Proposing a Model for Enhancing Financial and Operational Performance in Supply Chains

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Abstract

This study aims to propose a model for improving the financial and operational performance of supply chains. The participants in this study were supply chain managers with a teaching experience of at least 15 years and holding a master's degree or higher. The selection of individuals was conducted using purposive sampling based on the criterion of teaching experience at the primary educational level. A total of 22 experts and specialists participated in the sampling process. Data were collected through semi-structured interviews, which continued until theoretical saturation was reached. Thematic analysis based on the Aterid-Sterling framework was used to analyze the qualitative data. To ensure validity, several criteria were employed, including Holsti's coefficient, Cohen's kappa index, Pi-Scott coefficient, and Krippendorff's alpha, all of which were confirmed. Thematic analysis was performed using ATLAS.ti software. The results of the thematic analysis indicate that, from the 54 indicators (themes) identified, 13 primary themes were recognized, and two major themes were derived. The identified model included two primary themes: financial performance and operational performance within the supply chain. The 13 primary themes are: inventory management, financial reporting, financial actions at the operational level, coordination, risk management, sourcing strategy, demand planning, technology management, logistics strategy, customer interaction, flexibility, supplier communication management, and world-class quality. Given the critical importance of the supply chain in organizational success, enhancing its financial and operational performance is essential and fundamental. These improvements will lead to optimizing coordination among internal and external members, efficient logistics management, and sharing financial information, ultimately resulting in increased productivity, cost reduction, and enhanced competitiveness. Moreover, identifying and managing various risks, such as price risk, supplier risk, and market risk, are key actions that help effectively address environmental challenges and opportunities.

Keywords: *Financial performance, operational performance, supply chain, Aterid-Sterling model.*

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1. Introduction

Rapid globalization has put unprecedented pressure on industries, forcing companies to stay informed about technological advancements and effectively respond to government policy changes and customer demands [1, 2]. Even in the most uncertain economic conditions, manufacturing organizations today are constantly under relentless competition to produce high-quality products at the lowest possible cost and in the shortest possible time [3, 4]. Due to competitive pressures, such as cost reduction and better customer service, businesses are always seeking new strategies to create long-term competitive advantages [5, 6]. Therefore, many industry leaders are constantly searching for new strategies that enable them to reinvent themselves in agile organizations, as they have become more aware of growing competition and its critical role in establishing leadership in their industries [7, 8].

Financial flow refers to the set of activities and financial transactions within an economic system or organization, including the inflow and outflow of money and financial resources. This flow can include revenues, costs, investments, loans, and repayments. In a business, financial flow encompasses all activities that affect the financial status of the company, such as product sales, payments to suppliers, loan receipts, and employee salary payments. In other words, financial flow represents how money moves in and out of an organization or economic system and can serve as an indicator of the financial health and efficiency of a business or overall economy [1, 9, 10]. Financial flow is managed through various financial tools and techniques to ensure economic stability and growth. At the macro level, financial flow involves financial interactions between the government, businesses, and consumers, carried out through financial and banking markets. At the micro level, financial flow includes liquidity management, budgeting, and financial forecasting within an organization. The primary goal of financial flow management is to ensure that an organization has sufficient liquidity to meet its financial obligations at any given moment and is capable of responding to investment opportunities [11].

Blockchain is a distributed ledger with an ever-growing list of records (blocks) securely linked through cryptographic hashes [12]. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data (generally represented as a Merkle tree, where data nodes are depicted as leaves). Since each block contains information about the previous block, they effectively form a chain (compare with the linked list data structure), where each additional block links to the ones before it [10]. As a result, blockchain transactions are irreversible, because once recorded, the data in any given block cannot be altered without changing all subsequent blocks retroactively [7].

Blockchains are typically managed by a peer-to-peer (P2P) computer network designed as a public distributed ledger, where nodes collectively adhere to a consensus algorithm protocol to add and verify new transaction blocks. Although blockchain records are not immutable—since blockchain forks may occur—blockchains can be considered secure by design and serve as an example of a distributed computing system with high Byzantine fault tolerance [13].

The healthcare ecosystem is a complex network of all participants in the healthcare sector. It includes a community of patients, doctors, and all satellite figures involved in the medical care provided to the patient or their hospitalization. This can include service providers, customers, and suppliers. Recently, the healthcare ecosystem has expanded to include e-health entities and virtual care providers. The healthcare system delivers the best outcomes when all stakeholders work together. Understanding healthcare as an interconnected ecosystem helps individuals within the system address resource inefficiencies, eliminate friction in the patient experience, and improve patient care outcomes. When the healthcare ecosystem is properly coordinated, it provides a personalized, affordable, and intuitive care experience for patients [6].

Supply chain management is a critical concept for all manufacturing and service industries in both developed and developing countries, but it is not a new concept [3, 14]. Researchers have conducted several studies to identify the relationship between supply chain management practices and operational and financial performance, green supply chain management, total quality management, and the performance of industries in various countries [15, 16]. Supply chain management refers to the total set of activities, information, knowledge, and financial capabilities involved in the movement and transformation of products and services from raw materials to final goods delivered to customers by suppliers, to meet or exceed their expectations [3, 17]. Tan et al. (2002) identified six aspects of supply chain management through factor analysis: "supply chain integration, supply chain characteristics, customer service management, information sharing, technological capability, and geographical proximity" [1, 9].

In order to better respond to customer demands, reduce costs, and increase performance, businesses must have strong supply chain strategies and technologies that can simplify operations involved in internal and external processes. Creating integrated cross-functional activities within the company and successfully linking them externally with business partners, suppliers, and customers using appropriate supply chain strategies and technologies is crucial for enhancing company performance. To maintain competitive advantage and improve financial performance, companies must continuously align all of their supply chain processes with their dynamic environment, as was clearly demonstrated during the current COVID-19 pandemic [10]. In supply chain management, this process involves acquiring the necessary capabilities to respond appropriately to the changing environment and market requirements. In an increasingly interconnected world, this means adopting Industry 4.0 digital technologies to maximize the use of company resources, while exploring opportunities to share information with supply chain partners for better response to market changes and ultimately outperform the competition [3, 16].

Indeed, improving the supply chain by involving suppliers and customers in the value-creation process enhances organizational performance [16]. In fact, effective organizations are those that link their internal processes with appropriate supply chain strategies and technologies to external processes in order to be more competitive and agile in the market. Therefore, supply chain integration is a dynamic skill that can create distinctive performance. One of the key issues that will fundamentally change how supply networks operate in the future is the optimization of supply chain management processes [3, 16]. Thus, efficient management of supply chain process optimization can result in immediate financial benefits and sustained competitive advantage. Operational performance in the supply chain supports organizations in improving their performance across all aspects. It can enhance supplier capabilities that help create customer value and reduce costs [1, 3, 9, 10, 14, 15].

The study of the consequences of supply chain process optimization on company performance has attracted significant attention from both academics and professionals. Studies emphasize the importance of dynamic supply chain capabilities, especially agility, in the digital transformation process. Agility in supply chain processes, widely defined as the ability to effectively respond to changes and market disruptions, plays a key role in a company's survival. The common belief that higher levels of supply chain process improvement lead to better company performance has been the primary motivation behind much of the supply chain performance literature [3, 14-17]. At strategic, operational, and technological levels, optimizing supply chain management can assist businesses in addressing business challenges [18].

Therefore, it can be said that the goal of supply chain management is to improve performance and commercial competitiveness through these strategic links. In other words, strengthening the strategies formed within the supply chain is key to the success of both the supply chain and the business. Given that industries are critical for national economic development, introducing and implementing supply chain strategies to support their sustainability is vital. However, these companies often have lower production efficiency than larger companies. As a result, this research seeks to answer the question: What is the appropriate model for improving the financial and operational performance of the supply chain?

2. Methodology

Given the objectives outlined for the present study and considering that this research aims to develop a model for enhancing the financial and operational performance of the supply chain, which could contribute to the existing knowledge on the topic and provide valuable insights for policymakers, planners, and stakeholders in the oil and industry sectors, this study is categorized as applied-developmental in terms of its goal. Additionally, based on the method and nature of the research, this study is descriptive-survey in nature. Regarding the type of data, this research is both quantitative and qualitative. Furthermore, as this study employs both library research methods and field methods, such as interviews and questionnaires, it can be described as a cross-sectional survey-based research with respect to data collection.

3. Findings

In the current study, thematic analysis was used for analyzing qualitative data. To present the model for enhancing the financial and operational performance of the supply chain, thematic analysis was utilized. The data analysis process begins when the researcher identifies and considers meaningful propositions and statements related to the subject. This analysis starts with repeated examination and study of the data, and once the meaningful propositions

are identified, they are coded. The process of data analysis involves four stages: preparation, familiarization, coding, and obtaining main categories.

In the next phase, 138 initial codes were identified from texts and articles. The identified indicators are the verbal propositions derived from responses to the research questions, and after extracting all these verbal propositions, some were found to be common and were categorized based on the existing literature and theoretical foundations, leading to the formation of secondary concepts.

Next stage involves categorizing various codes into selective codes and organizing all the summarized coded data. In this step, the researcher begins the analysis of the codes and considers how different codes can be combined to form an overarching theme. In this stage, 13 selective codes were obtained by the researcher. In this phase, incomplete or irrelevant codes, as well as repetitive codes, were discarded, resulting in this number of selective codes (Table 1).

Table 1. Identified Components Using Interviews Conducted

Construct Themes	Primary Themes
Inventory Management	Examination of item flows
	Marketing, sales, and production cyclical processes
	Customer demand management
	Demand and inventory alignment
	Product availability
Financial Reporting	Examination of sales growth
	Examination of operating profit margin
	Sales cost/cost of goods sold
	Inventory turnover
	Return on investment
Financial Actions at the Operational Level	Return on investment
	Financial balance sheet
	Financial flow
	Value-added activities
Coordination	Coordination between internal and external supply chain members
	Timely logistics coordination within the supply chain
	Coordination of financial information sharing and transfer
Risk Management	Price risk
	Supplier risk
	Market risk
Supply Strategy	Selection of appropriate suppliers
	Alignment of suppliers with financial goals
	Access to financial resources
	Access to skilled labor
Demand Planning	Accurate identification of customer needs
	Market research
	Competitor tracking in market demand estimation
	Production and demand alignment
Technology Management	Smartening supply chain processes
	Use of cloud computing
	Internet of Things (IoT) for increasing coordination
	Application of artificial intelligence
	Electronic logistics
Logistics Strategy	Warehouse management
	Distribution planning
	Timely transportation
	Management of delivery time and quality
Customer Interaction	Communication with customers
	Addressing customer problems
	Understanding customer needs and expectations
Flexibility	Percentage of access to materials
	Ability to manage change
	Relative capability to adjust production volume
	Order batch size

Supplier Relationship Management	Trust
	Openness
	Integrity
	Capability
	Stability
World-Class Quality	Quality optimization
	Creating sustainable competitive advantage
	Managing and aligning time and cost
	Achieving local and global standards

Stage four begins when the researcher creates a set of themes and reviews them. This stage includes two steps: reviewing and refining, and shaping the secondary themes. The first step involves reviewing the summarized coded data. In the second step, the validity of the secondary themes is evaluated in relation to the dataset. At this stage, the researchers arrived at the construct themes.

The results of factor analysis indicate that, out of 53 indices (items) identified, 13 first-level construct themes can be recognized, and two categories of second-level construct themes were obtained.

Stage five begins when a satisfactory picture of the themes is established. In this stage, the researcher defines the core themes for analysis and reviews them again. Then, the data within these themes are analyzed. Through defining and revisiting them, the nature of what each theme discusses is clarified, and it is determined which aspects of the data are included within each core theme. Ultimately, after reviewing the secondary themes, the researcher arrived at one core theme, which is explicable within the context of the research topic. Below are some of the secondary themes from which the core themes were derived.

Based on the literature, background, and existing theories, these components were named as presented in Table 2.

Table 2. Categorization and Classification for the Model of Enhancing Financial and Operational Performance of the Supply Chain

Overarching Themes	Construct Themes	Primary Themes
Financial Performance	Inventory Management	Examination of item flows, marketing, sales and production cycles, customer demand management, demand and inventory alignment, product availability
	Financial Reporting	Sales growth examination, operating profit margin, sales cost/cost of goods sold, inventory turnover, return on investment
	Financial Actions at the Operational Level	Return on investment, balance sheet, financial flow, value-added activities
	Coordination	Coordination between internal and external supply chain members, timely logistics within the supply chain, coordination of financial information transfer
	Risk Management	Price risk, supplier risk, market risk
	Supply Strategy	Selection of appropriate suppliers, alignment of suppliers with financial goals, access to financial resources, access to skilled labor
Supply Chain Operations	Demand Planning	Accurate identification of customer needs, market research, competitor tracking in demand estimation, production and demand alignment
	Technology Management	Smartening supply chain processes, use of cloud computing, IoT for increasing coordination, application of artificial intelligence, electronic logistics
	Logistics Strategy	Warehouse management, distribution planning, timely transportation, management of delivery time and quality
	Customer Interaction	Communication with customers, addressing customer problems, understanding customer needs and expectations
	Flexibility	Percentage of access to materials, ability to manage change, relative capability to adjust production volume, order batch size

Supplier Relationship Management	Trust, openness, integrity, capability, stability
World-Class Quality	Quality optimization, creating sustainable competitive advantage, managing and aligning time and cost, achieving local and global standards

Stage six begins when the researcher has a set of core themes that are fully abstracted and aligned with the structural context of the research. This stage involves final analysis and report writing, which will be presented at the end. After reviewing and analyzing the texts using the thematic analysis method and completing the six stages, the secondary and core themes were obtained. Finally, based on the final categories, the research model was presented.

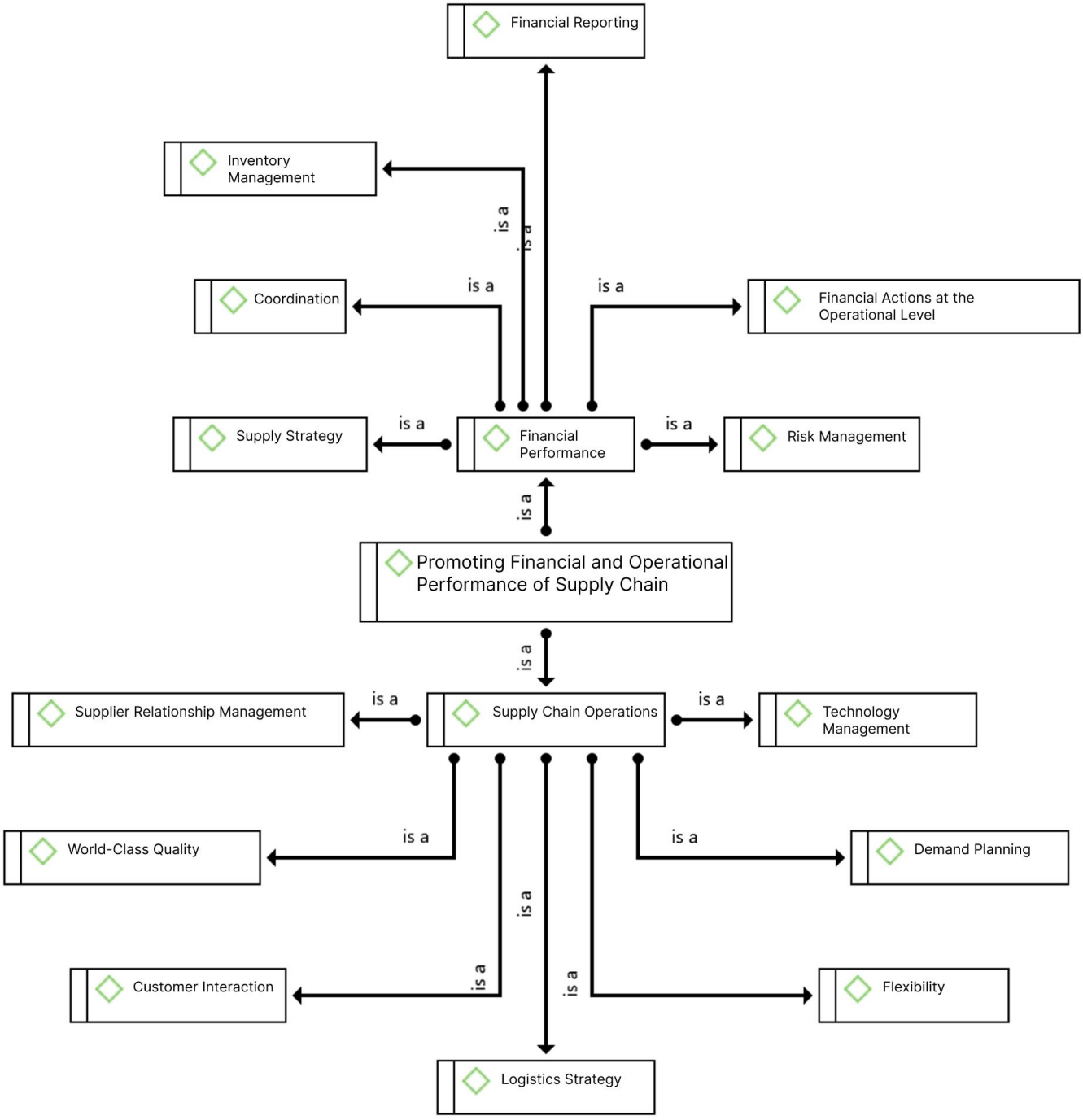

Figure 1. Model for Enhancing Financial and Operational Performance of the Supply Chain

Four quantitative criteria were used to assess the validity, transferability, confirmability, and reliability: Holsti's coefficient, P-Scott's coefficient, Cohen's Kappa index, and Krippendorff's Alpha.

Four quantitative criteria were used to assess validity, transferability, confirmability, and reliability: Holsti's coefficient, P-Scott's coefficient, Cohen's Kappa index, and Krippendorff's Alpha. The correlation between experts' perspectives was calculated using Holsti's coefficient (PAO), which resulted in a value of 0.886, indicating significant agreement. Given the criticisms of Holsti's method, the P-Scott coefficient was also calculated, yielding a value of 0.810. The fourth validity measure for qualitative research is the Cohen's Kappa index, which was found to be 0.809 in this study. Finally, Krippendorff's Alpha was used, and its value was estimated at 0.765 in this study.

4. Discussion and Conclusion

Based on the thematic analysis, out of the 53 indices (items) available, 13 primary themes can be identified, and 2 categories of construct themes were derived. In the identified model, two construct themes were specified: financial performance and supply chain operations. Within this model, 13 primary themes were determined. These themes include inventory management, financial reporting, financial actions at the operational level, coordination, risk management, supply strategy, demand planning, technology management, logistics strategy, customer interaction, flexibility, supplier relationship management, and world-class quality.

The supply chain connects various activities from the procurement of raw materials to the delivery of products to customers. For enhancing financial and operational performance in this context, inventory management holds special importance. This criterion focuses on optimal inventory management, warehouse cost control, and improving production and distribution performance. By using advanced inventory management systems and appropriate inventory strategies, this area can lead to improved financial performance. Financial reporting is also one of the primary tools in enhancing supply chain performance. Generating accurate and timely financial reports on the performance of each stage of the chain helps decision-making processes. These reports provide information that influences decisions regarding financial matters, resource allocation, and optimization of supply chain operations.

Financial actions at the operational level are also essential for improving financial and operational performance within the supply chain. This includes developing inventory financial policies, establishing payment terms with suppliers, and optimizing financial processes across the chain. By defining financial strategies at the operational level, the effectiveness and profitability of the supply chain are improved.

In this process, coordination plays a critical role. It includes coordination among internal and external members of the chain, coordination between supply and demand, and coordination among various activities within the supply chain. Accurate coordination leads to improved interactions, reduced delays, and increased efficiency across the supply chain.

Considering risk management, supply strategy, demand planning, technology management, logistics strategy, customer interaction, flexibility, supplier relationship management, and world-class quality, these criteria can also be used to significantly improve the financial and operational performance of the supply chain. Successful strategies in these areas will lead to improved supply, reduced risk, increased flexibility, and added value for customers.

Given the critical importance of the supply chain in organizational success, enhancing the financial and operational performance of the supply chain appears to be essential and necessary. These transformations mean optimizing coordination among internal and external members, correct timing in logistics management, and sharing financial information—key factors that will lead to increased productivity, reduced costs, and enhanced competitiveness. Additionally, recognizing and managing various risks, such as price risk, supplier risk, and market risk, are essential actions to effectively address challenges and opportunities in the environment.

As a result, developing effective strategies for selecting appropriate suppliers and actively engaging with them will increase organizations' ability to manage supply, reduce financial deficiencies, and enhance confidence in the sustainability of the supply chain. Overall, enhancing the financial and operational performance of the supply chain not only strengthens internal organizational communications but also prepares the organization to better face dynamic market challenges by improving decision-making quality and enhancing the flow of financial information.

Based on the results obtained for improving the financial and operational performance of the supply chain, inventory

management should first focus on customer needs and accurate demand forecasting. Detailed inventory analysis and determining optimal inventory levels at each stage of the supply chain will guarantee cost reduction and increased efficiency.

Next, financial reporting is considered a critical criterion for improving the financial performance of the supply chain. Developing a robust financial reporting system that provides accurate and up-to-date information across the supply chain aids effective management decision-making and offers optimization programs from a financial perspective.

Additionally, financial actions at the operational level are of high importance. Establishing financial processes and policies at each stage of the supply chain, including decisions related to production costs, warehousing, transportation, and distribution, leads to improvements in financial and operational efficiency. It can be said that effective coordination among supply chain members is of significant importance. Creating mechanisms and coordination processes for information transfer, inventory management, and decision-making across all members of the chain, including suppliers, manufacturers, and distributors, contributes to the overall performance improvement of the supply chain. Furthermore, risk management, as another key criterion, proposes methods to avoid financial and operational risks by providing safety measures and contingency plans, including price risk, supplier risk, and market risk. These measures can make the supply chain more resilient to various fluctuations.

Moreover, an appropriate supply strategy and demand planning based on precise market analysis will align suppliers with the actual customer needs. In this context, selecting and managing supplier relationships with a continuous and transparent collaboration approach will enhance quality and flexibility within the supply chain. Finally, flexibility within the supply chain is highly important. The ability to respond to rapid changes in demand, suppliers, and market conditions is considered one of the main features of improving the financial and operational performance of the supply chain. Additionally, managing communications with suppliers and influencing world-class quality are also of great importance. Effective communication with suppliers, including information transfer and transparent agreements, can lead to improved supply chain performance.

Authors' Contributions

Authors equally contributed to this article.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

All procedures performed in this study were under the ethical standards.

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