QUALITY DIGITAL MANAGEMENT OF INVENTORY IN LIQUOR ENTERPRISES

Qunying Zhou[1], Thanakorn Sirisugandha[1] and Surachai Kangwon[2]
[1]Lampang Rajabhat University, THAILAND
[2]University, THAILAND
noithonglek@hotmail.com

ARTICLE HISTORY
Received: 17 August 2024 **Revised:** 26 August 2024 **Accepted:** 26 August 2024

ABSTRACT:

With the advent of the era of big data, enterprises in the digital era must keep pace with The Times, realize the importance of data, and use digital technology to change the inventory management mode. Digital inventory management refers to the collection, sorting, storage and sharing of a series of inventory related data, strengthening data analysis and research, mining the information and laws behind the data, taking the whole production and operation process of inventory as an organic whole, realizing the dynamic management of inventory and providing strong data support for decision-making, let enterprises gain greater competitive advantage. Based on the theory and method of traditional inventory management, this paper, considering the characteristics of large inventory production, long storage cycle and great difficulty in manual inventory, brings forward the advantages of digital management. Combined with the situation of digital inventory management in Luzhou Laojiao Sichuan Limited by Share Ltd, it summarizes its advantages in management, and provides reference for Baijiu enterprises to digitally manage.

Keywords: Quality Digital Management, Inventory, Liquor Enterprises

CITATION INFORMATION: Zhou, Q., Sirisugandha, T., & Kangwon, S. (2024). Quality Digital Management of Inventory in Liquor Enterprises. *Procedia of Multidisciplinary Research, 2(8), 30*

INTRODUCTION

Baijiu industry is a completely competitive industry. As a kind of fast-moving consumer goods, Baijiu sales will be affected by seasons, policies, product styles, and marketing operation modes, which will also affect the production capacity of enterprises, thus affecting the inventory turnover of enterprises, and thus affecting the economic interests of enterprises. The production cycle of Baijiu industry is special. Due to the requirements of technology, the production cycle of Baijiu industry is mostly more than one year. At the same time, the market demand for Baijiu is changing frequently. Therefore, Baijiu production enterprises are prone to a large backlog of inventory, resulting in a low inventory turnover rate of Baijiu, or a shortage of goods, leading to the loss of consumers. On the other hand, the excessive hoarding of inventory will increase the proportion of capital occupation, leading to an increase in the cost of using funds. In the era of big data, one of the traditional industries with great potential on the Internet is the Baijiu industry. Information technology can be used to turn procurement, production and sales information into accurate data information, so as to improve production, more accurately predict market demand, and thus improve inventory management

RESEARCH VALUE

2.1 Theoretical Value

The level of inventory management plays a crucial role in determining whether a company can sustain long-term development and achieve economies of scale. Inventory management should be done well throughout the entire process of enterprise production and operation. Traditional inventory management methods only focus on a certain link of production and operation, solving the inventory problem in this link may push the problem to the next link, and cannot fundamentally improve inventory management problems.

In today's big data era, Baijiu enterprises can use advanced information technology means such as computer technology, communication technology and sensors to collect consumer consumption data. Consumer data can enable companies to predict future sales volume, thereby adjusting production and procurement quantities in reverse, and better managing inventory levels in various stages of production and operation.

2.2 Application Value

Introducing the concept of digitization into inventory management in enterprises, the various links of procurement, production, warehousing, sales, etc. in enterprise production and operation are regarded as an organic and unified whole, and the inventory of this whole is managed to make up for the limitations of traditional inventory management methods.

This paper selects Baijiu enterprises as the research object, takes the current hot development of digital information technology as the link, reasonably formulates inventory plans according to the market sales situation and product supply and demand relationship, establishes a set of information linkage quick response mechanism, runs through the whole process from sales forecast to production plan to purchase list, and provides a strong guarantee for the sustainable development of enterprises and the realization of economies of scale.

LITERATURE REVIEWS

Through reading literature, it is found that it is a consensus for enterprises to improve their internal inventory control system and strictly implement it. It is generally believed that the ability to turnover inventory and the level of management efficiency greatly affect the development and financial status of the company.

1. Quality Inventory Management

In order to expand the scale of the enterprise and reduce operating costs, every enterprise should choose the most suitable inventory management method for inventory management. The currently popular and widely accepted inventory methods by enterprises include ABC classification, economic order quantity method, just in time method, and supplier managed inventory theory.

ABC classification management method is to classify and manage the importance of inventory based on experience. The ABC inventory management method allows business managers to distinguish priorities, focus on key points, and has the advantages of improving inventory management efficiency and controlling major inventory varieties. But the drawbacks of this method are also very obvious, as the classification of inventory is subjective and does not consider that various types of inventory are an organic whole.

The core of Vendor Managed Inventory (VMI) theory is to establish cooperative management with suppliers. It was first proposed by Magee as a framework concept, and later gradually formed through continuous research and expansion by many scholars. The VMI model can effectively improve the cooperative relationship between retailers and suppliers. It adopts inventory custody and delegates inventory management decision-making power to suppliers, allowing producers to determine the inventory quantity of sellers. Through information sharing, the inventory management quantity of producers and sellers is maintained at the optimal value, and inventory management costs are controlled at the minimum. The VMI model is a win-win inventory management model. For suppliers, it is the core of inventory management, making replenishment decisions based on sales data provided by retailers, and achieving integrated optimization of inventory management and retailer sales. For retailers, it frees them from the pressure and burden of inventory management. The VMI model essentially integrates the production and sales of suppliers and retailers, eliminating the external costs of inventory management through enterprise integration, avoiding the situation where both parties manage inventory independently, and breaking through the perspective of the entire supply chain to manage inventory, greatly improving the level of inventory management.

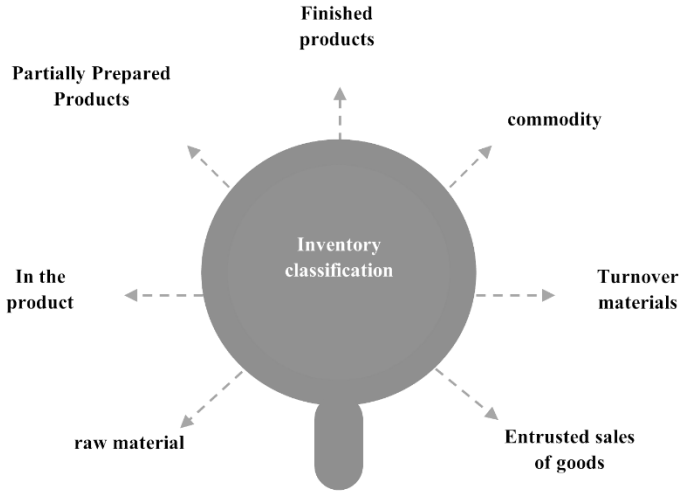

Figure 1 Classification of Inventory from the Perspective of Economic Content

2. Quality Digital Management

The rapid development of the Internet has penetrated into all aspects of life, and the traditional inventory management methods show limitations, which are difficult to meet the inventory management in the era of big data. Therefore, some scholars have proposed the concept of combining information technology for inventory management.

The rapid development of digital informatization has brought accounting informatization to a new level, and inventory management, as an important part of accounting work, should also keep up with the pace of digital informatization. The new technology of digital informatization has changed the traditional work mode, solved the problems of low efficiency and high cost, and actively carried out digital management mode is very necessary for inventory management. At the same time, the development of the Internet has also changed the traditional sales model. E-commerce has brought challenges as well as opportunities to enterprise inventory management. In the coexistence of traditional sales methods and online sales, digital informatization can be used to establish mathematical models and use regression analysis methods to calculate the demand function faced by enterprises. The research and exploration of e-commerce can help analyze the impact of big data on enterprise inventory management and product pricing.

In addition, digital management can also shift the perspective of inventory management from within the enterprise to the entire industry, increase inventory control from the perspective of the entire supply chain, and restructure business processes related to inventory management. On the other hand, digital inventory management can achieve internal inventory information sharing, strengthen the collaborative operation of various functional departments, complete the control of every link in the production and operation process, and thus achieve sustainable development of the enterprise.

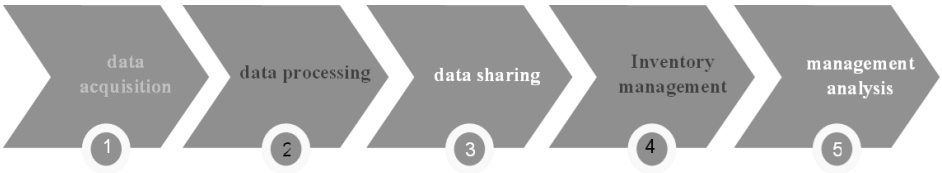

Figure 2 Digital Inventory Management Framework

3. Context of digital system application in inventory management in production process and various operational activities

Because Baijiu is more fragrant as its ages, high-quality Baijiu needs to be stored for a long time, so the digital management of Baijiu enterprises does not include the storage link. This paper only analyzes the digital management of inventory in the purchase, production and sales links.

1. The impact of digitalization on inventory management in the procurement process

In the procurement process, traditional inventory management methods mainly focus on the price and quantity of procurement, as well as the issue of delivery time. However, from a strategic and long-term perspective, modern enterprises need to greatly expand the role of procurement. Procurement is no longer just about purchasing, but about selecting target suppliers and partners for the enterprise and establishing long-term close working relationships with them. The use of Internet, big data and other technical means can not only improve the process of controlling inventory purchase costs, but also help enterprises make faster and better purchase decisions. In the procurement process, the inventory management methods of enterprises can be improved from the following aspects:

The first is to improve the order process. Enterprises can automatically transmit orders to suppliers through the internet and electronic data exchange. Combining big data analysis with information technology can shorten the time from placing an order to completing it. An automated order system can significantly shorten ordering time and improve the accuracy of the order process, while also saving transportation costs and reducing inventory procurement costs.

The second is to promote collaboration between enterprises and suppliers. If enterprises and raw material suppliers can establish long-term cooperation and share inventory production and sales data on the information platform, then both parties can achieve production collaboration. Enterprises can share available inventory and demand inventory, forecast accuracy reports, and other information with suppliers through the application of prediction and supply systems, which can enable suppliers to prepare for supply in advance based on the information provided by the enterprise. Moreover, orders can be generated on the information platform, greatly reducing communication time and costs with suppliers, and improving the procurement efficiency of enterprises.

The third is to carry out risk management. The application of big data analysis methods can also be used for risk management of inventory procurement and analysis of supplier risks. If enterprises want to achieve orderly operation of production and operation, they must establish a stable raw material supply network that covers all aspects from external suppliers to contract manufacturers. Modern enterprises need to evaluate the daily performance and risks of suppliers, as they highly rely on raw material suppliers. If through big data prediction, it is found that suppliers may have some problems, the enterprise can immediately adjust its procurement strategy or communicate with suppliers in a timely manner to jointly develop emergency plans, thereby ensuring that the normal production and operation of the enterprise are not affected.

2. The impact of digitalization on inventory management in the production process

The most reflective level of a company's production and operation management is inventory management in the production process. The issue of balancing inventory costs and corporate profits has always existed in the production process of a company.

If a company does not supply the corresponding inventory at the appropriate time and place, it will reduce sales volume and lower consumer service quality, and excessive inventory will result in high inventory management costs. By establishing a database through digitization, enterprises can real-time grasp the production quantity and cycle of products, monitor and track inventory levels, and make inventory decisions more reasonable. At the same time, combined with sales data, enterprises can calculate the current optimal inventory quantity to continuously optimize their inventory levels.

The use of big data management platforms can closely link enterprise product sales with raw material demand signals, and real-time sensing of sales terminal data can optimize inventory levels of raw materials and products. Lower inventory levels can reduce production costs for enterprises, and real-time location detection of goods can accurately match supply and demand relationships. This precise information will be promptly fed back to various aspects of inventory management, including planned production volume, inventory volume, and order volume.

3. The impact of digitalization on inventory management in the sales process

The sales process connects enterprises with consumers, with the main task of collecting consumer demand information, conducting market differentiation, predicting consumer behavior, creating demand for the company's current and new products, and seizing market opportunities

Due to providing consumer demand information, it drives all activities of enterprise production and operation, thus having a decisive impact on the choice of inventory management methods for enterprises. Enterprises can collect consumer demand information through big data analysis applications, differentiate the market, and predict consumer behavior based on past sales data, and then choose appropriate inventory management methods. By extracting and analyzing sales terminal data, we can gain a detailed understanding of consumer preferences, identify the most effective market segmentation, ensure that enterprises can provide efficient product production and transportation, and minimize inventory costs.

Digital inventory management enables reverse management of inventory. The predicted inventory quantity in the sales process determines the production plan in the production process, which in turn affects the purchasing quantity in the procurement process, which in turn affects the warehousing process. Big data analysis can provide more accurate data information, greatly improving the inventory management level of enterprises. In fact, more and more companies are relying on sales terminal data as a demand signal, which in turn notifies raw material and parts suppliers and drives changes in inventory management at various stages.

CONCEPTUAL FRAMEWORK

Effective inventory management can timely and accurately reflect the inflow, warehousing, outflow, and other situations of inventory. This dynamic monitoring is a prerequisite for enterprises to make correct production and operation decisions. In the era of big data, real-time collection of terminal consumption data and analysis, processing, and sharing of data through big data analysis platforms can provide support and assistance for inventory management decisions in various aspects of enterprise production and operation, making real-time dynamic inventory management a reality for enterprises.

1. data acquisition

Data collection is the foundation of inventory management work. In the era of big data, real-time sales terminal data can be collected through online shopping malls, mobile apps, and offline distributors, mainly including product sales volume, price, regional distribution, consumer preferences, age, consumer satisfaction and loyalty, seasonal fluctuations, and other data collection.

Data collection is one of the fundamental tasks of digital inventory management, and timely, accurate, and complete data information is the basis for inventory management and decision-making.

2. data processing

By using big data analysis methods, the collected information on consumers' natural attributes, location, purchasing power, preferences, triggering conditions, responsiveness, etc. is mined. Through screening, classification, and calculation, the group characteristics of consumers are identified, and consumers are subdivided according to quantity, business district, preferences, value, personality, lifecycle, etc., in order to create different product sales zones.

After in-depth data processing and analysis, the focus of inventory management in each partition is clarified, and different partitions adopt different inventory management methods to seek the best inventory management mode for each partition. For example, based on product types, if an enterprise has two types of products, high-end and low-end, and mainly relies on high-end products for profit, then in inventory management, the products should be divided and the focus should be on managing high-end products, rather than managing both types of inventory uniformly.

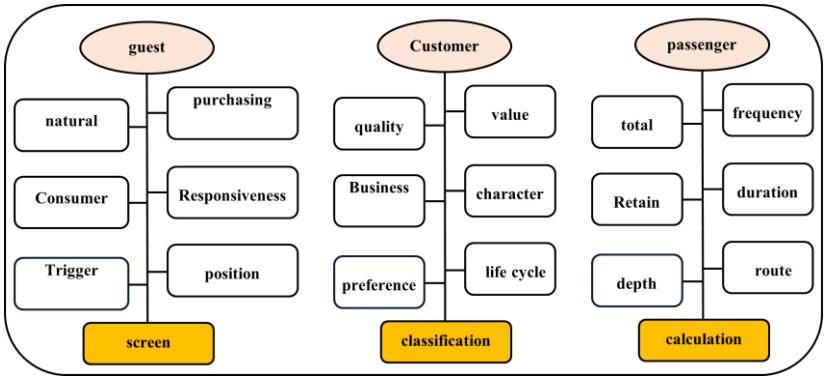

Figure 3 Digital Inventory Management Framework - Data Processing

In addition, through data analysis, it is possible to plan and construct a logistics center for products based on the total amount of passenger flow, consumption frequency, and routes, in order to reduce the out of stock costs and logistics risks of enterprises and improve the efficiency of inventory management.

3.data sharing

The sharing of data consists of two parts. One part refers to the horizontal integration of data resources of suppliers, manufacturers, distributors and consumers through the Internet platform, and the other part refers to the internal integration of the enterprise's purchase department, production department, warehousing department, sales department and financial department.

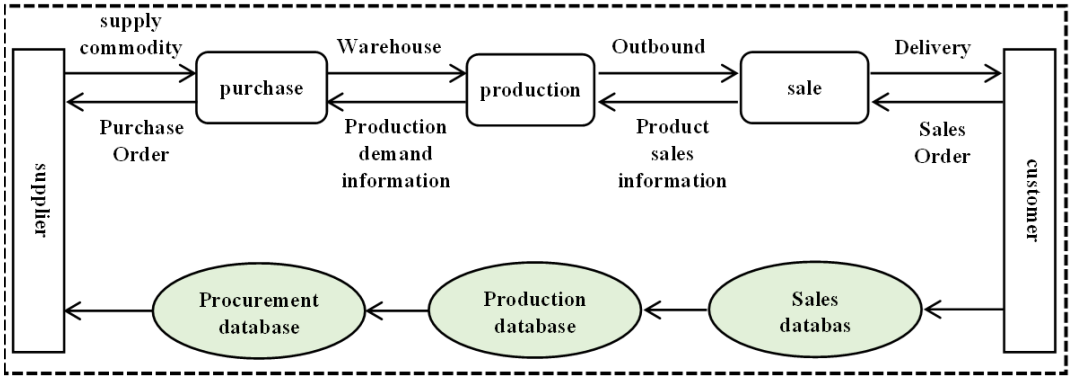

Figure 4 Digital Inventory Management Framework - Data Sharing

Data sharing enables enterprises to become a unified system, and inventory management information for each stage of production and operation can be shared in real time through a data platform. On this information system, as long as you log in to your account, you can see the inventory information for each stage of the production and operation process. The production department can see the sales department's forecast of inventory, the procurement department can see the production department's planned production volume, and the finance department can also make financial predictions and calculations based on each department, ultimately enabling the enterprise to achieve excellent financial results.

The convenience of information transmission saves communication time among various departments within the enterprise and improves their work efficiency, which is undoubtedly beneficial for the enterprise.

4.management analysis

Analyzing the effectiveness of digital management and evaluating the effectiveness of inventory management can identify problems that arise during the inventory management process and improve inventory management methods.

Under digital management, enterprises can utilize computer technology to establish full inventory simulations for various stages of production and operation based on historical data and analysis predictions. Enterprises can also use big data platforms to monitor the inventory levels of various types of inventory in real time, and analyze and calculate the impact of sales, promotions, procurement, internal distribution, distributor returns, and other links on the inventory cost of the enterprise, in order to set the optimal inventory warning value.

Meanwhile, through further data mining and analysis, it can also help enterprises accurately identify unsold products and products with slow turnover speeds, thereby effectively assisting

enterprises in making decisions such as promotions and shutdowns, and improving their inventory management level.

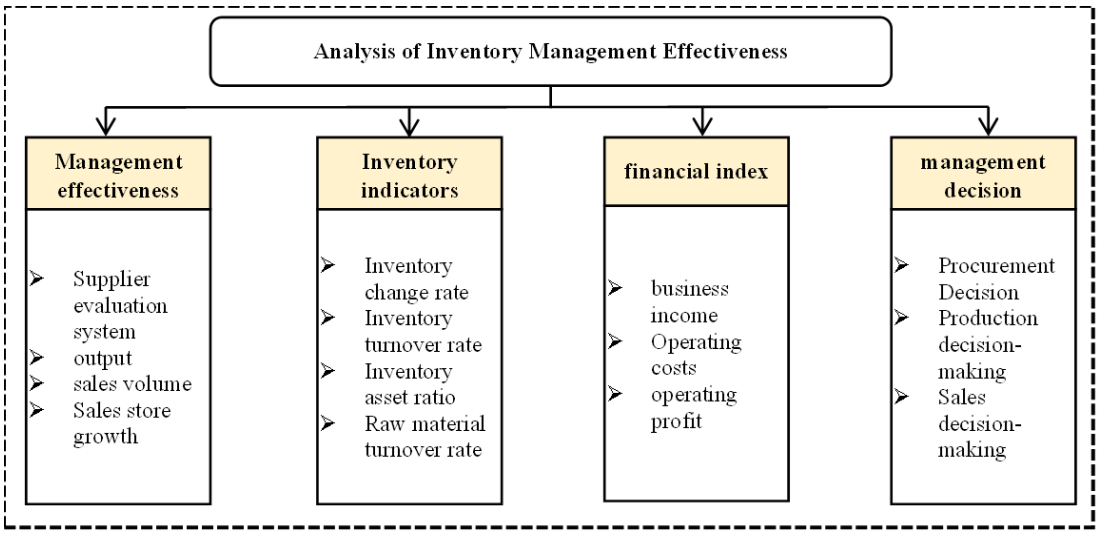

Figure 5 Digital Inventory Management Framework - Management Analysis

CONCLUSION

Under the background of big data era, traditional inventory management methods have certain limitations on inventory management in the production and operation process of enterprises. Baijiu enterprises should actively use the convenience brought by information technology, combine traditional inventory management methods to carry out digital inventory management, improve the competitiveness of products and services, and let enterprises gain greater competitive advantage.

Baijiu enterprises need to establish a highly information-based management system based on "database", fully realize the sharing of information in procurement, production, warehousing, sales and other links through data guidance, strengthen the analysis and research of inventory data, excavate the information and laws behind the figures, realize dynamic management, and promote continuous improvement. The use of information technology to accurately predict and manage inventory in various stages of enterprise production can effectively improve the level of inventory management, increase inventory turnover, reduce the cost of capital occupation, and enhance the economic benefits of the enterprise.

In the era of big data, enterprises should accelerate the construction of information technology, apply advanced technologies such as computer technology, communication technology, and sensors, build an intelligent remote real-time monitoring and information sharing information management platform, and improve the dynamic supervision of inventory, risk warning, and emergency response information management level. Inventory information work is one of the fundamental tasks of comprehensive inventory management, and timely, accurate, and complete data information is the basis for inventory management and decision-making.

REFERENCES

ADE, KU, FAA. Inventory control and distribution of medicine stocks by using a just in time method based on interactive web applications[J]. Journal of Physics: Conference Series,2021,1918(4).

Bou B. F., Rosa A., Jacques J. L. Inventory control of a class of logistic networks[J]. Systems & Control Letters,2021,147104845.

Chołodowicz E., Orłowski P. Neural Network Control of Perishable Inventory with Fixed Shelf Life Products and Fuzzy Order Refinement under Time-Varying Uncertain Demand[J]. Energies,2024,17(4).

Cristina Z., Krister F., Sigurd S. Bidirectional inventory control with optimal use of intermediate storage[J]. Computers & Chemical Engineering,2022:107677.

Ferhat Y., Burak E., Mustafa Y. Inventory control model for intermittent demand: a comparison of metaheuristics[J]. Soft Computing, 2023,27(10):6487-6505.

Ferreira L B, Sigurd S. Bidirectional Inventory Control with Optimal Use of Intermediate Storage and Minimum Flow Constraints[J]. IFAC PapersOnLine,2023,56(2):2665-2670.

Ferretti I., Marchi B. Q-Learning for Inventory Management: an application case[J]. Procedia Computer Science,2024,2322431-2439.

Heikkinen R., Sipilä J., Ojalehto V., et al. Flexible data driven inventory management with interactive multi-objective lot size optimisation[J]. International Journal of Logistics Systems and Management,2023,46(2):206-235.

Mousa M., Berg D. V. D., Kotecha N., et al. An analysis of multi-agent reinforcement learning for decentralized inventory control systems[J]. Computers and Chemical Engineering,2024,188108783-108783.

Radu B., Calvin T. Constrained continuous-action reinforcement learning for supply chain inventory management[J]. Computers and Chemical Engineering,2024,181108518.

Zemzam A., Alami E. J., Alami E. N. Robust control of pricing and inventory in a two-level supply network with competing retailers and delays in decision[J]. International Journal of Mathematics in Operational Research,2021,20(4):453-505.

Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.