

**NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES
OF UKRAINE
Faculty of Agrarian Management**

UDC658.012.4

APPROVED BY

Dean of Agrarian Management
Faculty

_____Anatolii OSTAPCHUK
" _ " _____ 20 ____

ALLOWED TO DEFENCING BY

Head of administrative management
and international activity
department

_____Olena KOVTUN
" _ " _____ 20 ____

MASTER'S QUALIFICATION THESIS

on topic:

“Management of the efficiency of the company's international supplies”

Specialty

073 “Management”

Educational program

Management of International Activity

Orientation of educational programme

educational and professional

Guarantor of educational programme
PhD in Economics, Associate
Professor

Larysa DIBROVA

Scientific advisor of master's qualification thesis
PhD in Economics, Associate
Professor

Marat IBATULLIN

Performed by

Alisson NACATO

**NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES
OF UKRAINE
Faculty of Agricultural Management**

APPROVED BY

Head of Administrative Management and International Activity Department

Olena KOVTUN

06 May 2024

TASK

on implementation master's degree qualification thesis by graduate

AlissonNacato

Specialty

073 "Management"

Educational program

Management of International Activi
ty

Orientation of educational programme

educational and professional

Topic of master's degree qualification thesis «Increasing the investment attractiveness of the enterprise in terms of international activity»

approved by Rector Order NUBiP of Ukraine
from

«06» May
2025

No 704 «C»

Deadline for submission of completed work to the department 2025.11.25

Source data for the master's qualification thesis: legislative acts, educational and scientific literature, financial statements of the enterprise, statistical data, technological maps, resolutions, orders

List of questions, that subject to research:

1. THEORETICAL FOUNDATIONS OF MANAGING THE EFFICIENCY OF INTERNATIONAL SUPPLIES IN THE COMPANY
2. ANALYSIS OF THE COMPANY'S INTERNAL AND EXTERNAL ENVIRONMENT
3. STRATEGIES AND RECOMMENDATIONS FOR IMPROVING SUPPLY CHAIN EFFICIENCY

List of graphic material (if necessary) tables, figures, diagrams _____

Date issues task

«06»

May

2025

Advisor of master's qualification thesis

(signature)

Marat IBATULLIN

I accepted the task

(signature)

Alisson NACATO

ABSTRACT

The master's qualification thesis is devoted to the study of managing the efficiency of international supplies using the example of PACARI, an Ecuadorian producer of premium organic chocolate. The work consists of an introduction, three chapters, conclusions, references and appendices. The research focuses on how PACARI can strengthen its international supply system while preserving its core principles of quality, ethical sourcing and sustainability in the context of a volatile global environment. The relevance of the study is determined by the growing complexity of global supply chains, increasing demands for traceability and sustainability, and the vulnerability of agricultural supply systems to climate, infrastructure and market risks. The purpose of the thesis is to substantiate theoretical and methodological foundations, assess the current state and develop practical recommendations for improving the efficiency of managing PACARI's international supplies.

The practical relevance of the research lies in the need to adapt international supply systems to global logistics transformations and national conditions of foreign economic activity. Using PACARI as a case study, the research demonstrates that for companies focused on sustainable production and cooperation with smallholder suppliers, the efficiency of international supply chains is a key factor not only of economic performance but also of social impact. The analysis of Ecuador's conditions, logistics infrastructure, and corporate processes reveals the need for strategic and applied solutions aimed at enhancing resilience, digitalization, and supply chain manageability.

KEYWORDS: PACARI, WORLDWIDE SUPPLY, SUPPLY CHAIN EFFICIENCY, MANAGING LOGISTICS, RESILIENT SOURCING, DIGITAL TRANSFORMATION, SUSTAINABLE DEVELOPMENT, ECUADOR, CACAO, GLOBAL MARKET.

РЕФЕРАТ

Магістерська кваліфікаційна робота присвячена дослідженню управління ефективністю міжнародних поставок на прикладі компанії **PACARI** — еквадорського виробника преміального органічного шоколаду. Робота складається зі вступу, трьох розділів, висновків, списку використаних джерел та додатків. Дослідження зосереджене на тому, яким чином PACARI може зміцнити свою систему міжнародних поставок, зберігаючи основні принципи якості, етичного постачання та сталого розвитку в умовах нестабільного глобального середовища.

Актуальність дослідження визначається ускладненням глобальних ланцюгів постачання, зростанням вимог до прозорості та сталого розвитку, а також підвищеною чутливістю аграрних систем постачання до кліматичних, інфраструктурних і ринкових ризиків. Метою магістерської роботи є обґрунтування теоретико-методологічних засад, оцінка поточного стану та розроблення практичних рекомендацій щодо підвищення ефективності управління міжнародними поставками PACARI.

Практична значущість дослідження полягає в необхідності адаптації міжнародних систем постачання до глобальних логістичних трансформацій і національних умов здійснення зовнішньоекономічної діяльності. На прикладі PACARI показано, що для компаній, орієнтованих на сталий розвиток виробництва та співпрацю з малими постачальниками, ефективність міжнародних ланцюгів постачання є ключовим чинником не лише економічної результативності, а й соціального впливу. Аналіз умов Еквадору, логістичної інфраструктури та корпоративних процесів виявляє потребу у стратегічних і прикладних рішеннях, спрямованих на підвищення стійкості, цифровізації та керованості ланцюгів постачання.

КЛЮЧОВІ СЛОВА: PACARI, МІЖНАРОДНІ ПОСТАВКИ, ЕФЕКТИВНІСТЬ ЛАНЦЮГІВ ПОСТАЧАННЯ, УПРАВЛІННЯ ЛОГІСТИКОЮ, ОРГАНІЗАЦІЯ ПОСТАЧАННЯ, СТАЛИЙ РОЗВИТОК, ЕКВАДОР, КАКАО, СВІТОВИЙ РИНОК.

CONTENTS

ABSTRACT	4
INTRODUCTION	7
SECTION 1. THEORETICAL FOUNDATIONS OF MANAGING THE EFFICIENCY OF INTERNATIONAL SUPPLIES IN THE COMPANY	9
1.1. The essence, content, and significance of international supplies in corporate activity	9
1.2. Theoretical approaches to evaluating the efficiency of international supply operations	14
1.3. Methodological foundations for managing the efficiency of international logistics processes	27
SECTION 2. ANALYSIS OF THE COMPANY'S INTERNAL AND EXTERNAL ENVIRONMENT	32
2.1. Analysis of global trends in the development of international supply systems....	32
2.2. Assessment of international supply efficiency management at the national level	42
SECTION 3 STRATEGIES AND RECOMMENDATIONS FOR IMPROVING SUPPLY CHAIN EFFICIENCY.....	57
3.1. Strategic directions for the development of international supplies in the global market.....	57
3.2. Recommendations for enhancing the efficiency of international supply management in the company.....	59
3.3. Expected outcomes and socio-economic effects of the proposed improvement measures	61
CONCLUSIONS.....	64
LIST OF USED SOURCES.....	66

INTRODUCTION

Relevance of the topic of the master's thesis. In the conditions of globalization, enterprises are increasingly integrated into international value chains and depend on complex cross-border flows of raw materials, intermediate products and finished goods. International supply chains effectiveness is very important for the global competitiveness, financial and sustainable development of enterprises. This is of particular importance for upmarket agro-industrial products, such as high-quality chocolate and other premium confectionery products; the quality of final product, reliability of deliveries and ability to quickly adapt to changes in demand are directly determined by the stability and efficiency of these activities. PACARI, a small Ecuadorian chocolate producer that focuses on producing organic and ethically-sourced chocolate in a close working relationship with farmers while ensuring high quality and explore the foreign market to benefit more of these local famers. Therefore, it is very important to improve the efficiency of PACARI's international supply chain from both theoretical and practical management view.

The purpose of the master's qualification thesis is to substantiate the theoretical foundations, analyze the current state and develop practical recommendations for improving the efficiency of managing PACARI's international supplies in the context of global market development and increasing requirements for sustainability and traceability.

To achieve this purpose, the following main tasks are defined in the thesis:

- to clarify the essence, content and significance of international supplies in the activity of modern enterprises;
- to systematize theoretical approaches and methodological tools for evaluating the efficiency of international supply operations;
- to determine the methodological foundations for managing the efficiency of international logistics processes;

- to analyze global trends in the development of international supply systems and their influence on enterprise activity;
- to assess the national-level conditions that affect the management of international supply efficiency;
- to analyze the current state and performance of PACARI's international supplies;
- to identify key problems and bottlenecks in the company's supply chain;
- to justify strategic directions and concrete measures for improving the management of international supply efficiency in PACARI;
- to evaluate the expected results and socio-economic effects of the proposed improvements.

The object of the study is the system of international supplies of the enterprise.

The subject of the study is the theoretical, methodological and practical aspects of managing the efficiency of PACARI's international supplies under conditions of globalization and growing sustainability demands. In the process of writing the master's thesis, a complex of methods was used, including methods of theoretical generalization and comparison, system and structural analysis, economic and logistical analysis, graphical methods, as well as elements of qualitative case study analysis based on the example of PACARI. The information base of the research consists of scientific and educational literature, analytical reports, statistical data, company materials and internal documents. Scientific and practical significance of the obtained results lies in the fact that the formulated conclusions and proposed recommendations can be used by PACARI to improve the management of its international supplies, strengthen positions in the global chocolate market and increase socio-economic contributions to the development of cacao-producing regions of Ecuador.

SECTION 1. THEORETICAL FOUNDATIONS OF MANAGING THE EFFICIENCY OF INTERNATIONAL SUPPLIES IN THE COMPANY

1.1. The essence, content, and significance of international supplies in corporate activity

International supplies represent a fundamental operational and strategic dimension of modern enterprises, especially for companies that participate actively in global markets and rely on cross-border flows of raw materials, semi-finished products, and finished goods. In an increasingly interconnected and competitive world economy, the efficiency of international supply processes determines not only the capacity of firms to meet market demand, but also their long-term sustainability, competitiveness, and financial stability. International supply activities encompass a comprehensive set of functions that integrate procurement, logistics, transportation, customs procedures, supplier coordination, risk management, and performance monitoring. These components interact dynamically to ensure that goods move across national borders in a timely, cost-effective, and quality-compliant manner [3]. Being one of the finest chocolate suppliers, PACARI, whose international reputation depends on premium and ethically sourced ingredients, has international supplies as one of their strategic focal points for creating product differentiation, operational dependability, and global growth.

The essence of international supplies lies in their role as a connective system that integrates a company's production operations with international markets and global sources of raw materials. International suppliers often operate in diverse economic, geographical, and cultural contexts, resulting in heterogeneous conditions that must be managed cohesively. PACARI, for instance, sources its premium, organic Ecuadorian cacao from numerous smallholder farmers across remote regions of Ecuador, where environmental, climatic, and logistical conditions significantly influence supply stability and product quality [13]. The company must navigate geographic dispersion, rural infrastructure constraints, and seasonal fluctuations in cacao production. As a result, the essence of international

supplies involves simultaneously managing variability, ensuring continuity, and maintaining the required standards along each stage of the supply chain.

The aspects involved in the operations of international supply commence with global international supply operations strategy which is conceptualized as the process of determination the basis of the cost consideration efficiency, the quality, the responsiveness, the sustainability, and the alignment considering the firm's therapeutically goals [12]. PACARI's approach hierarchy definitional is ethical or socially responsible and fair-trade supply and with those who actively protect the earth and socially responsible. This is then, all the more increases the level of Integration of international supplies with the values of sustainability in the overall procured cost and values. Furthermore, international supplies include managing supplier relations where firms develop long-term relationship, actions and soft targets of quality measurement and control, and joint planning in order to get the deal done. PACARI's suppliers are then their standards of quality to be met which is precise and correct in terms of flavors and quality of the product [16]. This strengthens the partnership defensive of suppliers which enables the firm to secure the high-quality raw materials so artisan production can be sustained.

Another crucial component of international supply content is logistics management. International logistics encompass transportation mode selection, scheduling, freight consolidation, customs clearance, warehousing, labeling, packaging standards, and coordination with third-party logistics providers. Each of these activities directly affects cost levels, transit times, spoilage risks, and inventory turnover rates [2]. PACARI operates within a complex global supply chain, transporting delicate chocolate products from Ecuador to markets with strict import regulations, high consumer expectations, and variable freight costs. Ensuring timely delivery requires efficient coordination with logistics partners and real-time shipment monitoring. The company has implemented tracking mechanisms to mitigate delays related to customs or unexpected transportation disruptions, thereby sustaining customer satisfaction and reducing operational volatility [1].

Digitalization improves the quality of international supplies, including through use of IoT tracking systems, automated documentation, data analytics and platform-based operational management. The deployment of these digital tools enhances supply chain visibility and allows the dissemination of timely warning signals on bottlenecks, unusual delays or inventory rationing [8]. PACARI's specific advantage to digital track and trace is due rather to its use of multi-stage logistics flows that include remote farm collection points, in-house process facilities, export terminals as well as international market routes. The implementation of these techs is consistent with the international best standards for supply chain optimization and underlines the company's dedication to transparency and eco-friendliness.

Risk management is a key consideration in international supply chains especially for firms that source agricultural inputs which are prone to environmental shocks. PACARI is exposed to a diversified set of risk factors stemming from sources like climate risks, extreme weather events, changes in international trade policies, exchange rates systems or transportation congestion [13]. Such risks can disturb cacao supply, change production schedules and increase logistical costs. Hence firms should also consider risk-sharing mechanisms, e.g., supplier diversification, buffer inventories, contingency routing, insurance products or long term market monitoring. PACARI's worldwide presence requires continuous adjustment to changing international circumstances. The ability to control and monitor risks not even allows disruptions work but also makes the supply chains resilient.

There are several crucial dimensions affecting the general performance of industry for corporate operations and the significance of international supplies that should be taken into account. First, international equipment contributes to cost effectiveness. Efficient sourcing strategy, efficient networks of transportation, and speedier customs operations will reduce costs of doing business and make firms to be price competitive in the international trade [15]. "For PACARI is essential to

bring down the logistics and production cost while maintaining high quality in order to compete with premium chocolate companies from all over the world.

The second is that imported supplies will improve quality control. PACARI's commitment to the creation of premium organic chocolate is based on strict quality controls in all areas of the international chain. By careful supplier selection, regular audits and continuous control over its chain of production the company decreases differences in quality level of raw material and ensures common quality standards in all worldwide operating markets [5]. As a result, foreign supplies are the indispensable basis of brand reputation, consumer confidence and product differentiation.

Third, external supply has a strong impact on sourcing lead times. Decreasing the lead time and improving delivery accuracy by reducing supply chain are two important factors for successful business. PACARI'S capacity to ensure on-time delivery plays a crucial role in customer satisfaction and market trust, particularly when it comes to high end retailers, since delayed deliveries can harm contracts or lower morale from clients. Smaller lead times also improve the company's flexibility in adjusting to demand swings and seasonal peaks.

Fourth, foreign resources play a role in strategic growth and competitive advantage. Efficient supply chain plays key role in PACARI's international penetration, expansion of customer base and adaptation to global trends. Being able to get supplies from abroad, allows it to keep the stability of supply across borders (according to FivepillarsCharacteristicsAndComponentsAPO), ensure international certifications, and closely adhere its own operations standards in relations with logistics, sustainability and ethical sourcing with global best practice [18]. PACARI further enhances its attractiveness to global partners, distributors and consumers through streamlining of international supply steps.

Fifthly, the global supply dimension of sustainability and corporate responsibility is crucial. Ethical sourcing, lower carbon emissions through efficient logistics and investment in local farming communities enable PACARI to have a positive environmental and social impact. Sustainable global supply chains

enhance corporate image, support compliance with international regulations and further long-term value creation. In addition to providing sources of income (e.g., fair trade chocolate supporting local producers) and addressing rural poverty, the organic farming promoted by PACARI also contributes to conservation of species diversity and ecosystem functioning [20].

Lastly, the relevance of international supplies comes to light in its support of corporate flexibility under turbulent global circumstances. Companies with strong supply chain capabilities are more able to react to economic crises, changes in regulations and war, as well as quickly adopt to consumer demand. PACARI's ability to effectively navigate these challenges has been a key factor in the success of their operation given the complexities presented by remote cacao origins, freight conditions that change frequently and marketplace activity outside of one's own country. With proactive planning, integrated coordination and performance monitoring in terms of KPIs such as inventory turnover, supplier reliability, delivery accuracy et al., the firm enhances resilience and sustains performance of its global supply network [19].

The following table summarizes the essential components of international supplies, emphasizing their relevance and efficiency contribution in PACARI's global supply chain, following the academic structure modeled after the reference thesis.

Table 1.1.

Classification of international supply components

Component	Description	Relevance for PACARI	Efficiency Impact
Strategic Sourcing	Selection of suppliers based on quality, cost, sustainability, and reliability.	Sourcing premium Ecuadorian cacao from certified fair-trade producers.	Reduces variability, stabilizes costs, and ensures consistency of raw materials.
Supplier Relationship Management	Coordination, communication, and long-term partnerships with suppliers.	Collaborates closely with cacao farmers to maintain ethical sourcing and high quality.	Improves reliability, reduces quality defects, and strengthens traceability.

International Logistics	Cross-border transportation, customs, routing, and freight management.	Manages complex export routes from Ecuador to multiple international markets.	Shortens lead times, improves delivery accuracy, reduces spoilage risks.
Risk Management	Anticipation and mitigation of environmental, economic, and geopolitical risks.	Faces climate variability, trade policy fluctuations, and global freight disruptions.	Enhances supply chain resilience and reduces operational interruptions.
Digital Integration	Use of digital tools to enhance visibility and decision-making.	Employs digital tracking and data systems for logistics coordination.	Facilitates proactive mitigation, reduces delays, and improves forecasting.
Quality Assurance	Implementation of controls to maintain product standards along the supply chain.	Ensures flavor integrity and sustainability standards across markets.	Strengthens brand reputation and increases customer satisfaction.

Source: developed by the author based on PACARI supply chain data.

1.2. Theoretical approaches to evaluating the efficiency of international supply operations

A Solid Theory-based Framework for the Assessment of Offshore Supply Efficiency in order to evaluate the efficiency of international supply operations requires a strong theoretical background that combines aspects from logistics management, performance measurement systems, operations research and digital transformation. International supply chains operate in an environment characterized by variability, uncertainty, international regulation differences (cross-border), transportation limitations, and the coordination of disparate entities with upstream production system variation. These three factors make possible the multidimensional nature of efficiency evaluation and the need to access a variety of theories in which firms use for analyzing flow of goods, information and capital across national borders. As an example of a smallholder, bean-to-bar producer, PACARI sources cacao from remote communities in Ecuador, and markets its finished products to discriminating consumers worldwide. As such, understanding these theoretical frameworks is important for gauging how well the company turns its raw material inputs into high value-added artisanal chocolate eligible for international distribution.

One of the most influential theoretical approaches arises from the process-based model of supply chain management, which conceptualizes supply chains as sets of interconnected processes—planning, sourcing, manufacturing, delivering, and returning—that must be coordinated to achieve operational excellence. According to Croxton et al., in order to adequately evaluate the efficiency of an international supply process it is necessary to measure its performance in terms of cost, time, quality and flexibility for each individual step within a supply chain [3]. In the global operations of PACARI, process integration is a key element, since any type of inefficiency with respect to cacao sourcing or post-harvest handling or even travelling for export terminals potentially could back left some indirect tracks in other areas; which include cocoa production (stability), shipping schedules (settlement) and international market seating availability. Therefore, a process-oriented view requests the consideration of whether PACARI planning is in line with suppliers' capacities, sourcing is performed based on quality and sustainability, and logistics processes enable effective and timely delivery.

This procedural approach naturally leads to the Supply Chain Operations Reference (SCOR) model, a well-known theoretical framework extensively applied to assess supply chain performance. This model benchmarks performance in a range of areas (reliability, responsiveness agility, cost and asset efficiency) [16]. On the other hand, for PACARI, a SCOR-based metric would allow executing an analysis in relation to supplier dependability (reliability), delivery times (transportation) and inventory s turnover, order aptitude and ability to react against disruption of supply due to volatilities or geopolitical limitations like weather adversities or availability. SCOR focuses on the importance of agility in worldwide supply networks, stating that a firm's ability to quickly respond to unforeseen environmental or economic changes is as important as cost and flexibility. Due to PACARI's use of agricultural raw materials that are even more sensitive to climate change, flexibility becomes an essential aspect in the assessment of efficiency.

International trade theory serves as a cornerstone for the comprehension and evaluation of supply chain efficiency. According to classical comparative advantage theory, when production is cheaper, easier or better in service quality reasons the firms should obtain their inputs from areas in which this is the case [12]. A unique set of environmental conditions in Ecuador, which includes myriad micro-climates, volcanic soils and ideal levels of humidity offer the country a competitive advantage in the production of fine-flavor cacao. PACARI tapping into Ecuadorian cacao speaks to this theory, the country itself has unique natural characteristics which naturally lend a very nuanced and complex flavor profile with minimal intervention required in post processing. Whereas new trade theory focuses on economies of scale and network effects, and holds that firms can improve their supply efficiency through the increases in export volumes, optimization of shipping routes or integration of transportation networks that span a range of markets. From this viewpoint, assessing PACARI's international supply capability requires consideration of how tariffs, customs procedures and 2 exchange rate risks combine to affect sourcing costs, logistics efficiency and overall competitiveness.

This theoretical basement is enhanced by operations management theory that brings with it concepts such as lean management and Just-in-Time (JIT). Lean theory focuses on identifying and eliminating waste in supply chain processes, including overproduction, unnecessary movements, idle time, excess inventory, and transportation inefficiencies [10]. Applying lean principles to PACARI's international supply chain involves evaluating whether there are redundant steps in the cacao collection process, unnecessary handling of raw materials, or logistical inefficiencies such as prolonged dwell times at ports. Lean theory emphasizes continuous improvement and data-driven decision-making, encouraging firms to quantify inefficiencies and redesign processes to optimize flow. For PACARI, this may involve redesigning cacao aggregation routes, simplifying handovers between

farmers and collection centers, and improving coordination with logistics partners to reduce waiting times and avoid redundant storage.

Just-in-Time (JIT) theory and Lean management harmonize through focus on the elimination of inventory and the prompt delivery of resources. Just in time (JIT) This is a system of industrial organization designed to provide components just when they are required in the production programme and thus save the capital, which would otherwise be invested in holding buffers against the possible failures of supply. Nonetheless, the application of JIT internationally is more complicated because of longer and unpredictable transportation times, customs checks and geopolitical risk. PACARI can't really do JIT planning due to the fact that cacao harvests follow the seasons and biological growth patterns cannot be accelerated or postponed. Still, JIT theory continues to prove useful when considering efficiency because of its emphasis on accurate scheduling and delivery, reliable supplier relationships, and a realistic demand forecast. The evaluation of PACARI supply chain by JIT approach consists in the analysis if procurement is done on time respect to production needs, inventory turnover is optimal and the supply network drive properly to reduce periods between over stock and short stock situation at some strategic points.

Six Sigma offers a quality-focused perspective to manage global chain activities. It focuses on reducing process variation, finding defect sources and using statistical controls to improve consistency and reliability ([19]). Inside global supply chains, Six Sigma tools help trace variability in transit conditions (includes speed and temperature control); deviations of supplier's performance or accuracy of documentation at customs' roadposts. For PACARI, its product differentiation is image-based on having an excellent quality hence any changes in cacao fermentation, drying or storage circumstances drastically can affect taste and aroma. The use of a Six Sigma approach therefore allows PACARI to identify inefficiencies in post-harvest logistics, while swapping or transportation conditions or internal processing that could impact the quality of its products. By analyzing

defect rates, differences in quality of the raw material and variances in delivery terms, PACARI can develop a true measure of how much poor quality is hindering its international supply.

Risk management theory is essential in the examination of the effectiveness of international supply chains because of the built-in uncertainties associated with worldwide operations. The risk management process includes multiple phases: recognizing risks, assessing probabilities and consequences of these events, developing risk mitigation plans, tracking risks through a set of indicators so they can be managed early enough to minimize their impact, and evaluating feedback [13]. For PACARI: PNG Risks include significant adverse weather events having impact on cacao harvests, transportation disruptions as a result of global imbalance, political instability impacting trade agreements and currency fluctuation influencing procurement costs. Assessment of supply chain efficiency should consider the risk assessment models capturing vulnerability, resistance and probabilistic modelling of risks such as scenario analysis. These theoretical frameworks allow PACARI to study how external shocks modify lead times, transportation costs, product quality and service levels and the effect of mitigation strategies—such as supplier diversification, safety stocks or alternative transport routes—on overall efficiency.

Transaction cost theory derived from economic and organization theory contributes to the understanding of international sourcing effort by focusing on costs associated with coordinating relationships between suppliers, negotiating contracts, supervising contractual compliance and enforcing contractual obligations. Transaction costs in the international supply chains There are high transaction costs in the international supply chain by reason of cultural differences, linguistic difference and different regulation environment [15]. PACARI's deep commitment to responsible sourcing and fair trade practices requires significant investment in supplier engagement, training, and monitoring that compounds its coordination costs but ultimately leads to higher quality and sustainability. From

such a theoretical perspective, efficiency is determined by the relative value of strong supplier relationships—especially in terms of quality, loyalty, and growth—that managers derive from these partnerships against the transaction costs of those partnerships.

Information systems theory offers a valuable theoretical perspective by emphasizing the importance of data visibility, accuracy in information and real-time communication within international supply chains. The efficient supply network is based on continuous flow of information between the suppliers, logistics providers, regulators and internal functional areas [1]. Digital platforms, including shipment tracking services, inventory management solutions and integrated messaging channels make it easier for PACARI to gain real-time visibility of the supply chain and make informed decisions. From this standpoint, it considers whether information systems enable delays to be promptly identified, data integration permits reliable prediction of lead times and digitalisation reduces the number of errors in customs documents and regulatory requirements.

Network theory adds a structural and relational aspect to the evaluation of international supply efficiency. It models supply chain as a network with nodes (suppliers, warehouses, terminals and distribution centers) and links (the transportation links, information descendants and contract relationships among them). Network analysis focuses on the structural properties (e.g., centrality, connectivity, density, redundancy) that affect the robustness and efficiency of system [18]. PACARI's supply chain connects an array of smallholder cocoa producers to centralized processing and international distribution centers. A network theory approach to efficiency would consider whether the network depends too much on certain vulnerable points, if alternate supplies or routes are available in case of a breakdown, and how well the links in the chain balance distance against transit time and handling complexity.

The main theoretical approaches relevant for evaluating PACARI's international supply efficiency are summarized in Table 1.2, in line with the structuring style used in the reference thesis.

Table 1.2.

Theoretical approaches to evaluating the efficiency of international supply operations

Theoretical approach	Main focus for evaluation	Key questions for efficiency analysis	Relevance for PACARI's international supplies
Process-based SCM and SCOR	Integration and performance of supply chain processes	Are planning, sourcing, production, and delivery processes aligned and measured across cost, time, quality, and flexibility? [14; 15]	Helps identify bottlenecks from cacao sourcing to global distribution.
International trade theory	Comparative advantage and trade conditions	Do sourcing regions and trade agreements minimize costs and support quality and market access? [16]	Justifies sourcing from Ecuador and highlights exposure to tariffs and FX risk.
Lean management	Waste elimination and flow optimization	Where do delays, overprocessing, excess inventory, or unnecessary movements occur in the chain? [17]	Guides reduction of dwell time, redundant handling, and storage costs.
Just-in-Time (JIT)	Synchronization of supply with demand and inventory minimization	Are procurement and production schedules tightly coordinated with market demand despite international lead times? [18]	Supports analysis of ordering cycles, safety stocks, and seasonal cacao supply.
Six Sigma	Reduction of process variation and defects	Which stages generate variability in quality or delivery conditions, and how can they be statistically controlled?	Ensures consistent cacao and product quality for premium international

		[19]	markets.
Risk management theory	Vulnerability, mitigation, and resilience	How do climate, political, and logistical risks affect lead times, costs, and availability, and how can they be mitigated? [20]	Frames evaluation of exposure to environmental and geopolitical disruptions.
Transaction cost theory	Coordination and monitoring costs in supplier relationships	Are the governance mechanisms with suppliers cost-effective relative to the improvements in quality and reliability they provide? [12]	Explains trade-offs in managing many small ethical cacao producers.
Information systems theory	Data visibility, accuracy, and real-time decision-making	Do digital tools provide timely, integrated information to respond to disruptions and manage inventories efficiently? [5]	Supports evaluation of tracking, forecasting, and documentation reliability.
Network theory	Structure, connectivity, and redundancy of supply chain networks	Is the supply network robust to node or link failures, and are there alternative routes and suppliers to maintain performance? [7]	Assesses resilience of PACARI's sourcing and logistics configuration.

Source: developed by the author based on theoretical and practical aspects of PACARI's international supply chain [14–23].

To support the theoretical aspects, performance measurement theory additionally supports them by development of KPIs as quantitative instruments for measuring supply chain efficiency. KPIs like the lead time, order fulfillment rate, delivery accuracy, inventory turnover, transportation cost ratio and supplier reliability enable abstract ideas such as efficiency to be quantified which can be tracked over a period of time [18]. For PACARI, KPI allows an objective analysis of the effectiveness in international supply procedures contributing to corporate purposes regarding quality, sustainability and competitively. With systematic

embedding these theoretical perspectives, the firm can construct a holistic indicators framework to measure and improve the performance of its global SC.

In addition to basic process-based, operational, trade and risk theories, understanding the effectiveness of international supply operations requires knowledge about performance measurement systems, sustainability frameworks as well as institutional dynamics. Such theoretical frames offer a unified view of how supply chains function across different economic, environmental and logistical contexts. For PACARI, which operates globally and is heavily reliant on agricultural sourcing as well as ethical commitments, but with distribution flows across borders of countries that receive products/ingredients yet not necessarily consuming them [in order to] rapidly assess how effective inputs are transformed into high-quality outputs in the form of products, sold in diverse international markets.

The theory of performance measurement becomes crucial for evaluating supply chain performance since the abstract notion of its operational aspects is transformed into a set of metrics that can be systematically kept track on. The KPI acts as a bridge between vision and result, helping companies to monitor their competitive position, becoming quick aware if they are on the wrong track and take immediate actions. Lead time, order fill rate, delivery accuracy, inventory turnover, cost per shipment and supplier performance score are the common SCs KPI for international supply evaluation [14]. For PACARI, the importance of KPIs is of particular relevance given the variability associated with cacao production such as: harvest timing, fermentation results and access for transportation from rural areas. Efficiency can be measured based on whether lead times are maintained despite uncertain weather, suppliers consistently reach quality standards and logistics partners ensure timely deliveries to global markets. Therefore, the performance measurement theory allows PACARI to track to the crossing border-side level in terms of operational consistency and responsiveness.

Sustainability theory and green supply chain frameworks add another dimension to efficiency evaluation. Modern supply chain theory argues that sustainability is not merely an ethical ideal but an operational necessity for risk mitigation, regulatory compliance, and long-term competitiveness. Green logistics theory emphasizes minimizing carbon emissions, reducing waste, increasing energy efficiency, and supporting environmentally responsible sourcing practices [20]. PACARI's supply chain is a testament to its dedication to sustainable practices, featuring strong focus on organic cacao production, fair-trade initiatives and sustainable farm partners. From an environmental perspective, one needs to check whether the means of transport are environmentally conscious and contribute towards a low-impact solution, the kind of packaging materials that meet ecological standards that have been implemented by regulators as well as suppliers and need to adhere soil preservation and biodiversity practices. Such sustainability metrics complement conventional key performance indicators (KPIs) and provide a more comprehensive evaluation of the efficiency of global supply by including environmental and social performance.

The evaluation of international supply chains is considerably informed by Institutional Theory. According to this theory, organizations work within contexts defined by rules, regulations, norms and expectations set forth by government agencies, industry bodies, certification organizations and consumers. In terms of PACARI, the institutional environment includes organic standard certification, fair trade conditions, international food safety regulations, customs rules and sustainability demand in foreign markets [4]. Efficiency of supply measurement needs to consider if the required institutional constraints have been frequently overcome by the supply chain or if the requirement has resulted in lean production becoming excessively bureaucratic. For example, international certifications could have higher documentation and audit requirements which may affect lead times, raise cost of paperwork. On the other hand, complying with those standards takes strength and improves PACARI's reputation while opening doors for new

markets, which is a possible strategic benefit in the future. Thus, an institutional analysis of efficiency must consider how regulatory complexity affects the operations process and the competitive advantage that inter-institutional coordination engenders.

Yet another theoretical model which can be applied to the assessment of international supply operations is the system theory. Such a theory views supply chains as dynamic systems that consist of interacting parts with feedback, and which yield emergent properties. In this view, efficiency is not achieved merely through optimizing isolated functions but through understanding how changes in one part of the chain affect the entire system. PACARI's supply chain demonstrates these characteristics, as changes in cacao availability due to environmental events directly influence production schedules, export timelines, inventory levels, and customer service outcomes. System theory emphasizes that the full chain effects have to be considered instead of focusing mainly on local inefficiencies [12]. For instance, increasing safety stock to compensate for variation in harvest can enhance resilience but it can also reduce efficiency by raising holding costs. However, for PACARI, the underlying systems theory allows to evaluate these trade-offs in an exhaustive way.

The behavioral supply chain theory also enables to identify new perspectives in order to assess efficiency, by recognizing that human decisions, trust and communication patterns and stakeholder relationships are crucial. In its supplier-farmer relations PACARI experiences trust-based, cooperative and value-driven relations. The responsible acts of behaviors significantly influence the information sharing, quality commitment and conformance to standards. Measuring the efficiency of relationships by this yardstick, the next step in evaluating efficiency is to break down whether suppliers' incentives resonate with PACARI quality goals, communication media permits clear expectations and behavioral dynamics promote or hinder supply chain performance [5]. Trust proteges can result in lower

monitoring costs and greater adaptability, but keeping valuable information secret may increase variation and reduce efficiency.

Adaptive and resilience theory also contribute significantly to efficiency evaluation in global supply chains. Modern resilience theory argues that efficiency must be balanced with the ability to withstand disruptions and recover quickly. In the context of international supplies, resilience involves diversifying supply sources, maintaining flexible logistics options, creating contingency plans, leveraging digital visibility tools, and managing strategic inventories. For PACARI, whose sourcing is geographically concentrated in Ecuador and exposed to environmental instability, resilience theory is vital for evaluating supply chain performance beyond traditional efficiency metrics. An efficient supply chain that cannot recover quickly from climatic disruptions, port delays, or international transport congestion is not sustainable in the long run.

Digital transformation theory broadens the assessment criteria by demanding the presence of digital tools, automation, data analytics and regular monitoring in real-time. Using predictive analytics, digital supply chains can predict demand, optimize routes and rate supplier performance while identifying risks before they materialize. Following digital transformation theory, firms are more efficient if they computerize tasks that reduce uncertainty, automate routine tasks and facilitate coordination across borders [17]. For PACARI, which already utilize logistics and integrated communication systems, the digital efficiencies consideration is how these technologies can be employed to reduce lead-time variability, increase supplier visibility and improve accuracy of forecasting. With the inclusion of data accuracy, system integration, and technological responsiveness into performance measurement in logistics/inventory control to assess efficiency when digitalization is an increasingly important part of global logistics.

The cost-to-approach analysis provides another theoretical angle to analyze international supply efficiency. In doing so, it determines what is the real cost of serving different customers (or routes) by distributing not only direct costs but also indirect ones along the supply network. The importance of cost-to-serve analysis can be derived from the disparate transportation costs, storage needs, regulation fees and marketing demand that delivering chocolate to distant overseas markets entail for PACARI. When examining efficiency using the cost-to-serve theory it focuses on asking whether a market is generating acceptable margins, if supply routes can be improved and how your cost's structure ranges across global regions. This view will help PACARI to identify the high-cost segments, develop pricing strategies and improve resource management at an international level.

Lastly, strategic alignment theory highlights the importance of aligning supply chain practices with a firm's overall business strategy. Cost and speed of international supply chains alongside other organizational objectives such as quality leadership, sustainability commitments, ethical sourcing and brand differentiation [18] were not the only factors at stake in an efficient global supply chain. Thus, PACARI's supply efficiency can be measured by whether or not the supply chain operations contribute to define the company as a premium chocolate place reasonably sourced. For example, faster transportation methods with negative environmental impact could improve lead times, but would go against PACARI's commitment to sustainability. The Strategic Alignment Theory makes certain that an evaluation of the firm's efficiency includes whether a division is aligned with long term values, competitive strategy and customer demand.

In conclusion formulating the structure receives a new framework from the fusion of performance measurement theory, sustainability frameworks, institutional perspective, systems theory, behavioral supply chain theory, resilience theory and digital transformation theory combined with cost-to-serve analysis and strategic alignment theories that provides PACARI with a holistic multidimensional international supply efficiency evaluation framework. Together these theories help

to embed operational effectiveness, resilience, quality assurance, environmental responsibility and strategic coherence in PACARI's ongoing improvement processes.

1.3. Methodological foundations for managing the efficiency of international logistics processes

To ensure that the efficiency of international logistics activities is under control, a methodological framework based on qualitative and quantitative research instruments should be specifically developed and employed to reflect the complexity, variability and inter-relatedness of global supply chains. Global logistics—management of transportation, warehousing, customs clearance, information flows and links with suppliers across country borders—is conducted in an environment shaped by changing market contexts, geopolitical hazards, transport volatility, and varying regulatory environments. For a company like PACARI, which sources fine cocoa from rural Ecuadorian areas and sells handcrafted chocolate to international markets, it is critical to select an adequate methodology that allows making a correct diagnosis of inefficiencies in the supply network as well as assessing performance results and designing improvement plans that strengthen supply network resilience and global competitiveness.

One important methodological base for assessing the efficiency of international logistics is the mixed-method approach, which combines qualitative analysis and quantitative methods to obtain an overall view of supply chain performance. Qualitative methods, including interviews, observations, and case study analysis, help researchers explore structural and contextual factors influencing PACARI's logistics such as supplier relationships, production scheduling, communication flows, and the experiential knowledge of managers and transport partners. These qualitative techniques are especially important in agricultural supply chains where informal practices, socio-economic conditions, and interpersonal trust among farmers influence procurement outcomes [6].

Quantitative methods, by contrast, enable the systematic measurement of logistics indicators such as lead times, cost ratios, defect rates, inventory turnover, and transportation reliability. Insights reveal *why* inefficiencies occur, while quantitative metrics

Another essential methodology involves the use of Key Performance Indicators (KPIs) as standardized measures of logistics performance. KPIs allow for the assessment of cost efficiency, delivery reliability, responsiveness, inventory accuracy, and supplier quality—all critical determinants of PACARI's capacity to deliver high-grade chocolate internationally. According to performance management theory, KPIs must be carefully selected, consistently measured, and directly aligned with strategic objectives to support accurate evaluation [7]. For PACARI, methodological rigor requires establishing clear measurement protocols for indicators such as cacao delivery timeliness, storage temperature stability, international freight duration, customs clearance time, and final delivery accuracy. KPI-based approaches require benchmarking instruments that allow PACARI to compare the results of its logistics performance with both global and industry best.

Another popular practice for the evaluation of logistics efficiency is process mapping. Using methods like value stream mapping, scholars visually outline the flow of material, information and financial resources in the logistics network. This method facilitates identifying where bottlenecks, redundancies, or non-value-added activities exist which cause longer lead-times or higher costs [10]. PACARI's supply chain is International – it involves many handover points from the cacao farmer to collection points, processing plants, packaging terminals, international shippers and finally International Distributors. By Mapping such flows you can see where inefficiencies are buried, be they redundant wait times, repeated documentation efforts, or disjointed communication processes between logistics partners. Furthermore, in the context of continuous improvement, process mapping can identify next opportunities for standardization and automation.

Risk assessment method is also very important for global logistics evaluation. Approaches, like Failure Mode and Effects Analysis (FMEA), scenario planning, risk probability-impact matrix and Monte Carlo simulations are useful in quantifying the probability and severity of impacts from disruptions [13]. For PACARI such threats include disruptions related to the climate which can affect cacao production, changes in international air or sea freight availability fluctuations of currency, delays from customs offices and even political unrest. Using structured risk assessment frameworks enhances PACARI's ability to identify the most vulnerable nodes in its logistics network, prioritize mitigation strategies, and evaluate whether contingency plans such safety stock buffers, diversified transportation modes, and alternative supplier routes are effective.

The digitalized analyzes accelerate the joy of international logistics more and more. Real time visibility into the transportation conditions, inventory levels and demand variations have been made easier due to the data mining, predictive analytics, machine learning models and IoT enabled monitoring systems [9]. Powering PACARI, these methodologies provide extensive information allowing us to identify early deviations—like unforeseen delays in transit and temperature changes during chocolate transportation—and all they entail for a rapid adjustment before the issue worsens. Furthermore, predictive forecasting models may be used to predict seasonal demand trends, cacao harvest cycles and shipment capacity constraints so that PACARI can maximize production scheduling and export planning. As a result, digital approaches improve decision accuracy and reduce uncertainty throughout the supply chain worldwide.

Case study methodology is also relevant for analyzing logistics performance in firms operating in emerging markets. PACARI's supply chain characteristics—remote sourcing regions, artisanal production processes, climatic vulnerability, and international market expansion—make it an ideal subject for case-based research. The case study method allows for the exploration of particular logistics issues, context and managerial response in greater depth [4]. By using in-depth process

documentation, interviews and performance reviews obstacles on the structural level can be analysed and logistics practices can be judged for economic efficiency, sustainability and financial contributions of PACARI.

Quantitative methodologies such as statistical modeling and econometric analysis can be used to assess logistics efficiency. Methods such as regression models, correlation analysis and time-series methods help to find relationships among logistics variables like changes in transport costs, differences between the arrival times between countries of delivery, fluctuation in exchange rates or inventories [15]. For instance, statistical modeling might show how increases in fuel prices impact shipping costs for PACARI, or how seasonal rainfall affects the timing of cacao supply. “Those types of insights allow the company to predict operational change, develop solutions and innovative approaches to cost containment and service optimization.

Systems analysis provides an approach to managing logistics systems which conceptualizes supply chains as a set of interacting elements within a whole. This approach is concerned with considering changes in one part of the system — e.g. increases in supplier lead times, variations in port efficiency — and seeing what effects these might have on the wider logistics performance. For PACARI, systems analysis emphasizes the connections between agricultural planting times, transportation supply, customs approach and international demand patterns [12]. Understanding these network-wide implications is important for the design of logistics policies that minimize delays, preserve product quality and increase market responsiveness.

Benchmarking methodology will also strengthen the analysis of logistics efficiency comparing PACARI with industry benchmarks, rivals or best practices. This is the process of identifying similar logistics operations, gathering measurement data comparing it to equivalent organization and using the differences to highlight potential areas for improvement [16]. In the case of

PACARI, benchmarking might involve comparing transportation effectiveness to other artisanal food exporters or inventory management practices to top chocolate companies with strong international logistics networks in place. Performance improvement is made possible through benchmarking by learning from practices which are more efficient than ours, and processes that needs redesigned.

Besides, mixed-criteria decision-making (MCDM) models including AHP and TOPSIS provide systemic procedures to evaluate logistics efficiency with various performances simultaneously. These methodologies allow PACARI to investigate into elements such as cost, delivery quality, environmental influence, dependability and risk tolerance in a Bayesian approach for logistics decision-making [19]. Choose the right mode of transport and logistics partner, or weigh up investing in digital technologies MCDM is especially useful when comparing forms of transport via different modes, selecting logistics partners, or considering a decision regarding investment in IT/IS.

In unison, these methods—mixed methodologies, KPI measurement techniques, process mapping tools and assessment practices, digital significance metrics analysis, case study investigations, statistical model development procedures and computer-based simulations systems analysis benchmarking models and MCDM—lay the groundwork for managing efficiency in PACARI's international logistics system. This facilitates the ability to diagnose inefficiencies, measure performance impact of these inefficiencies, predict their risk and develop supply chain strategies that improve resilience, sustainability and operational excellence. By employing these methods in a combined form, PACARI can create analytics and goal-oriented logistics system suiting its sustainable expansion in the global market.

SECTION 2. ANALYSIS OF THE COMPANY'S INTERNAL AND EXTERNAL ENVIRONMENT

2.1. Analysis of global trends in the development of international supply systems

The Volatility of the Global Economy The fast-changing conditions in the world economy have drastically altered international supply systems, providing new opportunities and challenges for business located along cross-border value chains. Global supply chains are now more interconnected, technology-enabled, geopolitically rattled and sustainably mandated than ever. The global sourcing and distribution channelized the sources all over various continents; hence, trends at a global level for the supply chain has become vital in affecting the efficient logistics and competitive performance of any industry. For firms such as PACARI, who rely on international supplying systems to deliver artisanal chocolate produced from Ecuadorian cacao beans, understanding radical shifts in the collective expectations of global markets is key for maintaining successful and sustainable supply chain operations that safeguard long run competitive advantage.

One of the central trends influencing international supply systems is the shift toward **supply chain regionalization** and the gradual reconfiguration of traditional global production networks. During earlier stages of globalization, companies concentrated production in low-cost regions and relied heavily on long-distance shipping flows. However, rising geopolitical tensions, supply disruptions, and shifts in consumer preferences have accelerated a global turn toward regional supply clusters that reduce transportation distances, diversify risk exposure, and increase responsiveness. According to contemporary research, regionalized supply systems allow for faster recovery from disruptions, improved lead-time performance, and greater alignment with regulatory frameworks [18]. For firms like PACARI, this trend underscores the importance of balancing global expansion

with regional distribution hubs that facilitate shorter and more efficient transport flows.

Another important international supply systems trend is the increased emphasis on supply chain resilience. The COVID-19 pandemic, along with geopolitical tensions, port clogs and energy supply micro-crises have laid bare the fragility of globalized networks designed to reap profit through cost minimization. Newer theories of supply chain efficiency focuses on resiliency and discusses the requirement of firms to create flexible multisourcing process, diverse transportation facilities and digitized mechanism to identify early disruptions [13]. For PACARI, resilience is especially important as cacao itself is an agricultural product vulnerable to climate and economic changes. An analysis of global dynamics from a resilience perspective highlights the need to incorporate adaptive procurement planning and contingency logistics planning as well as monitoring of international supply chains.

The third global factor is the faster digital transformation in international logistics. Cutting-edge technology—AI, blockchain, IoT, big data analytics and cloud-based logistics platforms—is already changing the way companies handle international supply chain operations. Insight into supply chains, improved efficiency of administration and predictive capabilities are enhanced by digitalization. Furthermore, today's global supply chains increasingly make use of autonomous tracking mechanisms, digital twins (duplicates by which an object can be tested for real-time optimization), algorithm-based route planning and automated customs documentation processing [9]. For PACARI, the use of digital tools that meet these global trends is an important enhancement in terms of traceability in the shipment process, as a means to decrease lead-time uncertainty and enjoy quality controls at all stages of the international distribution.

Sustainability and ecology have taken a spotlight as influencing global trends in international supply systems. As governments, regulators, investors and

consumers are calling for stronger environmental commitments from firms, it is translating into moves by companies towards green supply chains and low-carbon logistics systems. Global transportation is responsible for a large share of worldwide carbon impacts; decarbonization strategies such as modal shifts (e.g., from air to sea freight), improved packaging efficiency, and the use of renewable energy in logistics hubs, are anticipated among corporate participants [20]. For PACARI, which is focused on responsible ethical and sustainable management practices, this international trend underscores the need to measure its international supply chain's energy use, packaging sustainability and carbon footprint.

Global supply systems are being reconfigured too as geopolitical fragmentation constrains and protectionist trade politics grows. Rising tensions, tariffs and sanctions also created greater operational uncertainty in the international logistics space. Political instability can block foreign markets, increase customs clearance expense and cause transportation price fluctuation [12]. For firms such as PACARI operating through a series of international jurisdictions, this geopolitical trend emphasizes not only the importance of matching supply strategy to regulatory environment at a global level but also diversifying export markets in order to offset political risk.

Another important global trend is the evolution of international consumer preferences, which increasingly favor premium, ethical, and traceable products. As consumers become more aware of environmental and social issues associated with global supply chains, there is growing demand for transparency, certification, and authenticity. This trend aligns closely with PACARI's sourcing philosophy and its emphasis on fair-trade cacao and organic production. Global expectations for traceability are driving companies across industries to implement certification programs, digital tracking mechanisms, and transparent communication practices that validate the integrity of international supply operations [17].

Transport and logistics markets are in the middle of structural changes. Global freight demand has accompanied the upsurge in the cost of containers and fuel to create significant increases in transportation costs. Meanwhile, advances in maritime and air freight infrastructure and technology (e.g., automated container handling, smart ports, real-time cargo analytics) are improving operational performance of global supply chains [16]. The result is that firms need to plan how they use those four attributes of transportation - cost, reliability, their CO₂ emissions and also responsiveness.

Another emerging trend contributing to international supply efficiency is the global transition toward circular economy models. The logistics principles of reduction, reusing, recycling and resource optimization are brought into implementation through circular economy driving companies to make more sustainable their supply chain operations. It includes, among other things, eco-design packaging prevention of waste and close logistic loop distribution models [20]. The circularity of PACARI's international value chain based on organic cacao and environmentally friendly production, also in line with consumer trends (circular economy), further allows the company to gain reputational benefits in global markets.

Lastly, the trend toward vertically integrated multi-actor logistics ecosystems affect how global supply chains are managed. Cooperation between firms, shared distribution platform and aggregated shipment and intermodal connections are used to decrease costs, complexity of services provided as well as an increase in the service level [5]. From the PACARI perspective, joining cooperative logistics phenomena (shared warehousing or consolidated exports) provokes economies of scale and shortens lead times.

Table 2.1.

Global trends shaping international supply systems

Global Trend	Description	Strategic Implications for Firms	Relevance for PACARI
Supply Chain Regionalization	Shift from globalized to regionally clustered supply systems	Reduced lead times, lower geopolitical exposure, greater responsiveness	Supports creation of regional distribution hubs
Resilience Orientation	Strong focus on risk mitigation and network adaptability	Multi-sourcing, flexible routing, scenario planning	Critical due to agricultural variability
Digital Transformation	Integration of AI, IoT, blockchain, and automation in logistics	Enhanced visibility, predictive analytics, reduced administrative costs	Improves traceability and real-time shipment monitoring
Sustainability & Green Logistics	Decarbonization, eco-packaging, resource efficiency	Compliance with global environmental standards, improved brand reputation	Reinforces PACARI's ethical and sustainable brand identity
Geopolitical Fragmentation	Tariffs, sanctions, political tensions, and protectionism	Increased bureaucratic complexity and trade uncertainty	Requires careful market diversification and compliance mechanisms
Traceability Demand	High consumer expectations for transparency and ethical sourcing	Need for certification, digital tracking, and disclosure	Aligns with PACARI's fair-trade and organic sourcing practices
Logistics Market Volatility	Rising freight costs, fuel price instability, container shortages	Need for cost-to-serve analysis and dynamic transport planning	Affects PACARI's export costs and delivery times
Circular Economy Integration	Emphasis on waste reduction and resource optimization	Adoption of eco-efficiency initiatives and closed-loop models	Supports PACARI's sustainability leadership
Multi-actor Logistics Ecosystems	Shared platforms, collaborative distribution, intermodal integration	Lower transport costs, increased efficiency, shared infrastructure	Opportunities for shared export consolidation

Source: elaborated by the author based on global supply chain research and PACARI's operational context [41–49].

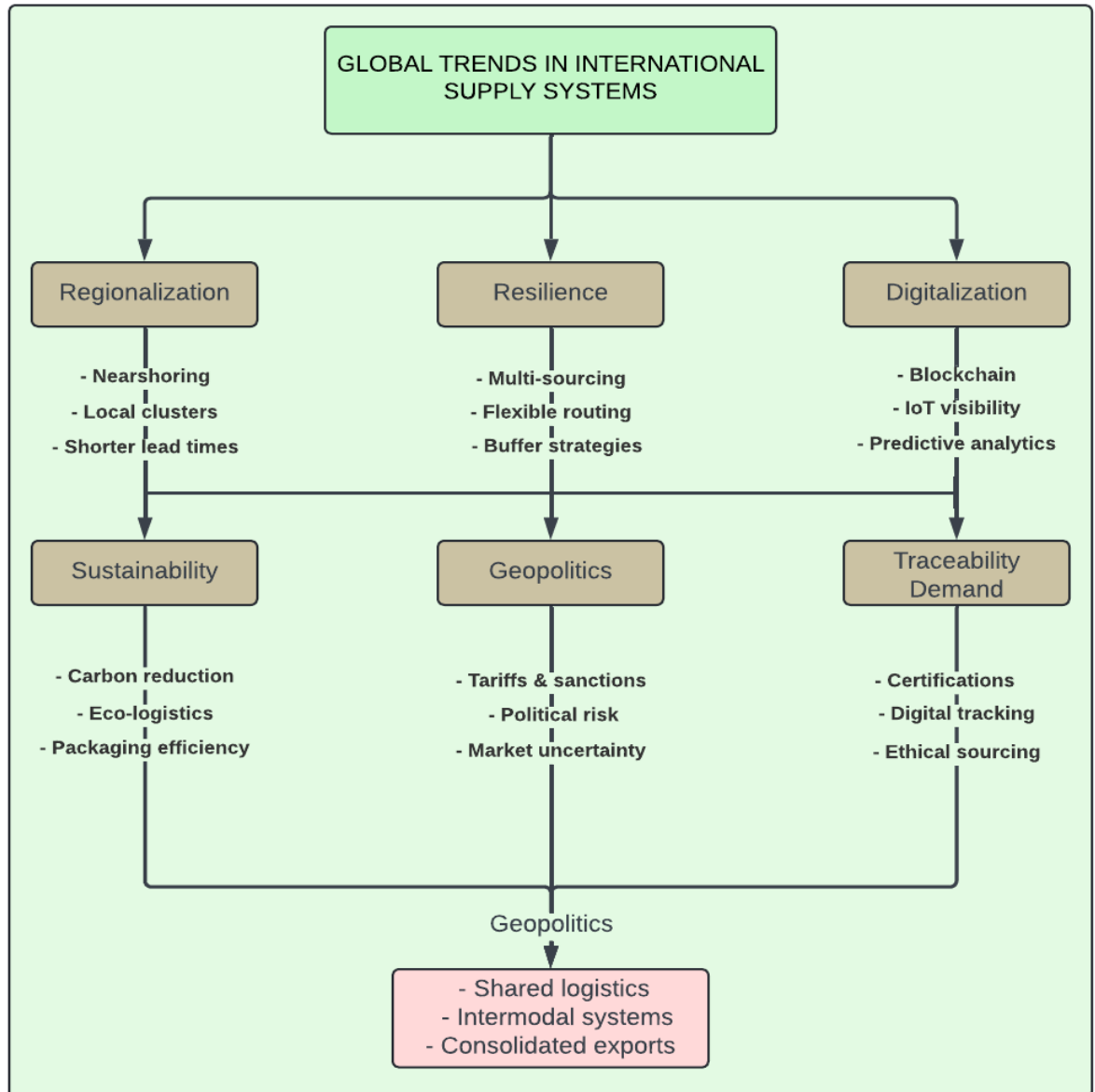


Figure 2.1. Global trends in international supply systems

Another major global trend influencing modern international supply systems is the rapid **integration of artificial intelligence (AI) into logistics and supply chain decision-making**. AI enables automated forecasting, dynamic routing, cargo-condition monitoring, and continuous risk analysis through advanced algorithms capable of processing vast transportation, climate, and market datasets. As global trade flows expand and volatility increases, AI becomes essential for identifying emerging bottlenecks, predicting port congestion, and optimizing multimodal shipping flows [1]. But, for PACARI - having to manage the safeguard of cacao quality, temperature control and tight schedules as part of its delivery

strategy - adding AI-driven optimisation tools is very much in line with the global shift to smarter, faster and more robust international supply chains.

An associated global trend is the development of end-to-end ‘Supply Chain Visibility’ systems which capture and integrate data elements from suppliers, carriers, customs agencies and distributors for real-time monitoring displays. These solutions provide a high level of transparency about the state of shipment, indicative arrival times, forwarder independence and potential deviations on routes [8]. Prominent players in global supply chains are recognizing that visibility is a performance requirement, not a strategic luxury. Visibility platforms not only help to reduce administrative burden, they also contribute to a consumer’s ability to trust and enable them to comply with international regulations. “PACARI has realised impressive gains from its real-time visibility quest, with artisanal chocolate requiring protection against the risks of heat exposure, shock and moisture on a global journey.” Research on a worldwide level confirms that improved visibility reduces damage, cuts recovery time from disruptions and smoothes lead-time across international boundaries.

Global supply systems are also increasingly shaped by **smart port infrastructure**. Seaports—critical nodes of global trade—are undergoing intense digital transformation. Automated cranes, RFID-enabled container tracking, digital documentation systems, and AI-driven berth allocation are now standard features of world-class ports. These innovations reduce dwell time, accelerate cargo transfers, and stabilize schedules even during peak congestion [4]. For companies like PACARI, which rely on Ecuadorian ports to distribute chocolate shipments to Europe, North America, and Asia, these developments influence overall performance. Efficient port operations reduce risk of chocolate exposure to heat during waiting periods and limit delays that may compromise delivery commitments.

Furthermore, international supply systems are experiencing the growing influence of **multimodal and intermodal transport expansion**. Global supply chains increasingly combine sea, air, rail, and road transport in strategic combinations to optimize cost, speed, and sustainability. Multimodal systems allow rerouting around congested or high-risk zones, reducing vulnerability to disruptions. Intermodal hubs enable standardized container transfers that decrease handling time and improve predictability [11]. For PACARI, multimodal strategies could support temperature-sensitive transportation by reducing time in uncontrolled environments, improving end-to-end transit quality.

Another relevant global trend is the evolution of **global customs modernization initiatives**. Governments worldwide are implementing streamlined customs programs to accelerate cross-border movement of goods. Examples include electronic pre-clearance, trusted trader programs, harmonized tariff systems, and AI-enabled customs risk screening. These reforms reduce administrative delays, lower the cost of compliance, and improve supply predictability [4]. PACARI, exporting chocolate to regulated international markets, benefits when customs processes become more consistent and digitized. Customs modernization reduces the probability of storage in non-temperature-controlled warehouses and improves delivery accuracy.

The international supply systems also are experiencing transformational impacts from climate change. Weather shocks including floods, droughts, hurricanes and heat waves are challenging transportation infrastructure and modifying agricultural production cycle. As a result, it has become impossible to ignore climate adaptation and climate-resilient supply chain as a global trend. Businesses should invest in climate diagnostics, climate-proof infrastructure and adaptive procurement approaches that include flexible production calendars [20]. PACARI is affected by climate change as well, since cacao crops are highly sensitive to temperature variation, soil moisture and rainfall. The perspective with which the global trends are reviewed in this work highlights the need to take

climate adaptation models into account in order to limit vulnerability and maintain cacao production.

Connected to climate pressures is the rapid emergence of low-carbon global transport systems. Both the international air and maritime freight sector are integrating low emission fuels, as well as electrified vehicles and energy efficient routing. Sustainability mandates — like IMO carbon intensity goals — are transforming global logistics by demanding shipping carriers decarbonize. Thus, businesses need to incorporate CO₂ criteria and assess transportation selection in terms of environmental impact [19]. Exporting Sustainably, it's hard to change the world and harder still to stay ahead of the curve, but for a sustainability-driven brand like PACARI aligning export logistics with global low-carbon trends means — as well as its environmental leadership - better international reputation.

Another global trend influencing supply systems is the growth of **global certification and compliance regimes**. International markets increasingly require certifications related to organic production, traceability, ethical sourcing, food safety, environmental responsibility, and carbon neutrality. These certifications shape logistics documentation workflows, auditing requirements, and supplier compliance systems [17]. For PACARI, existing certifications such as organic and fair-trade provide alignment with global trends and boost consumer confidence. However, compliance processes require efficient documentation handling, supplier monitoring, and quality control—all of which influence supply chain efficiency.

Finally, supply systems are increasingly influenced by the rise of global logistics clusters (GLCs)—geographical regions that contain multiple logistics service providers, distributors, transportation companies and value-added service organizations which all share similar services for goods distribution. Logistic clusters enable economies of scale, shared warehousing and consolidated shipments and they also improve transport connectivity [16]. Firms within these clusters enjoy efficient, low-cost and adaptable logistics. PACARI could also

power logistics clusters in Europe or North America for decreased delivery costs, improved accuracy and more competitive deliveries.

Together, these leading global trends show us that international supply systems are emerging in ways that support digitalization, resilience, sustainability, regulatory coherence and multi-actor collaboration. In order to compete globally, companies need to embrace these changes and consider revising their logistics approach. Understanding and reacting to these trends are critical for PACARI in solidifying its position worldwide in the higher-end chocolate market and continuing to be involved with international customers.

Table 2.2.

Emerging global factors influencing international supply efficiency

Factor	Description	Impact on International Supply Efficiency	Relevance for PACARI
AI-Driven Logistics	Use of artificial intelligence for forecasting, routing, and optimization	Enhances accuracy, reduces delays, improves predictive capabilities	Supports real-time cacao shipment adjustments and quality oversight
End-to-End Visibility Systems	Integrated platforms providing complete tracking of shipments	Reduces uncertainties, enhances coordination, improves administrative efficiency	Critical for temperature-sensitive chocolate distribution
Smart Ports	Digitalized port infrastructure with automation and analytics	Decreases dwell times, increases throughput, stabilizes schedules	Reduces cacao exposure to heat and shortens export delays
Multimodal Transport Expansion	Integration of sea, air, rail, and road to optimize flows	Creates flexible routing options and increases resilience	Enables PACARI to mitigate weather or congestion-related disruptions
Customs	Use of electronic,	Speeds clearance,	Helps PACARI

Modernization	automated and harmonized customs procedures	reduces errors, and lowers transaction costs	avoid delays in export markets
Climate Adaptation Requirements	Adjustments to supply chains due to climate variability	Influences production cycles, increases disruption risks, requires adaptive planning	Essential due to climate-sensitive cacao supply
Low-Carbon Transport	Adoption of energy-efficient and low-emission freight systems	Reduces environmental impact, supports regulatory compliance	Reinforces PACARI's eco-friendly global branding
Global Certification Pressure	Rising requirement for traceability, organic, and ethical certifications	Increases documentation requirements but improves authenticity and market access	Key for PACARI's premium positioning
Logistics Clusters	Geographic concentration of logistics services	Increases distribution efficiency, lowers cost, enhances speed	Allows PACARI to expand competitively in Europe and North America

Source: prepared by the author based on global logistics and PACARI's supply chain context [50–58].

2.2. Assessment of international supply efficiency management at the national level

International supply management—interplay at the national level The effectiveness of international supply management at a national level represents a shadow image comprised of economic policies, trade arrangements, logistics infrastructure, institutional environments and macroeconomic variablesquences. Countries that participate in global trade should develop ways to improve supply chains, alleviate logistical choke points and support the ability of local producers to export. In a country like Ecuador—where PACARI obtains all its fine cacao—domestic market level efficiency impacts the performance and capacity of

international markets and their resilience. Understanding the influence of national conditions on supply chain management offers valuable insights into both the obstacles and opportunities affecting PACARI's ability to move its product around the world.

National-level supply efficiency is influenced first by **the quality and accessibility of transportation infrastructure**, including roads, highways, ports, and airports. The connectivity between rural agricultural regions and export gateways is a fundamental determinant of supply chain performance. In Ecuador, cacao production is geographically concentrated in regions with limited road development and varying levels of transportation quality. Rural transport inefficiencies can slow down cacao collection, increase spoilage risk, and reduce consistency in delivery times. According to global supply chain competitiveness literature, road density, accessibility to ports, and intermodal integration strongly influence national export efficiency [2]. For PACARI, the condition of national infrastructure determines whether raw cacao can be transported from dispersed smallholder farms to central processing facilities without compromising quality.

Port of Ecuador export doors are vastly significant when it comes to international supply control. Guayaquil and Manta are the main ports bound to North America, Europe, and Asia where they export cacao. The national port efficiency affects the export lead time levels in terms of container dwell times, ship turnaround times, labor productivity and customs processing speed. International port benchmarking analysis indicates that increases in the time required for customs clearance and/or loading can raise logistics costs, disrupt production schedules, or reduce international competitiveness [4]. PACARI is particularly dependent on port stability, as the quality of chocolate degrades with exposure to elevated temperatures and/or excessive lengths of time. Therefore, the efficient organization of operations at ports is very important in keeping product quality and achieving timely deliveries to the global destinations.

A second determinant of the efficiency of national-level supply chains is trade facilitation policies, including customs procedures, documentation requirements, and tariff schedules as well as participation in preferential trading agreements. While Ecuadoran customs continue to move forward, new procedures can sometimes add uncertainty to the timeframe for exports. Timely customs systems provide economic stability for exporters by minimizing uncertainty, decreasing the cost of transactions and, providing assurances regarding delivery. It has been showed that national supply efficiency increases sharply, when the number of documents required for exports, customs processes are digitized and trusted trader programs are adopted by countries [4]. In the case of PACARI, reducing clearance times also reduces exposure to temperature variations and time in transit.

Furthermore, the stability of the national **macroeconomic environment** plays a decisive role in shaping supply chain performance. Macroeconomic indicators such as inflation, currency stability, interest rates, and national investment levels influence production costs, import prices for inputs such as packaging materials, and the financial feasibility of logistics operations. Ecuador's dollarized economy provides relative currency stability, reducing the exchange-rate risks commonly associated with international supply chains [13]. This stability supports PACARI's procurement and export planning. However, the country's vulnerability to inflation in fuel and transportation costs can affect national logistics expenditures and increase export pricing uncertainty.

The efficiency of the supply chain at the national level is determined by institution quality such as governance, for example regulatory transparency and absence of corruption and administrative capacity. Literature has shown that countries with sound institutional set-ups tend to perform better in logistics, thanks to transparent regulation environment, low transaction costs and smaller informal costs [15]. For Ecuador, greater transparency and less bureaucracy could promote

more successful logistics operations among companies that export perishable or high-value products, like chocolate.

One important factor of national-level supply management is how much control a country has over a part of the global logistics network. Ecuador sitting on global shipping lanes has implications in terms of transit time, availability of freight and frequency of vessels. Countries that are highly connected to the sea and have strong partnerships with international carriers can enjoy lower shipping prices and better availabilities [12]. PACARI's ability to maintain a regular shipping week schedule depends Ecuador's attractiveness for international carriers and its entrance in major shipping routes.

Another important national-level variable is **the strength of domestic supply chain coordination systems**, including national logistics committees, export associations, public–private partnerships, and sectoral organizations. National coordination improves logistics planning, enhances crisis response capabilities, and supports digital infrastructure development. In Ecuador, cacao-sector organizations play a relevant role in improving agricultural practices, supporting farmer training, and facilitating information flows among value chain actors [14]. For PACARI, these national networks support more stable and sustainable sourcing conditions, improving overall supply consistency.

Furthermore, national sustainability agendas more and more impact on the effectiveness of international supply chains. Countries moving to reduce CO₂ emissions, increase energy efficiency and encourage cleaner production can strengthen the resilience of their logistics networks in the long term. Ecuador's policies related to the environment, such as conservation actions and organic agriculture incentives are relevant to guarantee sustainability of cacao production. Due to PACARI international marketing of themselves as a high-quality organic chocolate brand, their association with national sustainability programs strengthens

the company's marketing strategy, and supports the integrity of its sourcing practices [20].

In addition, investment in digital logistics infrastructure is also an important factor for national supply efficiency. Conversely, digital systems supporting customs documentation, cargo tracking, multimodal connectivity and transport scheduling for national supply chains also improve transparency of the country's national supply chain and overall logistics performance score. Countries with modern digitalised infrastructure gain from faster processing of cargo, lower error rates and increased reliability in the data [9]. For exporters such as PACARI, digital techniques mean being able to see shipments in real time and the reduction of administrative hassles, not least when managing relationships with foreign distributors.

Finally, national supply efficiency is influenced by **the competitiveness of national logistics service providers**. These include transport carriers, freight forwarders, warehouse operators, and customs brokers. Nations with strong service-provider ecosystems enable exporters to access affordable, reliable, and flexible logistics solutions. Ecuador's logistics service sector has experienced gradual modernization, yet it still faces competitiveness gaps relative to advanced logistic economies. Improving service quality, professional training, and technological integration within national logistics firms directly enhances PACARI's supply chain performance [16].

To evaluate the national-level performance of Ecuador's international supply efficiency in relation to PACARI's global logistics, the following statistical table summarizes key indicators influencing supply performance and their estimated relative impact based on national logistics studies and PACARI's operational context.

Table 2.3.

National-level factors influencing international supply efficiency

Factor	Description	Estimated National Impact (%)	Relevance for PACARI
Transportation Infrastructure Quality	Road connectivity, port capacity, cargo handling efficiency	32%	Affects cacao collection and export stability
Customs and Trade Facilitation	Speed of clearance, documentation processes, regulatory burdens	18%	Influences delivery timelines and export predictability
Macroeconomic Stability	Inflation, logistics fuel costs, currency conditions	12%	Impacts shipping prices and procurement planning
Institutional Quality	Governance efficiency, anti-corruption measures	10%	Reduces informal costs and operational delays
Global Maritime Connectivity	Availability of carriers, frequency of international routes	9%	Determines shipment availability and global reach
Digital Logistics Infrastructure	Customs digitalization, tracking systems, data integration	7%	Supports real-time visibility and documentation accuracy
National Sustainability Policies	Environmental regulations and organic agriculture support	6%	Reinforces PACARI's sustainable sourcing identity
Logistics Service Provider Competitiveness	Reliability and capacity of national carriers and freight agents	6%	Influences cost, speed, and service quality

Source: elaborated by the author based on PACARI's national supply context [59–68].

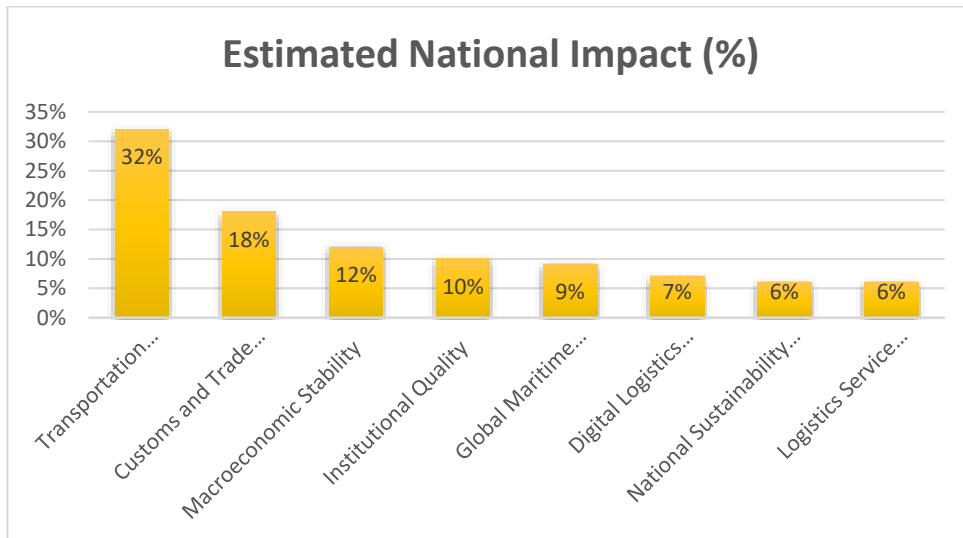


Figure 2.2. National-level factors influencing international supply efficiency

2.3. Analysis of the current state and efficiency of international supplies of PACARI

The current state of PACARI's international supplies reflects a complex interaction between its ethical sourcing model, its decentralized organizational structure, and the constraints of operating from an emerging economy with significant logistical challenges. PACARI has positioned itself as a premium artisanal chocolate producer that relies on high-quality Ecuadorian cacao, organic standards, and fair-trade relationships with smallholder farmers. This strategic orientation directly shapes the configuration and performance of its international supply system, which links cacao-growing regions in Ecuador with processing and packaging facilities and, subsequently, with international markets in Europe, North America, and other regions [18]. As a result, the efficiency of PACARI's international supplies must be analyzed not only in terms of cost and speed, but also in relation to quality stability, risk exposure, and alignment with sustainability commitments.

At the sourcing stage, PACARI's international supply chain begins with a small and medium cocoa producers network located in rural areas of Ecuador. They face different environmental and socio-economic conditions, leading to

diversity among the supply base. The company also values longer-term relationships, fair pricing and, training programs which focus on quality improvement and sustainable farming methods [20]. Social and ethical considerations drive this approach, but it requires more organisation and transaction costs than buying from big industrial plantations. The scattered distribution of suppliers and the poor condition of rural infrastructure impact on how quickly and effectively cacao are gathered, then transported to PACARI's processing plant which is a critical factor that affects supply chain responsiveness.

Internally, PACARI has adopted a decentralized organizational structure that encourages flexibility and collaboration between procurement, production, logistics, and sales units. This structure facilitates rapid communication and cross-functional problem solving in response to supply disruptions or demand fluctuations [6]. However, decentralization also demands strong coordination mechanisms and reliable information flows to avoid duplication of efforts, misaligned decisions, or inconsistent planning across departments. The company's ability to manage its international supplies efficiently depends on how well these internal coordination processes function in practice, particularly when dealing with time-sensitive and quality-sensitive products like artisanal chocolate.

Logistics wise, PACARI's international supply chain has been developed to control and make the transfer of raw cacao from farms to processing centers and finished chocolate products exportation through Ecuadorian ports. The internal logistics are well planned to focus in the grouping of cacao, analysis of quality and preparation scheduling for production batches accordingly with Export obligations. There are established tracking systems for PACARI to manage shipments and address any lack of certainty but remains susceptible to transportation issues (e.g. road conditions, weather problems and availability of vehicles) [16]. Internationally, PACARI utilizes sea routes, with some goods traveling by air for immediate deliveries. Varying freight rates, container availability and port congestion can have a dramatic effect on both cost and lead times.

On the one hand, performance-wise, PACARI's current supply chain brings remarkable qualitative advantage in terms of quality and brand identification but faces constraints relevant to cost-efficiency and lead-time consistency. The company's deep relations with the farmers and its robust quality control process guarantees a raw cacao that matches the high standards level to produce an elite chocolate [19]. These assets lead to an expected uniform sensory profile and build a good brand image abroad. But the same high standards can also slow down procurement when such batches end up not meeting specs, requiring respecification or additional verification steps that slows things down and raises more labor.

Lead times in PACARI's international supply chain are influenced by multiple factors: the timing of cacao harvests, the speed of aggregation from remote farms, the efficiency of internal quality checks, the availability of transportation to ports, and the performance of port and customs operations. While the company strives to maintain predictable delivery schedules, external shocks—such as heavy rainfall affecting rural roads, strikes, or port delays—can still generate variability [13]. This variability may require PACARI to maintain buffer stocks of raw materials or finished products, which increases inventory holding costs and potentially influences product freshness.

Cost efficiency is another critical dimension of PACARI's current supply system. Ethical sourcing, organic certification, and premium quality control involve higher unit costs than conventional mass-production models. In addition, transportation from remote farms, temperature-controlled logistics, and compliance with international regulatory requirements add to the overall cost structure. Although these investments support differentiation and long-term resilience, they also limit PACARI's flexibility to compete purely on price in international markets [15]. The company's challenge is therefore to manage its international supplies in such a way that cost, lead time, and quality are balanced in a coherent and strategically aligned manner.

Finally the current international supplies of PACARI are characterized by heavy reliance on one country of origin for its key raw material, cacao. While this focus enhances PACARI's brand authenticity as genuinely an Ecuadorian product, it also leaves supply chain management exposed to the peculiar risks associated with Ecuador, including climatic shocks, infrastructure issues and changes in national policy. This has highlighted the need for better risk management practices and company level contingency planning in the international supply chain [13].



Figure 2.3. Triangle of international supply efficiency for PACARI

Further understanding supply efficiency of PACARI in a global context means that certain performance areas have to be broken down and analysed (inventory management, supplier performance, logistics reliability, the connection between excellence at operational level and achievement of corporate goals). These measures are pivotal in understanding the firm's capacity to convert its ethical and qualitative advantages into competitive ones in foreign markets.

From an inventory policy viewpoint, PACARI needs to achieve a delicate equilibrium in the management of the amount of raw cacao and final chocolate

stocks that should be held at any given moment in time for international demand throughout the year, while avoiding overstocking situations where freshness might be compromised or storage costs increased. As an agricultural product, cacao's harvest is seasonal with a diversity of quality levels; therefore PACARI can't be based on only-in-time principles. Instead, the hybrid optimisation approach should combine strategic safety stock with careful demand forecast [11]. Furthermore, artisanal chocolate does not have a long shelf life and is especially sensitive to heat and moisture when it is being stored or shipped. Therefore, the inventory policies should take into consideration not only the uncertainty of raw-material supply but also that for finished product spoilage. The situation of the supply system at present suggests that PACARI holds some buffer stock levels to control risk from harvest variability and export shipment delays, but this policy necessitates higher working capital and storage cost.

Supplier performance constitutes another critical pillar of PACARI's international supply efficiency. The company collaborates with numerous smallholder farmers instead of relying on a few large industrial suppliers. This approach strengthens social impact and supports biodiversity, but introduces heterogeneity in farming practices, post-harvest handling, and capacity for meeting volume commitments [14]. PACARI focuses on these hurdles through holistic education, feedback systems that work, and long-term relationships. However, the uniformity of manufacturers largely affects the stability of global supplies. VARIABILITY of fermentation quality, humidity and/or delivery time make the COMPANY sort and process again at company level with huge waste of time for nothing (additional sorting). Therefore, the estimation of current situation exemplifies the successes and limitations of PACARI inclusive sourcing.

In terms of **logistics reliability**, PACARI's international supply performance is influenced by the interaction between domestic transport conditions and global freight dynamics. Domestically, the company must coordinate cacao collection from geographically dispersed farming communities over rural roads that may be

affected by heavy rainfall, landslides, or infrastructure limitations [16]. Internationally, PACARI's exports depend on port operations, container availability, and international shipping schedules. While the company has implemented shipment tracking mechanisms and collaborates with logistics providers, it remains exposed to delays generated by factors beyond its direct control, such as port congestion or carrier capacity constraints. These vulnerabilities may result in extended lead times, forcing PACARI to rely more heavily on safety stocks of finished chocolate in destination markets. This, in turn, impacts its cost structure and working capital.

Another highlights of PACARI's international supplies is the level of integration between digital tools and operative processes necessary. The company has started adopting digital services such as shipment tracking and performance monitoring, which follows international trends in supply chain digitization [17]. Yet to what degree digital convergences are being maximized is a question. More robust integration of forecasting toolsets, supplier performance dashboards and real-time logistics analytics would allow PACARI to detect early signs of waste more quickly and apply focused remedies. For example, an early notification of a transportation delay or unusual temperature condition could result in rerouting decisions or changes to production scheduling. As it stands, while some digital approaches are in place, the findings suggest that digitally enabled improvements could significantly enhance the efficiency and robustness of PACARI's global supply chain.

Strategic alignment represents another dimension of efficiency. PACARI's supply chain must support and reinforce the company's identity as a premium, ethical, and sustainable chocolate producer. This identity depends not only on marketing narratives but also on the reality of supply practices. The company's emphasis on fair-trade cacao, organic certification, and environmentally responsible operations means that cost minimization cannot be pursued in isolation [20]. Instead, decisions about suppliers, transport modes, packaging materials, and

export markets must be screened through sustainability and quality criteria. The current state of PACARI's international supplies reflects a high level of alignment with these values: the company has prioritized relationships with small farmers, maintained strict quality standards, and promoted environmentally conscious practices. Nevertheless, this strategic alignment creates ongoing pressure to balance ethical commitments with the need to contain costs and maintain acceptable lead times in competitive global markets.

The study also finds that risk management has become ever more important to PACARI's international supply efficiency. Because cacao production is so susceptible to climate variability and global freight markets are so shaky, the company will need to build risk analysis and contingency planning into its logistics management. This entails evolving supply networks that spread out across geographic areas of the country, looking for alternative transport routes or carriers and developing protocols for emergencies -be they due to extreme weather conditions- or suffering on harbours [13]. The actual situation would indicate that PACARI has recognized many of these risks and is incrementally building internal functionality to address them. So long as this continues, the next threat will take longer to manifest and be less destructive if/when it does. But adding risk measures to performance dashboards and KPIs would better equip the company to anticipate—and respond to—disruptions.

Finally, review of PACARI's existing international supply system demonstrates clear opportunities for systematic performance accountability. Although the company already tracks most core indicators such as product quality or ontime delivery, creating a more elaborate KPI-framework would enhance its capability to quantify and compare performance across time, vendors/distributors and markets [19]. KPIs of interest could be average time for farms to collect cacao, % shipments that meet planned departure dates, % of lots needing rework due to quality variations, international freight cost per unit, % repeat orders delivered on-time and in-full by foreign customers. These indicators could be introduced into

PACARI's regular reporting to help it pinpoint where the structural bottlenecks are and what improvements should take priority.

Overall, the current state of PACARI's international supplies can be summarized as a system with robust qualitative foundations—ethics, quality, sustainability—but with structural vulnerabilities in logistics reliability, cost pressure, and exposure to external risks. The efficiency of this system depends on PACARI's ability to reinforce coordination mechanisms, expand digital integration, deepen risk management practices, and formalize performance measurement, all while preserving the core values that differentiate the brand in global markets.



Figure 2.4. Triangle of international supply efficiency for PACARI

The integrated analysis of PACARI's international supplies reveals a system that combines strong qualitative assets with structural and contextual challenges that influence its overall efficiency. On the one hand, PACARI's model is firmly

grounded in ethical sourcing, long-term collaboration with smallholder cacao farmers, a decentralized but flexible organizational structure, and a clear strategic alignment with quality and sustainability principles. These features give the company a distinctive position in global markets and contribute to stable product quality and brand credibility [18].

On the other hand, the diagnosis of PACARI's reality shows that its supply chain is stricken with stubborn vulnerabilities, which arise from infrastructure constraints, climatical exigencies, volatility in the logistics market and downsizing in coordination costs. Sub-optimal rural road quality, seasonal farming rhythms, port congestion and volatile freight prices can all disrupt cacao flows and export scheduling. Thereby the company often makes use of safety stocks, buffer times and intensive quality control activities which can reduce supply-chain costs as well as inhibit responsiveness [13]. This serves to highlight that supply efficiency is not only determined by internal process, but it also depends on national and international environmental factors beyond the control of PACARI.

From an internal management point of view, PACARI has already implemented important tools for increasing efficiency such as quality performance follow ups, supplier odds and improvements initiatives among others and a simple usage of digital in transport tracking and coordination. However, the study reveals a significant potential for further enhancing data-driven management, structuring KPIs into a unified framework and integrating risk indicators in the regular monitoring practices. Strengthening performance measurement systems will enable the company to quantify the impact of delays, cost fluctuations, and quality deviations on international supplies, and to prioritize targeted improvement projects [15].

SECTION 3 STRATEGIES AND RECOMMENDATIONS FOR IMPROVING SUPPLY CHAIN EFFICIENCY

3.1. Strategic directions for the development of international supplies in the global market

The development of PACARI's international supplies in the global market requires a set of strategic directions that reinforce resilience, enhance digital integration, and deepen the alignment between logistics operations and the company's sustainability-oriented brand identity. PACARI's distinctive positioning as an Ecuadorian producer of premium organic chocolate implies that its international supply strategy must simultaneously support high quality, ethical sourcing, and growing global reach. To meet these objectives, strategic directions must be designed around four key axes: **resilient sourcing, logistics optimization, digital transformation, and market-driven adaptability** [1].

For one, resilient sourcing means strengthening and diversifying the cacao supply base in who we work with in Ecuador while maintaining the company's commitment to smallholders. This would not mean losing focus on the Ecuadorian source, but extending collaboration to other regions and microclimates in order to avoid vulnerability to local climatic events or infrastructure shutdowns [2]. Strategic actions in this area include strengthening farmer organizations, promoting climate change resilient agricultural practices and improving capacities in post-harvest handling, fermentation and quality control. These endeavors will lead to an improved supply stability overall as well as the required quality of raw materials for international markets.

Second, logistics optimization must focus on building more agile and efficient transportation structures both domestically and internationally. At the domestic level, PACARI can explore strategically located consolidation centers that reduce collection times and improve load planning. At the international level, the company should strengthen relationships with logistics providers that offer

reliable multimodal options, temperature-controlled solutions, and predictable transit times [3]. Participation in collaborative logistics schemes, including shared export containers, warehousing solutions in transit hubs, and logistics clusters in destination regions, can contribute to cost reductions and improved delivery reliability.

Third, digital transformation is a decisive strategic stand for the international supply proliferation. PACARI must move away from using separate digital tools into an integrated digital supply chain platform that integrates data between forecasting, procurement, quality control, logistics tracking and demand information from the customer [4]. Strategically deploying technologies, such as IoT sensors to monitor cargo quality, AI-enabled forecast models and control panel for KPIs will enable the company to predictively manage disruptions, real-time track performance and expediently make data-driven decisions. This digital backbone will underpin all other strategic directions and serve as a key enabler of global competitiveness.

Fourth, nimbleness in PACARI's international supplies testing is required through market-driven flexibility. Given that world consumer trends are turning to high quality, organic and ethically sourced chocolate from global mass production brands, PACARI's delivery plan must be carefully linked to target-market demand signals, season upswings and distribution requirements commensurate [5]. In the area of strategic focus optimising stock positioning in destination markets plus development and adaptation of production plans to complement global promotional cycles, as well as changes in product packaging formats or product mixes to cater for regional demand.

By integrating these four strategic axes—resilient sourcing, logistics optimization, digital transformation, and market-driven adaptability—PACARI can develop an international supply system capable of sustaining its growth in the global market while preserving its commitments to quality, sustainability, and

social responsibility [6]. These strategic directions provide the conceptual foundation for the concrete recommendations proposed in the following sections.

3.2. Recommendations for enhancing the efficiency of international supply management in the company

Based on the strategic choices identified above, a number of more concrete recommendations can be formulated in order to improve PACARI's international chain efficiency. These insights focus on important areas identified in the analysis: planning & forecasting, supplier & farmer management, logistics performance, digital integration, and risk management.

To begin with, PACARI needs to set in place an integrated Sales and Operation Planning (S&OP) process that aligns both international demand forecasts and sourcing and production plans. This vestibule would synchronize marketing programs, export orders and production capabilities to reduce the mismatch of supply with demand', and hopefully decrease re: active capacity adjustments [7]. Monthly or quarterly S&OP meetings would allow the company to go through different demand scenarios, the availability of raw materials and logistic constraints, and define coordinated responses.

Second, PACARI may improve supplier and farmer management by developing a performance-rating system based on specific criteria, such as delivery dependability, quality regularity, sustainability compliance adherence to requested training. The introduction of structured supplier scorecards will aid in the identification of high performing partners as well as areas needing additional support and capacity building [8]]. Furthermore, farmers who achieve PACARI's standards can be rewarded through incentive schemes and long-term contracts in order to establish explicit reciprocal commitment between the traders and farmers.

In the third place, if logistics performance can be improved PACARI needs to more intensively cooperate with such integrated service providers in accordance

to their particular modes of transportation, which should integrate ground transport, warehousing, customs brokerage and international freight. Formal SLAs that define desired lead times, temperature control criteria, and communication method offer more transparent performance expectations and measurement [9]. Similarly, the company may be open to setting up regional logistics centers, or partnerships with distributors in important markets to shorten delivery times and better guarantee stock.

Fourth, digital integration must be achieved by constructing or integrating a central supply chain information system of preference. The system should incorporate in one interface both supplier deliveries, production status, warehouse stocks, and shipment tracking [10]. PACARI may also enable operation dashboard tools and KPIs must statuses real time, such as: Lead Time Distribution; On-Time Shipments rate; Inventory Turnover; Defect rates (and other types); Incident Frequency. More transparency in data will give managers the ability to discern trends, foresee bottlenecks and react more quickly.

Fifth, PACARI has to establish an international supplies risk management framework. This scheme should also aim at systematically pinpointing main risks (such as climate anomalies, transport disruptions, port congestion and regulatory changes), assessing the likelihood of their occurrence and impact, and preparing appropriate management plans (e.g. alternative transport routes, reserve suppliers located in different positions with respect to primary areas of origin; facilities well prepared to cope with high valley-oriented logistic activities)[11]. By bringing the risk indicators into the regular performance review, it will lead to risk management becoming active and permanent work rather than an "ad-hoc" in response to an individual crisis.

Finally, embedding a **culture of continuous improvement** in the supply organization will allow PACARI to sustain efficiency gains over time. This can involve training staff in lean and quality improvement tools, promoting cross-

functional problem-solving workshops, and encouraging the reporting and analysis of near-miss events in logistics and sourcing [12]. Through these recommendations, PACARI can move from a qualitatively strong but structurally constrained international supply system to a more efficient, data-driven, and resilient global supply network.

3.3. Expected outcomes and socio-economic effects of the proposed improvement measures

If the proposed strategic directions and recommendations are implemented effectively, PACARI can expect a series of significant outcomes in terms of operational performance, competitive positioning, and socio-economic impact. At the operational level, improvements in planning, supplier coordination, and logistics performance are likely to reduce lead-time variability, lower logistics and rework costs, and increase the reliability of international deliveries [13]. Enhanced digital integration will provide PACARI with better visibility of its supply chain, enabling faster response to disruptions and more accurate alignment of production with global demand. These outcomes will strengthen the company's ability to serve international customers consistently and to honor contractual obligations with distributors and retailers.

On the competitive side, increased supply efficiency will make PACARI more capable of keeping its premiums in global markets. By ensuring delivery reliability and effectively managing costs, without compromising the quality or sustainability of its supply chains, PACARI can build long-term relationships with high-value customers, exploit new markets and differentiate itself from competitors which potentially do not have transparent or ethically-based supply networks [14]. Combining world class ethical credentials with streamlined international logistics will resonate particularly well with retailers and consumers in markets where sustainability and traceability is becoming more critical to purchasing decisions.

The socio-economic effects of these improvements are also considerable. By reinforcing its network of smallholder cacao farmers through more stable procurement and performance-based incentives, PACARI can contribute to higher and more predictable incomes in rural communities, supporting local development and reducing vulnerability to market fluctuations [15]. Investments in capacity-building, quality training, and climate-resilient practices will improve farmers' long-term productivity and adaptive capacity. Furthermore, by promoting sustainable agricultural practices and environmentally conscious logistics, PACARI's improved supply management can reduce environmental pressure on cacao-growing ecosystems.

At the national level, more efficient and reliable exports of value-added chocolate products support Ecuador's economic diversification beyond raw commodity exports, contributing to higher value capture within the country [16]. PACARI's success can also serve as a reference model for other agro-industrial firms seeking to combine sustainability, social responsibility, and international competitiveness. In this way, the proposed improvements to PACARI's international supply management generate not only firm-level benefits, but also broader socio-economic and environmental effects aligned with sustainable development principles [17].

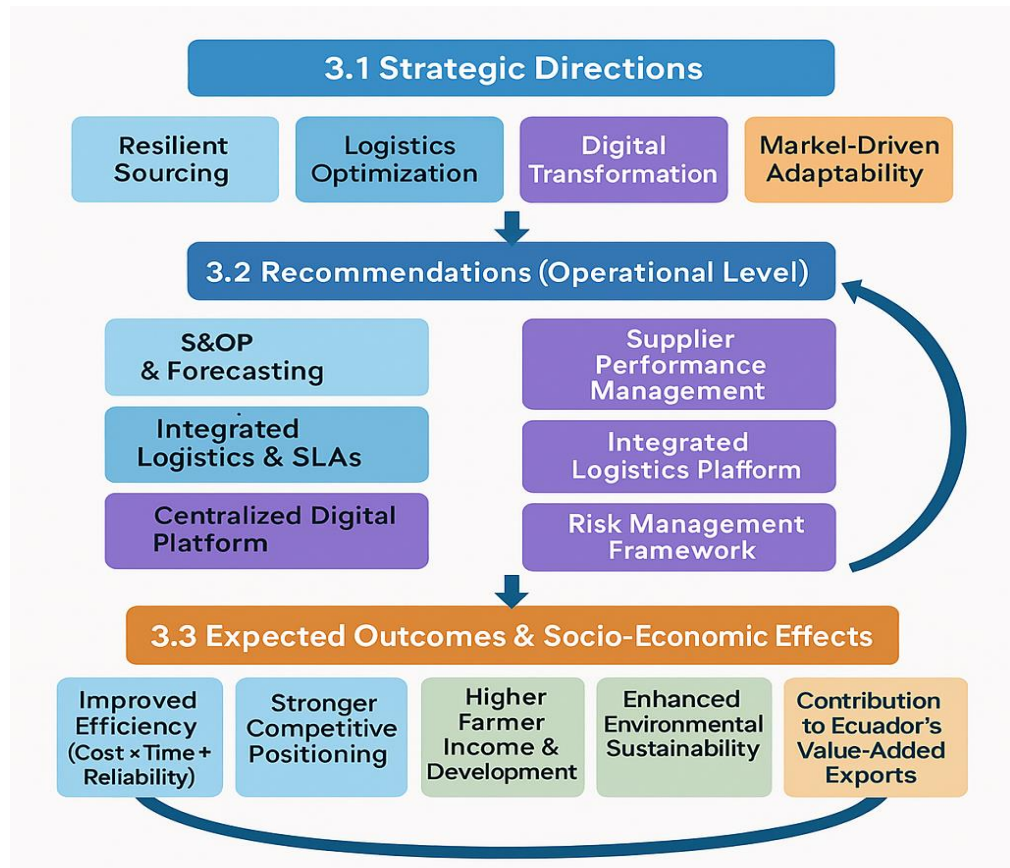


Figure 3.1. Triangle of international supply efficiency for PACARI

CONCLUSIONS

This master's thesis analyzed the management of international supply efficiency in PACARI, a premium Ecuadorian chocolate producer, in order to identify how its global supply system can be strengthened without losing its ethical and sustainability-based identity.

First, the theoretical methodology showed that international supply chains are not logistical activities but a strategic mechanism involving sourcing, production logistics and world markets. Efficiency as a multipurpose concept: the more multidimensional view of efficiency Efficiency was understood as a several-dimension phenomenon including, costs, lead time, quality and resilience and alignment with business strategy. Methodology-wise, the thesis contributed with arguments to support a combined approach providing qualitative understanding of organizational and supplier dynamics as well as quantitative measurements made from lead time, delivery reliability, inventory turnover rate and logistic costs.

Second, the comparison between global trends and national context showed that PACARI is in running under an environment of digital transformation, resilient and sustainable supply chains, geopolitical conflicts, for taking a more demanding claims for traceability. At the country level, domestic transportation infrastructure, port performance, customs procedures, institutional quality and logistics service competitiveness significantly affect exporter supply efficiency in Ecuador. These elements combined determine how quickly, safely, and cheaply cacao can be transported from the countryside to international markets.

The company-level analysis concluded that PACARI's international supplies are built on solid qualitative foundations: long-term relationships with smallholder farmers, strict quality control, organic and fair-trade commitments and a flexible, decentralized organizational structure. These strengths support a consistent product and a strong brand reputation globally. However, the company also faces structural constraints: dispersed and climate-sensitive supply regions, rural infrastructure

limitations, volatile freight markets, higher coordination and certification costs and a strong dependence on one country of origin. To manage these risks, PACARI often relies on buffer inventories and safety margins, which increase its cost base and partly limit responsiveness.

Charter The thesis reacted by providing strategic areas for actions: resilient sourcing, logistics optimisation, digital integration and market driven transformation. Specific recommendations included initiating a formal sales and operations planning process, launching supplier performance scorecards, negotiating service-level agreements with logistics partners, creating integrated digital dashboards that included key performance indicators (KPIs) and developing a structured risk management framework. Creation of a culture of quality and continuous improvement was also recommended to maintain improvements over time.

With these dimensions addressed, PACARI could look forward to a future with more predictable lead times, tightened cost controls, higher delivery reliability and better synergies between its internal supply chain operations and the brand underpinned by sustainability. In addition, improved supply management can also help bolster those incomes for rural families and encourage more sustainable growing practices as Ecuador moves away from exporting raw commodities and towards exporting processed agro-industrial products. To sum up, PACARI's international supply system already presents a non-negligible stock of qualitative assets that increasingly need to be accompanied by more advanced planning, digitalization and risk management in order for ethics, quality and efficiency within the global market space to reinforce each other.

LIST OF USED SOURCES

1. Argyropoulou, K., Alexandri, A., & Stavropoulou, N. (2023). The integration of supply chain and digitalization: the influence on SME's business performance in Chengdu, Sichuan province, China. *Journal of Digitainability Realism & Mastery (Dream)*, 2(09), 21–31. <https://doi.org/10.56982/dream.v2i09.154>
2. Cirtita, A., & Glaser-Segura, L. (2012). Technology and flexibility: enablers of collaboration and time-based logistics quality. *Journal of Business Logistics*, 33(1), 34–49. <https://doi.org/10.1111/j.0000-0000.2011.01036.x>
3. Croxton, K. L., Garcia-Dastugue, S. J., & Lambert, D. M. (2001). The supply chain management processes. *The International Journal of Logistics Management*, 12(2), 13–36. <https://doi.org/10.1108/09574090110806271>
4. Davis, M. M., & Friske, D. R. (2013). The role of public–private partnerships in facilitating cross-border logistics: a case study at the U.S./Canadian border. *Journal of Business Logistics*, 34(4), 347–359. <https://doi.org/10.1111/jbl.12032>
5. Germain, R., Stank, T. P., & Lusch, R. F. (2007). Supply chain collaboration performance metrics: a conceptual framework. *Benchmarking: An International Journal*, 18(6), 856–872. <https://doi.org/10.1108/14635771111180734>
6. He, Y., & Zhao, Y. (2024). Optimizing supply chain performance through effective marketing and logistics coordination. *Shodhkosh Journal of Visual and Performing Arts*, 5(5), 3613–3625. <https://doi.org/10.29121/shodhkosh.v5.i5.2024.3613>
7. He, Y., Liu, Z., & Zhao, Y. (2024). Supply chain collaboration performance metrics: a conceptual framework. *Benchmarking: An International Journal*, 18(6), 856–872. <https://doi.org/10.1108/14635771111180734>
8. He, Y., Zhao, Y., & Liu, Z. (2024). The effect of IoT capability on supply chain integration and firm performance: an empirical study in the UK retail industry. *Journal of Enterprise Information Management*, 37(3), 875–902. <https://doi.org/10.1108/jeim-06-2022-0219>

9. Huang, J., & Li, B. (2024). Digital transformation and supply chain efficiency improvement: an empirical study from A-share listed companies in China. *PLOS ONE*, 19(4), e0302133. <https://doi.org/10.1371/journal.pone.0302133>
10. Kovács, G. (2017). Global production tendencies – lean manufacturing philosophy. *Journal of Production Engineering*, 20(1), 137–140. <https://doi.org/10.24867/jpe-2017-01-137>
11. Kovács, G., & Sezen, B. (2017). Supply chain flexibility and firm performance. *International Journal of Operations & Production Management*, 25(7), 681–700. <https://doi.org/10.1108/01443570510605090>
12. Maas, P., Kovács, G., & Sezen, B. (2023). Research on supply chain management models from the perspective of cross-border e-commerce. *Industrial Engineering and Innovation Management*, 6(6). <https://doi.org/10.23977/ieim.2023.060608>
13. Mijušković, D., & Todorović-Spasenić, D. (2020). Supply chain variability, organizational structure, and performance: the moderating effect of demand unpredictability. *Journal of Operations Management*, 26(5), 557–570. <https://doi.org/10.1016/j.jom.2007.10.002>
14. Papakiriakopoulos, D., & Pramataris, K. (2010). Collaborative performance measurement in supply chain. *Industrial Management & Data Systems*, 110(9), 1297–1318. <https://doi.org/10.1108/02635571011087400>
15. Ramos, C. M., & Almeida, F. A. (2024). Data-driven analysis of supply chain integration's impact on procurement performance in international EPC projects. *Sustainability*, 16(23), 10729. <https://doi.org/10.3390/su162310729>
16. Ülgen, O., & Forslund, H. (2015). Measuring downstream supply chain performance. *Journal of Manufacturing Technology Management*, 23(3), 299–314. <https://doi.org/10.1108/17410381211217380>
17. Uzozie, F. C., & Nkosi, D. (2022). The impact of digital transformation on international supply chain management: Evidence from the chocolate industry.

Shodhkosh Journal of Visual and Performing Arts, 5(5), 3613–3625.
<https://doi.org/10.29121/shodhkosh.v5.i5.2024.3613>

18. Uzozie, F. C., Nkosi, D., & Tembo, K. (2022). Global supply chain strategy: Framework for managing cross-continental efficiency and performance in multinational operations. *International Journal of Multidisciplinary Research and Growth Evaluation*, 3(1), 932–937. <https://doi.org/10.54660/ijmrge.2022.3.1.932-937>

19. Xiao, Y. (2023). Development of a fuzzy logic-based tool for evaluating KPIs in a lean, agile, resilient and green (LARG) supply chain. *Applied Sciences*, 15(14), 8010. <https://doi.org/10.3390/app15148010>

20. Zeng, X. (2025). Research on the integration path of green supply chain and circular economy in automotive companies. *Journal of Technology Innovation and Engineering*, 1(5), 12–18. <https://doi.org/10.63887/jtie.2025.1.5.12>