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Research Article

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Research on management model of post-disaster reconstruction based on Contingency Theory--taking the post-disaster reconstruction project in Lushan as an example

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Abstract Post-disaster reconstruction project is a huge and complex systematic engineering. It is necessary to establish a set of effective post-disaster reconstruction management model to effectively achieve the goal of post-disaster reconstruction. In this paper, the contingency theory is combined with post-disaster reconstruction projects. And the paper has analyzed of "the five model" of post-disaster reconstruction in Lushan through the combination of contingency, leadership and organizational structure of the contingency. Also it has summarized the experience from the case, and proposed the management model of post- disaster reconstruction, providing post-disaster reconstruction management reference.

Keywords Contingency Theory; post-disaster reconstruction; management model

0. Preface

Post-disaster reconstruction projects have the attributes of traditional construction projects, but also have differences from traditional construction projects. They are huge and complex systematic projects. The government is the dominant force in the post-disaster reconstruction projects, but it is difficult for the government to have enough professionals to meet the needs of the post disaster reconstruction projects. In order to effectively carry out post-disaster reconstruction projects, we need to explore a set of effective post-disaster reconstruction management models, solving the reconstruction problems and defects of local conditions, so promote post-disaster reconstruction work can be carried out normally and effectively, and the goal of post disaster reconstruction can be accomplished.

1. Backgrounds

In a broad sense, the post-disaster reconstruction projects refer to a series of activities to restore normal production and living conditions, mental status and social order after the emergency rescue and temporary emergency work in the disaster area have been completed. In a narrow sense, post-disaster recovery and reconstruction is a physical reconstruction in disaster areas, including the restoration of emergency phases, the restoration of projects and facilities, and the reconstruction of damage projects.

Post-disaster reconstruction projects are different from traditional projects and have many particularities. First of all, facing the balance of time and quality, in order to protect the basic livelihood of the people in the disaster areas, it is necessary to complete the construction of post-disaster reconstruction projects in a short period of time. Compared with traditional projects, the projects are short of time and heavy in tasks, and it is a great test for the time limit and quality. Secondly, capital and resource allocation, in a short period of time to complete the post-disaster reconstruction projects, a large number of funds need to focus on investments, and a lot of resources are also focused on demands. If there are no planning and co-ordination, it is likely to cause a lot of waste of resources and money, and delay the tight deadline. Again, prospective planning and management, post-

disaster reconstruction projects are not only the living space reconstruction, but also public buildings reconstruction. It is more important to the support it's industry, teaching them the skills to fish, to ensure the sustainable development of the disaster areas. Planning is the foundation of the whole constructions. In order to realize the sustainable development of the disaster areas, it is necessary to develop the view of post disaster reconstruction planning in advance, from the industrial planning of land use planning and the cultural heritage to public participation, from the system of property rights to the planning. Finally, environmental conditions are limited. Environmental conditions include not only natural environment conditions, but also technical and environmental conditions. The natural environmental conditions are in addition to their own geographical conditions, and have secondary disasters of all the risks, contingencies and uncertainties. While technical conditions are mainly from the perspective of technical knowledge, professional and technical organizations and relevant personnel involved and thought.

The government is the leading force in post-disaster reconstruction projects. It is responsible for the coordination, integration and deployment of the whole process of post-disaster reconstruction, and also serves as the guiding role of supervision and guidance. The reconstruction projects are very professional, not only have engineering properties, but also put forward higher requirements of professional functions of the institutions, while the government agencies don't have enough professional personnel to engage in post disaster reconstruction works. Therefore, project managements are introduced into the post-disaster reconstruction, trying to transform government function mode, and it is also necessary to innovate management mode. It can not only meet the requirements of professional for the post-disaster reconstruction projects, but also make up for the lack of government capability.

2. Contingency Theory combined with post-disaster reconstruction projects

2.1. Contingency Theory

Contingency theory is a management theory that was further developed on the basis of the empirical school at the end of 1960s. The "contingency" means "with the specific situation and change" or "according to the specific circumstances", namely to adjust to changing circumstances according to the changes of environment and internal conditions in the practice.

Contingency theory takes system view as theoretical basis and considers it from the point of view of system. The core of the theory is to determine the relationship between the type and structure of various types of variables through the mutual connection between the various subsystems and each subsystem of the organization, and the relation between organization and environment; it emphasizes on management according to the internal and external conditions to which the organization, according to the specific conditions of different seek the most appropriate management mode, or different methods. It has the characteristics of openness, dynamic and holistic.

2.2. Contingency Theory combined with post-disaster reconstruction projects

Contingency theory is generally applied to enterprise management, discussing the problems of the enterprise and environment, the internal organization of enterprises, and providing theoretical methods for the strategic development of enterprises. We can analyze post-disaster reconstruction projects from the perspective of Contingency theory, mainly because of the management thinking characteristics of contingency theory can provide a new perspective on the management of the post-disaster reconstruction, to solve some key problems of post-disaster reconstruction projects.

From the dialectical point of view, post-disaster reconstruction projects have nature attribute of projects, requiring to meet the conditions of engineering construction, from planning, design, procurement, construction and acceptance of delivery, and the formation of professional construction process. Based on this, the reconstruction can be seen as a system, every participation of construction can be seen as a organization of system or subsystem. But they are different from the traditional construction projects, facing the double test of environment and conditions. They are heavy in work tasks, and have complex environmental conditions. In order to complete the reconstruction goal, we must fully consider the impact of environmental conditions, timely and appropriately to make "contingency", seek the most appropriate management mode, method, or environment in post-disaster reconstruction projects to deal with complexity. Therefore, the management

thinking characteristic of contingency theory can be applied to the post-disaster reconstruction projects to solve the practical problems according to local conditions and achieve the goal of reconstruction.

3. Analysis of management model in Lushan post-disaster reconstruction from the perspective of contingency theory

3.1 Background of post-disaster reconstruction in Lushan

(1) Multi way planning strategy to motivate participation

Post-disaster reconstruction planning covers almost all kinds of challenges faced by the traditional planning, namely land-use planning, industrial planning, strategic decision under incomplete information, social customs and cultural heritage, public participation, to attract investment and capital source. But at the same time, it also has some general planning characteristics: the urgency of the time, the term "vision" planning requirements, economic pressure, emergency situations and unknown factors superposition etc. The reconstruction of Lushanhas implemented the "central planning guidance, local disaster area as the main body, the broad participation of the masses" policy, also put forward higher requirements on the reconstruction planning. If continuing to unified planning and construction of Wenchuan post-disaster reconstruction, it will weaken the enthusiasm and participation of the masses, and won't solve economic and social problems completely, but induces new contradictions. From Wenchuan reconstruction planning, we have learned a lesson. Fully mobilizing the enthusiasm of the people in the disaster areas, the reconstruction of Lushan changed the planning strategy, forming multi way reconstruction planning.

(2) Test of security factors

Land and capital are the two key elements for the smooth implementation of the reconstruction. The problem of funds is often the biggest problem facing reconstruction and needs to be raised through many ways. Post-disaster reconstruction of Wenchuan mainly adopts the mode of counterpart construction, the funds mainly come from counterpart aid, urban financial contributions and social donations, and the funds are scattered and the amount is clear. And under the new mode of the "central guidance, as the main place of disaster areas, the broad participation of the masses" , Lushan post-disaster area is economic backwardness. The local government has a serious shortage of financial resources, and the source of funds and funds for construction of the follow-up project security is a concern. The second problem is the land for construction. Land for construction is the key to ensure the start of reconstruction projects on time smoothly. If in accordance with normal procedures for approval, it can not meet the demand on time. The dominant local government holds greater rights. Therefore, giving full play to the local government authority, making a quick response to ensure the reconstruction work quickly, arefull of challenges to the ability of the government.

(3) Lack of resources

Ya'an is an underdeveloped area, and the Lushan earthquake disaster area is mainly mountainous area. The social and economic development of Lushanis relatively backward. The traffic is inconvenience, and natural environment is poor. It is not only lack of professional and technical personnel in the construction market, and construction consciousness of the leadership level is not strong, which makes the reconstruction at the beginning of the project progress management confusion, serious lag, and engineering quality not be guaranteed, so leading to bad phenomenon like "qualification affiliation", "the relationship between the host and other". In such a harsh situation, in order to achieve the goal of reconstruction, we are forced to seek a new path. government transfer the role form coordination of disaster reconstruction and coordination of "supporting role" of the past to the front desk, featuring "starring". If there is no strong technology and a large number of talents, it is difficult to do this role.

3.2. The organizational structure of post-disaster reconstruction in Lushan

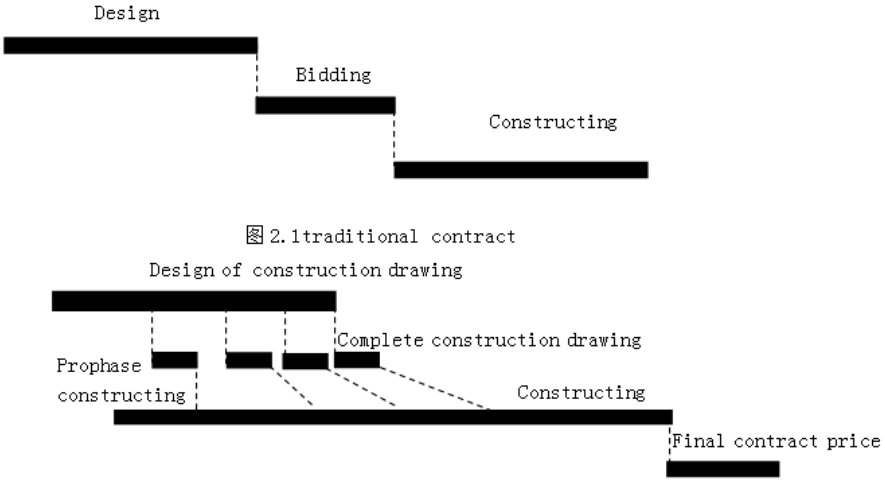
The organization is an open system; contingency of organization structure refers to the relationship between the activity and dynamic system in investigation and type of relationship between the best organizational structure established under certain conditions, to meet the needs of environmental change.

Each construction participant constituted the entire post-disaster reconstruction system. Because of the restriction of the conditions and the particularity of the environment, the post-disaster reconstruction in Lushan

put forward higher requirements for the whole system and high requirements for the management mode of the government which is in the leading position. From the government point of view, the local government led the mode of post-disaster reconstruction, strengthening the functions and powers of local governments, but at the same time bear greater responsibility. In order to achieve the goal of organization efficiency of the reconstruction system , to control the coordination from the overall innovation, we implement the "five total" mode, namely the "chief responsible design "with a design unit, several design units with; the "project construction contract" hat state-owned construction enterprise as special construction main force; the" total project management " that professional project management unit to play professional advantages, the implementation of comprehensive professional management; " project construction supervision " that the area formed the backbone of the disaster area line; "leading commander" that each key area to set up a command organization of. The "five model" has solved the weakness of reconstruction of Lushan professional technical force, and the problem of the lack of natural resources, leading to the overall adjustment of government functions, a reasonable share of the responsibility of the government, which have more energy to a higher level, the unified integration of the overall and the social environment, the elastic response to environmental challenges that may bring.

Taking internal organization of Lushan post-disaster reconstruction system as an example, we span the organizational boundary, integrate resource and adjust organization structure to realize the relationship between the internal organization system optimization, and to achieve double-win cooperation between organizations.

Under the idea of "planning ahead", to ensure that the planning and design of sharing in the planning concept, the technical level of communication and information, planning and design will be blended together, as one of the parties. It does common operations across the planning and design of organizational boundary, and restructure, improving the sharing of information and the efficiency of transfer, to meet the high requirements of the planning system reconstruction.



Picture1: the working chat of design-constructing across the boundary

For post-disaster reconstruction projects, if in accordance with the standard procedures, construction contractor can't meet the time requirements, and will cause a lot of idleness and waste of resources. In order to solve the conflict, to adapt to the changing environment, "flow construction" work is introduced in the design and construction. For the entire contract, while a part of the design drawings was completed, the part of the construction work was done. A project is equivalent to design-construction flow work, which solves the problem of long construction period. This way has crossed the design-construction boundaries and has formed to streamline the design and construction, and promote the flow and complementarily of resources and information.

From the regulatory point of view, the original local government has not been able to support the entire professional and technical personnel supervision and management of the post-disaster reconstruction system. In order to achieve the best and most effective supervision, the integration of resources should be carried out from the allocation of professional and technical personnel. Sent the steering group to "deep down" in disaster areas,

10 city states coordinated more than 40 quality and safety supervision personnel to the disaster area in helping, combined with the local building department daily inspection of construction quality and safety, special inspection work to organize non-periodically the planning, design, supervision, and other business mix, and strengthen disaster supervision departments.

From the perspective of general contracting, a dynamic matrix structure is constructed on the basis of the organizational structure of a general contracting enterprise in construction contracting. Go on, the dynamic matrix structure of "listen to the foreign office, the internal auditory company headquarters"; Go down, weakening the authority of the headquarters. The project department is responsible for construction. It is a "command weak matrix" to avoid multiple instructions and the unclearness of source instructions, at the same time to reduce the levels of organizational structure, to avoid distortion of information transmission. In the "command weak matrix", it has emphasized the project management functions, management of the actual project from a technical perspective, given full play to the various departments of the professional ability, so as improved the management ability, to better solve the lack of professional technology and the messy situation of organization and management.

3.3. The contingency of leadership in post-disaster reconstruction in Lushan

The development of organization is a dynamic process, and the adjustment of leadership is the continuous development process under the interaction between the leadership and the external environment as well as the task structure while the quality of management team determines the effect of the implementation of the policy. In the reconstruction of local government dominated, the system of Lushan post-disaster reconstruction has strengthened the authority of local government. In order to achieve the efficiency of the organization system and give full play to the functions of the government, the government adjusted the way. In the government functional departments, the audit department is closely related to the operation track of the whole post-disaster reconstruction projects. In accordance with the routine project audit process, the required time of all the contract projects is too long, and the payment time of the project payment is longer. So it has aggravated the burden of the enterprise, and the progress of the project is affected. In order to achieve a double-win, the government departments adjust the internal management structure of the government to establish a legal and feasible "audit Easy Access". Under the premise of ensuring the audit legal norms, we reduce audit of free float in order to improve audit efficiency, thus completing the promotion of reconstruction efficiency of the whole system.

3.4. The contingency of humanity in Lushan

Contingency theory holds that man is complex and is influenced by a variety of internal and external factors. Therefore, the motivation, characteristics and attitude of labo always change with the change of their psychological needs and working conditions.

The Lushan earthquake restoration and reconstruction are a wide geographical distribution, quantity, large amount of construction (only Ya'an city planning projects 2148 projects),and the minimum investment is about 200 thousand RMB, the largest investment is about 6 hundred million with a total investment of up to 100 billion RMB. Taking a project construction as an example, it will undoubtedly attract a large number of contractors and related units, to seek appropriate benefits from it. Many contractors may take unfair means, thus affecting the quality of the completion of the project, and causing chaos in the construction market at the same time. From the point of view of post-disaster reconstruction organization systems, under the limitation of time and resource, the project of Lushan reconstruction guarantee the smooth and effective implementation, to ensure the normal production and life of people in disaster areas, and the social responsibility is needed. A sense of social responsibility is the responsibility of an enterprise for all actions that affect others, society, and the environment. Social responsibility will increase the cost of enterprises, and bring some risks, so many small enterprises can’t meet the risks through their own conditions. But from a long-term point of view, through the social responsibility, the enterprise can form higher social reputation, which is rare and is the strategic assets of enterprises that can not easily copy. And it is also the source of sustainable competitive advantage of enterprise. Post-disaster reconstruction projects in Lushantake "project construction general contracting” mode by contracting, bundling dicing tender, and the general contracting unit is determined state-owned grade

construction enterprises, in addition to a strong political consciousness, professional personnel, high level of technology, construction organization, effective and easy to be good at putting the advantages of supervision outside, the social responsibility of enterprise has been greatly reflected. The" five general model "just meets the needs responsibility for social reputation of enterprise. The unusual situation of "no change, no claim" appeared in the project construction. One of the most important reasons is the demand of social responsibility.

The work of post-disaster reconstruction in Lushan has been carried out smoothly under the management of the "five general model", and the quality standards and the time limit for the project are reasonable.

4. Suggestions on the management model of post-disaster reconstruction from the perspective of contingency theory

Contingency theory is based on the system theory, and use dynamic thinking perspective in the development of things, to keep pace with the times, forming a good interactive relationship with the environment, in order to seek a set of effective management mode to solve challenges that environmental conditions bring, and to meet the overall goals of the system. From the perspective of contingency theory to analyze the "five general model", from the case escalation, we give analysis recommendations of post-disaster reconstruction system engineering management model:

(1) Make appropriate adjustments and establish flat elastic organization structure

Contingency mans" make appropriate adjustments ".According to the contingency theory, the organization is an open system. We should establish a certain period of time and under the condition of the most suitable organization mode or management system around the relationship between sub-systems and systems and the external environment and dynamic activities. A special post-disaster reconstruction system with itself, or different changes will affect the whole system to achieve the goal of environmental conditions, so we must make suitable adjustments and measures according to the environmental conditions. From the organizational point of view, the organizational structure design is reasonable and effective, relating to the implementation of the entire organization and management. Post-disaster reconstruction system is in a more general uncertainty, and unpredictable complex environments, and we can build a flat flexible structure for system management, improving efficiency, and effectively accomplish the aim of the system.

Information is the key factor for the existence and development of the system. Due to the particularity of post-disaster reconstruction system, information spread quickly and the amount is great in a short period of time. The flat structure is favorable for transmission of information, reducing the level of information required and delivery time, and ensuring the validity of the information, so as to avoid information's distortion. At the same time, a flat structure improve the efficiency of implementation of management functions of policy and play initiative and creativity by reducing the management level, reconstructing the functional departments, optimizing work procedures. It emphasizes organizational resilience. Post-disaster reconstruction system is facing many unpredictable changes. In the premise of ensuring system stability, we need to increase the ability to adapt the organization to the environment, improve the system to adjust the receiving and processing ability, uncertainty timely, and continuously optimize the organizational structure, to achieve target dynamically.

(2) Cross boundaries and integrate resources to improve the capability of post-disaster reconstruction system

Boundaries are defined as the place where an organization terminates and where the organization begins. Organizations communicate and exchange with the environment outside the boundaries, and the boundaries are conducive to the mobility of organizations and to enhance the influence of the organization on the external environment. Boundary crossing means the act of organizing access to key resources and information, and the use of external activities to cross the boundary with the environment. Boundary crossing activities enable organizations to maintain a certain degree of openness, and enhance inter-organizational interdependence, deepen communication between each other, and achieve sharing of information. Resource integration refers to the identification and selection and activation of organic integration of different sources, different levels, different structure and different content resource, so it has strong flexibility, organization, system and value.

Facing the complex post-disaster reconstruction environment, the goal of the post-disaster reconstruction system is different, and the ability to achieve the goal is also different. In order to achieve the goal of the post-disaster reconstruction system, we must improve the capability of the post-disaster reconstruction system. Through the

implementation of the boundaries across, we can realize the exchange of information of the parties involved, delivering the information effectively and professional technology sharing, to avoid that the government departments affect the system development because of lack of professional conditions. At the same time, the participating of organizations help the government to catch people's livelihood from the tedious affairs. Through the integration of resources and optimizing of the allocation of resources, it can reduce waste of resources, improve the efficiency of use, so that the organization's work efficiency has been improved, and the ability of the entire system to upgrade has been promoted.

5. Conclusion

The management of post-disaster reconstruction projects is a dynamic management process related to environment, and it is also a systematic project. In the management of post-disaster reconstruction, we should fully consider the problems and key links in the complicated situation and numerous and complicated situations. Taking, the "five general model" in Lushanas an example, we have analyzed the "five general model" by contingency theory, from the three aspects of contingency of humanity, leadership and organizational. Starting from the organizational structure and through the overall perspective, we deal with the problems to enhance the ability of dealing with in the face of internal and external environment, the effective realization of system reconstruction after the disaster. From the case to upgrading, we also have summarized and put forward to set up a flat organization structure trough crossing boundaries and resource integration to enhance the ability of post-disaster reconstruction system.

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