Exploration of "One Yard to the End" Material Life Cycle Management

Take the Material Management of China Mobile Hainan Company as an Example

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Abstract. In the life cycle of the company's material management, such as procurement, acceptance, requisition, distribution, return, capital transfer and scrap, due to the lack of unique identification code of materials, the lack of key design and penetration of relevant processes, it is impossible to achieve the penetration of the whole process of materials and the traceability of the whole process. As a result, the material management of the company has high management risks, high control difficulties Hidden costs and high management problems have brought great challenges to the company's operation. With the rapid development of cloud computing, 5g, mobile Internet, big data, blockchain and other new generation information technologies, diversified market demands and competitive trends have put forward higher requirements and technical guarantees for industrial development. Many traditional fields have applied emerging technologies for industrial upgrading and digital transformation to realize modernization of operation management. Traditional enterprises must closely follow the development trend of the times and enter the "intelligent +" digital era. Under the background of deeply implementing the new development concept, accelerating the construction of a new development pattern, and promoting the application of digital intelligence technology in all fields and links of production and operation, this paper comprehensively explores the full life cycle management of communication operators' materials, aiming at strengthening lean management and helping enterprises improve quality and efficiency.

1 Introduction

In 2018, China Mobile Hainan Company (hereinafter referred to as "the company") accounted for 58% of its total inventory of stagnant materials, with a serious backlog of materials. The data matching between the asset management system and the asset use system was low, and the risk of capital occupation and material loss was high. In order to effectively promote the efficient management of materials, the pain points such as insufficient horizontal coordination, insufficient vertical management and lack of management means in the process of material management should be thoroughly solved. The company comprehensively sorted out the common problems in the fields of material management, engineering management, asset management, etc., combined with the strategic requirements of China Mobile Group for digital intelligence transformation, launched the work of actively identifying and introducing new technical means and cutting-edge technologies, coordinated the construction of enterprise big data platform, promoted the digital intelligence transformation of the whole process management of materials, and effectively promoted the high-quality development of the company [1-3].

2 Management purpose

2.1 Establish a sound risk prevention and control mechanism

There are three control risks in material management: first, in the configuration process, scientific and effective evaluation of configuration requirements and standards can effectively reduce the risk in the configuration process; Second, in the use link, the damage and waste caused by excessive maintenance, lack of maintenance and idle assets are the risks that should be paid attention to in the use link; The third is the disposal link. In the process of asset disposal, the risk of asset loss will occur due to inaccurate and nonstandard value evaluation [4]. The main purpose of the company's material management is to effectively identify and control risks by establishing a sound risk prevention and control mechanism, improving management means, and using effective tools to minimize risks in all links of material management.

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2.2 Support the effective implementation of cost reduction and efficiency improvement

In the second half of 2018, China Mobile Group put forward the management concept of strengthening fine management and vigorously promoting cost reduction and efficiency improvement. All units within the group are required to strengthen the concept of benefits, implement management responsibilities, seek benefits from fine management, and promote development through scientific management [5-6]. As a heavy asset industry, the cost reduction and efficiency increase work of communication should be the first to start with assets, especially physical assets. It is the company's business focus for a long time to effectively implement the development concept of fine management, cost reduction and efficiency increase from the aspects of efficient identification of inefficient and ineffective assets, recovery and reuse of surplus and old materials, and reduction of material inventory.

3 Exploration and application of "one yard to the end" material life cycle management

Communication operators have the characteristics of large-scale assets, high density, fast update and iteration, and wide distribution. Over the years, all lines of the company have established relevant management systems to facilitate the management of relevant assets within their scope of responsibility and corresponding links. Most of these systems are not directly related, but the materials managed by these systems are not strictly linked from procurement, engineering construction, project traffic maintenance, asset management and other links. The project starts from the procurement link, sets the unique identification code of all materials, and runs the identification code through all subsequent use and management links, ultimately realizing the full life cycle management of assets [7].

3.1 General idea of "one code to the end" construction

"One code" refers to the data encapsulation and combination of informatization management codes of all links in the whole process of materials from design, order, storage, logistics, distribution, installation, transportation and maintenance, capital transfer, maintenance, network withdrawal, reverse logistics, etc., to form a set of coding assemblies for digital management of materials. "In the end" means that the data of each management system in the whole process of assets are connected and transferred automatically, and the matching of information and value of assets from the beginning to the end should be ensured. According to the actual investigation, the company determines that SN (product serial number) can be used as unique "identity" identification. Through multi-link code scanning and verification, materials are prevented from being replaced and materials can be tracked.

To implement "one code to the end", we must first solve the problem of long process information identification in the whole life cycle of materials, and must establish a digital long process management mode of material information; And then promote the realization of the objectives of physical management and value management. Secondly, we should find out the starting point of "one code to the end", that is, "take the digital management of physical objects as the starting point". The supply chain line, the planning and construction line and the financial network line fully cooperate to establish an integrated management mode of information, goods and value from the warehouse to the end, so as to achieve the full life cycle management goal of materials with high complexity and large quantities.

3.2 Key and difficult issues of project promotion

3.2.1 Build a transparent security data system for the whole process

The survival foundation of communication operators is "network information service". To build high-quality communication networks, it is necessary to solve all kinds of security problems in the whole process of network construction. Specifically, it includes: the safety of information exchange and transmission, the urgent need to solve the problem of product management information exchange between suppliers and operators, and improve the efficiency of demand configuration and exchange; To ensure the safety of the material supply process, a low-cost, efficient and transparent logistics management mode is urgently needed to ensure the safety of the supply process; To ensure the safety of construction terminal management, it is urgent to solve the problem of accurate construction of massive materials, outlets and construction personnel; For the whole process quality safety of materials, it is urgent to establish a "transparent whole process quality safety" system covering the whole process of "production, acceptance and use" of products.

According to the requirements of security management, the precondition for project implementation is that the data of front-end suppliers are standardized and unified. At present, communication operators have not developed a unified industrial Internet resolution system. Each supplier uses its own coding specifications according to its own industrial production level and actual network needs. For example, there are obvious differences between the SN code and box code rules of ZTE and Huawei equipment. Actively coordinate with the main front-end suppliers to unify the coding rules, provide product information based on one-id product serial number, associate box code, pallet code, batch number and order number one by one, and gradually improve the basic data layer data.

The project implementation needs to meet the complex application scenarios of communication operators. Due to the complexity of communication network construction, engineering equipment installation includes overhead, hanging pole, underground, pipeline, underwater, building, machine room and other construction environments. Different construction environments and different

construction parties have great differences in equipment configuration and installation record requirements. It is necessary to comprehensively sort out the construction management processes and methods, coordinate the construction party to improve the internal management system, improve the construction management requirements, effectively access the company's "one code to the end" related app, and ensure that the unique code is effectively controlled in all construction links.

3.2.2 Break through traditional management ideas and barriers between lines

Each line of the company has established a professional management system to independently undertake the receipt, delivery, and use and asset control of its own materials. However, due to the lack of data integration between professional systems, information islands have been formed, which can't give full play to the value of data. In order to solve the problem that the source of controlled materials can be checked, the destination can be traced, and the responsibility can be investigated, to promote the effective implementation of the project, it is necessary to connect all internal systems and establish a full life cycle management network of materials.

First of all, we should complete the roles and clarify the division of labor. The full life cycle management of materials has long lines, many links, wide coverage, clear responsibilities and complete division of work, which are the management basis for promoting project implementation. Clarify the division of responsibilities, innovate and improve the management process across departments and organizations, effectively promote business communication, implementation of management process and response speed of problem follow-up and resolution.

Secondly, we should improve the system and clarify the standards. The requirement of "one code to the end" is integrated into the system process, and through system solidification, the free flow of key data across multiple lines is realized. The key link is to strictly establish the "five no's" mechanism: no warehousing, no claim, no start, no capital transfer, no opening without code scanning. The "physical objects, personnel and locations" of outbound materials are bound together to promote horizontal business integration, vertical process integration and whole process data integration, fully tap the data value of material management process.

3.2.3 Project implementation plan and pilot results

The project has built a unified data platform covering planning, demand, procurement, supply, storage and use. With the real logistics of materials as the main line, it connects the systems of procurement, logistics, market, engineering, maintenance and assets, and brings the data information of the whole process of order, delivery, arrival, use, stock return, asset, scrap and disposal into the unified platform for centralized management, promotes the integration of real logistics and information flow, and provides services for the company's quality management Provide analysis support data for project construction, maintenance and repair, asset management, etc., and realize data empowerment. The material platform for the whole life cycle of materials is shown in Figure 1.

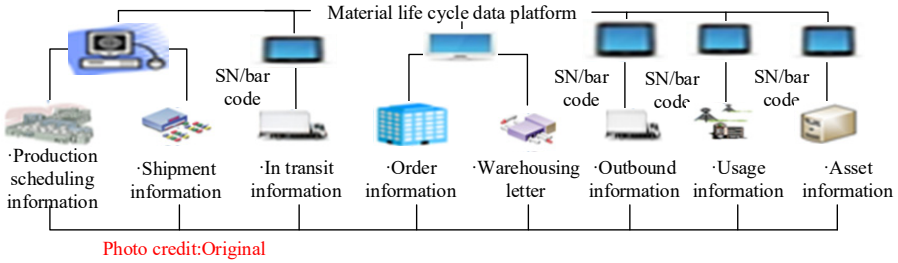

Fig. 1. Material life cycle data platform

The overall framework of the project realizes the "full life cycle control, full process link, and full business department integration" of materials, builds a collaborative and efficient capacity and vitality operation system, and effectively monitors and promotes various assets to "not delay", "dare not delay", "do not want to delay", "not in the warehouse, but in the network" through visual maps, so as to maximize the use of materials and constantly improve the efficiency and efficiency of material use, Promote cost reduction and efficiency improvement in the whole process. The overall architecture of the one code to the bottom blockchain is shown in Figure 2.

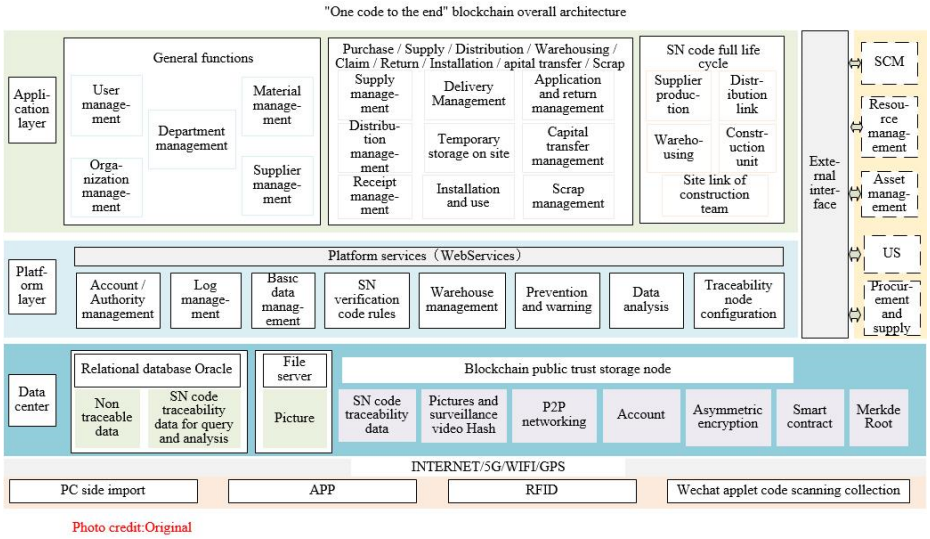

Fig. 2. "One code to the end" blockchain overall architecture

Focusing on the real logistics of materials, it adopts the operation mode of "super simple front-end + fully automatic back-end" to promote the integration of real logistics, information flow and capital flow. The front-end completes the collection of material status data by tracking and scanning SN code information, without the need for business document selection or business process operation. The back-end automatically performs data verification, document matching and business data interaction, improving the convenience and acceptance of front-end operations. The material circulation process is shown in Figure 3.

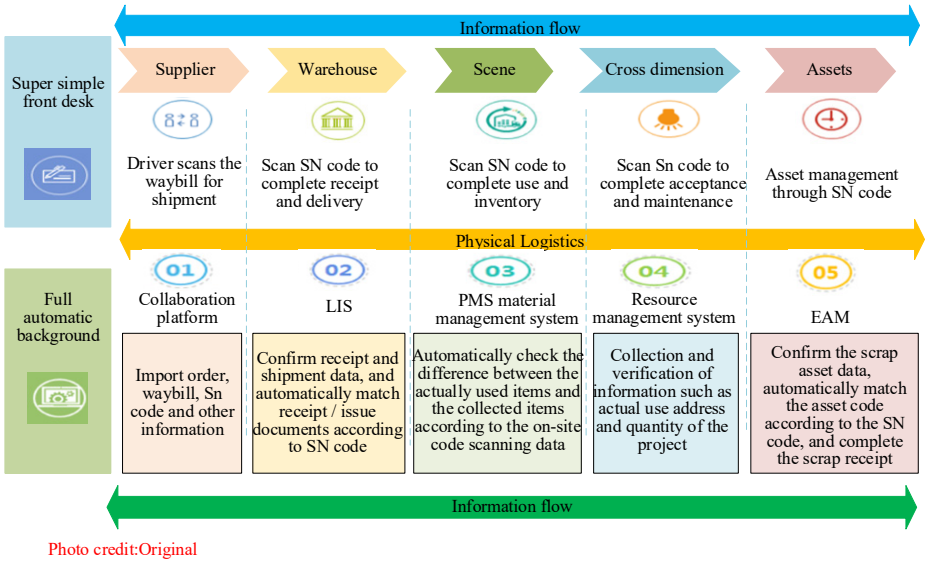

Fig. 3. Material circulation process

After the development and implementation of the first phase of the pilot project, the whole process control from code scanning receipt to code scanning installation has been completed normally, and the process connection of material warehousing, warehousing, receiving and signing, and installation has been realized. The code scanning behavior of SN code has been embedded into the actual production work scene, that is, the function development is directly embedded in the original user interface, greatly reducing the development cost. The unified data platform effectively collects material information, geographical location information, implementers and other relevant information to effectively track and trace; it also establishes a management portrait of various assets according to management requirements, which is convenient for carrying out various thematic analysis and early warning reminders, and can automatically send supervision work orders, effectively improving work efficiency. At present, 137 kinds of high-value materials including main equipment have been included in the whole life cycle management of materials, accounting for 75% of the main equipment types.

Based on the "one yard to the end" visual management scheme for the whole life cycle of materials, the safety inventory mechanism is established to achieve accurate control and early warning, so as to ensure that the inventory of materials is at a reasonable level and eliminate the backlog of inventory on the basis of ensuring the timely supply of market development. Before and after the pilot, the length of materials in the warehouse

decreased by 20%, the operation efficiency increased by 10%, and 800m was saved ² The storage area is increased, the time of unused materials out of the warehouse is shortened, the reuse of returned materials is increased by 45%, and 3% of the total investment of the whole year is saved. Using mobile phone code scanning instead of paper document signing to realize paperless documents, applying electronic signatures to promote energy conservation and emission reduction, practicing corporate social responsibility, saving paper equivalent to 1 ton of carbon emissions, and reducing office costs by 15.4%.

4 Conclusion

The company's "one code to the end" material life cycle management relies on a unified data platform to unify the language of assets between different systems; Establish an asset life cycle management system that runs through enterprise data platform, LIS, ERP, boss, TMS and other systems to achieve seamless connection of business processes and data. Establish one-to-one correspondence among multiple codes such as network resource code, financial asset code and equipment string code; Replacing asset code with "one code" has greatly improved management efficiency, effectively controlled management risks, and provided effective guarantee for cost reduction and efficiency improvement.

The company will continue to consolidate and expand the value of "one code to the end", continue to expand the scope of implementation, and simultaneously promote the construction of total quality management and industrial digital cooperation system. It will continue to build a digital supply chain network within the enterprise, go deep into the source of demand and the end of use, and form a digital collaborative network with closed-loop management of product demand and end, and highly sensitive feedback of information. We will continue to implement the development orientation of "five verticals and three horizontals" in the industrial chain, promote "full volume business online", promote "collaborative intelligence" with "integration of demand and supply", and achieve "all cloud cooperation" with "integration of quality control"; We will move towards the stage of industrial ecological synergy of "business synchronization, cooperation, common promotion, mutual benefit and win-win".

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