How to Carry Out Digital Intelligent Transformation of Enterprise Supply Chain: Case from Huawei

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Abstract. With the proposal of “smart manufacturing” and “supply-side structural reform”, the core of enterprise competition has gradually transitioned from products to supply chain competition. More and more enterprises realize that the dynamic mesh supply chain with digitalization + intelligence as the core replaces the traditional linear supply chain and becomes a more appropriate party with the market. With Huawei as the primary research object, this paper explores the basic methods of digital and intelligent supply chain transformation from the six aspects of production planning, digital sales, building logistics parks, process learning, order signing, and supply chain collaboration, clarifies the advantages of digital and intelligent supply chain data analysis and information transmission, and expects to form a systematic method that can be referenced.

Keywords: Digital intelligence; Supply chain transformation; Huawei.

1. Introduction

Under the challenge of enterprises coping with the dynamic changes in market demand and the uncertain competitive environment, the direction of supply chain transformation that integrates with the traditional supply chain using digital plus intelligent equipment has come into being.

In the traditional supply chain, the supply chain nodes often appear in the industrial chain separately. The one-way linear structure of the supply chain also aggravates the rigidity of enterprises' production factors' flow. To achieve the optimization and upgrading of the supply chain, digital and intelligent technology connects the members of the supply chain, builds the supply chain into a dynamic network structure, effectively links the supply and demand sides, and realizes the two-way transmission of information to avoid decision-making errors caused by information difference, to cope with the market requirements of accelerated changes in the context of globalization.

In globalization, enterprises need to pay attention to the structural reform of the supply side of production content, which has become a new development trend to break through supply constraints. The key lies in solving the problem of supply and demand adaptation. With the blessing of digital technologies such as blockchain, the Internet of Things, and big data, the accuracy of market demand forecasting and the flexibility of production allocation have been further strengthened, breaking the barriers to information circulation. Under the background of “re-industrialization” jointly proposed by the United States and Germany, and China's emphasis on “changing manufacturing into intelligent manufacturing”, the new supply chain combines digitalization and intelligence to achieve a revolution in production technology to adapt to the global market environment and take supply chain reform as the fulcrum of enterprise competition. Taking Huawei as an example, this article analyzes the fundamental aspects of the digital and intelligent transformation of Huawei's supply chain, from production planning, sales, and construction of logistics parks. It provides a reference for the digital and intelligent adaptation of the enterprise supply chain.

2. Literature Review

With the development of digital technology and the wide application of intelligent equipment, the strategic importance of digital intelligence in enterprises has become more prominent. It has become an essential competition weapon for many companies [1]. And the construction of a “digital intelligence” supply chain system is the trend of the times [2]. With intelligence empowering digital, AI can help make complex decisions based on large amounts of data at breakneck speed and detect

patterns, anomalies, and threats, while performing predictive analytics that helps us understand large amounts of data and analyze them to unlock more profound value while saving money and time [1].

Digitalization can achieve more freedom and complex strategies, effectively targeting each customer base and even each customer. On the other hand, digitalization requires companies to become more flexible and innovate with high quality and speed [3]. The digitally intelligent chimeric model began to spread among significant companies at an astonishing rate in the challenge of optimizing supply chains.

Huawei builds three essential capabilities: business digitalization, process, IT service, and algorithm modeling; aggregates basic capabilities through scenario-based business design; creates a two-tier digital and intelligent service architecture for the supply chain and promotes the transformation of traditional operation modes and management models. Identify the contribution of digital transformation to cost reduction and value creation [4].

3. Digital intelligent transformation in the supply chain model

3.1 Production planning

After building the intelligent operation center, Huawei adopted the two-way transformation of algorithm mode and process service and made full planning of production planning based on analyzing data by adopting forecasting methods such as heuristic algorithms, linear optimization, mixed integer optimization, and complex gray prediction, coupled with the controllability of process services, as shown in figure 1. It simulates a variety of market fluctuations, combines production planning with market order forecasting, and realizes the complete linkage from orders to production departments, so that inventory optimization can be maximized while maximizing large-scale production. And to achieve the order confirmation, from the previous manual operation to the system automatic processing plus manual auxiliary verification, false orders by the intelligent system monitoring, the operation efficiency increased by 31%, significantly improving the efficiency and quality of production [5].

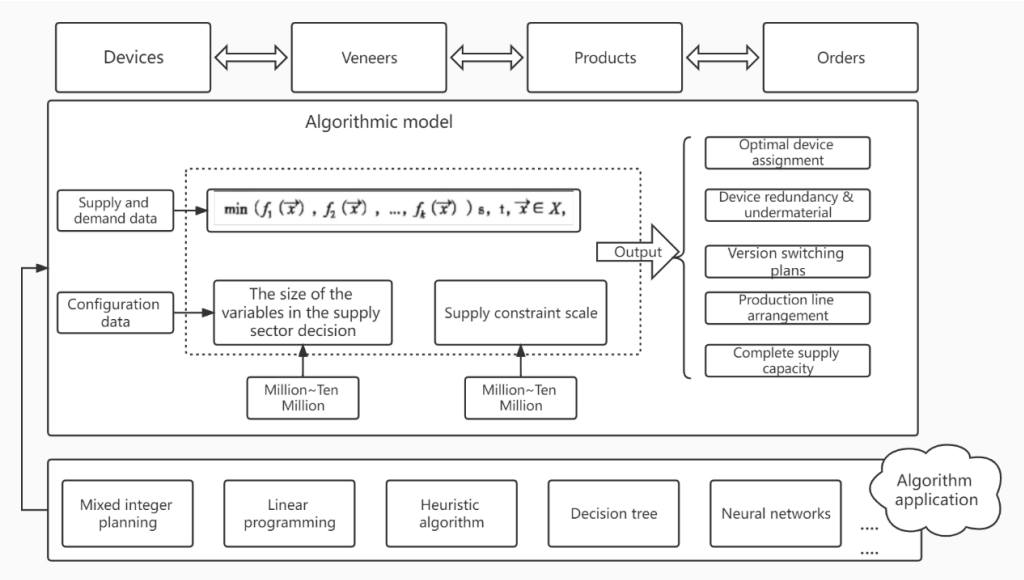


Fig. 1 Production planning

3.2 Digital selling

Huawei has always been a "customer-centric" enterprise value orientation. Build the same data platform, insisting that operators, enterprises, and customers share common information resources in the platform. At the same time, the sales department will digitize the business objects, build a three-dimensional customer service system, rely on the digital management platform, simulate the

management service standards corresponding to different customer types according to different scenarios, reasonably arrange the time, place, frequency of return visits to customers, and process, institutionalize and systematize the reception customer process. After the meeting, the conversation content is uniformly uploaded to the departmental intelligence platform and converted into customer data for subsequent analysis and communication.

After a sale, the product information in the digital platform is packaged and synced to the after-sales department. At the same time, it is tracked in real time in the intelligent operation platform. When a customer makes a request, the customer information, product information, and according to the customer's inquiries, find out the solution of the scene simulation on the platform.

When making market forecast, the sales department uniformly analyzes and saves the provisioning data in the cloud data lake, conducting vertical analysis at a specific frequency and uploading the analysis results to the intelligent platform in chronological order so that the required data can be quickly extracted from the joint platform. And the regulatory forecast of market demand is more reasonable, as shown in figure 2.

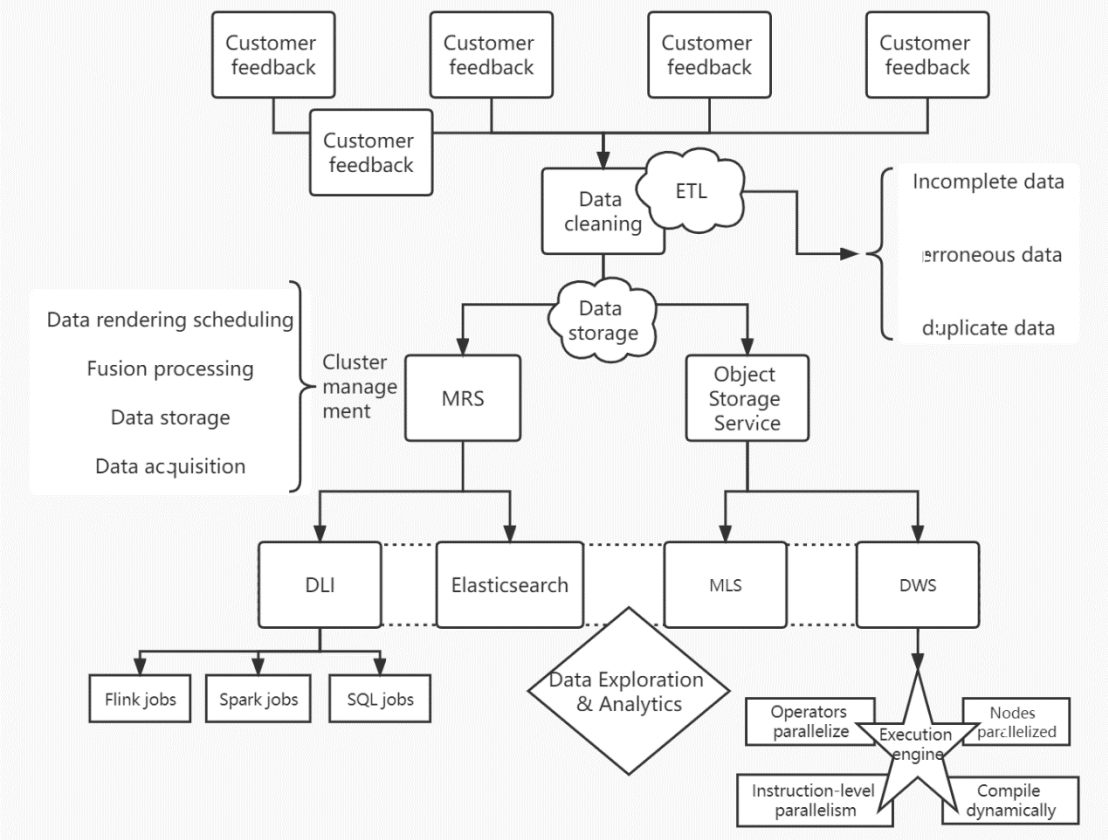


Fig. 2 Digital selling

3.3 The digital intelligent logistics park

Huawei has built an intelligent logistics center to enable proper connectivity between logistics nodes and efficient operation within logistics nodes. In the logistics park, enterprises can combine manpower and automated machines to digitalize the number of people, trucks, machines, and goods in the park into the intelligent logistics center to realize a clear grasp of the goods information by personnel. Under the unified analysis and scheduling of the logistics center, people, vehicles, machines, etc., receive instructions from the logistics center, and the entire logistics park accepts the unified integration and deployment of the logistics center. The supply chain nodes involved in the logistics park are then summarized into the cloud logistics center. And the logistics center algorithm is set to a self-renewing, deep learning form so that it can achieve the combination of digital intelligence and supply network in the logistics park [6].

Relying on new ICT technologies, Huawei builds a campus product portfolio solution to redefine campuses, enabling endpoint interconnection, data fusion, and service aggregation. Regarding the campus network: realize multi-line integration, wired to the wireless, simplified network, and other technologies. And redefine the campus hub: Cloud Edge collaboratively builds a new campus hub, centralizing campus management and control to the campus IT edge. Build a new park ecosystem, open ICT capabilities through the digital park platform, quickly gather ecological partners, and reconstruct the park business, as shown in figure 3.

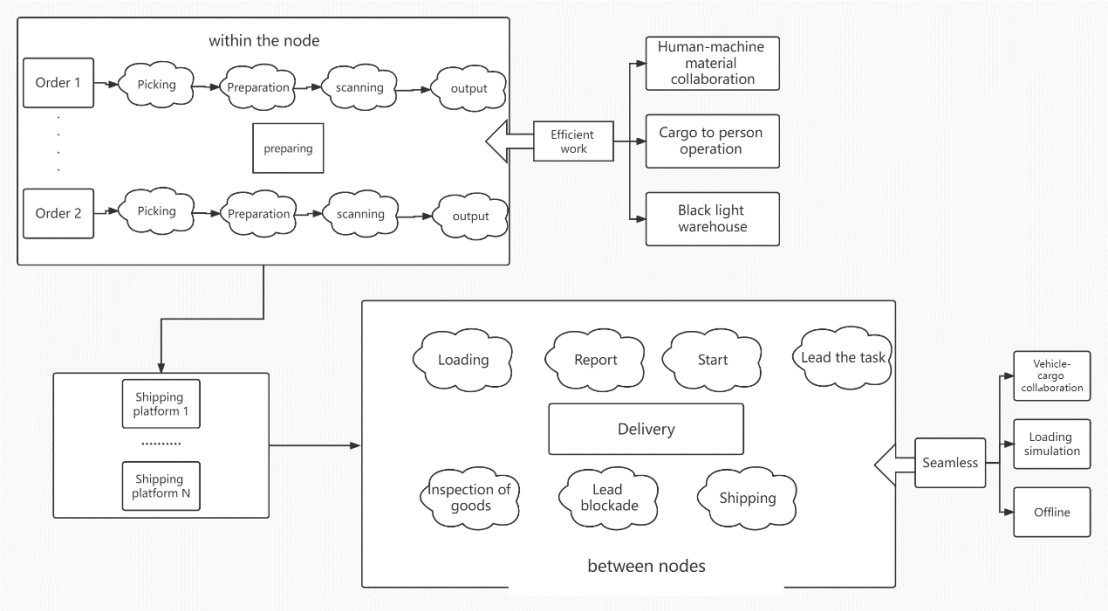


Fig. 3 The digital intelligent logistics park

3.4 Lean process

Huawei has set up an intelligent operations center, Lingkun, which constitutes the most critical intelligent part of its supply chain. Link helped Huawei transform from an intuitive judgment decision mode based on human experience to an intelligent decision-making model based on data analysis. In terms of process, Lingkun can intelligently screen out unnecessary links in the supply chain process and quick manual cutting to achieve process simplification and controllability. Lingkun uses data analysis and comparison in countless simultaneous processes to extract the process chain that requires focused observation or human intervention. Regarding business analysis, Lingkun can also react to market or order changes and match simulated solution scenarios through data matching scenarios so that the company can save trial and error costs and time costs [2].

Huawei provides user authentication identification and tracking number filling. Identify critical information in documents when personnel enters various types of documents. Save manual entry, improve efficiency, reduce the cost of real-name authentication, and make it accurate and fast. It plays a massive role in ensuring the confidentiality of personnel information and contracts. To avoid the risk of contract loss and content leakage caused by manual errors, Huawei adopted the automatic tracking number mechanism. In the case of transparent objects and sufficient data support, through the image recognition tool, identify the contact information in the picture and automatically fill in the courier form to ensure the accuracy of its filling.

3.5 Supply chain collaboration

As a core enterprise in the supply chain, Huawei has built an SCC supply chain collaboration system to achieve real-time information exchange with suppliers and carriers. The high frequency of information exchange enables partners in the supply chain to make the fastest response and decision to market changes, effectively avoiding the waste of production materials and commodities and

reducing costs. At the same time, sharing the information platform also realizes the stability of supply and the timeliness of response to market demand.

At the same time, collaboration within the enterprise is reflected in the flow of information between departments. Huawei's ISC-integrated supply chain system fulfills this need well. After coordinating the target performance calculated after coordinating each department's data, the target performance is decomposed into specific tasks and issued to each department to realize the interconnection of functions of various company departments. Let the entire company transform from an independent department to a highly unified organic whole, and work together to make the enterprise develop more rapidly, as shown in figure 4 [7].

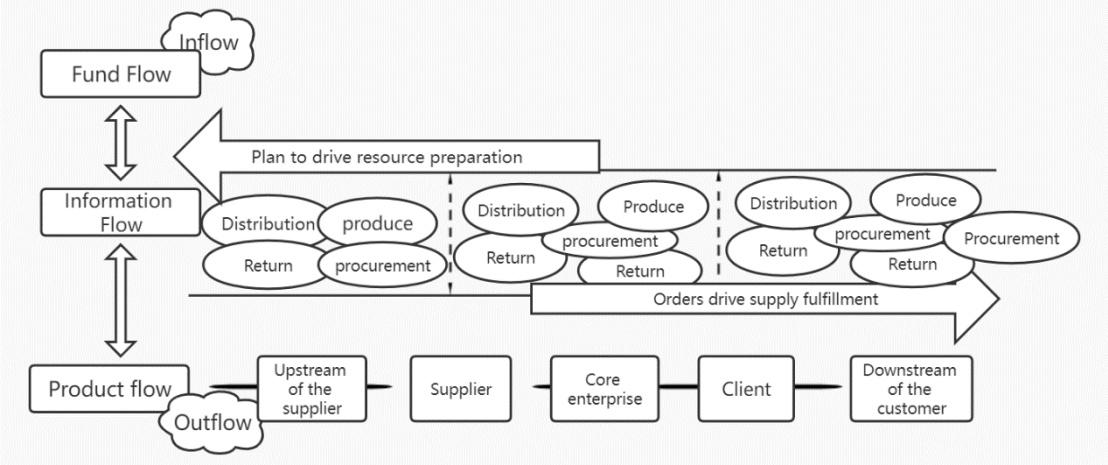


Fig. 4 Supply chain collaboration

3.6 The Internet of Everything ecosystem

When Huawei started digitizing its industry, building a platform database became a top priority. Huawei has adopted the Internet of Things technology in the data scraping process. In the industry chain, IoT technology links all digital devices. It enters them into the cloud data lake to grasp the company's digital information, such as statistical capture of decentralized data such as iSale and CPP. Realize data capture and integrated management.

Huawei has built an ecological working platform for the IoT industry to realize the one-stop IoT delivery process. IoT channel providers and system integrators are a bridge and link for buyers, sellers, and system integrators to help with equipment and application integration. The platform enables industry application services to enable low-cost replication of IoT applications. At the same time, in the five aspects of the Internet of Things module, travel (sharing, operating vehicles, etc.), IoT factory, logistics, and warehousing, construction and operation as the basis, with cloud computing, artificial intelligence, and other technical means to optimize the platform, so that it can simulate multi-scenario solutions, in the stable production technology to achieve the controllability and efficiency of the automated process. Connect everything and collect product data changes in real-time through the database created by the company. And to achieve real-time monitoring, control, and management in production, sales, transportation, and other scenarios, to meet the needs of modern production processes: large-scale, automated, low-cost needs.

4. Evaluation of the digital intelligence Transformation of Huawei

(1) Information sharing, empowerment, and progress. Huawei uses its core enterprise position in the supply chain, closely connects upstream and downstream enterprises through an intelligent collaboration platform, and builds a dynamic cobweb-like structure chain. Each enterprise uses the core technology to strengthen its products, from digital empowerment to enablement. Moreover, information sharing deepens the trust between enterprises and changes the instability of upstream and downstream enterprises brought about by changing markets. If Huawei chooses a fixed partner, it will

improve for a long time to achieve the best cooperation effect. And take the supply chain as a whole to jointly optimize the members of the supply chain, to achieve an efficient, low-cost, less running-in supply system so that the value of the supply chain has been steadily improved [8].

(2) Build a supply chain data analysis platform. Data analysis is the primary means of making market forecasts by monitoring the changes in the data flow, such as orders and prices, when the market changes or the costs, production, and core enterprise plans of upstream and downstream enterprises are different. The complete data in the platform is used to match and compare to issue an alarm. Huawei takes differentiated responses and countermeasures to enable the supply chain to respond to and recover from emergencies in the shortest possible time. To allow core enterprises to change their strategies as quickly as possible, enterprises adjust the supply chain structure or supply plan to reduce the loss of enterprise decision-making.

IoT technology enables intelligent devices to interconnect with cloud data platforms, replacing manual monitoring of material inventory and product transportation in logistics centers. Let the data flow intersperse between the intelligent machines and issue commands to the smart devices in real time. Multi-equipment joint production mobilization reduces manual judgment and helps improve production efficiency [9].

(3) Dig deep into your data and analyze it instantly. When enterprises need data, ensure that there is sufficient and complete data and information to provide analysis. Under the competition of digital native enterprises, industrial value transfers, squeezing out the living space of traditional industries. In digital intelligence, enterprises should be good at mining the information behind data to meet the challenges of digital technology to traditional industries. And enhance the digitization of enterprises, reduce the occurrence of human experience judgments in enterprise decision-making, all based on data, build a hierarchical response mechanism for enterprises, and face the rapidly changing supply chain ecological environment changes in the outside world [10].

(4) Process digitization, Internet of Everything. Huawei uses the methods of commodity digitalization, procurement digitalization, fulfillment digitalization, and operation digitalization to ensure the accuracy, real-time, and orderly data flow of market goods, enterprise capital flow, and supply chain logistics. The resilience of the enterprise supply chain is enhanced, and the ability of the enterprise to resist pressure is also improved. The speed of response to changes in the market or upstream and downstream companies and timely detection of contradictions in the supply chain. Implement “mistakes find people” instead of “people find mistakes.” Liberate the workforce from the task of finding contradictions in high energy consumption, and reduce the proportion of human factors in basic judgments. And increase the scientific and regular nature of the data.

The Internet of Things technology captures the company's decentralized data, smart link devices, production and transportation, and other processes. After the procedure is digitized according to the standard, it is summarized into the cloud data lake as data streams to achieve overall analysis and provisioning of data in the supply chain. By creating a new type of digital, intelligent, and service-oriented Internet of Things, we can realize the intelligent connection of people, machines, and things to provide intelligent links of all scenarios, deterministic analysis, and computing power [3].

5. Conclusion

This article takes Huawei's initiatives on traditional production lines as an example to explore some of the directions of the supply chain to digital and intelligent transformation. The benefits of information sharing, data collection, smart manufacturing to enterprise upgrading, and the reform of nodes in the supply chain are clarified, and the discussion of enterprise classification is ignored. At the same time, it does not pay attention to the innovation of the demand side of digital intelligent change. As the main body of economic development, enterprises embracing digital intelligence based on new technologies to carry out product and business innovation, organization, and management reform has become the consensus of everyone. However, this article does not discuss this aspect's digital and intelligent innovation on the demand side. And there is no more mention and profound

exploration of some emerging industries such as the Internet, digital energy, fnetlink, and other aspects of the world. Finally, in terms of digital technology innovation, this paper only analyzes Huawei's existing digital technologies and concepts to help the digital and intelligent reform of the supply chain and does not fully explain Huawei's approach to the innovation and reform of developing digital technologies and intelligent devices.

With the digital and intelligent upgrading of the supply chain as the fulcrum, the supply chain is changing from a rigid linear structure to a dynamically interconnected network structure. Members of the supply chain are connected by information into an organic whole. The digital and intelligent transformation of enterprises has promoted the change of enterprises from process-driven to data-driven, from internal to industrial and ecological collaboration. The digital and intellectual transformation of the supply chain has gradually developed into digital governance, and the sustainable development of enterprise management, operation, incentive, and other models, and the discussion of digital governance reform has slowly become a new topic for us.

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