

A DISCUSSION ABOUT URBAN RAIL TRANSIT ENTERPRISE BUSINESS MANAGEMENT INFORMATION SYSTEM

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Abstract: As a certain public products, the subway has its own characteristics, and the economics rule of internalization of external resources is the prerequisite of urban rail transit business management. Therefore in this paper we take the construction of rail transit enterprise business management information system about Ningbo as an example, discussing closely around the "resources" and following the "integration business mode". We discuss it on the perspective of the plan and design of business resources, the commercial resources management and the commercial resources operation, in order to provide an informationized means to develop, utilize, manage and operate the scarce resources effectively.

1 INTRODUCTION

With the accelerating urbanization, China has formed a world's largest and fastest-growing rail transit operation and construction market. The development and change of transportation must change people's consumption model, residential property values, the increase of business and resources restructuring, but urban rail traffic as a city's most important infrastructure, the investment is huge, the government gives priority to construct it. After putting into operation, because the operating costs and the financial cost is too high. Paying all costs fare income through the government subsidies to maintain normal business operation, give the government brought heavy financial burden. And rail transit as a "quasi-public product", its product itself has non-competitive, exclusiveness and monopoly on consumption, the ground and underground space occupied large, the district such as connection station, port, airport, wharf, business center, CBD, satellite towns in which the stream of people are intensive, business are prosperous, their passenger resources is extremely rich and they holds enormous business opportunities. With the efficient and fast passenger transport primarily, around huge passenger and spatial resources, fully develop urban rail transit comprehensive resource, develop a variety of business, maximizing rail traffic resource and benefits have reached an agreement. Especially

the related resources of urban rail transit, the profit through a variety of business can offset the lack of construction funds and operation funds, and it is a basic way to reduce governmental investment and subsidized. Starting from planning, unified planning, comprehensive development is the premise of profit. The Hong Kong subway is the world's only integrated operation of planning, construction and operation, it also rely on auxiliary diversification realize the profit. Therefore, the various business resources management of orbit transportation should start with plan and design, based on the reasonable construction, effective management, which can realize the goals of the auxiliary business fill the main business and get earnings.

As the development of urban rail transit enterprise's resource and the expansion of business scope, subway enterprises' management function also subsequently upgrades. Facing quite large and complex urban rail transit enterprise business resource, with which mode to manage will directly related to mobilize enthusiasm of the operators and the sustainable play of project's social and economical benefits. Therefore, we must change our management concepts, take the subway construction activities as part of the market operation activities, take the various resources of the urban rail transit as a whole, put the various business operation into the important business activities of subway enterprise, timely transfer and expand the subway enterprise

management functions, express the urban rail transit industry's whole advantages, form the long-term mechanism of sustainable development. On this basis, with the commonly use of the computer technology, the inevitable trend of enterprise's informatization, we use a variety of program technology and electronic information system technology, aimed at the actual situation of Ningbo urban rail transit enterprises, we have developed a set of urban rail transportation enterprise business management information system.

There is a special note that the operation department is responsible for the operational activities that are closely related to the operating routes resources for the reasons that the urban rail transit has its technical characteristics, especially the operation safety management requirements. But this paper just considers from the functions that information system should have while problems management implementation are not involved.

2 BUSINESS DEMANDS ANALYSIS

2.1 Integrated Resources Operation

Through the integrated operation and management, realize the land development, station property development, business, advertising, communications, other related resources, with the natural resources integrated operation of rail transit, from standing domain and the route to the derivative of subsidiary resources to form a resources optimizing system, fully excavate the potential of resources, take the related resources of rail transportation business as the auxiliary business, the auxiliary business fill the main business, with a variety of business operational benefit added the losses of main business, realize the virtuous cycle of rail transport business resource development and management.

2.2 Visual Management

Through directly query on the map, can get the information of spatial location and direction of urban rail transit, technical standard, traffic flow, population, land, etc. Will spatial resources and attribute resources of commercial resources to unify, set up a interactive, visual management interface. Through the comprehensive statistics and the analysis of various traffic data, using the rich and various of chart shows, provides scientific and quick support for decision.

3 BUSINESS MANAGEMENT INFORMATION SYSTEM FRAME STRUCTURE

Removing the business structures information, business management system is a system that collect, store and manage data. Business management subsystem frame is divided into three layers. The bottom is the basic data about economic development of Ningbo. The middle is the geographical information system (GIS) and the top is management application. Figure 1 shows the specific:

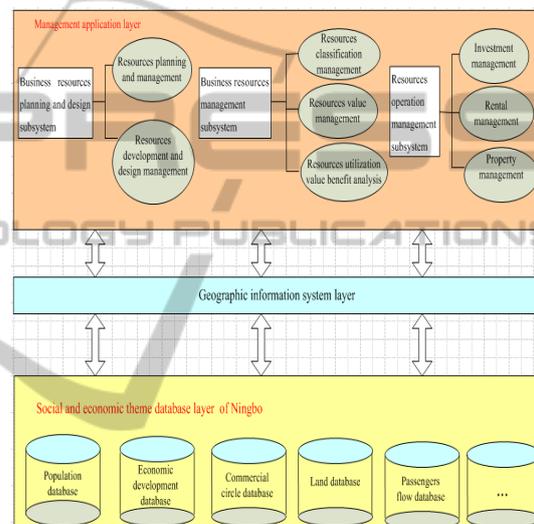


Figure 1: Business management system application architecture.

3.1 Underlying Database Design

The database is the core information system, and the goal of theme database design is to accelerate the development of application project. We divide all the data of the enterprise into some units that can be categorized managed, and the all the units constitute the theme database. Theme database should be designed as stable and can provide a stable service for enterprise's information resources in a long period. According to the characteristics of basic data about urban rail transit operation, we design the theme database consist of population database of Ningbo, social economic development database, commercial circle distribution and development database, land database and passenger flow volume database.

3.2 The Geographic Information System Layer

The geographic information system integrated the computer data bank technology and the computer graphic processing technology, it could carry on the retrieval, the inquiry, the analysis to the urban rail transit foundation information, as well as Three-Dimensional Display of the stratum information; and forms an expandable urban track transportation foundation information database initially. According to thematic map's statistical analysis function, It can analyze the changing situation of passengers and cargo flow, thus formulation driving plan. The urban track transportation foundation geographic information system based on the GIS established correlational dependence for each kind of isolated, scattered urban track transportation essential data taking the geography space as the link.

3.3 The Business Resources Planning and Design Subsystem

As the different urban rail transit foundation resources have different development prospects, its orbital transportation resources' comprehensive development and diversified management's strategies are also different. This system focuses on the prior phase about the building, design and construction of Ningbo rail transit projects. We complete the overall planning and detailed design of business resources mainly according to the basic data about economic development of Ningbo, especially the data of business circle, land, population, economic growth ,urban planning and even the data such as passenger flow survey, the early rail traffic planning, program facilities and construction design. The implement of line synthesizes a body plan will combine the plan advancing, the construction feasibility and the management validity organically, striving for to realize the simultaneous implementation of the urban track transport facilities and the resources comprehensive development, particularly derivation resources inclusion project development enterprise bundles which will carry on the comprehensive development along the route, enables the subway enterprise to have the land comprehensive development and the auxiliary industry management franchise rights to complete the overall planning of business resources and concrete design. Of course, these planning and design in the system are based on quantitative indexes reflect.

3.4 The Business Resources Management Subsystem

The urban rail transit resources can be divided into the inherent resources and the derivation resources according to the management form. The inherent resources includes serve passenger transportation's carrier in kind such as the line, the station yard, the channel, the tunnel, the vehicles, the correspondence, the station territory land and so on, the derivation resources includes the inherent resources construction and the operation derives such as servicing facilities and land resource development along the route which, advertisement media, information communication, dining entertainment business.

To achieve business resources of urban rail transit the optimal configuration and improve efficiency of resources utilization, we must analyze the connotation, evaluation and management of their nature and value .Only in this way can we solve the urban rail transit the value of business resources for its value measure and can achieve the commercial resources value transformation. Of course, how to construct the value evaluation method and the model of its existing value and potential value of qualitative analysis and quantitative evaluation, this system do not considered.

3.5 Business Resources Management Subsystem

As a public program, the urban rail transit is also high quality assets. It is short-term investments and long-term earnings. Its potential capital operation is huge and function is very strong. We put the operation as an auxiliary business means and diversified investment and reasonable capital structure can make a integrated business operation. This system is mainly aimed at investment management. According to different investment way, it manages the basic information of agents, specific merchants, rent, the lease term and the rental contracts and undertakes the task to realize property management informationization for Ningbo rail transport group.

4 DATA RELATIONSHIP OF THE SYSTEM

The top data flow diagram of this system as figure 2 shows. The key data flow relations between

subsystems of inner system and the data demand relations between this system and other system (or other external entity) are emphatically described.

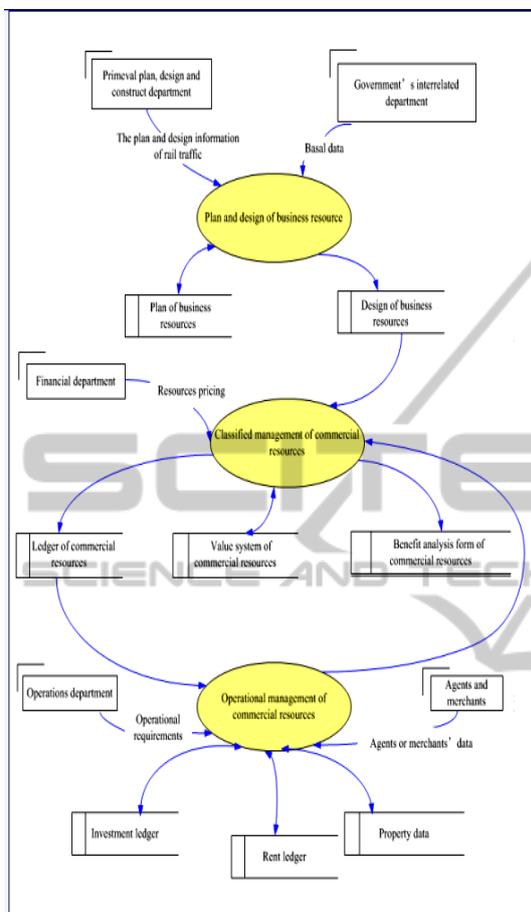


Figure 2: Key data transfer and demand relation graph Business management subsystem.

The major data of business management subsystems are described below:

- (1) Rail traffic planning and design information. It mainly includes the draft of Ningbo rail traffic planning which is formulated in prophase by planning department and the design provided by scheme department and the revised situation during the construction process.
- (2) Basic data. It mainly includes the data of land, population, social economic development, business circle distribution and development and passenger flow survey about Ningbo.
- (3) Business resources account. It mainly includes the number, name, attribute, place, operators, resources classification, potential value, etc of the commercial resource.
- (4) The value system of business resource. It mainly

includes the data of commercial resources numbers and commercial resources value.

(5) Investment account. It mainly includes the numbers of agents or merchants, names, legal representatives, contact method, resources situation of rent (loan), main business and enterprise qualification.

(6) Rent account. It mainly includes commercial resources numbers, business contracts, rent and dates.

(7) Realty data. It mainly includes the relevant policies, the regulations about property management and the basic situation of the objects which are serviced and the property managers.

5 EPILOGUE

This paper has discussed both the needs of the urban rail transit enterprise business management and the structure and the data relations of the business management information system. It follows the principle of integration. We make the plan from the perspective of the whole technical, economic, construction and operation and do the innovation development. It makes the operation indexes quantified and increases the economic efficiency and reduces the management strength and improves the commercial resources operation. Meanwhile, with the single financing mode in our country and the market financing system is not in a perfect condition, the benefits from the scientific and reasonable business management is undoubtedly can be the beneficial supplement of urban rail transit constructions.

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