Min-Max Policy Implementation for Inventory Management in Steel Supply Sector

Tinnakorn Phongthiya and Chompoonoot Kasemset *
Department of Industrial Engineering, Faculty of Engineering, Chiang Mai University, Suthep, Muang, Chiang Mai, 50200, Thailand
***Corresponding Author E-mail:** chompoonoot.kasemset@cmu.ac.th
Received: Feb 18, 2025; **Revised:** Apr 07, 2025; **Accepted:** Apr 09, 2025

Abstract

This study explores the application of the Min-Max inventory management policy to improve stock control efficiency at a steel supply company in Chiang Mai Province, Thailand. The company operates two branches: a central warehouse and a retail store located 40 km apart. Due to the absence of a formal inventory management policy, the retail branch frequently experiences stock shortages, leading to daily replenishment trips from the main warehouse, causing operational inefficiencies and excessive transportation costs. The research focuses on four top-selling products from the company's highest sales-value category. A Min-Max policy was proposed where the minimum stock level was set based on the average daily demand multiplied by the minimum lead time, and the maximum level based on average demand multiplied by the most likely lead time. Historical demand data from May 2022 to May 2023 were analyzed to determine appropriate Min-Max thresholds. Demand analysis revealed low average daily sales coupled with high variability, indicating the need for a structured inventory approach. Trace-driven simulations were conducted using historical demand data to assess the impact of the Min-Max policy. The simulation results showed a significant reduction in the number of transportation trips and cost compared to the company's current practice of daily restocking. The study concludes that implementing the Min-Max policy can reduce operational inefficiencies and transportation costs for the company. However, the results are limited to the selected products and may not reflect the entire inventory's performance. The simplicity of the Min-Max policy makes it practical for SMEs, though further refinements such as demand forecasting techniques could optimize its performance in environments with high demand variability.

Keywords: Min-Max Policy, Inventory Management, Steel Supply Sector

1. Introduction

Inventory management involves maintaining an optimal stock of materials or resources for future use, whether for direct sale or as inputs in production [1]. Effective inventory control is critical for industries like steel, where stock balance directly influences operational efficiency and profitability. Proper management ensures businesses meet customer demands by having the right products available in adequate quantities and at the right time [2]. Additionally, inventory often constitutes a significant portion of a company's working capital, typically accounting for 30% to 40% of total assets. While maintaining inventory can enhance service levels and prevent production delays, excessive stock can lead to high overhead costs due to storage needs, security, and resource management. Therefore, efficient inventory management practices are essential to optimize working capital, control costs, and sustain business competitiveness [3].

A steel supplier located in Chiang Mai Province, Thailand, serves as a case study due to its inventory management challenges. The company operates two branches: a central warehouse storing all products and a retail store approximately 40 km away with limited stock capacity. A significant issue arises when the retail branch runs out of stock, necessitating frequent product deliveries from the main warehouse. Currently, the company lacks a formal inventory management policy, particularly at the retail branch. This absence of proper control leads to daily deliveries, resulting in inefficient operations and unnecessary transportation costs.

A review of the literature reveals that the Min-Max inventory management policy is widely acknowledged for its simplicity, flexibility, and ease of implementation, particularly in environments lacking advanced inventory systems [4]. Unlike the Economic Order Quantity (EOQ) model, which assumes constant demand and requires precise cost data for optimization, or the Just-in-Time (JIT) approach, which depends heavily on highly reliable suppliers and synchronized logistics, the Min-Max policy offers a more practical and adaptable solution in real-world settings. Advanced methods such as dynamic programming and machine learning-based forecasting can provide optimized results but often demand substantial computational resources, expert knowledge, and data infrastructure, which may not be available in small to medium-sized enterprises or sectors with operational constraints.

Studies have shown that the Min-Max policy can achieve significant improvements in inventory control with relatively low implementation barriers. For example, in manufacturing environments, it has been used to reduce stockouts and balance service levels with inventory costs [5], while in gas stations, it has helped manage fluctuating demand with minimal intervention [6]. However, despite its documented advantages, the application of the Min-Max policy in the steel supply sector remains underexplored. This sector is characterized by irregular demand patterns, high transportation costs due to bulky products, and limited space at retail branches—conditions where a structured yet easy-to-maintain inventory policy like Min-Max could offer considerable benefits.

This study aims to address these gaps by implementing the Min-Max inventory policy in a steel retail company facing operational inefficiencies, especially related to frequent and uncoordinated transportation trips between the central warehouse and its retail branch. These inefficiencies are largely due to the absence of a systematic inventory control framework. The Min-Max policy is chosen for its ability to provide a balance between stock availability and transportation frequency without requiring complex forecasting models or disruptive process changes. To evaluate its effectiveness, the study focuses on the highest sales value product group, selecting four best-selling items for simulation-based analysis. Trace-driven simulations using historical demand data are used to assess potential improvements in inventory stability, reduced stockouts, and enhanced transportation efficiency following the adoption of the Min-Max policy.

2. Literature Review

2.1 Uncertainties in Inventory Management

Inventory management is often challenged by uncertainties in demand, supply chain disruptions, and lead times, which can significantly affect stock levels and operational efficiency. According to Chopra and Meindl [7], demand variability is a critical factor that complicates inventory control, leading to either stockouts or excessive holding costs. Additionally, supply chain uncertainties such as delayed shipments, supplier reliability, and market volatility further exacerbate inventory challenges [8].

Research by Graves and Willems [9] emphasizes the importance of safety stock in managing uncertainties, advocating for dynamic safety stock levels that adjust based on real-time demand fluctuations. Furthermore, stochastic inventory models have been developed to account for probabilistic demand patterns and improve decision-making under uncertainty [10].

The interplay between uncertainty and inventory policies highlights the need for adaptive strategies. For instance, the Min-Max policy can be enhanced by incorporating probabilistic demand forecasting to mitigate the impact of uncertainties and ensure optimal stock levels.

2.2 Min-Max Policy

The Min-Max inventory policy is a widely used inventory management approach aimed at balancing stock levels to meet customer demand while minimizing holding and transportation costs. This policy involves defining two critical inventory thresholds: the minimum (reorder point) and the maximum stock levels. When the inventory level falls to or below the minimum threshold, a replenishment order is triggered to restore stock up to the maximum level [11].

The primary advantage of the Min-Max policy is its simplicity and effectiveness in managing inventory, particularly in environments with consistent demand patterns. According to Bramel et al. [12], the policy helps reduce stockouts and excessive inventory holding, making it suitable for small and medium-sized enterprises (SMEs) with limited resources for complex inventory control systems. However, its effectiveness can be limited in situations with highly variable demand [13].

Several studies have investigated the application and optimization of the Min-Max policy. For instance, Cohen et al. [14] demonstrated the policy's efficiency in maintaining service levels while controlling storage costs in multi-echelon inventory systems. Furthermore, Voorsluys and Buyya [15] highlighted that the policy is particularly useful when combined with trace-driven simulations, allowing historical demand patterns to be incorporated into the decision-making process for better accuracy.

In the context of retail operations, implementing the Min-Max policy can reduce unnecessary transportation costs and streamline operations, as demonstrated in the work of Ghodake et al. [16]. Their research emphasized that for multi-branch retailers, such as the steel supplier case in Chiang Mai, implementing a structured Min-Max policy could significantly reduce daily replenishment trips while maintaining service quality.

In summary, the Min-Max policy provides a practical and effective solution for inventory management, especially when integrated with historical demand data and simulation techniques. However, its success depends on proper parameter setting and demand forecasting accuracy, as variability can affect the overall efficiency of the policy, allowing historical demand patterns to be incorporated into the decision-making process for better accuracy.

3. Case Study and Problem Description

The case study selected is a steel supply company located in Chiang Mai Province, which operates a main warehouse and a retail store. This research focuses on the retail store with the goal of enhancing its inventory management practices. A significant challenge arises from frequent stock shortages at the retail branch, which often requires replenishments from the main warehouse. However, the retail store currently lacks a formal inventory control system, resulting in daily restocking trips that lead to operational inefficiencies and increased transportation costs.

Two critical factors for establishing an effective inventory policy are demand and lead time. Regarding lead time, the main warehouse is situated approximately 40 kilometers from the retail store. If the required products are available in stock, delivery can be completed within a day. However, if products are unavailable, the warehouse must place orders with external suppliers, which typically results in a waiting period of 3 to 7 days. The supply chain of this company is presented in **Figure 1**.

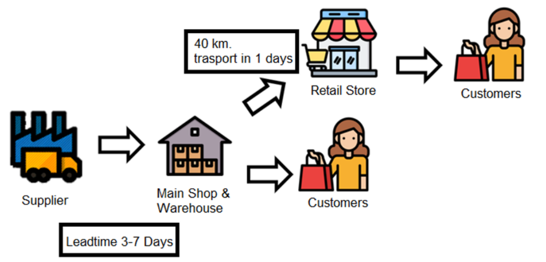

Figure 1 Supply Chain of Company Case Study

To understand demand patterns, an analysis was conducted using historical sales data from May 2022 to May 2023. The study specifically focused on the product group with the highest sales value, from which four top-selling products were selected for detailed examination. To evaluate the impact of the proposed inventory management approach, trace-driven simulations were performed using the historical demand data. These simulations aimed to assess the potential improvements in inventory control and transportation efficiency resulting from the implementation of the Min-Max policy.

4. Methodology and Results

Step 1 Demand Analysis

The one-year historical demand for four best-selling products, labeled A, B, C, and D, is presented in **Figures 2–5**. A summary of key statistics for each product, including the mean, standard deviation, minimum, and maximum demand, is provided in **Table 1**.

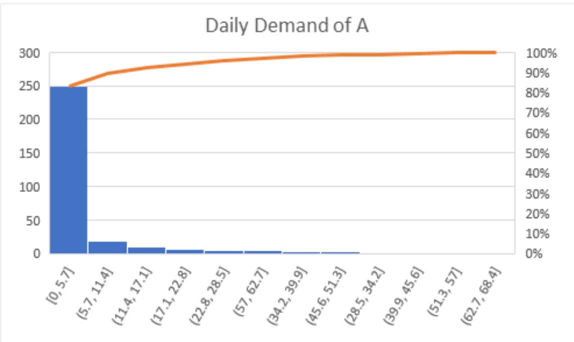

Figure 2 Histogram of Demand for Product A

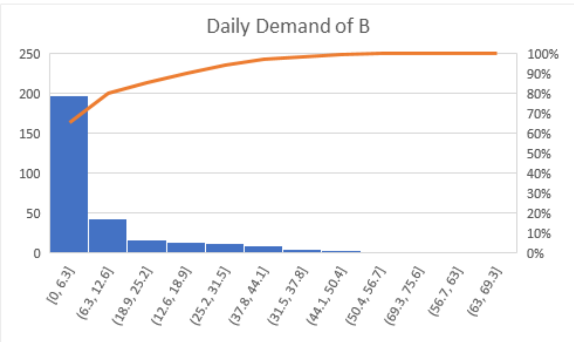

Figure 3 Histogram of Demand for Product B

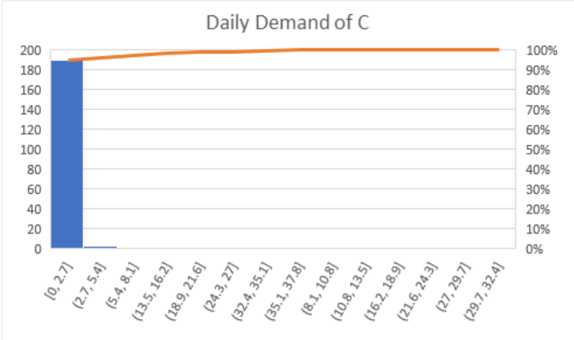

Figure 4 Histogram of Demand for Product C

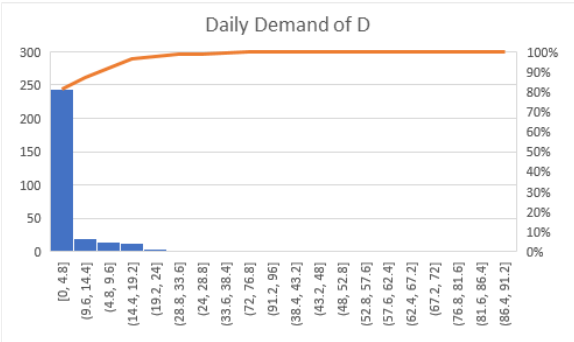

Figure 5 Histogram of Demand for Product D

Table 1 Key statistics for each product

Product	Daily Demand (Units)			
	Mean	STD	Min	Max
A	4.21	10.96	0	65
B	7.75	12.03	0	75
C	0.90	4.45	0	36
D	3.50	9.01	0	94

The analysis of the demand data indicates that the four selected products experience low demand volumes with significant variability. This is demonstrated by the combination of a low average demand, a high standard deviation, and a wide demand range. **Figures 6–9** illustrate the daily demand patterns over a 30-day period for each product, revealing that demand is highly irregular and discrete, with numerous days showing zero demand.

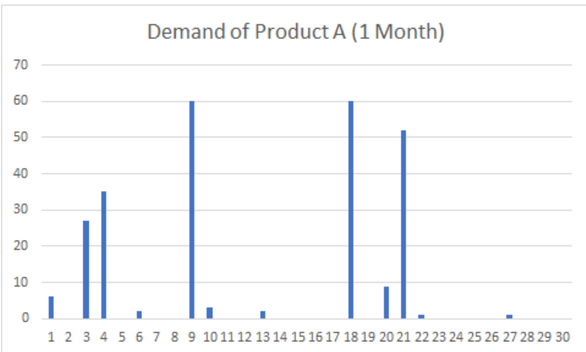

Figure 6 Daily Demand (1-month) for Product A

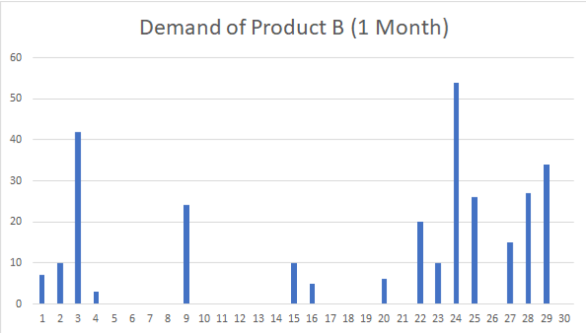

Figure 7 Daily Demand (1-month) for Product B

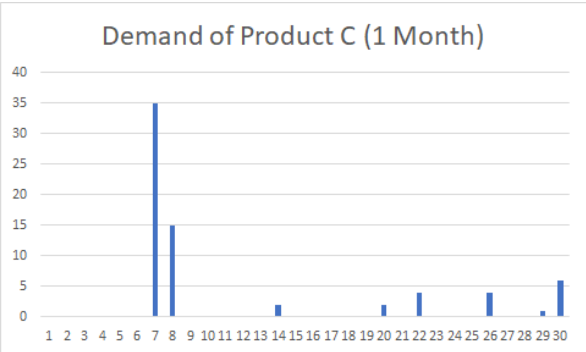

Figure 8 Daily Demand (1-month) for Product C

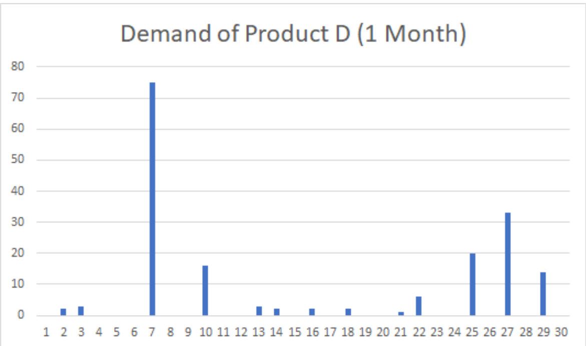

Figure 9 Daily Demand (1-month) for Product D

Due to the high frequency of zero-demand days, the demand analysis was conducted after excluding these zero values, as presented in **Table 2**.

Table 2 Demand Analysis Ignoring Zero Demand

Product	**Daily Demand (unit)**			
	Mean	**STD**	**Min**	**Max**
A	14	16	1	65
B	13	13	1	75
C	11	12	1	36
D	11	18	1	94

Step 2 Proposed Procedure

In this step, the Min-Max inventory policy was implemented for the store to manage demand fluctuations more effectively. The demand data presented in **Table 2** served as the basis for determining the Min and Max values used in the policy setup. These values were calculated using the following formulas:

Min = Average Demand x Minimum Lead-time

Max = Average Demand x Most Likely Lead-time

The minimum lead time, based on the collected data, was determined to be one day, while the most likely lead time was estimated at three days, as reported by the purchasing officers. These lead times reflect typical delivery patterns and help balance inventory availability with demand variability. The calculated Min and Max values for the Min-Max policy are summarized in **Table 3**, providing a structured approach for managing stock levels to minimize stockouts while avoiding excessive inventory.

Table 3 Min-Max policy for the case study

Product	Min	Max
A	14	42
B	13	39
C	11	33
D	11	33

The proposed Min-Max policy flowchart for the retail store is illustrated in **Figure 10**. This flowchart outlines the decision-making process for managing inventory based on demand patterns. When incoming customer demands are received, the system first checks whether the current inventory level is sufficient to fulfill the request. If the inventory is adequate, sales can be processed immediately. However, if the inventory is insufficient to meet demand, the retail store initiates a replenishment order from the warehouse. The order quantity is determined by the difference between the maximum stock level and the current inventory, adjusted to include any existing backorders. To optimize logistics efficiency, the order quantity is rounded up to match the lot size or the full load capacity of the delivery trucks. Upon the arrival of the order within the specified lead time, the stock is updated accordingly to reflect the replenished quantities. The effectiveness of this proposed Min-Max policy was evaluated by tracing historical demand data through a simulation model, ensuring its practical application and reliability in managing inventory fluctuations.

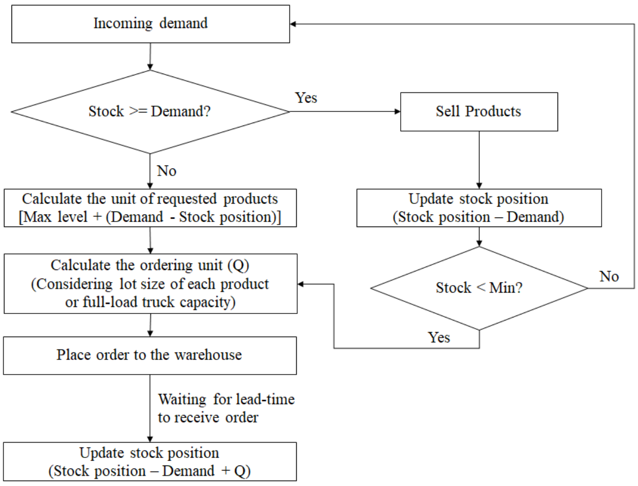

Figure 10 Proposed Min- Max procedure

Step 3 Simulation Results

The proposed Min-Max inventory policy, as detailed in **Table 3**, was evaluated using a trace-driven discrete-event simulation to assess its effectiveness in managing inventory levels. The simulation used actual historical daily demand data as input, replicating real operational scenarios and preserving the natural sequence of demand events. A constant replenishment lead time of one day was assumed, and it was further assumed that all items were always available at the warehouse, eliminating upstream supply constraints. These assumptions created a controlled environment that allowed for a focused analysis of the inventory policy's responsiveness.

Figure 11 presents a sample simulation result for Product A over the month of May 2022. The minimum and maximum inventory levels were set at 14 and 42 units, respectively, with a fixed lot size of 40 units and a maximum storage capacity of 80 units. The columns in the table record daily demand, remaining stock, replenishment orders placed, and receipts of goods.

Product A:		**Min**	**Max**		
Lot Size:	40	**14**	**42**		
Max Cap:	80				
		Demand	**Stock**	**Order**	**Receive**
Wed	4/5/2022	6	36		
Thu	5/5/2022	0	36		
Fri	6/5/2022	27	9	40	
Sat	7/5/2022	35	14	0	40
Sun**	8/5/2022	0	14	0	0
Mon	9/5/2022	2	12	40	0
Tue	10/5/2022	0	52	0	40
Wed	11/5/2022	0	52	0	0
Thu	12/5/2022	60	-8	40	0
Fri	13/5/2022	3	29	0	40
Sat	14/5/2022	0	29	0	0
Sun**	15/5/2022	0	29	0	0
Mon	16/5/2022	2	27	0	0
Tue	17/5/2022	0	27	0	0
Wed	18/5/2022	0	27	0	0
Thu	19/5/2022	0	27	0	0
Fri	20/5/2022	0	27	0	0
Sat	21/5/2022	60	-33	40	0
Sun**	22/5/2022	0	7	40	40
Mon	23/5/2022	9	38	0	40
Tue	24/5/2022	52	-14	40	0
Wed	25/5/2022	1	25	0	40
Thu	26/5/2022	0	25	0	0
Fri	27/5/2022	0	25	0	0
Sat	28/5/2022	0	25	0	0
Sun**	29/5/2022	0	25	0	0
Mon	30/5/2022	1	24	0	0
Tue	31/5/2022	0	24	0	0

Figure 11 Example simulation for product A

The simulation began on May 4 with an initial stock of 36 units. On May 6, a demand of 27 units reduced the stock to 9 units, falling below the minimum threshold of 14. This triggered a replenishment order of 40 units, which was received the following day (May 7), raising the stock to 49 units. On May 7, a further demand of 35 units dropped the stock to 14 units, exactly at the minimum level, so no order was triggered. On May 10, the stock level was replenished to 52 units after receiving an order placed the previous day. No demand was recorded that day, so the inventory remained unchanged. However, a sharp demand spike occurred on May 12, with 60 units required while the stock was only 52 units, resulting in a negative balance of -8 units. A replenishment order of 40 units was then placed and received on May 13, bringing the stock to 32 units.

This cycle repeated on May 21, when demand again spiked to 60 units. The available stock of 27 units was insufficient, leading to a stockout of -33 units. A new order was placed and received on May 22, restoring the stock to 7 units. A final notable stockout occurred on May 24, when demand of 52 units drew the stock down to -14 units. A replenishment order was placed and fulfilled on May 25, raising the stock to 25 units.

Over the one-month simulation, four replenishment orders were triggered on May 6, 9, 12, 21, 22 and 24—each aligned with the fixed lot size policy of 40 units. The simulation illustrates how the Min-Max system reacts when inventory dips below the threshold but also highlights its limitations. Because of the fixed lot size, inventory occasionally exceeded the maximum stock level (e.g., May 10 with 52 units) or fell into negative territory due to high demand and lead time delays.

The simulation data also illustrate key patterns. First, on several days (e.g., May 5, 8, 10, 11), demand was zero, indicating periods of no sales or customer inactivity. During these periods, no changes in inventory occurred. On days with unusually high demand (e.g., May 10 and May 21, with demands of 52 and 60 units respectively), the fixed lot size and 1-day lead time sometimes resulted in temporary negative stock levels, reflecting potential stockouts. Although the inventory was replenished promptly the following day, this highlights how the Min-Max policy can be vulnerable under large, sudden demand spikes when constrained by lot sizes.

These results demonstrate the Min-Max policy's operational simplicity and responsiveness, while also exposing its challenges under highly variable demand conditions. The simulation for Product A was part of a broader, one-year evaluation of four key products. The results, summarized in **Table 4**, provide a comprehensive analysis of inventory behavior, service levels, and order efficiency under the Min-Max control framework.

Table 4 Simulation Results

Product	No. of transports/year (times)		Average Inventory (Units)	
	Existing	Min-Max Policy	Existing	Min-Max Policy
A	30	22	55.31	27.71
B	47	47	65.92	35.66
C	5	6	61.96	17.84
D	25	21	61.24	28.03
Total	107	96	244.43	109.24
Diff, %Impro.	11, 10.28%		135.19, 55.31%	

To evaluate the impact of implementing the Min-Max inventory policy, this study compares the total number of replenishment orders placed for four key products over the course of one year under the existing method versus the proposed Min-Max policy. A key performance indicator used in this comparison is the transportation cost, specifically fuel expenses, which are directly influenced by the frequency of trips between the central warehouse and the retail branch. The fuel cost per transportation trip was calculated using the formula:

Fuel cost = (Round-trip distance/Fuel consumption rate) × Diesel price

Substituting actual values: (40 km / 7 km per liter) × 32.14 THB/liter = 184 THB per trip.

By reducing the number of transportation trips required through more efficient inventory control, the implementation of the Min-Max policy results in a substantial cost saving. For the four analyzed products alone, the reduction in transportation frequency translates into an estimated annual fuel cost saving of approximately 2,024 THB. This calculation assumes a conservative scenario where each trip delivers only one product.

In addition, as shown in Table 4, the Min-Max policy reduces the average inventory units by 55.31% for four key products. This reduction in average inventory units also implies a decrease in inventory holding costs.

These results highlight the practical value of adopting a structured inventory management policy in retail operations. Beyond improving stock availability and service levels, the Min-Max policy demonstrates measurable operational cost savings—emphasizing its relevance for companies seeking low-complexity, high-impact improvements in supply chain efficiency.

5. Conclusion

This research explores the implementation of the Min-Max inventory policy for improving inventory management at the case study company. The primary issue identified was the absence of a structured stock control system, which resulted in frequent and unnecessary transportation between the main warehouse and the outlet shop, increasing operational inefficiencies. A demand analysis conducted at the outlet revealed that demand for the selected products was both discrete and highly variable, contributing to inventory challenges.

To address this, a Min-Max inventory policy was proposed, where the minimum stock level was set to cover one day's demand and the maximum stock level was established to cover three days' demand, both determined based on the variability of lead times. This systematic approach aimed to balance inventory availability while minimizing the frequency of stock replenishments.

The simulation results clearly demonstrate that implementing the Min-Max inventory policy led to a substantial reduction in the number of transportation trips required for the selected products, as well as a significant decrease in overall transportation costs. Compared to the previous practice of daily restocking based on staff judgment and experience, the Min-Max approach offers a more structured and data-driven method of inventory control. This reduction in transportation frequency not only lowers fuel expenses but also highlights the policy's potential to enhance logistics efficiency, streamline operations, and contribute to more sustainable supply chain management.

6. Discussion

The products analyzed in this study were the four best-selling items within their category, representing only a small subset of the company's entire product portfolio. As a result, the findings presented here may not fully capture the broader impact of implementing the proposed Min-Max inventory policy across the entire organization. The primary objective of this analysis was to demonstrate the practical application of the Min-Max approach in a focused setting rather than to offer a comprehensive company-wide evaluation of its effects.

A key advantage of the Min-Max inventory policy is its simplicity and ease of implementation, making it accessible for practical use in day-to-day operations. However, accurately determining the optimal minimum and maximum stock levels can be more complex than the straightforward calculations presented in this study. Various methods could be employed to define these thresholds, with the choice of approach depending on the specific performance metrics being prioritized, such as service level, order frequency, or cost minimization. More advanced Min-Max strategies may have been applied in other studies to address similar inventory challenges, utilizing sophisticated statistical models or demand forecasting techniques.

Nevertheless, the simplified method adopted here was intentionally chosen to align with the practical requirements and operational constraints of the case study company. This straightforward approach provides a foundational framework for improving inventory control while remaining adaptable for potential refinement in future applications.

7. Managerial Implications

The findings of this study offer several managerial implications for improving inventory management practices. Implementing a structured Min-Max inventory policy can help managers establish clearer stock control procedures, reducing unnecessary transportation between the warehouse and retail stores. This structured approach minimizes reliance on manual decision-making and enhances overall operational efficiency. The simplicity of the Min-Max policy also makes it a practical choice for businesses seeking straightforward inventory solutions. Its ease of implementation ensures that managers can adopt it without requiring extensive technical expertise, making it suitable for various operational environments.

However, while the simplified Min-Max calculation used in this study proved effective, managers should consider refining the minimum and maximum stock levels based on more detailed performance metrics such as service levels, demand variability, and holding costs. Periodic adjustments based on data analysis can help maintain optimal stock levels and align them with evolving business conditions. Moreover, the reduction in transportation trips observed in the simulation suggests that expanding the Min-Max approach to other product categories could further optimize logistics, reduce transportation costs, and improve service efficiency.

A key takeaway from this analysis is the importance of data-driven decision-making in inventory control. Managers should encourage the use of historical demand data and simulation models to support evidence-based decisions, ensuring more predictable and efficient inventory operations. Since the findings were derived from a limited product subset, it is recommended that managers exercise caution when applying the Min-Max policy across the entire product portfolio. Conducting pilot tests on a broader range of products and performance metrics would provide a more comprehensive understanding before full-scale implementation.

To maximize the benefits of the Min-Max policy, managers should also invest in employee training and standardize inventory management practices across all locations. Providing staff with the necessary knowledge and tools will promote consistency and reduce variability in stock control processes. Finally, the Min-Max policy should be viewed as a flexible framework rather than a static solution. Managers should continually evaluate and refine the approach, potentially incorporating advanced demand forecasting methods to further enhance inventory efficiency over time.

8. Limitations

One limitation of the Min-Max inventory policy lies in its handling of lot size constraints, which may prevent the ordering of quantities that precisely match replenishment needs. In practice, order quantities are often restricted by predefined lot sizes, requiring purchases in fixed multiples regardless of actual demand. This constraint can lead to higher inventory holdings, as excess stock is ordered to comply with lot size requirements rather than to fulfill immediate demand. The issue becomes more pronounced under conditions of high demand variability or when demand drops to zero for extended periods. In such cases, the Min-Max approach may result in overstocking, thereby tying up capital and occupying valuable storage space. To address this limitation, future research could explore alternative lot-sizing methods tailored to discrete or highly variable demand environments. Techniques such as dynamic lot-sizing or mixed-integer optimization may offer more efficient inventory control by aligning order quantities more closely with real-time demand fluctuations.

Additionally, daily demand in inventory systems typically follows time-series patterns characterized by trends, seasonality, and irregular fluctuations. Recognizing this, future studies should incorporate advanced time- series forecasting techniques to improve demand prediction accuracy and inform inventory decisions more effectively. In this study, historical daily demand data were analyzed and incorporated into the simulation process using trace-driven simulation, which preserves the temporal structure of actual demand patterns. While the Min-Max policy itself does not explicitly forecast demand, the use of historical time-series data in simulations allows the evaluation of policy performance under realistic demand scenarios. Nevertheless, future work could integrate statistical forecasting models—such as exponential smoothing, or machine learning approaches— to enhance inventory responsiveness and reduce the risk of overstocking or stockouts.

9. Acknowledgments

This research is part of the project "A Strategic Roadmap Toward the Next Level of Intelligent, Sustainable, and Human-Centered SME: SME 5.0" from the European Union's Horizon 2021 research and innovation program under the Marie Sklodowska-Curie Grant agreement No. 101086487.

10. References

[1] D. C. Bose, "Introduction," in *Inventory management*, New Delhi, India: PHI Learning Pvt. Ltd., 2006, ch. 1, pp. 1–5.

[2] J. W. Toomey, "Overview," *Inventory management: principles, concepts and techniques,* New York, NY, USA: Springer Science & Business Media, 2000, ch. 1, sec. 1, pp. 1–9.

[3] E. E. Ozguven and K. A. Ozbay, "A secure and efficient inventory management system for disasters," *Transportation research part C: emerging technologies*, vol. 29, pp. 171–196, 2013, doi: 10.1016/j.trc.2011.08.012.

[4] N. Hernandoko and P. W. Laksono, "Inventory Control Using ABC Classification and Min-Max Stock Method in The Manufacture of Armored Vehicle Body Hull at PT XYZ," presented at 8th International Conference on Industrial, Mechanical, Electrical and Chemical Engineering (ICIMECE 2023), Mataram, Indonesia, Oct. 30, 2023, Paper 02009, doi: 10.1051/e3sconf/202346502009.

[5] Y. Zhang and H. -W. Chen, "A min-max policy for multi-item joint inventory replenishment problem: Application to industrial vending machines," *Computers & Industrial Engineering*, vol. 172, 2022, Art. no. 108633, doi: 10.1016/j.cie.2022. 108633.

[6] D. Muhamad and S. Kodrat Imam Design, "system fuel inventory control in gas stations with the concept of min-max stock level and time phased order point case study gas stations," in *Proc. 1st International Conference on Information Systems For Business Competitiveness (ICISBC) 2011*, Semarang, Indonesia, Dec. 8–9, 2011.

[7] S. Chopra and P Meindl, "Supply Chain Management. Strategy, Planning & Operation," in *Das Summa Summarum des Management*, C. Boersch, R. Elschen, Eds, Wiesbaden, Germany: Springer Fachmedien Wiesbaden GmbH, 2007, ch. 4, sec. 4, pp. 265–275.

[8] P. D. Larson, "Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies," *Journal of Business Logistics*, vol. 22, no. 1, pp. 259–261, 2001, doi: 10.1002/j.2158-1592.2001.tb00165.x.

[9] S. C. Graves and S. P. Willems, "Supply chain design: safety stock placement and supply chain configuration," *Handbooks in Operations Research and Management Science*, vol. 11, pp. 95–132, 2003, doi: 10.1016/S0927-0507(03)11003-1.

[10] Y. Aviv and A. Federgruen, "Stochastic inventory models with limited production capacity and periodically varying parameters," *Probability in the Engineering and Informational Sciences*, vol. 11, pp. 107–135, 1997.

[11] E. A. Silver, D. F. Pyke and R. Peterson, "Individual Item with Probabilistic Demand," in *Inventory management and production planning and scheduling*, Danvers, MA, USA: John Wiley & Sons, 1998, ch. 6, sec. 6.3, pp. 237–316.

[12] J. Bramel, S. Goyal and P. Zipkin, "Coordination of Production/Distribution Networks with Unbalanced Leadtimes," *Operations Research*, vol. 48, no. 4, pp. 570–577, 2000.

[13] S. Nahmias and T. L. Olsen, "Inventory Control Subject to Uncertain Demand," in *Production and operations analysis*, Long Grove, IL, USA: Waveland Press, 2015, ch. 5, sec. 5.1, pp. 249–314.

[14] M. Cohen, P. V. Kamesam, P. Kleindorfer, H. Lee and A. Tekerian, "Optimizer: IBM's Multi-Echelon Inventory System for Managing Service

Logistics," *Interfaces*, vol. 20, no. 1, pp. 65–82, 1990, doi: 10.1287/inte.20.1.65.

[15] W. Voorsluys and R. Buyya, "Reliable Provisioning of Spot Instances for Compute-intensive Applications," in *2012 IEEE 26th International Conference on Advanced Information Networking and Applications*, Fukuoka, Japan, 2012, pp. 542–549, doi: 10.1109/AINA.2012.106.

[16] S. P. Ghodake, V. R. Malkar, K. Santosh, L. Jabasheela, S. Abdufattokhov and A. Gopi, "Enhancing Supply Chain Management Efficiency: A Data-Driven Approach using Predictive Analytics and Machine Learning Algorithms," International *Journal of Advanced Computer Science and Applications*, vol. 15, no.4, pp. 672–686, 2024, doi: 10.14569/IJACSA.2024.0150469.