

Comparative Study of Organizational Structure of Urban Rail Transit Operating Company

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Abstract

The urban rail transit has developed for more than sixty years and it has been operated in nearly twenty cities in China. In different stages of the development of urban rail transit, the companies' organizational structures have their respective characteristics. The existing organizational structures can be divided into two modes: one is typical of Shanghai and Beijing for the M-type organization mode, and the other one is U-type organization mode, which is typical in Nanjing and Shenzhen. This paper analyzes the two main structure types and characteristics, so it provides some references for the construction and optimization of organizational structures of city rail transit operators.

Key Words: urban rail transit, operation management, organization structure

City Rail Transit in China began in the last century 60's. Since Beijing built China's first subway, city rail traffic has been in the stage of rapid development, by the end of 2012, Beijing, Tianjin, Shanghai, Nanjing, Chongqing, Wuhan, Dalian, Changchun, Xi' An, Foshan, Shenyang, Hongkong, Guangzhou and Shenzhen had opened the city rail transit, and the total operating mileage is up to 1950.9 km. In 2012, the new opening mileage is 339.3 km. With more and more cities opening track traffic, more and more city traffic entering the network operation, and once the city rail transit system put into operation, we should ensure the normal operation, to achieve the goal of safety, high efficiency, high-quality when operating in the city track traffic system, we must have a sound management mechanism and in line with the actual situation organization structure, and in the two enterprises for city rail traffic operation organization is of great importance.

1. Literature Review

The organization structure is an important part of the company management, and effective organizational structure plays a significant role in improving the activities of the organization performance: it can provide clear instructions for the activities of the organization, and it is helpful for the cooperation of various organization members; it makes the action of organization more orderly, and help to organize and summarize the experience and lessons; it can make the organization form more reasonable, and helpful for division of labor and cooperation, and improve working efficiency. In a word, it is the essential condition to strengthen the competitiveness of the company and achieve the organization's objectives.

For a long time, in the study of enterprise, organizational structure is the key focus, and the research results are also fruitful. Organizational structure is an organization established by the relationship between each component form, which can affect the organization's operation (Youmin Xi, 2003).

Organizational structure, as an interaction and coordination pattern composed of many tasks in the organization, technology and human unit, is the bridge connecting strategy formulation and strategy implementation (Tiebang Sun, 2007). According to Williamson's classification, enterprise organization structure of enterprise group organization structure is divided into the following three categories: the u-shaped structure, H structure and M type structure [1]. Chandler (1977), on the book *Visible Hand, the Enterprise Management Revolution*, wrote: Although organizational patterns evolved many variants, and occasionally there are some variations in the near future fusion as a pattern, especially in the management of group enterprise, only two basic types of organization structure, namely the centralized model, according to the functional department and over the company's decentralized architecture. Visible, M type structure mode and U-shaped structure mode have long been the basic types of enterprise organization structure. Fu Guoping summed up the characteristic of "Shanghai model" operating production organization structure and operation "mode of Hong Kong" production organization architecture from the angle of urban rail transit operation management [2]. Coontz proposed organizational structure function; Separation of powers and authorization are closely related to the authority granted under, but there is a difference. Decentralization is generally organization at the highest levels of power and responsibilities, authorization management at all levels have a function. The separation of powers is the basis of the authorization (Mingjie Rui, 2001). Coase found the logical reasons for the emergence of the organizational structure and reconstruction. The organizational structures are set up with the development of industrial society and industrial civilization, corresponding to the environmental conditions, such as economy, technology, and continuously rebuilt according to enterprise's internal and external environment, presents a dynamic effectiveness, gradually become an important part of enterprise competitiveness[3].

2. Urban rail transit M type structure mode

M type model is an organic combination of centralized and decentralized organization structure, also known as the divisional system or department structure, is U and the model of H a product of the development and evolution. In this mode, the interest of each department or branch is a semi-autonomous center, which set up usually by product, region and logo etc. Branches usually consists of functional departments to coordinate and management in the division of production and operation activities, although each branch to profit as the center, its profit calculation is not entirely dependent on the market, and can only be within the framework of unity in the enterprise development strategy for self-development[4].

Urban rail transit M type structure mode, which is a "operational headquarters - professional branch" two layers of management, mainly reserves administrative headquarters functions and key controlling functions, such as pipe, security and passenger transportation, power supply, communication, public works and other performed by professional branch organization. Of course, because the subway operating company's business is single and stable, this model is a kind of weak decentralized management mode, the high degree of separation of powers system is not as subsidiary or division.

This kind of organization structure mode, which is to dicide production department belongs the operational headquarters staff members into building and equipment system of the business section, Labour, passangers, constructed, electrical and mechanical section, the top-down management. To set up separately according to the equipment system maintenance or departments set up by the professional division of labor, and this kind of organization structure mode in a wide range of institutions, by setting up a professional and technical personnel team management several routes, is advantageous to the technical personnel human resources sharing, thus to downplay institutions more unfavorable factors. When an urban rail transit line is developing rapidly, line is longer, the volume is larger, and there is a certain merit. In large railway management mode, because each railway management quite a long line, according to the specialties of equipments maintenance period can manage several routes, the management of the railway in our country has been using this kind of organization structure mode. Beijing, Shanghai, existing metro line length is long and fast development of other cities, so it is reasonable to adopt the vertical organization structure mode. But this vertical pattern is derived from the organization pattern of railway in our country, set of institutions, management personnel, the relationship between institutions is relatively complex, is not easy to coordinate. M type structure mode is a typical of Shanghai and Beijing.

Beijing metro operation company organization structure mode has the following characteristics: organizational structure belongs to the M type model.

Beijing metro has set up a passenger transport company, Beijing metro vehicles No.1 company, No. 2 company, power supply company, communication, mechanical electrical and circuit companies; And vehicle scheduling command, security monitoring, equipment management and other business and finance, human resources, material management, administration, administrative work are still in the head office. This is a combination of centralized and decentralized management system. Considering Beijing subway, there are many lines, stations, vehicles, persons, M type structure is generally in accordance with the actual situation of Beijing subway. Most domestic subway operating company only responsible for operations, but Beijing subway operation also consists of real estate management department, advertising department, business department, communication group, restaurants, department of tourism, culture industry group and other for-profit business unit.

Shanghai subway belongs to the M type of organization structure mode. But compared with other M type structure modes, it also has its own characteristics, mainly including: in addition to the security supervision function in the headquarters, productive business basically completed by the secondary company, as the train scheduling, three passenger branches, vehicle branch, communication guardian branch, etc; From this perspective, Shanghai subway has higher degree of decentralization than Beijing subway. Strengthening the preparations for the new line in headquarters and the information management, to adapt to the need for the future development of the Shanghai subway. For logistics, logistics and other non-core business and education training, human resources management work, setting up specialized operation units, such as logistics branch and logistics center, education training department, human resources, the advantage is the management of energy and can be focused on the subway operation on the core business, it is convenient for calculation and control of non-core business and management cost, the non-core business outsourcing to lay the foundation for the future.

3. The urban rail transit U-shaped structure model

U-shaped structure is a centralized organization structure, also known as “one yuan structure”. It was put forward by Taylor first, without the middle management, without branch, the secondary institutions, such as group headquarters and subordinate enterprise directly related to organizational structure and management mode, on the organization structure is basically belongs to straight line function, which is a kind of centralized management system. Is the management according to the function is divided into several departments, and various departments are only little independence, power concentrated in the hands of enterprise top decision-makers. U architecture is useful to facilitate unified management and resources allocation, but excessive centralization may lead to the low efficiency of management, at the same time due to the increased cost of enterprise internal management [3]. This kind of organization structure mode, is the operating company within the metro equipment system daily maintenance, inspection and regular maintenance and so on related business work, and comprehensive maintenance department is responsible for all of them, and it is horizontal management. The comprehensive maintenance, power supply workshop (or central), mechanical and electrical workshop, communication workshop, automation workshop, maintenance workshop and workshop. Each workshop is divided into and replacement work area and inspection working area.

The setting of its maintenance organization will be the unified management of all kinds of equipment, less management organization and workers, overcoming the vertical management mode of management are not due to institutions more facilitate the lack of coordination, according with the requirement of modern enterprise organization for efficient compact. When city subway line laying long and rapidly develop, the related human resources will not be used effectively. U-shaped structure model is typical of Shenzhen and Nanjing.

Shenzhen metro subway operation mechanism mainly learns from Hong Kong, closely related the functions in one unit, a transverse integrated management, and the subway operation is divided into the human resources department, security department, planning department, comprehensive department, material department, and in the finance department, belongs to U management pattern, its advantage with Guangzhou metro. Due to Shenzhen metro only two lines in operation, the model has good applicability.

In the organizational structure of Nanjing subway operation mode belongs to U, mainly studys from Hong Kong, Guangzhou metro operation mechanism, combining with the characteristics of Nanjing, the formation of characteristic management mode, the subway construction, operation, resources, development of a trinity of three core business.

Current operations have been completed the first phase has taken simulation due to the horizontal comprehensive management, a section of passenger transport, vehicle department, materials department, technology department, security agency, the human resources department, finance department and other functional departments and an integrated office, responsible for production planning and scheduling, people, goods, content, security, and ticketing and other aspects of the management and train operation, equipment maintenance, maintenance and other operations production organization and scheduling, etc. And through certain outsourcing management, saving a lot of personnel, improving the working efficiency and the efficient compact, flat management, the purpose of compression.

4. M-shaped Type of Urban Rail Transit and U-shaped Structure Model Comparison

If we don't consider the number of subway line, the length of the mileage, how much of the station, the subway systems in the number of equipment and technical differences, the subway system informatization level, organization and design of contingency factors such as traffic, the number of employees, in the same case, M type management system with the characteristics of the management system of U-shaped are as follows:

4.1, The resources use. U type is more advantageous to make full use of human resources and managing personnel than that of M-shaped. Due to the management of the branch permissions for a division within the company to a few bigger, therefore on internal resources sharing, division sharing of smaller than internal department, corresponding M-type management under the system of resource sharing management system is lower than U-type.

4.2, Organizational flexibility. Obviously, U management system of metro lines and contingency factors such as scale, the traffic is more sensitive, once the above factors

Changes greatly, the normal operations of the company will be affected; and M type management system may lack of contact and easily produce selfish departmentalism, affecting the coordination between the members and are easier to be controlled within each branch.

4.3, Management efficiency. In terms of level, the less of management levels, the higher the efficiency of management. U management system, as it has less level than M type management, so its management efficiency is relatively higher. In terms of amplitude, two kinds of management scope are the same as the management system, however, to the middle (that is, the branch manager or department manager), when there are few the subway lines, subway operation business scale will be small, the margin of management system appears small, and it is not very economical; When there are many subway lines, and the scale of metro operation is big, and very complex, under the management system of U-type, middle level management will be too big.

5. Summary and Recommendations

Overall, at the beginning of the urban rail transit in single line operation conditions, the u-shaped structure is more suitable; and when the urban rail transit into multiple, network operation, operation scale is larger, using M-type organizational structure is more suitable. In addition, the managers' ability, quality, enterprise informatization level also affect te design of organizational structure modes. When with high ability and quality, more business outsourcing ,the management scope can be bigger, at this time even if the lines are more, the subway operation scale is bigger, also can use U management system.

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