5.3 Public Crisis Decision-making Ability

After the outbreak of the public crisis, the decision-making ability that best reflects leadership is the ability to make decisions. Once the crisis erupts, each time the time is extended by one minute, the loss caused to the public will increase by one point, requiring government leaders to make decisions

quickly and form a public crisis management plan. On the one hand, leaders need to make corresponding decisions in a short period of time and lead the people into crisis management. On the other hand, leaders need to make decisions and take the overall direction and manage public crises rationally under the conditions of insufficient information.

5.4 Public Crisis Coordination Ability

When leaders make clear decisions, they also need to coordinate the operation of relevant decisions. Under the uncertain state of high public crisis, the leaders coordinate their work horizontally and vertically, and quickly organize relevant personnel to make important changes within a certain period of time to minimize the degree of public crisis damage. The nature of coordinated action is a political activity. The leader is not a decision maker, but a designer, protector and facilitator. By learning from the crisis, the relevant personnel can help to deal with the crisis.

5.5 Public Crisis Decision Making Research Capabilities

After the crisis has occurred in the crisis research, the manager should organize the public to resolve the corresponding crisis by calling the resources of all parties. In this process, leaders need to develop public crisis plans, gather relevant information, and conduct public crisis research. In the research process, leaders need to analyze the causes, processes and solutions of public crises from a professional perspective, laying the foundation for the next crisis prevention.

6 CONCLUSION

Through a series of treatments after the outbreak of the crisis, society will enter a certain gradual stage, but at the same time it will enter the stagnation period of the next crisis. Therefore, after the outbreak of the public crisis, it is necessary to assess the leadership improvement behavior of public crisis management. First, there is a need for leadership accountability in the public crisis recovery period. That is to say, accountability is required, and it is necessary to analyze the consequences of leading cadres' defaults and consequences. Second, it is necessary to strengthen the construction of administrative accountability culture.

There must be certain objective reasons for the outbreak of public crises, strengthen the construction

of administrative accountability culture, break the traditional thinking of "official standard", standardize the rights and responsibilities of leadership, and improve the public responsibility consciousness of leadership by improving the accountability mechanism. Finally, leadership assessment in public crisis management. After accountability, it is necessary to conduct a job evaluation of some well-performing leaders and give corresponding rewards. In addition, a leadership learning system should be constructed to disseminate information about public crises with appropriate systems to prepare for the next public crisis prevention.

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