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The role of USD unavailability in moderating the relationship between sustainability supply chain processes and corporate performance in Egypt

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Abstract

This study aims to examine how the unavailability of the US Dollar (USD) moderates the relationship between Sustainability Supply Chain Processes (SSCP) and corporate performance in the Egyptian automotive sector. It addresses the question of whether and to what extent currency scarcity affects the positive outcomes typically associated with supply chain management strategies. A quantitative approach was adopted, collecting primary data through surveys administered to 356 employees across key departments (e.g., production, logistics, customer service) in a leading automotive company. The study used cluster random sampling and analyzed the data using Structural Equation Modeling (SEM) via SmartPLS software. The reliability and validity of the constructs were assessed using Confirmatory Factor Analysis. Results indicate that SSCP positively and significantly affects corporate performance. However, USD unavailability has a significant negative moderating effect on this relationship. In conditions of high USD scarcity, the influence of SSCP on corporate performance becomes negligible. This highlights the disruptive impact of macroeconomic currency constraints on the effectiveness of supply chain strategies. Academically, the study contributes to the literature on supply chain management in emerging markets by integrating macroeconomic factors such as foreign currency availability. Practically, it suggests that firms in currency-constrained environments should adopt resilient supply chain strategies, diversify sourcing and financing approaches, and collaborate with policymakers to address systemic currency challenges.

Keywords: Automotive industry, corporate performance, Egypt, innovation competence, just-in-time production, operational efficiency, supply chain management, total quality management, USD.

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1. Introduction

Modern business success in the current interconnected market demands strategic supply chain administration for both performance improvement and long-term competitive dominance [1]. Modern organizations worldwide understand the essential business role of strong supply chain management practices such as just-in-time production, along with total quality management and logistics optimization, because these methods deliver operational excellence and lower operating costs, and improve customer satisfaction [2]. Supply chain initiatives offer organizations the possibility of releasing substantial financial and operational advantages that help them match their activities to market changes and customer demands [3].

Specific external economic conditions that surpass organizational control modify the connection between Sustainability Supply Chain Processes and corporate performance [4, 5]. Research conducted by Abdelraouf and Muharram [6], Fernandez [7], and Rushdy and Samak [8] indicates that Egyptian organizations encounter major difficulties obtaining and using the United States Dollar (USD) because it is in short supply. The lack of United States Dollar liquidity creates obstacles for businesses to participate in cross-border operations and purchase fundamental materials and machinery while dealing with currency-based debts, which reduces their ability to fulfill their supply chain plans [8].

This study examines the effects of USD unavailability on the connection between Sustainable Supply Chain Processes and corporate performance within the Egyptian automotive market. This research addresses the following inquiry regarding the influence of USD unavailability on corporate performance through Sustainable Supply Chain Processes in the Egyptian automotive sector.

To what extent does USD unavailability influence the impact of supply chain management strategies on key dimensions of corporate performance, such as sales growth, efficiency, innovation competence, and organizational commitment, in the Egyptian automotive market?

This research study provides vital findings about how Sustainability Supply Chain Processes interact with USD unavailability to affect corporate performance in the Egyptian automotive market. The findings of this research validate the idea that Sustainability Supply Chain Processes create substantial and beneficial effects on corporate performance dimensions across sales growth and efficiency, innovation competence, and organizational commitment in the Egyptian automotive market. The analysis proves that organizations can boost their corporate performance through the execution of structured supply chain management practices consisting of just-in-time production, along with total quality management and efficient logistics coordination.

The research outcome supports the initial assumption, demonstrating that USD limitations affect the relationship between supply chain management practices and organizational business results. Organizations face difficulties in maximizing supply chain management initiative outcomes because the lack of USD liquidity in the Egyptian market restricts their corporate performance enhancements. Currency stability, together with sufficient cash reserves, proves essential for successful supply chain execution, leading to organizational goal achievement.

Results from the 3rd hypothesis demonstrate that the supply chain process has no influence on corporate performance in the automotive market in Egypt. This contradicts the findings of the first hypothesis. An unstable foreign currency market inhibits supply chain management practices from positively impacting corporate performance, as these methods may lose their effectiveness under such conditions.

The examined findings show that supply chain management operates as a highly complex system that depends on currency access to drive organizational success within the Egyptian market. The analysis of this study will help guide decision-making strategies while optimizing supply chains to develop policies and interventions that will strengthen the currency resilience of Egyptian automotive businesses across industries. The research follows a format composed of two literature review sections, followed by methodology, then data results, which lead to the conclusion.

2. Literature and Theoretical Background

2.1. Supply Chain Process

In this section, the paper will discuss the dimensions of the supply chain process, which are Just in time production, total quality management, supply network coordination, logistics, Information technology, and customer relationship management.

2.1.1. Just-In-Time Production (JITP)

JITP stands for Just in Time Production, which is a crucial part of the supply chain management and is favored as a lean manufacturing technique. Derived from the Toyota Motor Manufacturing firm in Japan, JITP has expanded into an international model for enhancing effectiveness, minimizing avoidable expenses, and enhancing product quality [9]. JITP is based on the foundation of manufacturing products when they are wanted and in the requisite numbers at the time needed. The use of this strategy is also in contrast to production techniques that have, in the past, involved mass production with huge inventory stocks. The primary objective of JITP is thus to eliminate all kinds of waste activities, namely, overproduction, waiting, conveyance or transportation, processing, inventory, motion, and defects, also referred to in lean manufacturing concepts as the ‘seven wasted types’ [10].

JIT production can be considered an effective strategy and tool for material production and supply that, if used correctly, can ensure benefits such as increased effectiveness, quality, and competitive position. Nonetheless, for successful implementation, it requires strategic stewardship along with an appropriate organizational culture within which the system may function, as well as a reliable and sensitive supply chain. JITP, like all business principles and practices, will have its principles change to suit varying technologies in the market, fluctuations in demand from consumers, and other global changes affecting the economy. The further evolution of the JITP concept is to demonstrate how JITP can align with the

important guidelines of lean manufacturing while also responding to the requirements of flexibility and robustness in an increasingly intricate and unpredictable business environment [11, 12].

2.1.2. Total Quality Management (TQM)

TQM stands for Total Quality Management; it is an all-embracing managerial and systemized technique that aims at enhancing the quality of goods and services through continual enhancement due to constant feedback. It is not an inspection paradigm, but it is a management culture that runs right from the top of the company and down to the employees on the lower ranks, and to its suppliers and consumers [13]. Altogether, Total Quality Management is a management system concept of company affairs that should be comprehensively employed to significantly enhance the quality of products and satisfaction of customers as well as company performance [14].

Since implementation can be challenging, this strategic approach provides value for modern organizations to succeed in their competitive business sphere. TQM shall maintain its essential principles of continuous improvement and customer delight throughout business transformation regarding modern technological advances, evolving consumer expectations, and international market adjustments [15].

2.1.3. Supply Network Coordination

Supply Network Coordination is one of the subdivisions in the current supply chain that not only addresses the coordination of different activities but also information and resources from supply network members. It is a different way of perceiving the supply chain, which is wider than a linear view that connects buyers with suppliers, manufacturers, distributors, and other stakeholders. The fundamental strategic purpose of Supply Network Coordination is to establish better orchestration of goods, information, and financial flows across the network members and functionaries, leading to greater operational efficiency, product responsiveness, and business value creation. This coordination is very important in today's business activities because the supply chain has expanded in terms of geographical spread [16].

Supply Network Coordination represents a critical capability for organizations operating in today's complex, global business environment. It requires a holistic view of the entire supply network, advanced technological capabilities, and a collaborative mindset that extends beyond organizational boundaries. While challenging to implement, effective coordination can lead to significant benefits in terms of efficiency, responsiveness, resilience, and overall value creation. As business environments continue to evolve, so will the practices of supply network coordination, adapting to new technologies, changing customer expectations, and global challenges while maintaining its core focus on optimizing the performance of the entire supply network [17, 18].

2.1.4. Logistics Management

Logistics is a sub-process of supply chain management and is directed at organizing and managing the flow and storage of goods, services, and any pertinent information from the point of production to the point of consumption. It refers to all the activities by which the right stock of products is transported to the right place, at the right time, and in the right quantity and quality. Logistics has evolved from being a functional activity to one that possesses the potential to deliver a competitive advantage. Today, logistics management has become one of the most important business activities, cutting across industries concerning its contribution to customer satisfaction, reduction of costs, and satisfaction of stakeholders [19].

The digital revolution is gathering pace, and the focus is shifting to logistics. Applications of the Internet of Things (IoT), blockchain, and artificial intelligence are helping extend real-time visibility and translucent interaction, as well as productivity and optimization in the logistics industry. For instance, an IoT device can provide specific details of where consignments are and how certain conditions, such as the temperature of fresh produce, are being maintained. Currently, the use of blockchain technology makes it possible to achieve more secure and transparent supply chains. Artificial Intelligence (AI) and, more specifically, machine learning can contribute to improving routing, reducing the cost of asset maintenance in the logistics industry, and enhancing demand forecasting [20].

2.1.5. Information Technology (IT)

Efficient supply chain management is implemented in most contemporary ERP systems, which have the element of cooperation with analytics engines to supply real-time data. Moreover, they also foster improved communication between different sections of the organization and the outside world, thus leading to better organizational supply chain coordination. While ERP systems incorporate general business process integration, dedicated supply chain management software is about particular sustainability supply chain processes. Another key advantage inherent in cloud-based supply chain management solutions is the relative ease of scaling the application to the needs of the business, the availability of access to the system, and the ability to work together within the supply chain network [21].

Therefore, IT is a crucial tool in supply chains today to increase the level of supply chain visibility, improving efficiency and flexibility in a complex supply chain network. As the use of technology expands rapidly in the business sector, organizations should follow these advancements and seek the appropriate methods and IT infrastructure to achieve the company's supply chain goals. Furthermore, the future of IT applications in supply chain management will experience more integration, intelligent resource integration, as well as more self-owned and self-governed intelligent supply chain systems that can make a variety of choices at the same time [22].

2.1.6. Customer Relationship Management (CRM)

CRM is the element of the supply chain management process that directs attention to how an organization can manage and enhance its communication with customers. What used to be a mere sales and marketing tool, especially for measuring

consumer satisfaction, has merged over time with the supply chain, and it is well known that the supply chain cannot prosper without consumers. While in supply chain management, CRM is a little broader because it encompasses far more than managing the relationships where customers interact with the business; it also incorporates how supply chain operations can effectively meet customer needs to improve performance, satisfaction, and retention. At its core, CRM is about amassing, consolidating, and analyzing customer data [23].

But they also need to solve some issues, which include data privacy concerns or a lack of interoperability between different organizational systems and digital channels, as well as the trade-off between operational excellence and customer focus. For the supply chain to truly benefit from CRM, it is important to go beyond the technology solutions and embrace an organizational culture that is customer-focused, as well as demonstrate a willingness to appreciate change and evolve to accommodate customers' changing behaviors.[24].

2.2. Corporate Performance

This section will discuss the main dimensions of corporate performance, which are sales growth, efficiency, innovation competence, reputational assets, and organizational commitment.

2.2.1. Sales Growth

Sales growth is a critical measure of corporate performance, reflecting a company's financial health, market position, and overall business success. It represents the increase in sales revenue over a specific period, typically compared on a year-over-year or quarter-over-quarter basis. More than just a number on a financial statement, sales growth is a multifaceted concept that indicates a company's capacity to expand its market share, enter new markets, innovate its products or services, and effectively respond to evolving customer needs and market dynamics. The significance of sales growth in corporate performance cannot be overstated. Investors, analysts, and stakeholders often prioritize this metric when evaluating a company's performance and potential [25].

Sales growth remains one of the most strategic activities in most organizations, where it is usually integrated into the annual strategic plan. Nevertheless, HRM should also be aligned with other types of organizational performance objectives, including financial, customer, risk, and social performance. As such, taking a chance and growing heavily with its environment can lead to dangerous financial, operational, and reputational threats, but it is also important to retain product quality, customer satisfaction, and high staff morale through this process [26].

2.2.2. Efficiency Management

Optimality is a key idea in organizational effectiveness, referring to an organization's capacity to generate the highest possible outcome with the least possible resources. It refers to accomplishing the most for the least in terms of input experienced by organizations, which affects organizational profitability, competitiveness, and longevity. At the heart of efficiency, one finds the stated goals of achieving the greatest value for what is available or attainable through available resources. More with less, waste reduction, lower costs, and increased customer and shareholder value are important goals both for efficiency, which is a business imperative today in the global world [27, 28].

When it comes to corporate efficiency, one function that can be distinguished is operational efficiency, which relates to the optimization of business processes. It entails rearrangement of activities, cutting the cycle time, and excluding waste on the production line or in the process of providing a particular service. High operational efficiency is one of the most substantive parameters in the field of production and supply, as organizations that meet it can offer products or services faster, with fewer mistakes, and at a cheaper cost [29].

2.2.3. Innovation Competence

Innovation competence is the firm's capability to routinely come up with new, superior, and valuable ideas, goods, services, or techniques that are beneficial to the firm as well as other stakeholders. This capability has become a necessity in today's faster and more complex business environment to build a sustainable competitive advantage. It means that innovative competence cannot be seen as simple creativity or outstanding innovative ideas that arise at any given time, but is a full-fledged set of competencies, tools, and frameworks for permanent innovations. Innovative firms facing execution conditions are in a good position to meet future market requirements and help sustain their leadership position when facing this challenging test in their market [30].

Companies that develop these capabilities maintain attractive appeal for employees because they operate in innovative environments. Innovation can take various forms. Product innovation gets the most attention, yet companies successfully innovate through process developments as well as business model transformations and market promotion methods, and organizational workplace implementations [31].

2.2.4. Reputational Assets

Reputational assets are any work in progress but important characteristics that a firm has that relate to its external appearance, believability, and perception by society. These assets consist of the worth that is attached to the organization by consumers, employees, shareholders, and government, among other people in society. Reputational assets play a strategic function in the modern globalized environment, in which news, or, in fact, information, travels fast. Having a sound reputation tends to increase the flow of customers, make employees happy to join a company, make investors willing to invest their money, and make regulators or partners willing to collaborate with the business. On the other hand, reputation loss brings

severe negative outcomes, including reduced sales, low morale, escalated regulatory attention, and the risk of insolvency [32].

Several components that form are integral to building reputational assets. It is also common for companies to place heavy importance on brand identity since it is people's perception of the company can be relied on to influence its turnover, enable increased prices for its products, and provide the basis on which it can enter new markets. Equally important is the reputation of a company's products or services. Consistently delivering high-quality and reliable products builds trust with customers and leads to long-term loyalty. Customer satisfaction and loyalty are essential, as how a company treats its customers can lead to positive word-of-mouth recommendations, fostering a strong and favorable reputation [33].

2.2.5. Organizational Commitment

Organizational commitment refers to the psychological attachment and dedication that employees feel towards their organization. It goes beyond mere job satisfaction and encompasses an employee's willingness to exert effort on behalf of the organization, their desire to remain a part of it, and their alignment with its goals and values. Corporate performance depends heavily on the commitment of employees toward their organization. Organizational commitment at high levels produces improved workplace efficiency and reduced employee departures and creates better customer experience and organizational flexibility. Employed workers who demonstrate commitment tend to deliver both innovative solutions and boost team spirit and organizational values and develop a positive business culture that makes the company more appealing to prospective employees [34].

Different elements form the basis of organizational commitment for employees. Affective commitment describes an emotional bond between employees and their organization so that staying is their choice. People who have a strong affective commitment deeply care about their organization's objectives as well as feel honored to belong to it. The commitment to stay at an organization depends on how employees assess the costs of leaving their present organization. Common weaknesses that employees perceive from moving to a different role cause their strong continuance commitment factor [35].

2.3. USD Unavailability

Probably the most critical problem within supply chains is the lack of access to US Dollars (USD) – this, in turn, can have severe impacts on worldwide trade and economic sustainability. This is a common issue that arises when such businesses mostly operate in developing or emerging economies, lacking adequate USD needed for international operations. The World's leading reserve currency, the USD, is instrumental for a considerable part of global business, with key importance in the import and export of oil and global value chains [36].

New global banking rules aimed at preventing money laundering and funding for terrorism have been known to cause challenges for companies in some nations to obtain USD. Sanctions reduce or prevent a country from engaging in certain transactions, such as using USD in transacting international businesses, whether with local or global firms. In periods when economic risk rises, people prefer to hold USD; therefore, during those periods, there might be shortages of USD in some regions. Furthermore, the USD liquidity market can be determined by other factors such as the US Federal Reserve's mortgage policies, in terms of interest rate change or quantitative easing facilitation [37].

The unavailability of USD can have severe impacts on supply chains. A lack of USD access by companies results in supplier payment difficulties that cause them to delay or cancel shipments. The disruption of trade flows produces serious supply chain problems during this process. Companies that face USD access issues must turn to costlier funding solutions or foreign exchange intermediaries, thus causing their expense structure to grow. The inability of companies in affected nations to do business in USD-denominated trade fields makes it more challenging for them to compete abroad, which results in reduced global market competitiveness [38].

Companies would need to switch suppliers located in markets with unimpeded USD access, which threatens their well-established supply chains. The scarcity of USD on macroeconomic levels impacts foreign trade by reducing import activities, which slows down economic progress and progress within those nations. Higher USD demand due to market scarcity results in currency depreciation, which makes international trade more complex. USD availability uncertainty pushes companies toward enhancing inventory stockpiling through available means while wasting capital and creating possible inventory management challenges [39].

2.3.1. USD Unavailability and Egyptian Currency Fluctuation

In this case, questions of the unavailability of USD and fluctuations in the Egyptian currency bear a close relationship and pose many problems for the Egyptian economy, and more so for its external commitments as a player in the market. This paper focuses on the Egyptian experience, and like most developing countries, Egypt has, from time to time, undergone short dollar spells partly because of a volatile EGP. Environmental depletion, business and consumer perspectives, and the overall economic impact of this condition have been tremendous. As has been discussed earlier, there are several reasons for such a problem with USD availability in Egypt. The country has always had a trade deficit; it exports less than it imports, and an outcome of that is that dollars are sent out. This was made worse by political instabilities that arose because of the 2011 revolution, hence heavily reducing tourism and foreign direct investment, important sources of foreign currency for Egypt. COVID-19 escalated these challenges because the restrictions on international travel affected tourism income [40].

This action was taken to begin attracting foreign investments and abate the shortage of dollars, which was also accompanied by a steep decline in the Egyptian pound and subsequently inflation. The currency fluctuations resulting from these policies have had profound impacts on the Egyptian economy. The value drop of the pound enhances Egyptian export competitiveness in foreign markets while simultaneously drawing foreign investment opportunities into the country. Since

the pound's depreciation started, more foreign products have become more expensive, which has raised inflation levels and created difficulties for businesses using imported materials or products [41].

2.4. The Relationship between Supply Chain Process and Corporate Performance

Supply Chain Process and Corporate Performance relations represent a multi-layered, complex phenomenon that has become essential for modern businesses working in an international context. The supply chain-performance links function as a well-entwined system because improvements in supply chain approaches yield substantial corporate accomplishments, whereas superior corporate results enable additional supply chain capability advancements [42].

This has also emerged when examining the impact of the supply chain process on the expanded theoretical model for the coverage of corporate performance risk management. Evaluating risks and possible measures that the supply chain process encompasses involves identifying, assessing, and responding to different risks, ranging from the suppliers' vulnerability to disasters. This capability can help avoid incidents that may lead to poor performance and stabilize the organization, hence adding to the strength of the corporation [43].

2.5. USD Unavailability and Supply Chain Process

The absence of the USD can greatly impact supply chain systems, most likely in the systems involved in the international supply chain. Given that the USD was the world's reserve currency, it is used to clear international transactions, value most goods, and serve as a benchmark unit of account in global trade. When the USD is out of the market or in short supply, it can cause major upheavals in different areas of the supply chain management process. Procurement and sourcing are among the areas that can be affected in the short term. Most international suppliers provide quotations in USD and expect their payments to be made in the same currency [44].

It was also found that constraints on USD may be hampering inventory control strategies. Currency problems may have undermined the notion that firms must stock up on enormous inventory as a hedge against supply challenges. Such increased inventory holding can occupy more of the working capital and may also raise the carrying cost of inventory in the supply chain.

Even the supply chain, transport, and logistics are not immune to the effects of unavailable USD [45].

Likewise, a general shortage of USD can also lead to changes in supplier relationships where several organizations may decide to employ localized or regional supplies to prevent high dependence on USD. These localizations can also have impacts on other scopes of supply chain design and the optimal supply chain network. Altogether, the absence of USD can cause several consequences for all processes related to the supply chain, including procurement, inventory, logistics, and financial processes [46].

2.6. Automotive Market Industry

The automotive market industry operates as a worldwide multilayered business sector that advances continuously at a rapid pace yet dominates the global economic stage. The motor vehicle industry functions through comprehensive stages of design, manufacturing, and development of products, as well as their sale through marketing and distribution networks. The automotive industry stands out because it operates throughout the entire world. Automotive leaders in the sector function at a wide international level through multiple country-spanning supply networks. Through global expansion, companies gain entry to multiple markets while utilizing regional economic benefits and reducing business risks between varied economic territories [47].

The automotive industry witnesses the growing integration of advanced technologies as its primary evolving pattern. Vehicles in the modern era have developed into mobile electronic systems because they integrate advanced software components alongside connectivity capabilities and ADAS technologies. The traditional automotive business sector now partners with technology companies, which have redrawn competitive market boundaries in this industry space. Within the automotive sector, the definition of mobility transforms [48].

Therefore, the following research model and hypothesis are as follows:

It consists of concepts and, together with their definitions and references to relevant scholarly literature, existing theories that are used for your study. The theoretical framework must demonstrate an understanding of the theories and concepts that are relevant to the topic of your research paper and that relate to the broader areas of knowledge being considered.

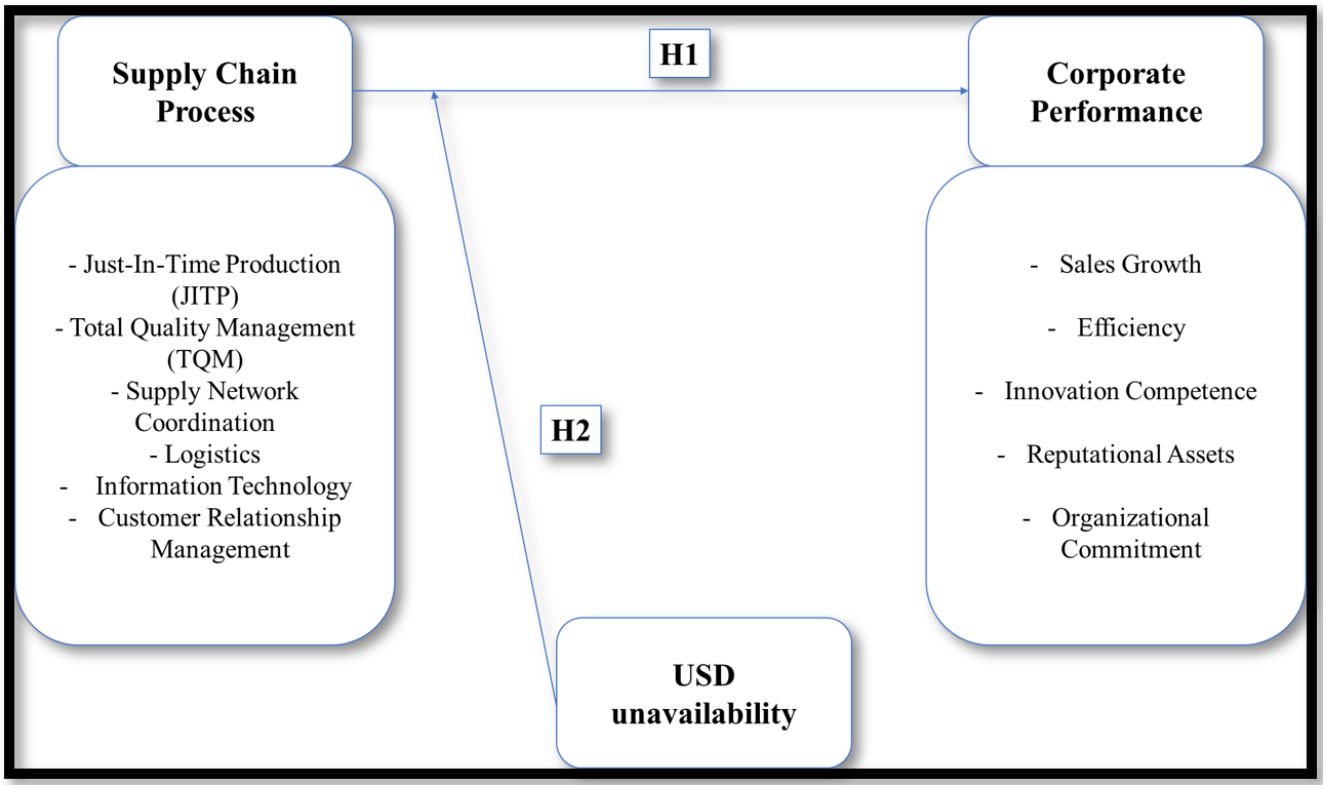

Figure 1.
Conceptual Framework.
Source: Deshpande [49] and Pathiranage et al. [50].

The following research hypothesis has been formulated:

H_1: The supply chain process has a significant effect on corporate performance in the automotive market in Egypt.
H_2: The unavailability of USD moderates the relationship between the Supply Chain Process and Corporate Performance.
H_3: The supply chain process has an insignificant effect on corporate performance in the automotive market in Egypt.

3. Methodology

3.1. Data Source and Description

This study utilized both primary and secondary data to enhance the quantitative assessment of the influence of Sustainability Supply Chain Processes on corporate performance in the Egyptian automotive industry, with a particular focus on analyzing the moderating effect of USD unavailability. Primary Data: The primary data collection involved a questionnaire developed based on a review of relevant literature, including studies by Nguyen et al. [51] and Christopher [52]. The survey targeted 510 employees across various departments of a leading automotive company in Egypt, with a focus on those directly involved in supply chain activities, such as purchasing, quality control, supply chain, and retail. The high response rate was achieved through face-to-face interviews, though 43 responses were excluded due to the respondents' limited understanding of specific supply chain metrics, such as the order fulfillment rate.

The final dataset comprised 356 valid responses from employees across the following departments:

- Warehouse: 93 employees.
- Logistics: 48 employees.
- Customer Service: 98 employees.
- Production: 189 employees.
- Quality Control: 44 employees.

The sample also included 46 supervisors and 18 managers, providing a diverse range of perspectives on the impact of Sustainability Supply Chain Processes on corporate performance.

Secondary Data: The study also utilized secondary data from the AMIC-Egypt June 2024 report, which provided a sampling frame of the key active car companies in the Egyptian market. This report was used to inform the researchers about the selection of the participating automotive companies and ensure a representative sample of the broader industry.

3.2. Sampling Methods and Sampling Frame

The study employed a cluster random sampling approach, which targeted a cluster of elements from the diverse sampling frame obtained from the AMIC-Egypt June 2024 report. This method allowed for the capture of a range of information about the subject under study.

The selected automotive company was approached, and the head of the supply chain department, along with selected employees from the logistics and quality assurance departments, was interviewed in person. This direct interaction helped

achieve high response rates and reduced the potential for bias, as the respondents provided an accurate picture of the problems impacting Sustainability Supply Chain Processes, particularly due to USD constraints.

3.3. Data Analysis Method

The study utilized the SmartPLS software to conduct a Structural Equation Modeling (SEM) analysis on the collected data. SEM is a powerful multivariate technique that allows for the simultaneous examination of the relationships between multiple independent and dependent variables, as well as the assessment of the moderating effect of USD unavailability on the relationship between Sustainability Supply Chain Processes and corporate performance.

The SEM analysis involved two main steps:

1. Measurement model evaluation: This step assessed the reliability and validity of the constructions measured in the study, ensuring the accuracy and consistency of the data.
2. Structural model evaluation: This step examined the hypothesized relationships between the constructs, including the direct effect of Sustainability Supply Chain Processes on corporate performance and the moderating effect of USD unavailability.

The secondary data from the AMIC-Egypt June 2024 report was also used to supplement the survey results, providing a more comprehensive understanding of the subject matter and the role of USD scarcity in moderating the influence of Sustainability Supply Chain Processes on corporate performance in the Egyptian automotive industry. It is important to note that while the AMIC-Egypt June 2024 report provides a reliable sampling frame, the accuracy and liability of the data within the report ultimately rest with the individual members of the AMIC organization who submit the information. The research firm that aggregates and publishes the report does not bear responsibility for the accuracy of the numerical values presented.

The Materials and Methods should be described with sufficient detail to allow others to replicate and build on the published results. Please note that the publication of your manuscript implies that you must make all materials, data, computer code, and protocols associated with the publication available to readers. Please disclose at the submission stage any restrictions on the availability of materials or information. New methods and protocols should be described in detail, while well-established methods can be briefly described and appropriately cited.

Research manuscripts reporting large datasets that are deposited in a publicly available database should specify where the data have been deposited and provide the relevant accession numbers. If the accession numbers have not yet been obtained at the time of submission, please state that they will be provided during review. They must be provided before publication.

Interventional studies involving animals or humans, and other studies that require ethical approval, must list the authority that provided approval and the corresponding ethical approval code.

In this section, where applicable, authors are required to disclose details of how generative artificial intelligence (GenAI) has been used in this paper (e.g., to generate text, data, or graphics, or to assist in study design, data collection, analysis, or interpretation). The use of GenAI for superficial text editing (e.g., grammar, spelling, punctuation, and formatting) does not need to be declared.

Table 1.
Descriptive frequencies.

Characteristic	**Frequency**	**Percentage**
Gender		
Male	308	60.4%
Female	202	39.6%
Age		
Under 25 years	49	9.6%
25-34 years	177	34.7%
35-44 years	161	31.6%
45-54 years	94	18.4%
55+ years	29	5.7%
Education		
High School	73	14.3%
Bachelor's	270	52.9%
Master's	119	23.3%
Doctorate	32	6.3%
Other	16	3.1%
Position		
Entry Level	251	49.2%
Supervisor	66	12.9%
Middle Management	137	26.9%
Senior Management	26	5.1%
Executive	30	5.9%
Experience		

Less than 5 yrs	112	22.0%
5-10 years	132	25.9%
11-15 years	109	21.4%
16-20 years	79	15.5%
Over 20 years	78	15.3%
Department		
Warehouse	93	18 %
Logistics	48	9%
Customer service	98	19%
Production	189	37%
Quality control	44	7%
Supervisors	46	8%
Managers	18	2%
Company Size		
Less than 100	32	6.3%
100-500	117	22.9%
501-1000	185	36.3%
1001-5000	155	30.4%
Over 5000	21	4.1%
Years in Egypt		
Less than 5 yrs	62	12.2%
5-10 years	114	22.4%
11-15 years	132	25.9%
16-20 years	104	20.4%
Over 20 years	98	19.2%

Source: Based on SPSS calculations

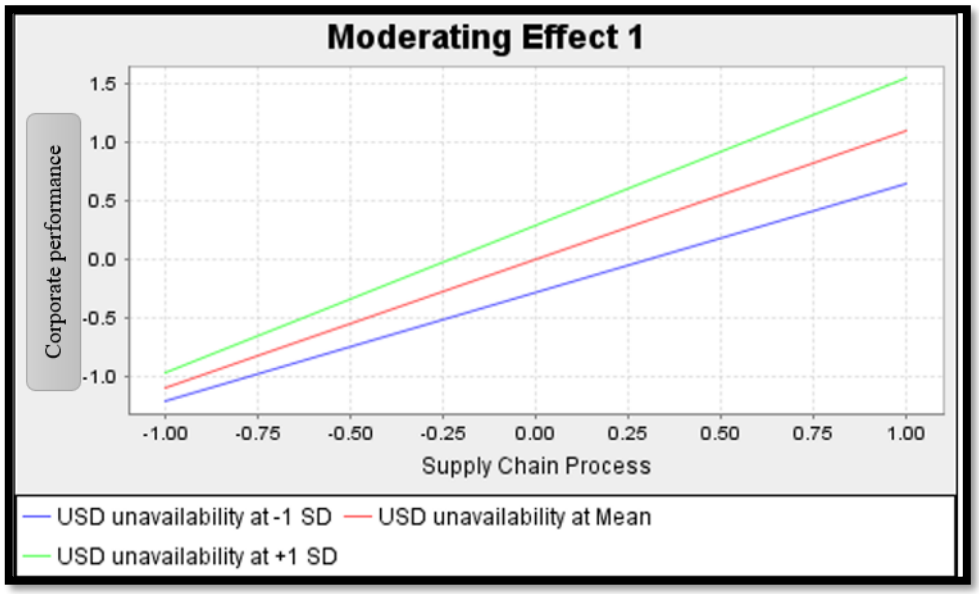

Figure 2.
Conceptual Framework.

4. Results

4.1. Demographic Result

Figure 2 demonstrates how supply chain process-corporate performance relationships are influenced by the unavailability factors of USD on corporate performance. Different USD unavailability thresholds are displayed on the graph through blue, red, and green lines, which correspond to -1 standard deviation, the mean, and +1 standard deviation, respectively. The corporate performance levels enhance across all three lines when the Supply Chain Process shifts from negative to positive ranges. Different slopes and intercepts between these lines indicate how USD unavailability acts as a moderator. The blue line depicting low USD unavailability exhibits the highest rate of corporate performance growth when compared to the green line, which represents high USD unavailability. Supply Chain Processes and corporate performance show the greatest strength when USD unavailability is low. The graphic depiction illustrates how severe USD scarcity disrupts the relationship between Supply Chain Processes and Corporate Performance within the Egyptian automobile sector.

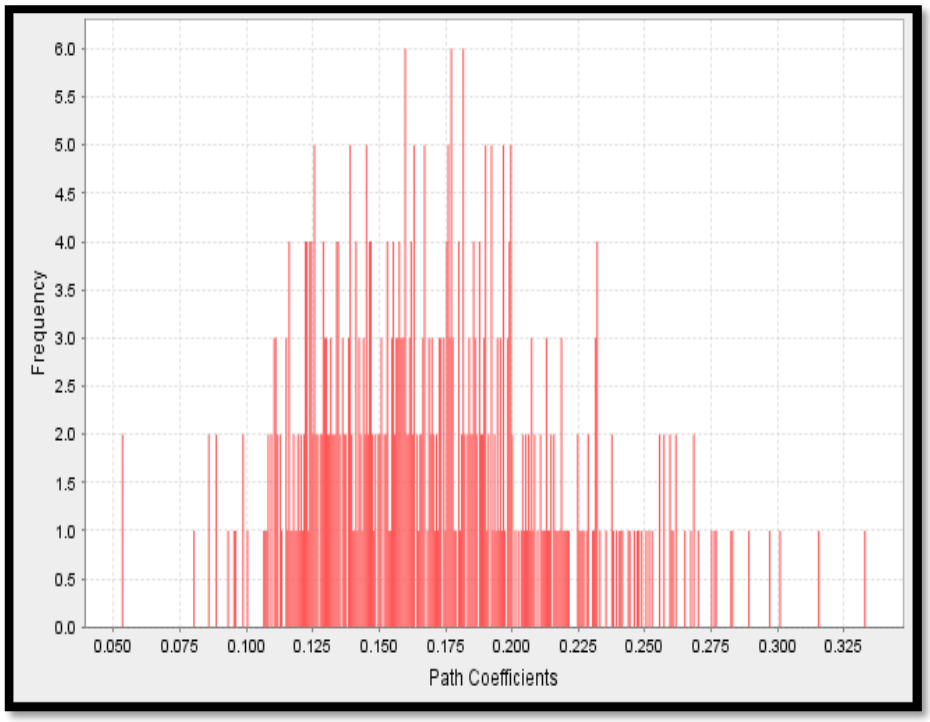

Figure 3.
Conceptual Framework of Moderating Effect -> Corporate performance.
Source: Based on SmartPLS 3 output.

Statistical insights regarding the research model emerge from studying the path coefficient distribution in the bootstrapping histogram. The path coefficients extend from 0.125 to 0.225, with 0.325 as the peak value and 0.050 as the bottom value, representing moderate variable connection levels. The variation in frequency indicates the reliability of the statistical estimates through repeated resampling. The clustering around specific coefficient ranges implies that the relationships between Sustainability Supply Chain Processes, USD unavailability, and Corporate Performance are statistically significant and reproducible. The histogram's pattern supports the study's findings that supply chain processes have a meaningful impact on corporate performance, with the effect being moderated by USD unavailability. The bootstrapping technique verifies that path coefficients in the research stay consistent in multiple random samples, which strengthens statistical analysis. This helps to validate research hypotheses. The illustration supports and strengthens the quantitative analysis of the research by backing the study's quantitative techniques and findings about Egyptian automotive market dynamics.

Table 1.
Model Measurements of the phenomenon.

Variable	**CA**	**CR**	**AVE**
Supply chain process	0.940	0.902	0.640
Corporate performance	0.913	0.910	0.502
USD unavailability	0.893	0.940	0.616

Source: Based on SmartPls calculations

4.2. Confirmatory Factor Analysis

The study addressed common method bias by utilizing the full collinearity approach. Research findings showed that variance inflation factors (VIFs) were less than five, which proves that common method bias does not impact the results [53]. Reliability and validity assessments were conducted through Confirmatory Factor Analysis (CFA). The research validity reached satisfactory levels due to Cronbach alpha coefficients exceeding 0.7. The construct validity measurement reached acceptable levels as both Composite Reliability (CR) and Average Variance Extracted (AVE) exceeded their recommended thresholds [54].

Table 3.
P-value result.

Dimensional direction	**Original sample**	**Standard deviation**
Supply chain process -> Corporate performance	0.327***	0.048
USD unavailability as moderator -> Corporate performance	-0.160***	0.030

Note: P value <0.01 ***, 0.01<p value<0.05 **, 0.05<p value<0.1 *, P value>0.1.

4.3. Path Coefficient

Table 3 shows that the supply chain process had a significant positive effect on corporate performance at a 99% confidence level, while USD unavailability negatively moderates the relationship between the supply chain process and corporate performance. This means that the suggested hypotheses, H1 and H2, are accepted.

4.4. Discussion

Processes interact with USD unavailability to influence corporate performance in the Egyptian automotive industry. The research findings integrate existing scholarly works about supply chain management effectiveness by presenting detailed results influenced by currency constraints.

Research by Gunasekaran et al. [42] and Pournader et al. [43] showed that Sustainability Supply Chain Processes generate considerable positive effects on corporate performance measures, including sales growth, efficiency, innovation competence and organizational commitment, in addition to previous findings. To maximize organizational performance, an organization needs well-designed supply chain management practices because they drive operational effectiveness and competitive advantage.

Research makes its primary impact through investigation into how USD unavailability acts as a moderating factor in the supply chain-performance connection. The research results show that limited USD liquidity reduces the direct impact of Sustainability Supply Chain Processes on corporate performance until it becomes completely negligible. Research accredits existing literature because currency availability plays a vital role in enabling organizational objectives through effective supply chain execution [44, 46]. This research shows how currency complications negatively affect potential gain from supply chain management investments because organizations require better knowledge about external factors that influence the performance dynamics in supply chains.

By investigating the Egyptian automotive industry, the research delivers important market-specific findings that add to academic knowledge about supply chain management, together with corporate performance analysis of emerging markets. The research reveals that Sustainability Supply Chain Processes intertwine with USD unavailability and organizational outcomes to create distinctive effects, especially in currency-limited economies that function on available foreign exchange access or barriers toward successful supply chain strategies implementation [47, 48].

5. Conclusion

The study outcomes deliver key information about how supply chain operations impact USD availability, which affects corporate performance in the Egyptian automotive sector. Supply chain management strategies enhance corporate performance metrics such as sales growth and organizational commitment alongside efficiency and innovation competence; yet, these benefits appear with greater strength when foreign currency, specifically USD, remains available in the market.

This study demonstrates that Sustainable Supply Chain Processes deteriorate their ability to affect corporate performance when USD remains unavailable in the market. The availability of local currency plays an essential role in maximizing organizational benefits that result from established supply chain management methodologies. Organizations need stable currencies with easy access to successful supply chain operations to achieve their business targets effectively.

5.1. Academic Recommendations

The research contributes academically to expanding knowledge about the link between supply chain management and macroeconomic elements and business results, specifically in emerging market environments. Researchers should incorporate currency-related constraints into their studies measuring Sustainable Supply Chain Processes and their effects on corporate results.

Expanded future research should investigate a larger representation of automotive companies and additional industries within Egypt to determine the applicability of these current findings. Further investigation should focus on identifying the exact processes blocked by USD scarcity, which limits supply chain management performance so that professionals can create specific intervention strategies.

5.2. Practical Recommendations

The study provides useful direction to Egyptian automotive professionals who need to handle supply chain management alongside currency-related issues. Organizations must develop resilience and adaptability strategies in addition to supply chain the best practices for enhancing corporate performance when facing foreign exchange challenges in the market.

Organizations need to implement diverse supply source selection along with different financing approaches, as well as create emergency plans to minimize how their supply chains react to limited dollar availability. Companies should support policymakers and industry associations to advocate for release policies that resolve currency-related issues so they can create better conditions for supply chain enhancement and organizational success.

5.3. Future Research Directions

Building upon the insights gained from this study, future research could explore the potential spillover effects of USD unavailability on other aspects of organizational performance, such as innovation, internationalization, and financial stability. Investigating how companies in the Egyptian automotive industry, or other sectors, adapt their strategic and operational decision-making in response to currency-related challenges could also yield valuable insights.

Additionally, researchers may consider adopting a longitudinal approach to monitor the dynamic interplay between Sustainability Supply Chain Processes, USD availability, and corporate performance over time, capturing potential shifts in the underlying relationships as the macroeconomic landscape evolves.

Cross-country comparisons with other emerging markets facing similar currency constraints could also shed light on the contextual factors that shape the complex dynamics observed in this study. Ultimately, the findings of this research provide a solid foundation for further exploration of the intricate relationships between supply chain management, macroeconomic factors, and organizational performance, with the potential to inform both academic discourse and practical decision-making in the Egyptian automotive industry and beyond.

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