Organization Structure Design of Greenization Transformation of Old Districts—Taking the Elevator Installation Project as an Example

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Abstract. Taking the “village collective” in the old suburbs of Tianjin’s suburbs as an example to upgrade existing residential elevators, using organizational design theory and business process theory, and using traditional organizational design methods, the village collectively funded elevators are retrofitted. Conduct organizational structure design and process design to form the project organization task-resource allocation relationship and the cooperation relationship between the subjects. From the operational level, we provide design solutions for the implementation of specific projects, making them more targeted and operable. Enriched the research field and content of organizational structure design issues.

1. Introduction
After more than ten years of development, China's green buildings have entered a new era and vigorously promoted the greenization transformation of old buildings and old districts (hereinafter referred to as GTOD). With the goal of green transformation and livability, the organic renewal of old urban districts is promoted [1]. This kind of "urban repair" can replace traditional large demolition and large-scale construction, or partly replace shanty towns, which can greatly save energy and reduce emissions. In recent years, some villages' old communities in the suburbs have undergone collective capital contributions in their reconstruction projects and achieved good results. However, there are still some issues that cannot be ignored in the process of reconstruction. The most important thing is irregular management and despise the soft reconstruction of old residential property management after the transformation. From the perspective of the construction process, the reconstruction of old communities has relatively high requirements for the construction management of the project. However, in the specific implementation process, the phenomenon that the construction management of the project is not standardized is common. The root cause behind the management issues is project organization issues. The organizational structure can reflect the state of the interrelationships among the constituent departments within the organization, and is a framework that defines the division of labor and collaborative relationships among organizational members. Through the construction of the organizational structure, the interrelationships of the various components within the organization can be clarified, and various business processes within the organization can be guided, so that the organization can effectively operate and achieve the strategic goals of the organization. According to the three-phase organizational design process proposed by Levchuk [2, 3], this article takes the collective financing of an existing residential elevator installation project in an old residential village...
in the suburbs of Tianjin as an example to design its project organization and clarify its project implementation path arrangement. In order to shorten the construction period, reduce the waste of resources, coordinate the collaborative relationships between the parties, and improve the efficiency of the organization and management of the GTOD project.

2. Elevator retrofit project tasks-resource analysis

Project task-resource analysis, that is, the task planning of the project. Under the premise of clear project objectives, clearly define the tasks and their contents to complete the project objectives, and analyze the resources required to perform the tasks, and finally determine the project tasks model.

The elevator installation project in the old community is guided by the government. The village committee initiates, raises funds, and commissions and organizes the builders of the project to install elevators on existing premises on the premise of safe use of the premises. To facilitate the travel of households, especially elderly households. Its project goal is to minimize costs and shorten construction periods on the premise of meeting quality and safety. According to this project goal, this article first uses the work breakdown structure to decompose the elevator installation project in the GTOD project and determine the sequence relationship between the tasks, and then analyzes the resources required to perform these tasks.

2.1. Project task analysis

This article uses the work breakdown structure, namely WBS (Work Breakdown Structure), to perform task decomposition on the elevator installation project in the old community, and to clarify the composition of the project work. According to the implementation process, the elevator installation project can be divided into four phases and 14 tasks.

2.1.1. Project implementation suggestions ($T_1$). The village committee takes the lead in organizing a survey of villagers' existing homes to install elevators, clarifying the villagers' willingness to install elevators, and convening villagers' congresses to formulate plans and form written documents.

2.1.2. Structural safety appraisal ($T_2$). The village committee shall provide the relevant information of the existing dwellings to the housing structure safety inspection and appraisal institution to facilitate its work.

2.1.3. Project feasibility analysis ($T_3$). The village committee shall provide relevant information about the project, such as a structural safety appraisal report, to the feasibility study unit.

2.1.4. Project site survey ($T_4$). The village committee shall provide the survey unit with relevant information about the project, such as information about the underground burial of existing residences.

2.1.5. Project scheme design ($T_5$). The design unit forms plan design documents, plan design instructions and plan design drawings. The final result document of the architectural design plan shall be publicized, and the village committee and villagers may apply for the project without objection.

2.1.6. Submit project application ($T_6$). The village committee or its client submits an application for the installation of elevators in the old community to the planning department, and attaches the written opinions of the villagers agreeing to install the elevator, as well as the project feasibility study report, house structure safety appraisal report, project site survey report and project Architectural design and other information.
2.1.7. **Joint departmental review** \((T_7)\). After receiving the application materials, the planning department conducts a joint review. The process is roughly divided into three stages: land information verification, architectural design scheme review, and pre-approval publicity.

2.1.8. **Construction drawing design** \((T_8)\). After the architectural design plan has been approved, the design unit will use this as a basis to express the design intent and design results in detail, form construction drawings, blueprint descriptions and necessary equipment and material tables, and prepare a budget book to meet the equipment and materials procurement during the construction phase.

2.1.9. **Apply for construction permit** \((T_9)\). After obtaining the construction project planning permit, the village committee or its client shall go through the formalities of quality and safety supervision and registration with the housing and urban-rural construction department, and apply for a construction project construction permit.

2.1.10. **Project equipment procurement** \((T_{10})\). The quality supervision department announces to the society the information on the list of qualified existing residential elevator installation, manufacturing, installation, renovation, and maintenance units. After the villagers have negotiated according to the list, they independently choose the elevator equipment supplier to purchase elevator equipment.

2.1.11. **Project construction** \((T_{11})\). After the construction unit prepares the construction operators and management personnel, it organizes the construction of the project in accordance with the construction standards and relevant regulations of the elevator installation project in the old community.

2.1.12. **Project completion acceptance** \((T_{12})\). After the planning department receives the approval materials, it organizes the relevant departments to carry out the project completion inspection.

2.1.13. **Register for use** \((T_{13})\). Before the elevator is put into use, the elevator usage manager should go through the special equipment safety supervision and management department to register the use.

2.1.14. **Periodic maintenance inspection** \((T_{14})\). Elevator use managers entrust elevator maintenance units to perform routine maintenance on the elevators; regularly submit inspection applications to special equipment inspection agencies to inspect elevators.

Specifically, the interrelationships among the various tasks of the elevator retrofit project are shown in Figure 1.

![Figure 1. Task map of elevator installation project.](image)

2.2. **Project tasks-resource analysis**

According to the above project work breakdown structure, the existing residential retrofit elevator project includes 14 work tasks: project implementation suggestions, structural safety assessment, project feasibility analysis, project site survey, project plan design, submission of project applications, joint department review, construction Graphic design, construction permit approval, project equipment
purchase, project construction construction, project completion acceptance, application registration, and regular maintenance inspection.

3. The subject of the elevator installation project-resource analysis

3.1. Analysis of project participants
In the GTOD project, the retrofitting of old residential elevators involves a series of activities such as financing, construction, operation, and maintenance. Therefore, there are many participants, mainly including village committees, villagers, government departments, consulting and service units, and project contractors.

3.2. Project subject-resource analysis

3.2.1. Village committee. In the GTOD project, the old community elevator installation project, the village committee played two roles: First, the village committee, as a basic self-governing mass organization of villagers' self-management, self-education and self-service, performs the functions of community management. Second, the village committee, as the main body of funding for the elevator installation project, performs the economic function of external investment.

3.2.2. Villagers. As the actual users of the elevator and the direct beneficiaries of the elevator installation project, the villagers’ participation in the project and decision-making directly affect the effect of the project implementation. Therefore, during the decision-making phase of the project plan, the villagers' opinions on the elevator installation must be consulted.

3.2.3. Government departments. The government departments in the existing residential retrofitting elevator projects mainly serve as the makers of project construction standards, perform administrative management, provide services, and perform supervision in accordance with laws and regulations, perform social management functions, and safeguard public interests.

3.2.4. Consulting and service units. The consulting and service agencies have professional skills and can provide scientific decision-making basis for elevator installation projects, optimize construction plans, reduce costs, ensure project progress, improve project quality, and maintain project operations.

3.2.5. Project Contractor. A project contractor refers to an enterprise that has certain production and operation or service capabilities and can provide a certain form of construction products or services. The contractors for elevator installation projects include construction units and materials and equipment suppliers. In the GTOD project, there are many participants in the elevator installation project, and each participant forms a complex and clear cooperative relationship due to the execution of the task. Through the effective cooperation of these participants, the various tasks of the project can be successfully completed, thereby achieving the overall goal of the project.

4. Construction of project organization structure
Based on the analysis of the task-resource and subject-resource of the elevator installation project in the old community, the collaborative relationship between the subjects in the task is studied, and the project organization structure based on the entire participants is established.

The GTOD project has a large number of participants and frequent exchanges and collaborations among participants. The organizational structure of the GTOD project should be based on the overall situation of the project and integrate the participants. This organizational structure model takes the village committee as the core manager, while the other participants are equal project implementers. This organizational structure model has a high degree of flexibility. The village committee can re-select the participants according to the project's task needs, adjust the cooperation of the participants to adapt to the new environment, and reflect the flexibility of the project organization. At the same time,
under this organizational model, the ability of information mobility is enhanced, the information barriers between organizations are broken, and the information communication between participating entities is strengthened, so as to achieve resource sharing and improve management efficiency.

5. Conclusion
This article takes the existing residential elevator installation project as an example, and puts forward the implementation plan of the organizational structure design of the green renovation project in the old community, which is innovative to some extent. At the same time, it provides specific implementation plans for the project from the operational level, which is more targeted and operable.

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