

Supply Chain Management Performance, Business Resilience, and AI-Enabled Decision-Making in Lebanon

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Abstract. This research explores how supply chain management (SCM) performance shapes business performance and entrepreneurial decision-making in Lebanon. The manuscript addresses a context marked by macroeconomic instability, disrupted access to foreign currency, dependence on imported inputs, and the gradual emergence of artificial intelligence (AI) in business operations. Drawing on an exploratory qualitative interview design, the study uses semi-structured interviews with eight Lebanese supply chain managers and directors from different industries, supported by a focused review of the literature on SCM, organizational performance, crisis-related disruption, and AI-enabled supply chain practices. According to the interview results, participants consider supply chain management (SCM) a crucial strategic competence that affects customer satisfaction, operational continuity, inventory efficiency, and business responsiveness in the Lebanese business environment. The Lebanese economic crisis has undermined SCM through currency depreciation, procurement difficulty, banking restrictions, inflation, and weakened supplier relationships. At the same time, accurate forecasting, digital resilience, supply chain visibility, planning discipline, inventory optimization, and decision support are considered possible with AI. However, its adoption remains constrained by infrastructure, cost, and data-quality limitations. Overall, the initial results indicate that SCM performance may affect managerial and entrepreneurial choices by Lebanese companies operating in unstable economic environments. At the same time, external shocks and digital capabilities jointly shape the resilience of Lebanon's supply chains.

Keywords: supply chain management, business performance, entrepreneurship, Lebanon, economic crisis, artificial intelligence.

1. Introduction

In recent years, supply chain management (SCM) has moved beyond being just an operational function to becoming a key driver of how organizations perform and compete over time (Christopher, 2022). As global markets become more complex and unpredictable, and as businesses face disruptions such as economic crises, pandemics, and geopolitical tensions, SCM has taken on a much more central role in managerial decision-making (Ivanov & Dolgui, 2021; Ponomarov & Holcomb, 2009). Today, organizations are judged not only by the efficiency of their internal operations but also by how well they build and manage flexible, responsive supply chains that adapt to uncertainty while still delivering consistent service and controlling costs (Christopher, 2022).

This shift is even more noticeable in emerging and crisis-affected economies, where external pressures can significantly disrupt business activities. Lebanon is a clear example of such a context. Since 2019, the country has been facing a severe economic crisis marked by currency depreciation, banking restrictions, inflation, and limited access to foreign currency (World Bank, 2021; International Monetary Fund, 2023a). Because the Lebanese economy relies heavily on imports, these conditions have directly affected procurement, supplier relationships, and logistics operations. As a result, supply chain performance has weakened, and businesses have had to rethink their strategies to survive and operate under these challenging conditions (World Bank, 2021).

At the same time, technological developments—especially the rapid growth of artificial intelligence (AI)—are changing how supply chains operate worldwide. AI tools can improve demand forecasting, optimize inventory levels, strengthen supply chain visibility, and help managers make faster and more informed decisions (Wamba et al., 2017; Makridakis et al., 2018; Baryannis et al., 2019; Choi et al., 2018). In environments characterized by uncertainty, such as Lebanon, these technologies can be particularly valuable. However, their effectiveness depends on several factors, including the availability of reliable data, the level of technological infrastructure, and the organization's readiness to adopt such tools (Wamba et al., 2017). In many emerging markets, these conditions are still developing, which limits the full potential of AI in supply chain applications.

Although SCM is widely recognized as an important factor in improving organizational performance, research examining how supply chain performance is affected by economic instability and technological change in specific contexts, such as Lebanon, remains limited. Most existing studies focus on stable or developed markets, offering less insight into how firms operating under severe constraints adjust their supply chain strategies and decision-making processes. In addition, while the benefits of AI in supply chain management are well documented, empirical evidence on how these technologies are applied and experienced in crisis-affected economies remains limited (Wamba et al., 2017). There is still a shortage of research on AI-enabled supply chain coordination, digital adaptation, and operational resilience in emerging and crisis-affected economies (Queiroz et al., 2022; Wieland, 2021; Gupta et al., 2022).

In response to this gap, this study examines the relationships among SCM performance, business performance, and entrepreneurial decision-making in Lebanon. More specifically, it examines how economic instability affects supply chain performance, how SCM performance influences business outcomes and strategic decisions, and the extent to which AI can improve supply chain effectiveness under constrained conditions. By combining insights from supply chain professionals with existing theoretical perspectives, the study aims to provide a more context-sensitive understanding of SCM.

Overall, the research highlights that SCM should not be viewed simply as an operational requirement, but rather as a strategic tool that can support resilience and competitiveness, especially in uncertain environments (Christopher, 2022). It offers practical insights for managers and policymakers, while also contributing to the academic discussion on supply chain management in emerging economies and the growing role of digital transformation in shaping its future.

2. Literature Review

The movement of goods, materials, and information within and between organizations is called the supply chain. To ensure a smooth flow, supply chain managers oversee and monitor all activities across procurement, manufacturing, inventory management, and warehouse operations until the finished product is delivered to the end customer. Supply chain management extends beyond the organization, encompassing relationships with suppliers, distributors, and customers (Stock & Lambert, 2001). To increase operational responsiveness and performance, modern supply chain systems increasingly depend on integrated information sharing, interorganizational collaboration, and visibility capabilities (Mentzer et al., 2001; Srinivasan & Swink, 2018).

The supply chain consists of several departments that work together to execute the process that fulfills consumers' needs. It starts with demand planning, which involves studying and analyzing market trends and demand, and transferring the forecasted quantities to the procurement department to order raw materials from the pre-supplier. The logistics department ships and delivers to the manufacturing site, where the production team starts production. Once the product is manufactured, assembled, tested, and packaged, the organization delivers it to distributors through the distribution department or directly to end-users. Finally, the return process begins; to maintain a positive customer experience and loyalty, the customer service department handles all customer requests. However, not all organizations manufacture finished goods. Some only source them and sell. They are identified as distributors (Stock & Lambert, 2001).

Effective SCM is crucial for any company to reduce costs, minimize waste, and maximize efficiency in production and distribution. Therefore, supply chain managers should build supplier relationships and trust to enable flexible payment terms and ensure that all raw materials are available and sourced to meet consumer and market needs.

Additionally, recent research indicates that supply chains with digital integration and analytics capabilities enhance organizational responsiveness, operational agility, and resilience in times of upheaval (Gunasekaran et al., 2018).

Also, a strong supply chain should identify issues that might affect product quality and customer satisfaction. To reduce costs, supply chain managers should monitor logistics and shipping costs by sourcing the right forwarders and reducing the number of shipments, thereby improving cash flow and profitability. They must also reduce inventory storage to lower inventory and overhead costs. Here comes the importance of having a data-driven SCM to monitor the exact demanded quantity and produce accordingly: not more nor less (Sinthiya, 2023).

Supply chain management (SCM) significantly benefits organizations in many ways, as it is the chain of activities that produce the final product. By ensuring that the correct products are delivered with the right quality, quantity, and timing, SCM boosts customer satisfaction and loyalty. It also helps reduce the organization's supply chain expenses by selecting the most effective suppliers and the most appropriate material delivery processes (Li et al., 2006). This cost reduction positively impacts the organization's financial health by increasing profit margins, controlling costs, and optimizing assets. In addition, during social emergencies such as medical missions and disaster relief operations, SCM plays a crucial role in swiftly delivering essential goods and services to affected areas, underscoring its societal importance (Kovács & Spens, 2012). SCM's contribution to sustaining human life, improving healthcare access, and mitigating climate-related risks underscores its significance in enhancing quality of life. Also, by fostering economic growth, creating job opportunities, and promoting environmental sustainability through efficient resource utilization, SCM further enhances society's overall well-being (Zhu et al., 2008; Christopher, 2022).

The goal of SCM is to improve supply chain performance. Accurate supply chain information can help an organization ship only as many products as the market demands. The importance of planning is evident here, as effective supply chain planning helped both manufacturers and retailers reduce excess

inventory, thereby decreasing the costs of production, shipping, insurance, and storage of unsold products (Stock & Lambert, 2001).

A company's supply chain is essential to its survival and expansion. Long-term survival depends on performance, and the results indicate that performance can enhance an organization's international reputation. As a result, improving organizational performance and competitive advantage depends heavily on supply chain management practices (SCMP). According to Waiyawuththanapoom et al. (2023), management assistance can therefore provide useful insights for managing SCM activities, thereby improving business performance.

There is a link between supply chain management and organizational performance that deepens understanding of their interaction. Supply chain management has a positive, significant impact on an organization's performance, as effective practices benefit it. According to the study's findings, customer relationship management and the selected sample's organizational performance are positively associated. In addition, customer relationship management has a statistically significant influence on organizational performance, as cultivating strong customer relationships can enhance performance by fostering greater loyalty, increased purchases, and acceptance of premium pricing, thereby increasing market share. (Anaja & Bagobiri, 2022).

Resilience, agility, and digital adaptability are increasingly important organizational characteristics in times of change and uncertainty, according to recent supply chain literature. Supply chains are especially susceptible to currency fluctuations, reliance on imports, supplier disruptions, and infrastructure constraints in developing and crisis-affected economies. These factors can substantially impact business survival and operational continuity (Ivanov & Dolgui, 2021; Ponomarov & Holcomb, 2009; Wieland, 2021; Srinivasan & Swink, 2018). Simultaneously, AI-enabled technologies and digital transformation are being seen as crucial tools for improving supply chain visibility, forecasting accuracy, and business responsiveness in unstable business contexts (Wamba et al., 2017). These viewpoints are particularly pertinent in the Lebanese context, where supply chain resilience and managerial decision-making remain influenced by operational disruptions and economic uncertainty. Additionally, recent research highlights the growing dependence of supply chain resilience on data-driven operational skills, adaptive coordination mechanisms, and visibility systems (Ivanov et al., 2019; Queiroz et al., 2022).

2.1 Economic Crisis and the Financial Crisis in Lebanon

In the interim, Lebanon encountered a financial crisis. A financial crisis arises when asset values decline, prompting businesses and consumers to default on their debt obligations. This ultimately results in liquidity shortages for financial institutions. Financial crises can impact a single economy or an entire area. Many factors may lead to the emergence of a financial crisis, including systemic failures, unregulated human behavior, and excessive risk-taking. Such crises hold the capacity to drive an economy into a recession or potentially a depression.

Inflationary pressure, liquidity shortages, weakened import capacity, and operational instability across Lebanese businesses were caused by the national authorities' inability to effectively manage the crisis, which shifted the burden of adjustment onto the badly impacted private sector and market dynamics (Makdisi & Amine, 2022; International Monetary Fund, 2023b; World Bank, 2021).

This situation led to two main outcomes: increased unemployment and increased emigration. The actions taken by the central bank, coupled with the government's failure to implement necessary policy measures, meant that the private sector played a significant role in shaping market developments. What was initially referred to as the black market became the primary market, determining the prices of goods and services through a freely fluctuating exchange rate that reached LL 33,000 per USD by the end of 2021. This shift served the central bank's objective of relinquishing responsibility for maintaining a unified exchange rate or supporting designated transactions at official rates. As a result, multiple exchange rates emerged during this period. (Makdisi & Amine, 2022).

Local demand was further suppressed by banking system policies, such as strict withdrawal restrictions and pressure to close dollar deposits. The economy shifted toward cash transactions as the usage of debit and credit cards as official payment methods decreased. In addition, the need to recommend political governance is underscored by changes in the regional environment over the past few decades, especially as Beirut's regional financial significance declined between 2019 and 2021, primarily due to the Beirut port explosion. Rebuilding confidence in the financial system through improved political and economic governance is essential to improving Lebanon's financial situation (Makdisi & Amine, 2022).

2.2 Artificial Intelligence & Its Relationship with Supply Chain Management

Today, the supply chain faces numerous problems, including demand uncertainty, external disruptions, risks, and crises, all of which can affect customer service temporarily or permanently. As a result, there is a growing interest in an industrial revolution known as Industry 4.0, with Artificial Intelligence emerging as the predominant technology capable of transforming various industries and sectors (Atwani, Hlyal, & Elalami, 2022).

With the advent of Artificial Intelligence, work has become easier and more efficient in several parts of Supply Chain Management, especially in demand planning and forecasting (Min, 2010; Makridakis et al., 2018). As both are very important functions for the company and the supply chain itself, covering production planning, inventory management, marketing campaigns, procurement, etc. The accuracy of these two is what concerns the management the most. In a fast-changing world, having up-to-date data is crucial, as all decisions are based on predictions. Forecasting accuracy, inventory optimization, procurement planning, and operational responsiveness in supply chains are all being enhanced by AI-enabled analytics and machine-learning systems (Baryannis et al., 2019; Choi et al., 2018).

Therefore, researchers have turned their attention to this area, combining traditional forecasting with artificial intelligence algorithms to obtain more accurate forecasts (Makridakis et al., 2018). In addition, in procurement, it is very important to have the required raw materials, supplies, accessories, and products for manufacturing or selling. Hence, with the use of artificial intelligence, forecasting quantities needed based on demand would be much easier and more accurate (Wamba et al., 2017).

An alternative way to use AI in the supply chain is through production and inventory management. It is very important to plan everything strategically, from production to the final delivery of goods to the end-user or distributor. The plan is to optimize the use of human resources, machines, warehouse space, and movement to reduce production costs and satisfy customers. Warehouse coordination and operational visibility may be greatly enhanced by digital supply chain systems backed by ERP integration, predictive analytics, and real-time monitoring technologies (Srinivasan & Swink, 2018; Ivanov et al., 2019).

Lastly, AI has applications in distribution and transportation. Distribution networks, including route scheduling, means of transportation, and storage facilities, can be identified by it. Among other things, this entails organizing vehicle packing, loading, and unloading, planning routes, supervising group transportation, handling empty packaging, and managing vehicle returns. Transportation and distribution departments have to adjust to changes in demand constantly. AI lowers transportation costs and reaction times while enhancing operational decision-making, logistics coordination, route optimization, and delivery efficiency (Baryannis et al., 2019; Ivanov & Dolgui, 2021).

According to earlier research, AI may help with several supply chain management tasks, such as forecasting, inventory optimization, and operational coordination and visibility, thereby improving cost control and operational effectiveness. Businesses can reduce operational expenses by trimming purchasing and production costs. For instance, if a grocery store owner procures fresh vegetables directly from a farmer, bypassing intermediaries, it can result in cost savings and quicker availability of

vegetables in the store. In addition, the implementation of AI enhances data transparency, improving supply chain visibility and potentially reducing costs. Also, utilizing AI improves the efficiency of manual work by automating previously manual tasks. This reduction in human effort ultimately decreases operational expenses (Wamba et al., 2017).

AI can also monitor shipments and streamline the timely delivery of goods by analyzing data and identifying patterns, helping managers make informed decisions. AI-enabled financial and operational decision-support systems may enhance supply chain visibility, forecasting capacity, and business responsiveness, especially when combined with big data analytics and digital infrastructure, according to recent research (Yang, 2026). Additionally, recent research suggests that analytics-enabled decision-support systems could improve supply chain continuity, management responsiveness, and corporate resilience in difficult times (Bag et al., 2020; Gupta et al., 2022).

AI-supported visibility platforms and IoT-enabled logistics systems are increasingly recognized as crucial tools for enhancing operational responsiveness, transportation coordination, and disruption management (Saber et al., 2019; Queiroz et al., 2022).

Also, by providing information on warehouse management systems and pinpointing deficiencies, inadequacies, and potential hazards, AI can help businesses enhance workplace safety and streamline their supply chains by identifying and addressing risks preemptively (Wamba et al., 2017).

2.3 Artificial Intelligence in Lebanon and Lebanese Markets

According to a UN report on AI applications in Lebanon, the country remains in the early stages of establishing the necessary conditions for AI infrastructure. There is a restricted availability of broadband services that continue to be costly even in urban areas; a majority of governmental bodies are not digitized, resulting in the unavailability of data sets; there exists a limited quantity of local IoT or other applications producing big data; there is a critical requirement for a data center that is outfitted with super computing capabilities; and the government allocates under 1% of its GDP towards R&D (ESCWA, 2020).

Hence, given the significance of AI at both global and regional scales, and its enormous potential to nurture economic growth, Lebanon cannot ignore this transformative technology. Given that Lebanon's primary resource is its people, the country should invest in R&D and digital skills to remain competitive. By the year 2030, all day-to-day activities will involve the use of AI and its various applications. Even with the emergence of oil and gas exploitation, all employment opportunities will necessitate digital skills and an understanding of AI (ESCWA, 2020).

AI could also enhance prospects for sustainable development, particularly when combined with IoT applications aimed at crucial sectors such as electricity distribution, water, and agriculture. Thus, AI has the potential to help address Lebanon's ongoing social challenges.

However, Lebanon remains in the digitization stage, lacking the essential foundations to fully transition to the AI phase: datasets, IoT applications, e-Government applications, computational power, open data policy, and digital skills. Hence, applying AI-based systems and software immediately and at the same intensity as other countries wouldn't be right (ESCWA, 2020).

Similar obstacles to technological adoption have also been noted in several developing nations, where AI-enabled supply chain transformation remains hampered by low organizational readiness and constraints in digital infrastructure (Gupta et al., 2022).

3. Methodology and Procedures

To understand the perspectives and experiences of Lebanese supply chain experts regarding supply chain management performance, economic instability, and the implementation of artificial intelligence, this study employs an exploratory qualitative methodology. The research examines management

insights, operational difficulties, and strategic actions within the Lebanese corporate environment, rather than quantitatively assessing factors and causal linkages.

To investigate how supply chain management performance, economic volatility, and artificial intelligence affect company operations and entrepreneurial decision-making within Lebanese firms, this study employs an exploratory qualitative research design. Understanding participants' experiences, perspectives, and managerial responses to supply chain challenges in a highly volatile economic climate is the study's primary goal. We view artificial intelligence as a contextual digital capability that could help Lebanese businesses improve supply chain flexibility, operational efficiency, and forecasting.

Three primary research areas are examined in this study. It first examines how supply chain management performance affects Lebanese companies and entrepreneurial decision-making. Second, it examines how supply chain management performance is affected by the Lebanese economic crisis. Third, it looks at how supply chain management in Lebanese companies might be affected by artificial intelligence.

Semi-structured interviews with supply chain experts in Lebanon formed the basis for this study's exploratory qualitative research design. To investigate how participants view the connections among supply chain management performance, corporate performance, economic instability, and the use of artificial intelligence, the study takes an interpretivist approach. The research focuses on understanding managerial experiences, perspectives, and insights within the Lebanese corporate context rather than on quantitatively testing causal correlations.

While allowing participant experiences and viewpoints to influence how results are interpreted, this study is informed by current literature and theoretical insights. To gather qualitative information and investigate how supply chain experts assess the current operational and strategic challenges in the Lebanese market, semi-structured interviews were conducted.

The entire study process was conducted with ethical issues in mind. Interview participation was entirely optional, and participants were informed of the study's objectives, confidentiality policies, and their freedom to discontinue participation at any time without incurring any fees. No personally identifiable organizational information was revealed, and anonymized participant codes were used throughout the study to preserve participant anonymity and organizational confidentiality.

Purposive sampling was used to select participants with relevant knowledge of supply chain management. Eight directors and supply chain managers from various sectors in Lebanon took part in the interviews. Throughout the study, anonymized participant codes were utilized to preserve confidentiality and safeguard participants' identities. The participants' professional profiles are given in Table 1.

Table 1: Participant Profile Information

Participant Code	Position	Industry	Years of Experience	Company Size	Interview Duration
P1	Supply Chain Manager	Manufacturing	12 Years	Large Enterprise	30 minutes
P2	Supply Chain Director	Retail	15 Years	Large Enterprise	35 minutes
P3	Supply Chain Manager	FMCG	10 Years	Medium Enterprise	35 minutes
P4	Supply Chain Manager	Logistics	9 Years	Medium Enterprise	40 minutes

P5	Supply Chain Director	Food & Beverage	14 Years	Large Enterprise	30 minutes
P6	Supply Chain Manager	Pharmaceuticals	11 Years	Medium Enterprise	40 minutes
P7	Supply Chain Director	Distribution	13 Years	Large Enterprise	35 minutes
P8	Supply Chain Manager	Wholesale & Trade	8 Years	Medium Enterprise	30 minutes

4. Findings and Discussion

4.1 Research Framework

The framework examines three primary research topics: artificial intelligence in Lebanon, supply chain management performance, and economic instability. The research analyzes existing theories and prior research, as well as qualitative data, by conducting interviews with eight supply chain experts from different companies to answer the research question and explore the main research themes.

The main objective of this research is to examine and understand how Supply Chain Management performance affects business performance and entrepreneurial decisions in the Lebanese market.

One of the most persistent external factors Lebanon faces is the ongoing economic crisis. The country's economic struggles have led to adverse effects, including depreciation of the Lebanese pound, high inflation, and resource shortages. These economic challenges are placing a significant burden on several areas of business.

The second factor in the test is the development of Artificial Intelligence in the Lebanese market, which is transforming global business operations. While Artificial Intelligence implementations are still in their early stages in Lebanon, it is expected that, in later years, they will be part of the day-to-day activities of the Lebanese people and a main tool for businesses' daily tasks. This research analyzed the impact of artificial intelligence integration on supply chain management performance. Also, the research explored whether adopting artificial intelligence led to enhanced efficiency, cost savings, or a competitive advantage in the Lebanese market.

Therefore, the study employs both primary and secondary data collection methods to investigate the primary research themes, comprehend the influence of these factors on supply chain management performance, and evaluate their significance for business performance and entrepreneurial decision-making in the Lebanese market.

To gather primary data, the researcher interviewed eight supply chain directors and managers from different companies across industries in Lebanon. Through the interviews, the researcher has gained insight into how businesses in Lebanon are managing the dangers posed by the prolonged economic crisis, the current political conflict, and the development of artificial intelligence in the Lebanese markets, specifically in supply chain management. On the other hand, the researcher used secondary data to support the primary data, including previous studies and academic articles.

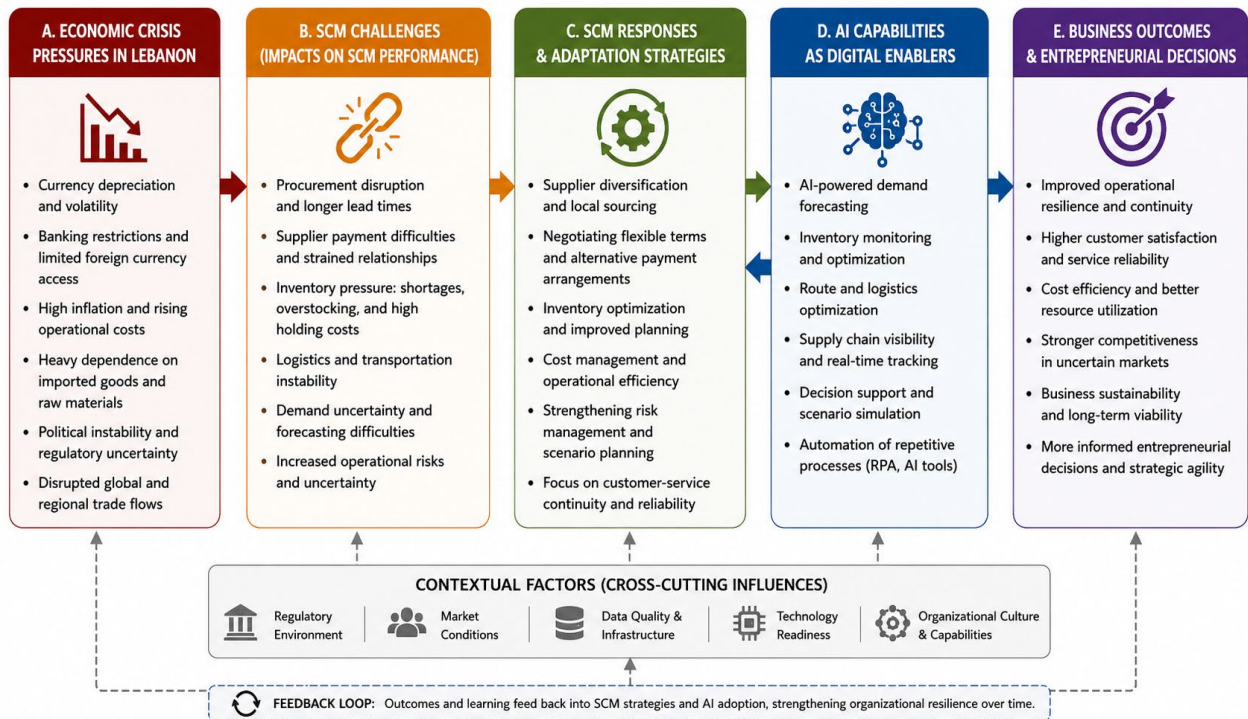


Fig.1: Conceptual Framework of AI Capabilities, Business Outcomes, Economic Crisis Pressures, and SCM Performance in Lebanon

4.2 Analysis

The researcher created a semi-structured interview guide comprising nine primary questions (see Appendix A). To identify recurring themes, patterns, and shared opinions regarding supply chain performance, economic instability, and the use of artificial intelligence in Lebanon, the interview responses were analyzed thematically.

The interview was conducted with eight interviewees, all of whom are experienced professionals in supply chain management, holding positions as Supply Chain Managers or Supply Chain Directors in their respective organizations. The researcher selected these participants based on their extensive knowledge and experience in supply chain management. Their professional backgrounds made them ideal candidates to contribute their experiences and perspectives to this research. Also, the main reason for selecting participants from companies across different industries was to ensure that the data was not biased toward a single industry.

All participants were given the option to decide whether they wished to participate in the research, and participation was entirely voluntary. They could also choose not to answer any question that made them uncomfortable. This shows that each participant freely partook in the study without feeling compelled to give responses they deemed unsuitable or irrelevant. Before the interviews began, the participants were fully informed of the study's goal and provided their agreement.

The questionnaire was sent to participants via email so they could review the questions before answering during the interview session. Interviews were conducted within a specified timeframe to ensure participants' convenience and the effectiveness of the data collected. Participants were asked to confirm their participation and to schedule an interview date and time via email. Given the experts' hectic schedules and probable professional obligations, this flexibility was crucial.

The questionnaire was specifically designed to ensure that answers not only explained the research objectives but also analyzed and supported them. The research was conducted to gather perceptions that

would help answer the main research question: *"Can the performance of supply chain management affect the decisions of businesses and entrepreneurs in Lebanon?"*

The primary goal of this study is to understand and demonstrate how supply chain management influences business and entrepreneurial decisions in the Lebanese market, and to show its key role in the growth and competitiveness of organizations. An essential component of organizational operations is supply chain management. It involves more than merely procuring raw materials through various routes and importing and exporting them.

The research examines how companies' performance in Lebanon can be affected by the effectiveness of supply chain management, using the gathered responses. The study also examines how supply chain management may influence the decisions of entrepreneurs and companies in Lebanon, potentially affecting their long-term viability, competitiveness, and growth.

To identify recurring themes and shared viewpoints among participants, the interview responses were analyzed using thematic analysis. Supply chain disruptions, operational challenges, customer service continuity, and the use of AI in Lebanese companies were among the main concerns that emerged. The primary themes found throughout the analysis process are compiled in Table 2.

Thematic analysis was used to examine the interview data. Following the completion of the interviews, the replies were examined and organized around shared professional experiences, recurring meanings, and recurring concerns. Initial codes on procurement interruption, supplier payment issues, inventory pressure, customer service continuity, AI readiness, and data/infrastructure constraints were developed by the researcher. Following that, these codes were grouped into broader subject categories that reflected the study's primary research areas. By comparing participant responses across industries, managerial positions, and years of experience, themes were improved through manual analysis. This method preserved the exploratory and interpretive aspects of the qualitative design while enabling the study to find recurring patterns.

Table 2. Summary of Thematic Analysis Findings

Main Theme	Description	Descriptive Participant Insights
Procurement Disruption	Due to import limitations and currency volatility, participants reported significant interruptions in sourcing and purchasing processes.	Import delays, higher procurement costs, and difficulties paying suppliers.
Supplier Payment Difficulties	Banking restrictions and foreign-currency shortages hindered payment arrangements and supplier transactions.	Exchange rate volatility, delayed transfers, and updated supplier terms.
Inventory and Cost Pressure	Companies faced forecasting difficulties, growing storage expenses, and inventory shortages.	Concerns about understocking and overstocking coexist with rising operating costs.
Customer-Service Continuity	SCM performance was considered critical to preserving both operational continuity and customer satisfaction.	The importance of prompt delivery, client loyalty, and dependable service was highlighted repeatedly.
AI Readiness and Adoption	Despite its limited application, participants saw AI as a promising operational support tool.	Route optimization, inventory tracking, and demand forecasting were emphasized.
Data and Infrastructure Limitations	Participants underlined that precise data and technological infrastructure are necessary for AI to be effective.	Infrastructure obstacles, low digital readiness, and poor data quality were noted.

4.3 Discussion

4.3.1 Business Decision-Making and SCM Performance

Based on the data collected from the interviews, most interviewees described supply chain management as an interrelated process comprising multiple stages, each of which plays an important role in a business's overall success.

It starts with sourcing raw materials, the initial step in ensuring businesses have all the necessary materials for production. Then goods are either imported or exported, depending on the company's operational structure. Efficient logistics at this stage are crucial to ensure materials are delivered on time.

Throughout the entire flow, the main goal of supply chain management is to meet or exceed customer expectations. The interviewees emphasized that customer satisfaction is the primary goal of the supply chain cycle. When customers are satisfied with the quality of the final product, timely delivery, and after-sales service, they develop customer loyalty. The more loyal customers are, the more likely they are to return and make additional purchases, thereby reducing the likelihood that they will switch to competitors. This allows businesses to differentiate themselves in a competitive market. This not only helps a business stand out in a competitive market but also ensures its long-term growth and profitability.

Eventually, customer satisfaction contributes to the business's sustainability. It helps businesses overcome market competition, ensuring a stable revenue stream and emphasizing their position in the marketplace. The more successful a business becomes, the greater the chance of sustaining its operations, expanding its contributions, and increasing its profits over time.

Almost all the interviewees emphasized that SCM is not just another function within a company but is interrelated with every department and aspect of a business. It ensures that resources are used efficiently, that finished products are delivered on time, and that customer expectations are met. This leads to customer loyalty, ensuring a stronger competitive position within the market.

Interviewee five said, *"I believe supply chain management is the backbone of a business's success. It directly impacts how efficiently we can produce and deliver goods to our customers... In short, supply chain management ensures that everything runs smoothly, from sourcing raw materials to delivering the final product, and this operational efficiency is critical to the business's overall success. Without it, a business wouldn't survive."*

Interviewee two said, *"In my opinion, supply chain management is the most important department of a business. Any changes in the supply chain management, either positive or negative, would immediately impact the business's performance."* Interviewee three said, *"Supply chain management is all about keeping customers happy. When the supply chain works well, customers get their orders on time, in perfect condition, and at the right price... Happy customers mean repeat business and positive word-of-mouth, both of which are essential for the company's success."*

By examining the perspectives and expertise of these experts, the study demonstrates that supply chain management (SCM) is a strategic function that significantly impacts a company's success. Participants in the interviews highlighted how effective supply chain management can influence business decisions, helping firms adapt to shifting market conditions, manage risks, and thrive in a fiercely competitive environment. The research findings from the interview lend credence to the claim that SCM plays a significant role in driving company strategy and decision-making in Lebanon, rather than merely serving as a support function.

The interviews also showed that supply chain problems directly impacted several strategic and entrepreneurial business decisions made by Lebanese enterprises. Participants described how persistent supply chain instability and economic uncertainty forced many companies to diversify their supplier base, rely more on local sourcing, modify pricing strategies, keep extra inventory buffers, postpone expansion and investment plans, and reevaluate market-entry decisions. Also, some interviewees noted that because major operational risks stemmed from disruptions to logistics, supplier payments, and foreign-currency availability, businesses became more cautious in their financial commitments and

purchasing plans. These results demonstrate that supply chain management performance influences not only operational effectiveness but also broader entrepreneurial and strategic decision-making processes in Lebanese companies.

These findings align with the supply chain resilience and dynamic capabilities perspectives, which prioritize operational flexibility, adaptive coordination, visibility, and strategic responsiveness in times of uncertainty and disruption (Wieland, 2021; Srinivasan & Swink, 2018).

4.3.2 The Lebanese Economic Crisis's Effect on SCM Performance

As discussed previously, Lebanon's 2019 economic crisis significantly impacted the country's financial stability, particularly in the banking sector. Banking operations were effectively interrupted, with financial institutions facing a liquidity crisis. As a result, the Lebanese people and businesses found it nearly impossible to withdraw their deposits, leading to financial instability. Also, the Lebanese Pound devalued against the US Dollar.

This depreciation made it very difficult for businesses to secure foreign currency to import raw materials and finished goods. The inability to secure US dollars left many companies struggling to maintain their operations, particularly those that import raw materials and finished goods. Importers faced steep cost increases due to the devaluation of the Lebanese Pound, while the price of US dollars rose rapidly. With rising costs and limited access to foreign currency, many businesses were unable to sustain their operations, leading to closures and bankruptcies.

Given these challenges, the research sought to determine whether the economic crisis and financial corruption affected businesses' supply chains in the Lebanese market. The interviewees were asked to share their perspectives on how the crisis affected the companies they worked for, and specifically their supply chains.

The findings of these interviews provided insight into the challenges faced by supply chain managers in Lebanon during this crisis.

The eight participants were asked to share their thoughts on whether the financial crisis and fluctuations in the Lebanese Pound against the US Dollar had affected the company's supply chain management. The results are shown in the bar graph below (Figure 2).

In general, interviewees stressed that their company's supply chain management was clearly affected by the 2019 financial crisis. Participants reported particular challenges in purchasing and procurement processes, as well as price swings that destabilized their supply chains. In addition, several pointed out that suppliers' unforeseen changes in payment terms were due to Lebanon's unstable financial system.

Interviewee eight said, *"The economic situation since 2019 has heavily impacted our supply chain management. Specifically, it has disrupted purchasing processes, including challenges with local supplier pricing, payment terms, procurement procedures, and logistics budgets."* While interviewee three said, *"With banks interrupting their operations and the local currency fluctuating, it became more difficult to manage supplier payments and importation costs as collecting funds and exchanging them to foreign currency was not only the problem, but having them transferred to the suppliers' bank accounts was challenging, too."*

These outcomes support the conclusion that supply chain management performance in Lebanese companies was adversely affected by the country's economic crisis. The findings imply that the economic crisis had a detrimental, direct impact on enterprises' capacity to manage their supply chains effectively, as most participants reported a direct effect on their supply chain operations. The results clearly corroborate this claim because several of the issues raised, such as erratic price swings and changes to payment conditions, further explain the disruptions caused by the crisis.

The results corroborate the literature on risk management and resilience-oriented supply chains, which emphasizes the importance of supplier diversification, operational flexibility, and adaptive procurement techniques during economic volatility.

Previous research has also emphasized the significance of visibility systems, adaptive procurement strategies, and supplier diversification during operational instability and economic disruption (Queiroz et al., 2022; Ivanov et al., 2019).

4.3.3 Artificial Intelligence as a Digital SCM Performance Enabler

Artificial intelligence has had a significant impact on several industries worldwide over the last few years, and its integration into everyday life continues to grow. AI systems are being used across a range of activities for many individuals and in the daily operational tasks of businesses, with one of the most notable applications being supply chain management. This was also discussed with the participants during the interviews conducted for this research. Many of them believe that AI could transform the industry and the supply chain, specifically by improving demand planning and raw material sourcing, thereby lowering costs. AI systems can automate monitoring of supply and demand changes, thereby quickening responses and, in turn, leading to more precise decisions.

However, interviewee six had a different perspective regarding AI: it has its limitations. That is, if the organization doesn't provide accurate data to such AI-powered systems, it won't be able to help in return with better, much more accurate results. He stated, *"To optimize the use of AI-powered systems and software, one should have accurate data."* This shows that no matter how much the industry automates its operations, human input is always needed to achieve the target. It also highlights a critical aspect of AI use: its effectiveness depends directly on the quality of the data fed into the system.

In addition, although AI can handle large volumes of data with precision, human error remains a substantial challenge in supply chain operations. As noted in previous research, poor forecasting or misinterpreted demand often goes unnoticed, which can negatively impact supply chain performance. Imprecise data can lead to inaccurate forecasts, resulting in overstocking or understocking, which can negatively impact customer satisfaction, costs, and overall efficiency.

AI-powered solutions can reduce such errors, ensuring accurate forecasts and raw material procurement, as numerous experts have indicated in their research and in interviews with the selected participants. For example, this can reduce waste and unnecessary expenses caused by improper inventory handling. AI could help reorganize operations and increase the reliability of supply chain activities when the supply chain faces growing fluctuations in supply and demand driven by globalization, shifting consumer tastes, or unanticipated disruptions. According to recent studies, AI-enabled analytics solutions significantly enhance supply chain visibility, inventory coordination, operational responsiveness, and forecasting accuracy in volatile market conditions (Baryannis et al., 2019; Choi et al., 2018; Bag et al., 2020).

Some of the perspectives of the interviews are: *"AI technologies can bring numerous advantages, although their implementation would effect on various parts related to the supply chain management and some of them are the enhanced efficiency, agility, cost reduction and calculation, demand planning and supply and finally the coverage and needs of raw materials."* as stated by interviewee seven, *"While we are still in the early stages of AI integration, I see that we might be using it for reports and studies with the demand and supply. In my opinion, AI can improve efficiency and optimize routes, which could be crucial in Lebanon's volatile environment,"* interviewee five said.

Most of the interviewees agreed that AI and AI tools would impact supply chain management's performance, given that they would help with forecasting demand, monitoring shipments, ensuring timely delivery of goods, and managing inventory to maintain data accuracy, resulting in accurate forecasts of demand and supply. While only a few of these experts doubted this idea, they noted that AI alone would not be enough for efficient supply chain management and that human input would help AI

achieve this. Previous studies also agreed that AI is important and should be applied to supply chain management activities, even in Lebanon.

Several participants highlighted the growing importance of digital integration tools and supply chain information systems in enhancing managerial decision-making, operational coordination, and visibility. According to interviewees, ERP systems, forecasting dashboards, inventory tracking platforms, and real-time monitoring tools could enhance supply chain coordination and forecasting accuracy. ERP systems, digital integration platforms, and AI-enabled decision-support tools enhance supply chain visibility, operational coordination, and managerial responsiveness in unstable business environments, according to earlier research (Srinivasan & Swink, 2018; Ivanov et al., 2019; Gupta et al., 2022).

Participants also discussed how data-driven insights from AI-enabled decision-support systems could help businesses monitor supplier performance, enhance procurement planning, and boost operational effectiveness. By enhancing business responsiveness, real-time visibility, and adaptive decision-making during crises, these technologies may also improve digital resilience. However, they emphasized that system integration, digital infrastructure, and data quality within Lebanese companies are critical to the efficacy of these technologies.

Also, prior research indicates that in unstable corporate situations, digital integration tools, IoT systems, and AI-enabled monitoring platforms may improve operational coordination and visibility, supply chain continuity, and organizational response (Meidutė-Kavaliauskienė & Linkevič, 2025).

From the standpoint of dynamic capabilities, participants viewed AI-enabled systems as potential instruments for enhancing operational coordination and visibility, forecasting capabilities, and business responsiveness amid unstable market conditions.

5. Conclusion and Recommendations

The paper discusses the vital role that supply chain management plays in the company's overall performance and business decision-making. Supply chain management refers to various, though related, activities, from raw material sourcing to the delivery of final goods to the end user. The businesses need a well-managed supply chain to improve operational efficiency, cost management, and profitability.

Procurement, demand forecasting, logistics, and inventory management—all of these processes are interrelated. Successful integration of these processes helped businesses optimize operational efficiency, ensure timely product deliveries, reduce costs, and provide high levels of client satisfaction. As a result, they would foster loyalty and satisfaction among their customers, which, in turn, would help them maintain their competitive positions in the market.

The failure of even one supply chain function may lead to the system's total collapse. Thus, this study seeks to emphasize that a failure in supply chain management is more than an isolated logistical problem. Instead, it becomes an obstacle to development and the maintenance of an enterprise's competitive advantage.

This study's main objective is to investigate Lebanese enterprises' supply chain operations, with particular emphasis on how external factors affect these operations. Procurement, shipping, and inventory management are just a few of the supply chain services severely disrupted by the Lebanese economic crisis. Participants also saw artificial intelligence as a possible tool for supply chain collaboration, operational coordination, visibility, and forecasting.

These results are consistent with recent research highlighting the strategic significance of AI-enabled systems in enhancing supply chain visibility, operational resilience, and adaptable business responsiveness during disturbances (Bag et al., 2020).

The results of the interviews provide preliminary qualitative evidence that participants believed these external variables significantly affected the effectiveness of supply chain management in their respective organizations.

Rather than statistically generalizable conclusions that apply to all Lebanese enterprises, the results should be seen as exploratory qualitative insights specific to the participants interviewed and their organizational contexts.

5.1 Limitations

However, this study has several significant limitations that should be taken into account when interpreting the results. First, the transferability and broader generalizability of the results are constrained by the very small sample size of the interviews. In addition, rather than offering a comprehensive understanding of the broader environment, the study may reflect the viewpoints of a small number of people.

Second, the sampling technique used in this research may introduce bias, as the researcher selected participants with supply chain backgrounds and field expertise, potentially limiting the comprehensiveness of the findings. In addition, the main focus of this research is the Lebanese market, which may not yield insights easily applicable to other countries.

Also, the relatively small body of academic literature on supply chain management in Lebanon makes it difficult to compare the study's conclusions with those of other studies. It limits the ability to confirm the research findings. The lack of academic research also makes it difficult to place the findings in historical perspective, as the research may only provide a snapshot of the present.

Finally, the study's findings provide theoretical and managerial insights that have the potential to transform how supply chain management is seen and done. The incorporation of external factors such as economic insecurity and technological advancements into supply chain management models is critical for advancing theoretical knowledge and operational strategy, while also providing practical insights for managers to improve supply chain performance.

5.2 Theoretical and Managerial Implications

The study challenges traditional SCM models, which primarily focus on internal aspects such as inventory management, supplier relations, and transportation efficiency, by incorporating external factors, including economic instability. It supports the creation of new models that account for external influences on supply chain operations and focuses on how technical breakthroughs might affect companies' strategic decisions and risk management.

By examining Lebanon's particular context, this study contributes to the body of knowledge on supply chain management. It provides a theoretical foundation for understanding how external factors influence businesses' everyday operations and long-term strategic goals.

The study emphasizes the necessity for Lebanese company managers to incorporate risk management and strategic planning into supply chain procedures by continuously monitoring external factors. This entails creating more adaptable, agile supply chains that can respond to external interruptions and reduce potential losses.

Interviewees highlighted strategies such as diversifying the supplier base, strengthening supplier relationships, improving inventory management, leveraging technology, subcontracting production, exploring alternative routes, and prioritizing local suppliers.

Lebanese enterprises must develop robust, cost-effective supply chains and incorporate sustainability practices, such as sourcing materials locally and partnering with local suppliers, to enhance resilience and competitiveness.

5.3 Future Perspectives

The supply chain professionals interviewed for this study were asked to explain the trends they foresee in the supply chain management of Lebanese businesses. Interviewees highlighted increased adoption of technology, including AI and blockchain, as well as the need for reliable internet access, cloud-based ERP systems, and secure data storage.

As a result, supply chain managers and directors should rely more on technological advancements to improve their supply chain operations, as such developments would help save time, reduce costs, and improve data integration for demand forecasting, logistics routing, and raw material sourcing. This would also help the Lebanese market become more up to date by adopting a more automated supply chain to compete globally.

Interviewees also emphasized strategies such as diversifying risks, investing in technology, enhancing supplier/client relationships, developing contingency plans, staying informed about global trends, and embracing sustainability and innovation to create resilient supply chains.

Businesses must be aware of potential issues that may affect their supply chain operations and be prepared for unexpected disruptions. By remaining vigilant about these external factors, managers may make better judgments and safeguard the company from unexpected changes.

The development of artificial intelligence may have a greater impact on the operational responsiveness, forecasting, and supply chain efficiency of Lebanese companies.

By being aware of both risks and opportunities given by external variables, managers can better handle challenges and position their businesses for long-term success.

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Appendix A: Semi-Structured Interview Guide

The following semi-structured interview questions guided the interviews with supply chain managers and directors involved in this study.

1. How do you explain the impact of supply chain management on the overall success of a business?
2. Since 2019, Lebanon has experienced a huge collapse in the economy. Banks' operations have been interrupted, and the currency has fluctuated. Did the company you work for, and specifically the supply chain that you manage, affect you?
3. With the development of artificial intelligence around the world and in Lebanon specifically, do you think that your company and the supply chain management that you manage would be affected in any way?
4. With the ongoing war between Israel and Palestine, do you think that this would have any impact on the performance of the supply chain management of a business? Please explain your point of view by providing examples.
5. Have these external factors affected the relationship between the company you work for and its suppliers? Please explain by providing examples, if possible.
6. With the many enduring changes happening in the world and in Lebanon specifically, have you planned anything or implemented any strategy to maintain the efficient management of the supply chain of your company?
7. Do you think that sustainability plays an important role in your supply chain decisions with the ongoing changes in Lebanon, and how?
8. Looking forward, do you foresee any trends in the supply chain management of Lebanese businesses as a result of the war, AI development, and economic crisis? If yes, please name the trends.
9. Based on your professional experience, what would you advise other supply chain managers or directors to do to adapt to these external factors if, in your opinion, they have a direct or indirect impact on the supply chain management?