Study on adaptive modularization of international maritime service industry

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Abstract: The modularization of international maritime service industry is advanced in adaptive management. This paper studies the level of adaptive modularity. The design principle and key process of adaptive modularization are studied. The process of recognition and processing of adaptive modularization is analyzed. An adaptive modularization method is proposed. The foundation for the application of adaptive modularity is proposed.

1. Introduction

As the maritime services industry changes rapidly, modularity also tends to become more complex. Modular organizational change requires a more efficient approach. The adaptive method is a good idea to deal with the rapid change of modularity. The optimization of modularity can be carried out from two aspects: the formation of module itself and the combination between modules. In theory, modular adaptive processes can consist of two levels. The first level is adaptive based on resource modularization, and the second level is adaptive based on capability modularization. These two levels of design and management difficulty are very different. For adaptive methods of modularity, resource-based modularity has more physical modularity boundaries. Capability-based modularity is more complex. The author believes that adaptive methods and theories are more suitable for capability-based modularity. The modular adaptive process can be divided into three stages of module information identification, processing and adjustment. This is where the modular build needs to be redesigned. Re-design the construction design of the module itself and the rule design between modules.[1]

2. Module identification and processing in adaptive mode

2.1 Three module recognition levels in adaptive mode.

The recognition between modules is the premise and foundation of intelligent modularization. The identification services between modules include physical information identification, functional information identification, and management information identification. Physical information identification of modules is the foundation, the basic function of the link between modules, and the bottom layer of information identification between modules. Functional information identification is the basic requirement of modular realization, the fundamental purpose of coordination between

modules, and the middle layer of information identification between modules. Management information identification business is an advanced stage of modularity, mainly applicable to the strategic management of decision adjustment.[2]

The expression of adaptive mode is the self-regulation of modular system. The internal operating mechanism is the intelligence of the module, which has the characteristics of artificial intelligence. Intelligent information collection is the basis, intelligent business communication is the means, intelligent decision is the key. Modular adaptive is also divided into full intelligence and auxiliary intelligence. Decision intelligence is low-frequency and does not require real-time intelligence. Information collection is high-frequency mass data processing, which requires real-time intelligence. Business communication is also high-frequency, but there are special cases that machines cannot solve, so an intelligent processing is the main. Among these three levels of intelligent work, the modular identification level corresponds to the three levels of intelligence. Physical information identification corresponds to intelligent intelligent collection. Intelligent service communication corresponds to functional information identification. Intelligent decision making corresponds to management learning recognition.

2.1.1 Construction of modular physical information identification service.

The recognition of modular physical information is the basis of international logistics modularization. This kind of recognition work can range from active recognition to passive recognition. Active identification is technically and administratively difficult. Active recognition requires a whole set of recognition systems. This identification system needs scientific design. [3]The system needs to have at least three dimensions. The first dimension is a unified classification of modular physical information. This classification is the basis of informatization and belongs to the construction of basic information. The second dimension is the rules of information exchange and recognition. This rule is a condition for physical information identification. Active recognition and passive recognition use the same rules, and have better convertibility. The establishment of recognition rules is the path of physical information exchange. The establishment of this path has an overall effect on modularity, making it possible for the functions of all modules to be superimposed. This rule requires a supply chain management framework. The relationships between the various modules vary in nature, from permanent to temporary. The difficulty of communication and recognition of different module relationships is different. The more long-term fixed module relationship, the lower the difficulty of information exchange and recognition. The more temporary the module relationship, the more complex the relationship between information exchange and recognition. High frequency temporary module identification requires high intelligence.

2.1.2 Construction of modular function information identification service

Modular functional information is the most important part of modular information exchange. The service information between modules belongs to the functional information of modules. This is the core of the application of modular technology to supply chain management. The recognition and utilization of functional information is the core and difficulty of modularization.[4]

The connotation of modular functional information mainly refers to the business communication information between supply chain modules. These business communication information mainly includes production business information and sales business information. In addition, there is additional information such as financial information. These business information data volume is large, need efficient transmission. The efficient transmission of modular information needs scientific communication mechanism and format. These mechanisms and conventions need to be studied in depth, which is also a research focus of this paper.

2.2 Module service processing in adaptive mode

2.2.1 Internal Service processing of the module in adaptive mode

The logistics supply chain system in the adaptive mode has a good function of self-regulation. The logistics module of a single supply chain node is based on feedback as the basis of system adjustment. Logistics module relies on its own feedback mechanism to achieve self-transformation. The feedback mechanism of logistics module is the foundation. The ability of logistics module to adapt and adjust to feedback is reflected. The speed of adaptation and adjustment is an important index to measure the adaptive ability of logistics module. The adaptive mechanism of module is one of the contents of module business processing. The business processing content of logistics module is very extensive, but it can be divided into two categories: basic processing business and control processing business. The basic processing business is mainly for the logistics business of the module, and the control processing module is mainly for the adjustment and reform of the module to external changes.

An adaptive internal processing system mainly consists of two parts of the business. A business is the processing of normal business processes inside a module, called basic intra-module processing. Another business is the processing and control of external feedback information within the module, which is called the feedback processing of the module. The first kind of business is treated as a normal business process inside the module, which is similar to the internal processing of the traditional logistics module and can be regarded as the traditional modular internal processing. This internal processing process generally includes three levels, the first level is the level of the physical module, the second level is the level of the business process module, the third is the level of the decision module. The feedback processing of the module is the reaction and adjustment of the module to the outside world.[5]

2.2.2 Inter-module service processing in adaptive mode

Adaptive control of inter-module business processing is the difficulty of modular management, and adaptive control is the focus of intelligent modular management. At present, adaptive control based on reference model is an effective method. This method is also relatively simple. In the initial stage of modularization, the supply chain leader sets up an adaptive reference model, based on which the general rules of supply chain management are set. Modular supply chain management generally has better construction efficiency, and colleagues also have lower management difficulty. At this time, once the supply chain management is integrated into the adaptive method, the intelligent level of supply chain management will be greatly improved.

3. Analysis and design of modular adjustment mechanism in adaptive mode

The logistics module of modern shipping is relatively stable. The related modules of maritime management are characterized by slow change. This is clearly different from the supply chain of commercial retail. The adjustment of maritime modularization is mainly divided into two categories, the first is the adjustment of a single module, and the second is the adjustment of the relationship between modules. Both kinds of adjustments can be adaptive.

The first type is the adaptive adjustment based on a single module, mainly the adaptive adjustment of the module interface. The adaptive adjustment of the module interface is mainly the adjustment of the module function, and generally does not change the internal physical structure of the module. Functional adjustment based on the inherent physical structure is generally relatively simple. This kind of adaptive adjustment is only the adjustment of the module's own management

system. The adjustment function of these systems is preset, and a large number of adjustment procedures are pre-set and belong to general routine adjustment.

The second type is adaptive adjustment based on the relationship between modules. The adjustment of this relationship is mainly the adjustment of the network relationship of the supply chain. Such adjustments are twofold. The first aspect refers to the structure adjustment of supply chain network relationship. The second aspect refers to the prioritization and ordering of these relationships. Both of these adjustments have a real need for adaptive technology. Due to the intelligent application of enterprise modular management, these two kinds of adaptive adjustment have the characteristics of fast and effective.

4. Conclusion

The maritime services industry will increasingly adopt intelligent management. Adaptive modular management will be its core management technology, is the basic measure of management intelligence. Each node of the supply chain has reached a better level in intelligent management, which is the premise of adaptive modular management. The standardization of adaptive modular management will be a trend in the future.[6]

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