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Intelligent Inventory Management: Implementing ABC SKU at the 'Água Fria' Ice Factory

Smart Inventory Management: ABC SKU Implementation at the 'Água Fria' Ice Factory

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Abstract

Agua Fria, a Mexican company with over 130 years of experience in ice production, faces critical challenges in its logistics management despite its extensive national presence. The organization suffers from inconsistencies in records, stockouts of high turnover products, and excess inventory of low demand items. This situation leads to unnecessary capital immobilization and lost sales due to decision making based on subjective criteria and unreliable manual records. This project is based on the implementation of key logistics tools such as the SKU (Stock Keeping Unit), which serves as a unique identifier to guarantee traceability, as well as ABC classification. Based on the Pareto Principle, this methodology prioritizes products according to their economic value, allowing for differentiated controls and more efficient resource allocation. The study, conducted at the Hidalgo plant, employed a quantitative approach, analyzing local databases and manual logs. The process included data cleaning, calculation of annual consumption, and product categorization. Preliminary results enabled the transformation of operational data into financial indicators, laying the groundwork for transitioning from reactive management to objective and proactive planning. The implementation aims to optimize service levels, mitigate stockout risks, and improve the company's net profitability.
Keywords: ABC, alphanumeric coding, efficiency, Pareto, SKU.

Summary

Agua Fria, a Mexican company with over 130 years of experience in ice production, faces critical challenges in its logistics management, despite its extensive presence throughout the country. The organization exhibits inconsistencies in its records, a lack of stock of high-turnover products, and excess stock of low-demand items. This situation results in unnecessary capital immobilization and lost sales due to decision-making based on subjective criteria and unreliable manual records. This project is based on the implementation of essential logistics tools, such as the SKU (Stock Keeping Unit), which acts as a unique identifier to ensure traceability, as well as ABC classification. Based on the Pareto Principle, this methodology prioritizes products according to their economic value, allowing for differentiated controls and more efficient resource allocation. The study, conducted at the Hidalgo unit, adopted a quantitative approach, analyzing local databases and manual records. The process included data cleaning, calculation of annual consumption, and product categorization. Preliminary results have enabled the transformation of operational data into financial indicators, establishing the basis for the transition from reactive management to objective and proactive planning. The implementation aims to optimize service levels, mitigate stockout risks, and improve the company's net profitability.

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1. Introduction

Agua Fría is a Mexican company established in 1890. It is dedicated to the production of food grade ice, building a solid expertise based on the quality and service it offers nationwide. Currently, they operate in 14 states across the Republic and supply more than 13,000 establishments, including supermarkets and convenience stores.

According to AR Racking (SKU in logistics: what it is and applications in the warehouse), an SKU (Stock Keeping Unit) is a unique code assigned to each product or product variant for identification within an inventory (it is an alphanumeric code of 8 to 12 characters). This code may consists of letters, numbers, or a combination of both, and its primary function is to facilitate product tracking throughout inventory and logistics processes. This is crucial in logistics as it allows for more efficient inventory management. By assigning a unique identifier to each product, companies can closely monitor the movement of goods and optimize operations. SKUs also facilitate product tracking and data-driven decision making. De Guevara, M. Á. L. (2020).

ABC inventory classification is a system for segmenting and organizing warehouse products based on their importance or relevance to the company. Generally, economic value is taken into account to prioritize tasks and resources and improve merchandise efficiency based on the Pareto Principle, which states that 80% of results come from 20% of the causes. Granda León, GL, & Rodríguez Gaybor, RE (2013).

In the words of Jay Heizer (2017) in Principles of Operations Management, the ABC method is proposed as an inventory stratification technique that segments items into three categories based on their annual monetary value, determined by annual demand and unit cost. This framework is supported by the Pareto Principle, which postulates that a small proportion of elements accounts for the greatest impact, while the majority has a relatively minor effect. Under this logic, the objective of ABC is to design differentiated control policies, focusing management, monitoring, and resources on the most critical items instead of applying uniform treatment to the entire inventory, Morocho, CA P. (2020).

In accordance with the above, Heizer et al. (1995) warn that inventory can represent up to 40% of a company's committed capital, highlighting the importance of establishing effective controls. Furthermore, they emphasize that information derived from inventory records must be characterized by accuracy and reliability, as it constitutes an essential input for decision making related to purchase orders, operations planning, and material flow. Hualtibamba, MMP, & Aitken, HGW (2018).

From this perspective, ABC classification is understood as a prioritization procedure that organizes SKUs according to their economic or operational weight, avoiding homogeneous

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administration. Although its theoretical foundation is linked to the Pareto Principle, its modern application lies in assigning differentiated service levels, defining fill rates, and controlling lead teams. Additionally, it acts as a criterion for prioritizing continuous improvement initiatives, starting with strategic SKUs. Associated benefits include a more rational allocation of resources, greater efficiency in inventory control, optimization of service levels, mitigation of stockout risks, and a positive effect on profitability (CSCMP, 2017: Mendonça, 2021).

For their part, Bustos Flores et al. (2010) defines procurement as the function responsible for ensuring the timely availability of goods required for production processes, service delivery, or commercial activities. Although often associated exclusively with the purchasing process, its operational scope is broader, also incorporating warehousing and inventory management activities. Arenas, JC (2024).

According to García (1999) and Odette (2025) in Warehouses: Planning, Organization, and Control, before structuring warehouse planning, it is essential to perform a preliminary analysis that includes the identification of items to be stored and the functional layout of the receiving, storage, and dispatch areas. This prior diagnosis allows for the alignment of infrastructure and operational flows with logistical requirements Zárate, LGE, & Lozada, M. Á. R. (2020).

In a systemic approach, Correa et al. (2010) conceptualize warehouse management as a strategic process aimed at synchronizing supply and demand flows, optimizing distribution costs, and meeting the needs of production processes. Along the same line, Gunasekaran et al. (2008) argue that efficient warehouse and inventory management is a critical component in the supply chain due to its direct participation in the exchange of goods and information between suppliers, manufacturers, distributors, and customers. González, SS, Maturano, BAM, & Lopez, LYC (2023).

Finally, García (2005) describes the warehouse as a functional support unit within the organization whose purpose is to safeguard, maintain, control, and supply materials. Complementarily, Ferrin (2007) points out that storage involves the correct physical placement of received products in assigned spaces, according to the defined storage system or module, ensuring order, traceability, and accessibility. Mantilla Saravia, OD, & Revilla Castro, JB

2. Problem

Currently, deficiencies in inventory control at Agua Fria result in unnecessary capital immobilization in slow moving products and, simultaneously, losses from unrealized sales due to stockouts. Implementing an efficient inventory system will free up cash flow and improve the organization's net profitability.

Despite its market position, the organization has critical deficiencies in its inventory control system, including incorrect shipments and difficulties in locating products. The existing problems

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manifest as inconsistencies in records, such as significant discrepancies between the physical inventory and the data reported in the system. This situation is compounded by stock shortages and excess inventory: stockouts occur for high moving products, while other supplies are maintained at excessive levels, generating unnecessary storage costs.

The lack of valuation methods is evident in the difficulty of accurately determining the economic value of warehouse assets, which hinders financial decision making.

This situation compromises the company's operational efficiency and highlights the urgency need to implement an inventory management model that adapts to dynamic organizational needs.

3. Methodology

The selected factory sells ice for both human and non-human consumption. Its facilities are located in the state of Hidalgo, Mexico.

This study focuses on improving product management and optimizing control through the application of ABC classification methodology. Based on structured observation and analysis of the company's operational and commercial information, a comprehensive view of the current situation was developed, highlighting the deficiencies associated with inventory management. From this diagnosis, an improvement proposal was formulated, focused on strengthening warehouse control within the chilled water factory, with the aim of increasing customer service levels and contributing positively to the organization's financial performance.

As part of the research and implementation process, the following activities were carried out:

- Observation and information gathering: The company's database was accessed to identify and analyze relevant information related to the subject of study. Historical sales and demand reports for each product in previous periods were considered as the main variables.
- Definition of inclusion criteria: Based on the data obtained, records that met the necessary conditions for analysis were selected. Subsequently, the information was cleaned, grouped, and structured for processing.
- Application of exclusion criteria: Data falling outside the defined time frame were discarded, preventing biases arising from the use of information limited to a single annual period.
- Data analysis and initial diagnosis: The company's baseline situation was evaluated, identifying critical processes related to inventory management and warehouse operations.

The company maintains records of its financial and production operations using local systems, supplemented by manual logs. Based on this structure, several areas for improvement within the management process has been identified. Due to the current organizational and control system, the following problems have been identified:

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Production decisions and priorities depend primarily on the manager's experience and judgment, sometimes with insufficient information for objective planning.

- Scenarios of overproduction or underproduction arise, creating imbalances between supply and demand.
- The customer serves as the primary indicator for detecting shortages, expiration, or product discontinuation, implying a reactive rather than a proactive approach.
- Inconsistent or incomplete historical data: Sales, consumption, or inventory movement records with errors, omissions, or a lack of standardization.
- Absence of structured SKU coding: Products without unique identifiers or with ambiguous descriptions, hindering classification and traceability.
- Unconsidered seasonal variability: Significant changes in demand (due to weather or season) distort ABC classification if a representative period is not analyzed.

4. Results

To evaluate the inventory situation and validate the applicability of the proposed methodology, an ABC classification analysis was conducted using historical sales and demand data for the products manufactured by the chilled water factory. This stage enabled the transformation of operational data into quantitative indicators, thereby facilitating the identification of the products that generate the greatest economic impact within the organization.

The analysis was conducted over a representative time horizon, integrating records from the company's local database and manual product dispatch controls. Based on this information, the calculation framework was established, incorporating key variables such as annual demand, unit price, and annual consumption value. These variables form the foundation of the ABC model, as they allow products to be ranked according to their financial contribution.

First, the data was cleaned and validated to eliminate inconsistencies and ensure the reliability of the results. Subsequently, the annual demand for each product was calculated by incorporating the sales volumes recorded during the study period. Based on these values, the annual consumption value was determined by multiplying the annual demand by the corresponding unit price, as shown in Table 1.

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Table 1. Sales Summary.

Product	**Annual demand**	**Unit price**	**Annual sales**
50kg Crushed Bag	35094	87	$ 3,053,160.51
15kg Gourmet Bag Generic Brand	2804	80	$ 224,355.17
5.0kg Bag Oxxo	384612	17.59	$ 6,765,326.80
5.0kg Bag Generic Brand	158812	29	$ 4,605,550.44
15.0kg Bag Generic Brand	7359	72	$ 529,821.35
5.0kg Bag Great Value	1084	16.28	$ 17,653.84
50kg Bar	58127	84	$ 4,882,649.06

Once the annual values were obtained, the products were ranked from highest to lowest economic contribution. This procedure enabled the calculation of both the individual and cumulative percentages of participation, as shown in Table 2. The 5 kg Oxxo bag ranked first, while the 5 kg Great Value bag ranked last.

Based on the cumulative percentages, the products were classified according to the standard criteria of the method, as presented in Table 3: Classification A (0 80%), Classification B (80 95%), and Classification C (95 100%). This classification facilitated the identification of items requiring a higher level of control, monitoring, and priority in planning.

The resulting segmentation demonstrates the concentration of economic value within a small group of products, a pattern consistent with the Pareto Principle, as illustrated in Figure 1.

TABLE 2. Percentage of participation.

Product	Annual demand	Unit price	Annual sales	%	% accumulated	ABC
5.0kg Bag Oxxo	384612	17.59	$6,765,326.80	33.69%	34%	THE
50kg Bar	58127	84	$4,882,649.06	24.32%	58%	THE
5.0kg Bag Generic Brand 50kg	158812	29	$4,605,550.44	22.94%	81%	B
Crushed Sack	35094	87	$3,053,160.51	15.21%	96%	W
15.0kg Bag Generic Brand 7359 15kg Gourmet		72	$529,821.35	2.64%	99%	W
Generic Bag Brand Bag 5.0kg Great	2804	80	$224,355.17	1.12%	100%	W
Value	1084	16.28	$17,653.84	0.09%	100%	W
		TOTAL	$20,078,517.16	100%		

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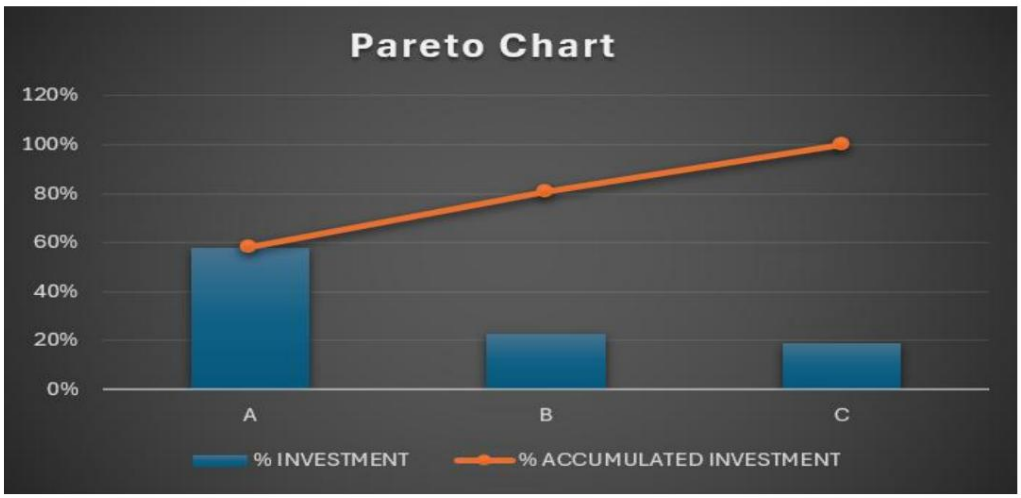
Table 3. Classification criteria.

Classification	% annual volume in money
THE	0.80%
B	80% 95%
w	95% 100%

Figure 1. Pareto diagram.



The results of the ABC analysis provide a clear view of the inventory structure, enabling the identification of critical products, medium contribution items, and products with low financial impact. This information is essential for decision making regarding supply policies, inventory levels, production priorities, and control strategies.

However, during the data cleaning and validation phase, a significant limitation related to inconsistencies in product identification was identified. The lack of a standardized coding system led to ambiguity in descriptions, duplicate records, and difficulties in consolidating historical data. This situation jeopardized the accuracy of the ABC analysis, as it could distort actual demand and the annual consumption value per product. To address this issue, a Stock Keeping Unit (SKU) coding system was designed and implemented to ensure the unique and structured identification of each inventory item.

The SKU system was developed using a hierarchical and structured coding approach, allowing for the integration of relevant variables such as product type, presentation, weight, and brand into a single identifier. The products manufactured by the factory are:

- 5.0kg Bag Oxxo
- 50kg Bar
- 5.0kg Bag Generic Brand
- 50kg Crushed Sack
- 15.0kg Bag Generic Brand
- 15kg Gourmet Bag Generic Brand

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As a first step, the physical nature or general category of the item was identified. This component allows for a quick distinction between the different presentation forms, as shown in Table 4.

Table 4. Product category.

Code	Description
HIE	Bag of ice
WAISTBAND	Bag
BAR	Bar

The second step describes the distinctive characteristic of the product, such as the type of ice or the commercial classification, as illustrated in Table 5.

Table 5. Product distinction.

Code	Description
TR	Crushed
CB	Cubed
GO	Gourmet
NA	Not applicable

In the third step, the capacity or content of the product was specified, expressed in kilograms, as shown in Table 6.

Table 6. Product Capacity

Code	Description
05	5 kg
15	15 kg
50	50kg

For the fourth step, the specific brand or client was identified, as shown in Table 7.

Table 7. Trademark.

Code	Description
OX	Oxxo
GV	Great value
MG	Generic Brand

Finally, using the variables described above, the SKU system was assigned to each of the products, resulting in the data presented in Table 8.

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Table 8. SKU system integration.

Product	Assigned SKU
50kg Crushed Bag	COS TR 50 MG
15kg Gourmet Bag Generic Brand	HIE GO 15 MG
5kg Bag Generic Brand	HIE CB 05 OX
5 kg bag, generic brand.	HIE CB 05 MG
15kg Bag Generic Brand	HIE CB 15 MG
5kg Bag Great Value	HIE CB 05 GV
50kg Bar	BAR NA 50 MG

This system standardized product identification, reducing errors in records, eliminating duplicates, and strengthening the reliability of the information used in the ABC analysis. Furthermore, it product improved traceability and optimized inventory control.

5. Discussion of results

The company Agua Fria has undergone an unprecedented evolution following the adoption of a structured SKU coding system and a hierarchical classification using the ABC method. When conducting a comparative balance between the organization's previous state and its current reality, a vast administrative gap is observed. While traditional management was limited by isolated manual records and decisions based on staff intuition, the current intelligent management model offers a centralized database and objective criteria for strategic decision making. This methodology has generated tangible benefits: warehouse space utilization has been maximized, purchasing cycles have been refined, and an increase in overall profitability has been projected, positioning the plant as a benchmark for operational efficiency within its sector.

- The transition from a reactive to a proactive approach allowed the company to capture demand that was previously lost due to stockouts.
- Increase in Sales: A 24% increase in net sales was recorded during the period evaluated, as shown in Table 9 and Figure 2. This growth is directly attributed to the guaranteed availability of Class A products (such as the 5kg Oxxo and Great Value bags), which previously exhibited production inconsistencies.
- Profitability: The optimization of delivery routes and the reduction of off schedule shipments to cover shortages led to an improvement in the operating margin.

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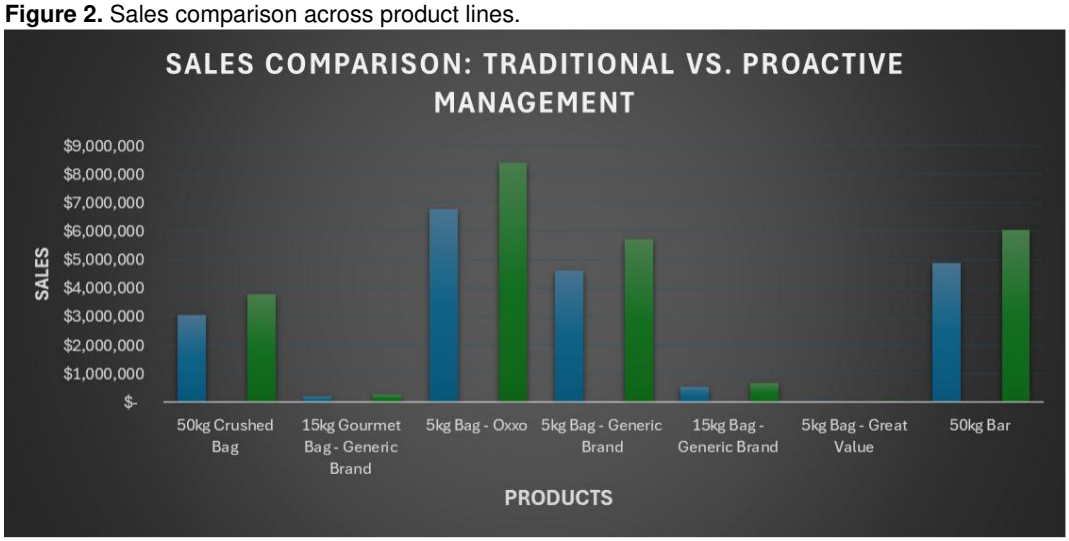
Table 9. Comparative analysis: traditional method vs. ABC SKU model.

Traditional method			
Product	Annual demand Unit	price	Annual sales
50kg Crushed Bag	35094	87	$ 3,053,161
15kg Gourmet Bag Generic Brand 5kg Bag	2804	80	$ 224,355
Oxxo 5kg Bag	384612	17.59	$ 6,765,327
Generic Brand 15kg Bag	158812	29	$ 4,605,550
Generic Brand 5kg Bag Great	7359	72	$ 529,821
Value 50kg Bar	1084	16.28	$ 17,654
	58127	84	$ 4,882,649
TOTAL	647892		$ 20,078,517

Figure 2. Sales comparison across product lines.



The ABC SKU classification demonstrated that the traditional inventory management approach was not the most profitable for Agua Fría. By implementing both methods, low turnover inventory for Class C products was reduced, resulting in a decrease in dead stock (immobilized inventory). This liberated physical warehouse space and, more importantly, increased sales to the extent that operational capacity benefited more than in previous years, as shown in Table 10.

TABLE 10. SKU-ABC Analysis: Results Comparison.

ABC---SKU			
PRODUCT	ANNUAL DEMAND	UNIT PRICE ANNUAL	SALES
50kg Crushed Bag 43516 15kg Gourmet Bag Generic		87	$ 3,785,919
Brand 3478 5kg Bag Oxxo 476919 5kg Bag Generic		80	$ 278,200
Brand 196927 15kg Bag Generic Brand 9125 5kg Bag		17.59	$ 8,389,005
Great Value 1345 50kg Bar		29	$ 5,710,883
		72	$ 656,978
		16.28	$ 21,891
	72077	84	$ 6,054,485
TOTAL	803386		$ 24,897,361

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Another significant benefit was the increase in the inventory turnover rate. By focusing production efforts on Class A items with the highest annual consumption value, total inventory turnover drastically improved. Furthermore, record accuracy was enhanced through the implementation of the SKU system; the discrepancy between physical inventory and the system was reduced to less than 2%, effectively eliminating duplicate records.

The management model based on the Pareto Principle demonstrated that strict control over 20% of the Category A SKUs ensures control of approximately 80% of the factory's economic value.

6. Discussion.

The implementation of ABC classification and standardization across SKUs at Agua Fría constitutes a fundamental pillar for optimizing the supply chain and financial security. According to Vollmann et al. (2005), ABC segmentation allows management to establish a clear operational hierarchy, concentrating efforts on Class A items that represent the highest inventory value. This vision is expanded by the approach of Lambert, Stock, and Ellram (1998), who emphasize that this prioritization is critical for optimizing expensive cold storage space, positioning high turnover products near dispatch points to minimize thermal loss. Complementarily, Ballou (2004) argues that correct identification via SKU facilitates total stock visibility, reducing inventory stockouts, while Martin Christopher (2016) links this precision to supply chain agility, allowing the factory to respond accurately to seasonal demand peaks. This efficiency not only improves service but also, according to Silver, Pyke, and Peterson (1998), enables a transition from empirical management to scientific administration, which is reinforced by the methodology of Flores and Whybark (1987) by introducing criticality criteria to ensure that strategic products (such as industrial ice for fisheries) are never out of stock. Avila Avila, MD, & Gil Ventura, R

Under this logic, SKU standardization allowed the organization to align its goals as per Heizer and Render (2014) avoiding energy waste on low demand products while guaranteeing total quality through First In, First Out (FIFO) systems which, as indicated by Kanter (1984), prevent crystal degradation due to prolonged storage. Furthermore, this structure mitigates the bullwhip effect described by Lee, Padmanabhan, and Whang (1997), preventing minor market fluctuations from generating unnecessary overproduction. By integrating activity based costing (ABC costing) from Kaplan and Cooper (1998), Agua Fría can identify the actual profitability of each ice variant after considering specific production costs, ultimately achieving the operational resilience proposed by Yossi Sheffi (2005), where data clarity allows for immediate recovery from any production line interruption, thus safeguarding cash flow and competitiveness in the cold chain market. Castro Suárez, M. (2020).

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7. Conclusions.

The implementation of intelligent inventory management at the Agua Fría ice factory represents a successful case study in logistical operations management for a company with a significant national presence in Mexico. This study demonstrates that transitioning from a traditional, intuition based approach to a technical system of ABC classification and SKU coding not only resolved operational deficiencies but also transformed the organization's financial and operational capacity.

Prior to this intervention, the company operated under a reactive scheme where the customer served as the primary indicator of shortages or irregularities. This lack of control created a scenario where capital was tied up in slow moving products while high demand items suffered from constant stockouts. The absence of standardized coding led to ambiguities, redundancies, and a critical gap between the warehouse's physical reality and system records. This situation not only increased storage costs but also hindered strategic decision making due to the lack of accurate data regarding the actual value of on-hand assets.

The first pillar of the solution was the creation of a SKU (Stock Keeping Unit) system with a hierarchical structure. By designing alphanumeric codes that integrate product category (HIE, COS, BAR), distinction (TR, CB, GO), capacity (05, 15, 50 kg), and brand (OX, GV, MG), the company achieved a unique and precise identification for every item. This technical tool served as the necessary foundation to eliminate duplicate records and reduce the discrepancy between physical inventory and the system to less than 2%. Without this standardization, any subsequent analysis would have lacked the reliability required for effectiveness.

The application of the ABC methodology, grounded in the Pareto Principle, allowed the organization to segment its products according to their economic relevance. The analysis revealed that products such as the "5.0kg Oxxo Bag" and the "50kg Block" belong to Class A, concentrating the highest annual consumption value and requiring strict control.

The results of this prioritization are compelling when comparing the traditional method against the ABC SKU model:

- Sales Increase: The guaranteed availability of strategic products (Class A) drove a 24% increase in net sales, rising from approximately 20 million to nearly 25 million MXN.
- Operational Efficiency: Delivery routes were optimized, and emergency shipments to cover shortages were reduced, thereby improving the operating margin.
- Space Optimization: The deliberate reduction of low turnover inventory (Class C) freed physical space in cold storage chambers and improved the total inventory turnover rate.

In conclusion, this study demonstrates that inventory management should not be a homogeneous process. The implementation of the ABC SKU binomial allowed Agua Fría to move

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away from empirical management in favor of scientific administration. By concentrating control efforts on the 20% of products that generate 80% of the value, the company not only secured its cash flow but also increased its agility in responding to seasonal demand and protected product quality through rotation improved systems. This intelligent management model positions the plant as a benchmark of efficiency, achieving the operational resilience necessary to compete in the dynamic cold chain market.

References

ARENAS, JC *Proposal for optimization and implementation of ABC inventories in wineries in Mansarovar.* 2024.

AVILA AVILA, MD; GIL VENTURA, R. *Proposes improvement to increase the inventory turnover rate in a iron products trader by employing ABC, EOQ and Kanban classification tools.*

BALLOU, RH *Logistics: administration of the supply chain.* Pearson Education, 2004.

BORJAS, JEO; BETANCOURT, RE Evaluation of the efficiency of the business logistics system. *Contributions to the Economy,* v. 8, no. 1, 2011.

CASTRO SUÁREZ, M. *Optimization of batch sequencing and stock management in a kit packaging process.* 2020.

CHÁVEZ, OAE et al. Integrated 5S model and ABC classification for continued improvement in inventory management at a community pharmacy. *RCMOS – Multidisciplinary Scientific Journal O Saber,* v. 1, no. 2, 2025.

CHRISTOPHER, M. *Logistics and supply chain management.* Pearson UK, 2016.

GUEVARA, M. Á. L. de. *Inventory management.* Tutor Training, 2020.

FLOWERS, BE; WHYBARK, DC Implementing multiple criteria ABC analysis. *Journal of Operations Management,* vol. 7, no. 1-2, p. 79-85, 1987.

GONZÁLEZ, SS; MATURANO, BAM; LOPEZ, LYC Implementation of ABC inventories in Grupo Spring warehouse. *Ciencia Latina: Revista Multidisciplinar,* v. 7, no. 6, 2023.

GRANDA LEÓN, GL; RODRÍGUEZ GAYBOR, RE *Design of a control system based on the ABC method of inventory management, through measurement indicators, applied to a photographic studio in the city of Machala.* 2013.

HEIZER, J.; RENDER, B. *Principles of operations administration.* 9. ed. Naucalpan de Juárez: Pearson, 2014.

HUALTIBAMBA, MMP; AITKEN, HGW Inventory management at the company SOHO Color Salón & Spa in Trujillo (Perú). *Latin American Administrative Journals,* v. 14, no. 27, 2018.

IZAR LANDETA, JM; YNZUNZA CORTÉS, CB; ZERMEÑO PÉREZ, E. Calculation of the point of

Year VI, v.1 2026 | Submission: 05/03/2026 | Accepted: 07/03/2026 | Publication: 09/03/2026

reorder when delivery time and demand are correlated. *Accounting and Administration,* v. 60, no. 4, p. 864-873, 2015.

JACOBS, FR et al. *Manufacturing planning and control for supply chain management.* New York: McGraw-Hill, 2011.

JARA-CORDERO, S.; SÁNCHEZ-PARTIDA, D.; MARTÍNEZ-FLORES, JL Analysis for improvement in the inventory management of a trading company. *Industrial Engineering Magazine,* v. 1, no. 1, p. 1-18, 2017.

KANTER, J. *Management-oriented management information systems.* Prentice Hall, 1977.

KAPLAN, RS; COOPER, R. *Cost & effect: using integrated cost systems to drive profitability and performance.* Harvard Business Press, 1998.

LAMBERT, DM; STOCK, JR; ELLRAM, LM *Fundamentals of logistics management.* 1998.

LANDETA, JMI; LANGO, HM Comparative study of the application of six inventory models to decide the quantity and reorder point of an item. *Science and Technology,* n. 13, p. 217-232, 2013.

LEE, H.L.; PADMANABHAN, V.; WHANG, S. Information distortion in a supply chain: the bullwhip effect. *Management Science,* vol. 43, n. 4, p. 546-558, 1997.

MANTILLA SARAVIA, OD; REVILLA CASTRO, JB *Systematic review for the design of a logistics system based on inventory management for cost reduction in the warehouse of the company Rímac SRL between the years 2008–2020.*

MENDONÇA, PHM Strategic controlling as a determining factor in optimizing logistics costs: a multidimensional analysis for competitiveness in freight transport. *RCMOS – Multidisciplinary Scientific Journal O Saber,* v. 1, n. 12, 2021.

MOROCHO, CAP Management of inventories through the ABC classification for companies dedicated to the sale of construction materials. *Observatorio de la Economía Latinoamericana,* n. 7, 2020.

PRATT, J. *Financial accounting in an economic context.* John Wiley & Sons, 2010.

SHEFFI, Y. *The resilient enterprise: overcoming vulnerability for competitive advantage.* MIT Press, 2007.

SILVER, EA; PYKE, DF; PETERSON, R. *Inventory management and production planning and scheduling.* New York: Wiley, 1998.

WILKINS, R.; THAKUR-WEIGOLD, B.; WAGNER, SM Managing demand uncertainty. *Industrial Engineer,* vol. 44, no. 8, 2012.

ZÁRATE, LGE; LOZADA, M. Á. A. Benefits of using ABC analysis in inventory management in a small and medium-sized trading company in Tlaxcala, Mexico. *Administrative Science,* n. 1, p. 10-20, 2020.