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RESEARCH ARTICLE

Assessing the Impact of Supply Chain Management Processes on the Lebanese Industry of Goods and Services During Times of Uncertainty

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Abstract

Through the three functions of Marketing, Operations and Finance, value for the customer is created. However, firms seldom create this value by themselves. Instead, they rely on a variety of suppliers who provide everything from raw materials to accounting. These suppliers when taken together can be thought of a supply chain. Being so diversified, the Lebanese firms have a huge challenge in setting an efficient supply chain process, thus, the firms and through their professional teams were able to set a detailed list of requirements to be followed to consolidate its data and to manage properly the flow of merchandise from the source to the destination particularly during the current critical period of risk and uncertainty. This research will describe how it is done through a vast literature review. So, the purpose of the research is to provide insights into the importance of the supply chain strategy and ERP integration for the organizations. This will ensure a proper integration and will highlight the flow of information of the supply chain helping the group to minimize the inventory cost and being a competitive Advantage. Also, The Electronic Data interchange (EDI) will contribute to the replenishment during the season and the analysis done over the historical data identify the best/worst selling items per shop and define the forecasted order of the upcoming season. The optimization is highly recommended to maintain a sustainable workflow of the supply chain along to the forecasted expansion. To achieve our goal, a primary data via different interviews with experts in the field will be used because of the complicated data collection process. We conducted 15 semi-structured interviews with 13 questions each. Results found showed that the supply chain management (SCM) stability has been affected by the crisis yet businesses in the Lebanese market have been adopting several measures and coming up with various strategies to mitigate the negative consequences.

Keywords: Supply chain strategy, Enterprise resource planning (ERP), e-business, Networking, Technology, Workflow, Electronic data interchange (EDI)

1. Introduction

The idea of supply chain management (SCM) is already well-established, and many businesses have benefited from its implementation by gaining a competitive advantage. What we frequently forget is that the concept of supply chain management is relatively new; it was only introduced in its initial stages less than 30 years ago. However, it was quickly adopted by academics, consultants, and practitioners, who then modified and reshaped it to reflect the lessons learned from actual

implementation. Since then, supply chain management has completely changed the way we think about markets, how they may be effectively served, and how important competitive advantage can be—and how it can be lost if it is ignored. The goal of current supply chain management practice has been to achieve what we refer to as dynamic flexibility, which enables businesses to adapt to specific changes in demand and technology while remaining within the predetermined framework of their current supply chain designs. However, as we'll argue, structural flexibility that incorporates flexible

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alternatives into supply chain architecture is necessary if we are going to handle the difficulties of a volatile economic climate (Christopher & Holweg, 2011; Xu & Zhao, 2022). Since the money once trapped in inventory is now available for other economic operations, supply chains have grown leaner and more profitable. Longer lead times are a result of the globalization of supply chains at the same time. Business developments including shorter lead times, lower inventories, shorter product life cycles, and more outsourcing on lengthy global supply chains have raised the risks in supply chains and made them more crisis prone (Bouncken, Kraus, & Lucas Ancillo, 2022; Norrman & Jansson, 2004). Crises have a significant impact on the wealth of the company's stockholders in addition to the flow of goods in the supply chain (Hendricks & Singhal, 2005). Economic development and logistics are interwoven (Chowdhury, Paul, Kaisar, & Moktadir, 2021). Research generally shows that demand for logistics services is influenced by economic growth, which promotes the growth of the industry. However, effective logistics can assure businesses' competitiveness and boost financial performance, especially during instances of financial turbulence (Ghazzawi, Palladini, & Martinelli-Lee, 2014). In order for an organization to understand, estimate, and make sense of how an environment might change, the potential impact of the changes, and whether an organization's response to such changes might be successful or not, environmental uncertainty refers to uncertain changes occurring externally and the degree of instability in the business environment that may occur at any point within a global supply chain network (Grzybowska & Stachowiak, 2022; Oke, Walumbwa, & Myers, 2012; Srinivasan, Mukherjee, & Gaur, 2011; Wang, Yeung, & Zhang, 2011; Yi, 2011). Due to the multifaceted nature of environmental uncertainty, businesses usually deal with several environmental uncertainties at once (Lean, Huang, & Hong, 2014). Supply chain uncertainty can take many different forms, including the dependability of suppliers, competitors' behavior, or the quality of products (Bouncken et al., 2022; Stevenson & Spring 2007). There have been differing opinions on the effect of environmental uncertainties towards supply chain partnerships. On the one hand, if there is a lot of uncertainty, businesses will coordinate their efforts more closely to lessen it. In contrast, businesses will work to increase their flexibility in ambiguous situations by a decrease in their reliance on inter-firm interactions. Thus, perceived environmental uncertainty exerts significant influence on organizational processes (Srinivasan et al., 2011).

Supply chains now compete against other supply chains in the current business climate, rather than enterprises. The relevance of the network of businesses inside a firm's supply chain to the achievement of goals has increased as supply chains now compete with one another rather than individual businesses of firm flexibility cannot be over-emphasized. The goal of current supply chain management practice has been to achieve what we refer to as dynamic flexibility, which enables businesses to adapt to specific changes in demand and technological advancements, but only within the predetermined framework of their current supply chain designs. However, structural flexibility that incorporates flexible alternatives into supply chain architecture is necessary to handle the difficulties of a volatile economic climate (Christopher & Holweg, 2011; Grzybowska & Stachowiak, 2022). Businesses can no longer solely concentrate on enhancing their own operations at the expense of those of their suppliers and consumers. Financial results show how well supply chain management methods are working. Measuring the financial performance can help with supply chain understanding and enhance overall performance (Moretto & Caniat, 2021). The goal of logistics is to give a business a competitive advantage and to improve performance. Therefore, organizations will benefit from acquiring and taking into consideration such an awareness of the impact of supply chain processes on performance to follow best practices and develop their own supply chain excellence strategies (Youssef & El-Nakib, 2015). Supply chains encounter additional problems and difficulties as businesses strive for greater global competitiveness. These include growing demands for cost-cutting measures as well as improvements in customer satisfaction, quality, and supply reliability (Xu & Zhao, 2022) (see Figs. 1–5).

The aim of this study is to investigate the influence of supply chain management practices on businesses during times of risk and uncertainty focusing on Arab and Middle East region and particularly Lebanon, knowing that the country has been witnessing an economic crisis in the last three years.

2. Literature review

2.1. State of knowledge in supply chain management

The term Supply Chain Management has been created early in 1982 by two consultants: Oliver and Webber – The supply chain is defined as a mission of logistics to become a top management concern

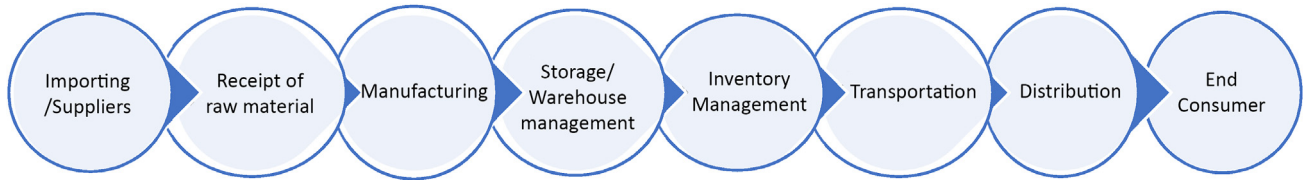


Fig. 1. Supply chain management diagram.

since “ only top management can assure that conflicting functional objectives along the supply chain are reconciled and balanced. And finally, that an integrated systems strategy that reduces the level of vulnerability is developed and implemented” (Oliver & Webber, 1992). The constituents of the Supply Chain Management are the management philosophy, the target, the objectives, the tools used to achieve these objectives “In a broad sense a Supply Chain consists of two or more legally separated organizations, being linked by material, information and financial flows” (Jackson, 1999). Competitiveness and customer service are considered as the highest standards to be followed for an ultimate achievement of a supply chain set goal. The reduction of the cost, increase of flexibility with respect to changes in customer demands or by providing high quality of products and services, are to be considered for a competitiveness improvement. The network integration along to the coordination of information material and financials workflow is selected as main components of the Supply Chain Management. There are 3 elements of customer service: Pre-transaction, Transaction and Post transaction elements. The integration is the collaboration in the long term of the below main

building blocks: Selection of partners, Network organization and Leadership and inter-organizational. The stability of a supply chain depends economically on its entities. Even if they are legally independent, the structure of a supply chain will stay steady, only if there is a win-win situation for each member at least in the long run. At short term, it should be compensated through a compensation scheme based on the usual price mechanisms. To implement the consistency of the supply chain members, several types of relationships may be used: “Technical bonds which are related to the technologies employed by the firms. - Knowledge bonds related to the party's knowledge about their business - Social bonds in the form of personal confidence - Administrative bonds related to the administrative routines and procedures of the firm. - Legal bonds in the form of contracts between the firms” (Bouncken et al., 2022).

2.2. Previous research

The main actor forming a supply chain is “Leadership”; it is a fragile topic in light of the supreme of self-organizing; Regardless of the advantages attributed to a supply chain, we should keep in mind that its structure is susceptible-the exit of one collaborator may put at risk the survival of the supply chain as a whole; Also, an associate may run the threat of becoming unappealing and to be substituted by a competitor once he identified how he has been distributed within the supply chain. The organization of information includes three main processes: Communication technology and information dispatch, Process direction and advanced planning. The progresses in the information technology (IT) made the procedure of information at different phases in the supply chain possible; the large storage space devices allow the storage and the retrieve of historical group data; therefore, the Data Warehouses may now be used for a better analysis. The communication through the electronic data interchange (EDI) can be recognized through private and public networks, the most known one being the Internet. The communication links are distinguished according to the below 3 parties:

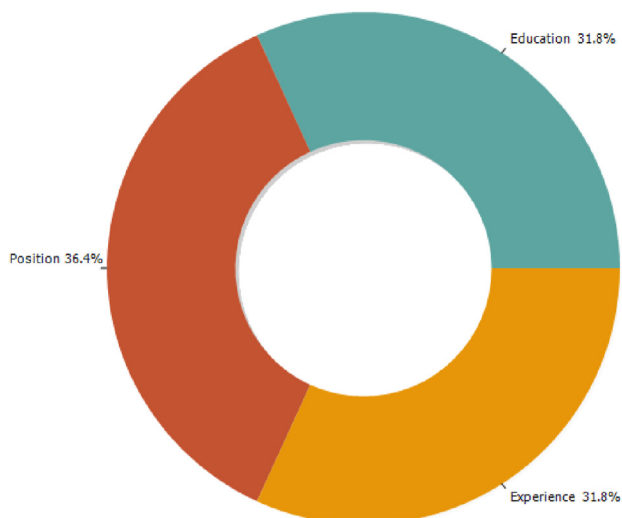


Fig. 2. Education, position and experience distribution frequency.

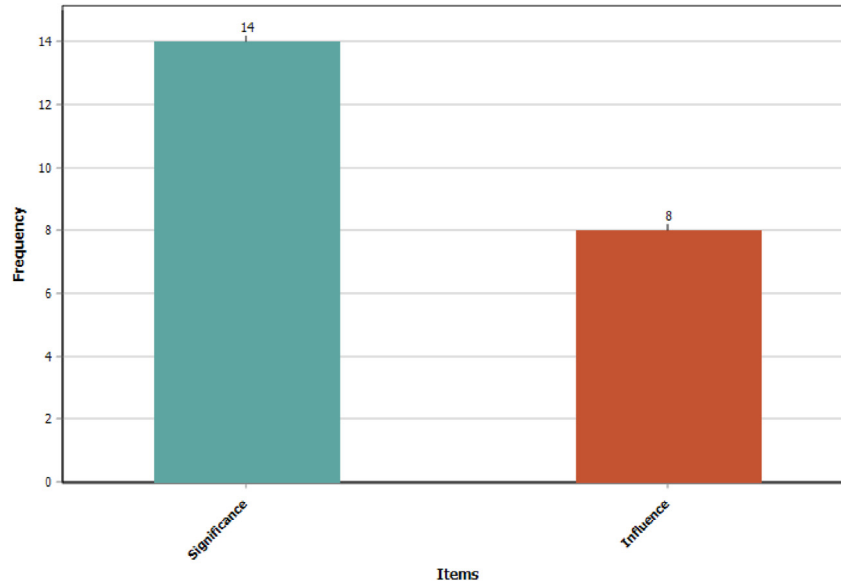


Fig. 3. Significance and Influence of supply chain management.

Business, Consumer and Administration. Two communication links are defined: the first dealing with Business-to-Business (B2B), it allows the companies to redesign and automate processes, the enterprises might use the network such as the internet as based marketplaces; the latter can be categorized through four characteristics: The specifications of the supplies, The period of the relationship, The Pricing matrices, and The unfairness if an e-hub, which may support either the seller, the buyer or take a neutral position. The second is about Business-to-Consumer (B2C), it releases a new

marketing channel to end consumers and offers a funds for incorporating end users within a supply chain, as long it is friendly used through the access to the information related to the goods and services, mode of payments, cost of carrying, shipping, and customer services after sale. The orientation method manages all the activities involved in the customer order in the most efficient way. “Key performance indicators (KPI) can reveal weaknesses, bottlenecks, and waste within a supply chain, especially at the interface between its members (Barrett, 1982). As Barrett (1982) puts it “streamlining cross-company

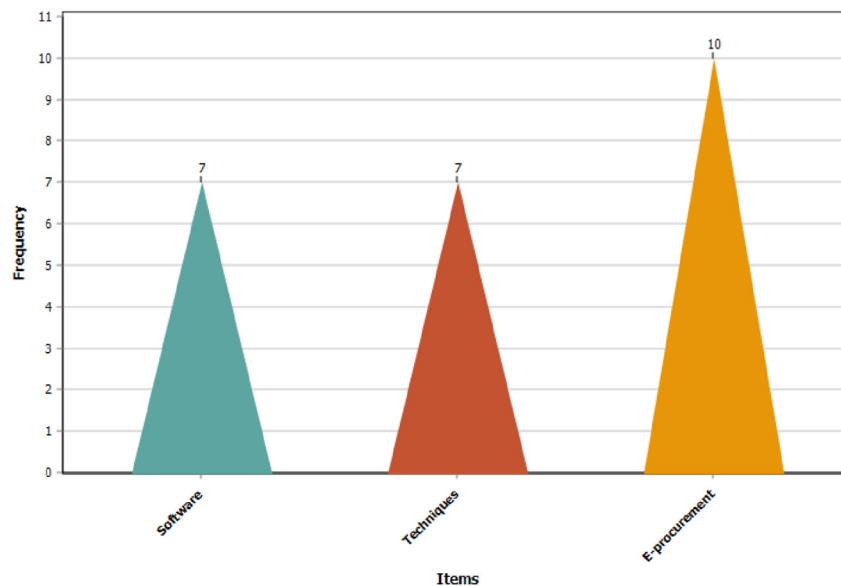


Fig. 4. Software, techniques and E-procurement utilization.

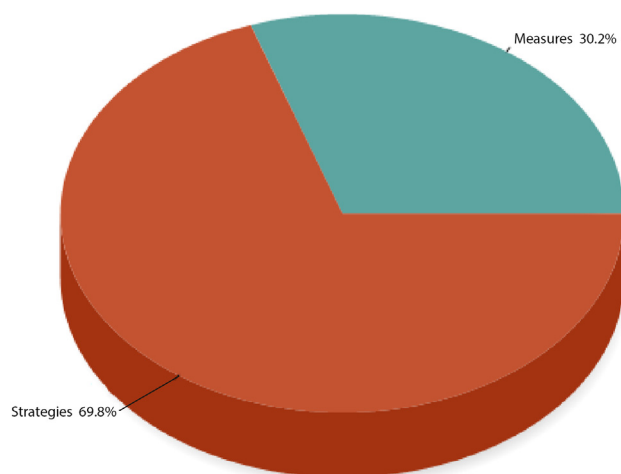


Fig. 5. Measures and strategies adopted by Lebanese companies.

processes is the next great frontier for reducing costs, enhancing quality, and speeding operations”. The advanced planning system includes long-term, mid-term and short-term planning levels. An Advanced Planning System (APS) is divided into several elements; efficient information run between these modules to make it a coherent software system. The Enterprise Resource Planning (ERP) system sculpts the different planning tasks insufficiently. These planning jobs are executed successively without allowing for reviews to upper-level decision makers. Even though the APS modules are separated in several modules, APS are planned to adjust the imperfections of ERP systems through a closer combination of modules, adequate redesigning of bottleneck capacities, a hierarchical scheduling concept and the use of the latest technical developments. To successfully operate a supply chain, the below components are highly required: Logistics and transportation - Marketing - Operations Research and Development - Organizational performance, industrial association, and operation cost - Procurement - Inventory Control The below mechanisms contribute to the incorporation and coordination of different functional elements that existed before the creation of the term Supply Chain Management in 1982. - Channel research (Alderson, 1957) - Collaboration and cooperation (Bowersox, 1969) - Location and control of inventories in production-distribution networks (Hanssmann, 1959) - Bullwhip effect in production-distribution systems - Hierarchical production planning (Hax & Meal, 1975). Over the past decade, companies across a large range of industries have been focusing their competitive strategies on leveraging

the competencies and inventive capabilities to be found in the groups of customers and suppliers constituting their business supply chains. Today academics, consultants and practitioners alike have come to understand that the capacity of companies to continuously reinvent competitive advantage depends on the ability to look outward to their supply chains in the search for resources to persuade the right mix of competencies that will resound with their own organizations and core product and process strategies. Competitive advantage in tomorrow's environment will go to those enterprises that can consistently anticipate and implement customer-winning supply chain competencies, while discarding those that have become commodities or easily copied by the competition. In today's business environment, no enterprise can expect to build a successful product, process, or service advantage without integrating their strategies with those of the supply chain systems in which they are inextricably entwined. In the past what occurred outside of the four walls of the business was of secondary importance in comparison to the execution of strategies designed to effectively manage internal engineering, manufacturing, marketing, sales, and finance activities. The measure of success in a company, it is its ability to look out of its channel associations to gain admittance to sources of unique competencies, physical resources, and marketplace value. “What has caused this awareness of the interconnectedness” of once isolated and often adversarial business occupying the same supply chain? What forces have obsolete long-practiced methods of ensuring corporate governance, structuring business, and developing strategies? What will be the long-term impact on the fabric of business ecosystems of an increasing dependence on channel partnership? What are the possible opportunities as well as the liabilities of channel alliances? How information technology tools like the Internet should be integrated into supply chain management, and what new sources of market winning product and service value will be identified? (Christopher, 1971). The supply chain event management (SCEM) offers timely event-related information that can be used to recognize and adjust disorder and malfunctions in operational supply-chain processes. An initiative-taking SCEM system that sticks to necessities resulting from the insufficiencies of current SCEM solutions can reduce supply-chain troubleshooting costs. “Several mechanisms for proactive SCEM are proposed, encompassing concepts to gather data on suborders in inter organizational settings, focus on initiative-taking monitoring activities with classified

critical order profiles, and analyze, interpret, and distribute information employing fuzzy logic. Agent technology is shown to be suitable for implementing proactive SCEM concept is evaluated by means of a prototype implementation for a logistics service provider. The results show that the costs of information and monitoring processes can be reduced substantially". Proactive Supply-Chain Event Management with Agent Technology. Abnormalities and troubles produced by the active situations and doubts of fulfillment processes threaten the benefits of optimized plans for supply chains. Inescapable variances in processing time and processing quality may be the cause of delays in the production processes and other irregularities. The interruption due to the machines' malfunctions, failures in handling it, the inaccurate picking in the warehouses, or any other external reasons like traffic overcrowding have a serious impact on the fulfillment of orders within a supply chain. There is a tremendous need for proactive assembly and communication of information to overcome such events across supply chains. This would take place as part of an inter organizational information exchange so significant for today's forms of collaboration in supply chains. Supply chain event management (SCEM) systems assure the beating of these problems. The term "supply chain event management" coined by AMR Research in 2000, refers to systems that monitor events in supply chains (e.g., milestones, disruptions) and react according to predefined business rules (e.g., sending e-mail alerts). Traditional tracking systems, the predecessors of SCEM systems, are widely implemented in logistics service provider (LSP) networks. They follow orders within the borders of a single corporation and generally do not offer practical alert mechanisms. Similar approaches to production control are also characterized as inaccessible systems without event-management competences. Current SCEM systems from companies like SAP, I2 and Manugistics, and specialized vendors like Saltare or Velocity have additional capabilities for reacting to critical events. "An overview of SCEM functions is given by AMR Research in 2000: • Monitoring: Identification of events during fulfillment processes (e.g., production, warehousing, transportation). • Notification: Generation of alerts and communication with actors or systems based on event information. • Simulation: Simulation of effects of disruptive events on supply-chain performance, and simulation of consequences due to managerial reactions. • Measurement: Supply-chain performance measurement over a longer period." SCEM software collects input from the planning and execution fields of supply

chain processes. It controls the status of these processes and feeds back information to planning applications such as Advanced Planning Systems (APS). "An APS covers several aspects of planning, such as long, mid-, and short-term planning. SCEM systems like the SAP Event Manager (EM) are not designed to substitute planning applications like the Advanced Planning and Optimization (APO) APS solution offered by SAP. The SCEM approach complements the planning functions by providing feedback capabilities from the execution processes of a supply chain to the planning domain. As a result, SCEM tools, if integrated with APS tools, enable closed-loop supply-chain management. Existing SCEM systems mainly perform monitoring and notification functions. What with their lack of simulation, control, and measurement functions, current implementations offer a huge potential for improvement. Having the logistics service provider (LSP) as a business partner, the LSP performs the warehouse operations and assign borders for transportation to different carriers. The LSP is part of a large international enterprise and mainly serves its customers. The products are small to medium sized, and orders may include large volumes of products. Deliveries are to national and international destinations across the world. The focus of the prototype implementation is on international transports because these exhibit more operational problems (Habib, 2010). For transportation, the LSP coordinates with carriers with a regional focus. The supplementary of the LSP examined in detail places about 200,000 orders per year with these carriers. The completion processes consist of warehousing operations conducted by the LSP and transportation processes. The warehousing process begins with the arrival of consumers orders. Such orders are generally fulfilled directly from stock. Therefore, procurement activities (Bouncken et al., 2022) are decoupled from the main order-fulfillment process. After significant order items are picked and packaging activities are completed, the order is dispatched to a carrier. From there on the carrier is accountable for the whole transportation process, covering *trans*-shipment and delivery to the customer. This may include activities to clear customs during international transport. Subcontractors or local carriers in the destination country are sometimes integrated into the process. If so, they have contracts with the carriers. The milestones defined by the LSP for the completion process include, for example, "Order released for picking" during warehousing processes and "Arrival at customs" during transportation. Severe deviations from predefined milestones and associated planned dates

indicate problems in the fulfillment process that must be managed actively. A proactive SCQM system located at the LSP needs to integrate information both from its internal data sources (especially its ERP system) and from the tracking systems run by the different carriers. Standard Event Detailed Information (EDI) messages for every order are generated externally by the carriers at certain intervals or milestones and sent to the LSP. The resulting databases at the LSP are filled with information on orders that in most cases do not encounter any serious problems during fulfillment. This situation calls for a decentralized storage of data at the carriers' sites and on demand queries for information when needed. Late orders are the one having different problems, the information on their status is postponed due to different reasons, including batch-wise transmission of status information. In addition, information on critical situations is often lost in large databases because there are no well-organized methods in place to extract the relevant information in a timely manner. A proactive system focusing on potentially critical orders can help to facilitate a focused operational management. The transferred data is not compatible with the needs of a decision-maker who must respond to a difficulty because they do not identify the types of problems encountered or the harshness or criticality of events. This situation calls for advanced self-directed interpretation support and quick innovation. The supply chain performance measures have two central effects (Bodendorf & Zimmermann, 2005; Chowdhury et al., 2021) and work in two directions. They can be used to describe the current situation by describing the past and present of the process being considered, on the other hand they can be used to set performance goals. This allows to establish a focal point on the future. The focus in this research will be on the components and elements used within the Lebanese Industries management to serve the organizations and their diversification along to optimizing their cost and increasing their efficiency. Within our below study, we will highlight the action plan set between firms and the source/supplier to have a successful supply chain flow while exploring new market or integrating a new brand/product taking into consideration the current period of risk and uncertainty.

2.3. Conclusion

Knowing that the Lebanese industries are working with different suppliers' sources worldwide, they should have a systematic workflow to maintain the

extending of the business while saving the environment. The group receives goods and raw materials from different regions, what would be the followed process that optimized the lead time between the order, production, and the distribution phases? What is the supply chain strategy pursued that make of those companies a success story at all levels particularly during the critical periods with economic and political crises?

3. Procedures and methodologies

In the previous section, we studied the background surrounding our research through the literature review. This helped us in finding what has been written concerning our topic, developing our conceptual framework that became the basis of our study, filling gaps in knowledge and finding answers to different questions. In this section, we will outline the main components of the research methodology that is the key part of our study. Because it is a procedure used to gather data and information for a particular research study to evaluate and make business decisions. We will start to describe the philosophical background in general, then state what philosophical paradigm to apply and the reasons for that. Subsequently, we will emphasize the research logic through different types of reasoning and choose the logic that better completes the understanding of our topic. Furthermore, we will draw attention to the road map of our methodology to integrate the essential elements of our research design by treating the different stages of the strategy. In addition to that, we will highlight the techniques to be implemented for collecting and analyzing our data.

We will emphasize the rules that guide our research and the systematic process in which we follow given statements to arrive at a conclusion. The deductive or the confirmatory inference will be used to test the validity of the explanations and theories already stated in the previous section. Because "Once a phenomenon is established, and perhaps tentatively explained, deductive approaches come into play to confirm its validity. In our study, the population of interest is all Lebanese firms and companies using and/or dealing with the supply Chain Management issues and services and about whom we will draw an inference. In research, according to Flick, Homolova, Herrmann, Kuck, and Rohnsch (2011), the reliability of the results is influenced by the sample size, the larger the sample size, the more valid our results. So, for the relevancy of our target and for the accuracy of our results taking into consideration a set of constraints, a

qualitative study is performed through interviews—semi structured interviews with a sample of 15 Experts and/or Decision makers in that field using 13 key questions about how SCM yields a competitive edge, its strategic importance and challenges for the Lebanese industry, as well as problems and optimal decisions during the times of uncertainty and crises (appendix). This will enable us to get as close as possible to all the recorded information. In fact, we faced challenging difficulties to get the needed information to secure the maximum accuracy of results and analysis. There are two types of methodology, qualitative and quantitative, we should be able to decide as to whether we choose one or both methods and which one will weigh the most, if it is the case. We adopted the second one, the qualitative research works with non-numerical data and refers to the meaning and description of things rather than their measures, because the data is gathered through the participants' observation and interview (Anas & Ishaq, 2022). Indeed, Interviewing can be a very important scientific tool and method of data collection in research; it needs preparation, construction, and must preferably be executed in a systematic way. Considering the different actual constraints, we found that it is better than questionnaires or surveys since the interviewer can probe or follow up with the interviewee or participant. Interviewing consists of asking the interviewee questions, listening to them, and collecting their responses through recording or taking notes. Kvale (1996) regarded interviews as “an interchange of views between two or more people on a topic of mutual interest, it sees the centrality of human interaction for knowledge production and emphasizes the social situations of research data”. In addition, and according to, interviews are a great method of getting insight into the way the respondents think. They are versatile, come in different forms and serve different goals. Therefore, knowing what kind of interview we might be conducting in advance is a promising idea. Indeed, the researcher or interviewer asks multiple respondents open questions so that he can allow them to freely give description with their own words. Hence, the unfolding of the interviews may differ; based on what a participant says the interviewer probes and follows up accordingly (Shazia, 2014). There is a multitude of resources assisting with the development of interview guides; one of them is Patton (2014) who generated diverse types of questions that might be asked.

According to the above, a list of 13 questions included in the appendix has been prepared to reinforce the study that we document in the previous part

using a special software for qualitative data analysis: “QDA Miner”. We will come up with some results, analysis and interpretation that will be included in next part. In other words, we will be having a list of information that explain and describe the major problems, Strategies, advantages, and drawbacks of the Supply Chain Management System in Lebanon during the crisis following the opinion of fifteen Experts and/or Decision Makers with years of experience in the field. Afterwards, we will compare this information with the ones that we find after a thorough understanding of the subject along with the results of previous studies described in detail in the next parts of the research.

4. Analysis of findings

The findings from the interviews with 15 Lebanese supply chain managers in well-respected and successful companies are discussed in this part. The interviewees' responses to the related problems and issues will be helpful in detecting major problems and formulating suggestions for improving the process significantly. The managers of the selected businesses were interested, cooperative and provided pertinent responses to the questions regarding supply chain management and related operations.

Many companies today recognize the critical role that supply chain management (SCM) plays in gaining a competitive advantage in the Lebanese market. In the following paper, we will discuss the importance of SCM to many companies in Lebanon, the challenges they face and the actions and coping strategies they are taking in time of crisis.

Various sectors in Lebanon consider supply chain management an integral part of their business success. The journey from importing raw materials from suppliers to the final product for the end user seems to be a complex process with many moving parts. Therefore, how well a company manages this process directly impacts its longevity and sustainability in the marketplace. By controlling the manufacturing processes, product quality can be improved. At the same time, controlling shipping processes and logistics, considering the production time of raw materials, transit time, and border clearance and paperwork, can improve customer service by avoiding costly shortages and delays or periods of oversupply or undersupply.

The process of SCM can facilitate every aspect of business operations, including logistics, purchasing and information technology. It integrates materials, finance, suppliers, manufacturing facilities, wholesalers, retailers, and consumers into one seamless system.

The respondents in our study enriched our knowledge and provided significant insights knowing that they have diverse educational background yet related to their field of work. They are employed in different sectors including manufacturing, retail and contracting, food and beverage etc. and they occupy managerial positions in supply chain, logistics and procurement. Furthermore, they revealed through their answers as well as information they provided a high level of experience with some having between 10 and 14 years of working in the field.

It is crucial in our study to understand the significance of supply chain management from the perspective of Lebanese businesses and the interviewee's proved through their direct answers such an importance. *"It improves customer services, reduce operating costs, and improve financial position. Building a good relationship with suppliers"* claimed one of the managers linking SCM to internal as well as external stakeholders focusing on internal operations, customers, and suppliers. Another interviewee mentioned *"it is especially important as it ensures continuity and smoothness of operation. It also ensures good and efficient planning is well maintained. It also helps with cutting operational costs both indirectly and directly."* One of the managers explained that *"it is used to cut excess costs and to provide the customer with the best product. It also takes into consideration the business's supply-side activities to maximize customer value and gain a competitive advantage in the marketplace"*. We can thus conclude that there is a shared belief in our market that SCM is critical for cost control as well as increasing customer value. On the other hand, the interviewees, and when asked about the influence of SCM on their businesses, claimed that *"it is very important as it ensures continuity and smoothness of operation. It also ensures good and efficient planning is well maintained. It also helps with cutting operational costs both indirectly and directly."*

It is worth to note, and based on the above information, that SCM is an important activity in Lebanese companies and a method through which they can monitor their costs and increase their efficiency.

Moreover, the respondents shed the light on some of the points that they consider as a competitive advantage for their companies and other aspects that they believe hinder their activities in supply chain management. For one of the managers, the main advantage is related to *"best price, quality, delivery and payment terms as well as time to market"*. One of the managers from one of the big manufacturing companies in Lebanon explain *"As a member of company X we have a centralized purchasing*

department that acts in coordination with the unit purchasing department. On one hand, suppliers take the massive and frequent placement of orders into consideration giving us the privilege of having competitive cost (not affecting the quality) and on the other hand, the high import/export frequency have an impact on the freight rates as shipping lines offer us keen rates."

As for the disadvantages or hindering factors, an attractive quote that highlights on the Lebanese situation *"disadvantages include operating in a region where suppliers are not close and high bureaucracy which means longer procedures."* It can be understood that the business environment that the businesses are functioning in has a negative influence on its operations. Also, another perspective is related to organizational culture *"lack of co-ordination among departments where the concept of supply chain management functions correctly only if there is better coordination between departments. Creating a coordination among numerous departments within big corporate is a bit difficult duty where this concept may eventually fail to be accomplished."* Accordingly, we can say that to avoid obstacles that hinder successful SCM practices, both internal and external factors shall be well considered, and flexibility is crucial. Since understanding the importance, influence, positive as well as negative indicators of a supply chain management activity in an organization are interrelated, we present a relationship that resulted from our analysis in table one below.

Before going into the effects of the prevailing economic crisis in Lebanon, it was worth to understand the techniques and software that are used in those companies and whether they engage in e-procurement as part of their supply chain management. The managers seemed to be aware of the software and programs that aid businesses in their operations nowadays and mentioned in major cases the use of *"ERP, EDI, AX, Oracle JD Edwards, BI (internal platform enabling user to issue various reports)* in addition to Microsoft Dynamics 365 Business Central. One of the respondents claimed the importance of the ERP system particularly in the context of SCM *"this program links all operations together in one System, it could be managed at any time and from anywhere. Most forwarders in Europe are acquainted with the ERP system"*. This statement also reveals that businesses in Lebanon have operations with European companies due to several reason including geographical proximity, availability of resources, etc. On the other hand, and in accordance with software adoption, the respondent highlighted on some techniques used in their companies. *"Abide always by the procedure, double check on a monthly basis the inventory of the company, enhance the ERP system and train the*

employees, build a good relationship with many suppliers and avoid unique supplier.” The managers seemed to understand the importance of integrating software and automation into possible aspects of their functions for several reasons. One of them discussed the importance of integrating six sigma into the system, others focused on automation; standardization and transparency and one respondent mentioned “As with any major undertaking, a down approach starting with high-level items and then zooming into raw materials for manufacturing and reaching the worthiest details that can help in focusing and prioritizing resources for improvement.”

When asked about e-procurement, we conclude that businesses in our market and in the context of supply chain management are involved on different levels and in some cases not involved at all. However, they seemed interactive in discussing e-procurement and expressed their interest in adopting it, in the cases where it is unavailable internally, and this is mainly related to their good education level, experience and having operations with foreign suppliers and other businesses.” *Our purchases and sale of supplies, work, and services through the Internet as well as other information and networking systems, such as electronic data interchange (EDI) and enterprise resource planning (ERP), has increased to large level and we have transformed lot of systems to meet the rapidly changing market demand.*” explained one manager who is involved in e-procurement revealing a certain degree of involvement in technological advancement when it comes to SCM. Accordingly, one other respondent explained “it can be used to a low degree in some cases due to the fact that demand on our products is always high and very diverse.” On the other hand, we can conclude that the type of business might affect the degree of involvement in automated activities such as the following elaboration “in our line of business, e-procurement is not a customary way of doing business. We buy and sell in bulk; this requires price & quality-related negotiations which cannot be automated”. What can be said is that, even though some businesses did not yet adopt the e-procurement, there seem to be an interest in the process, and it is part of its planning (see Table 1).

Moreover, since there is an interrelation between the software usage, e-procurement, and the benefits as well as drawbacks that may result, we present below Table 2 that shows how these indicators are linked according to the answers that we got from the respondents.

The crisis that erupted in Lebanon and intensified as of 2019 has been leading to temporary and permanent closure of businesses due to prolonged supply chain disturbances and decreased business

Table 1. Distribution of significance, influence, advantages and disadvantages (frequency).

Category	Code	Count	% Codes	Cases	% Cases
Supply Chain	Significance	14	10.0%	1	100.0%
Supply Chain	Influence	8	5.7%	1	100.0%
Supply Chain	Advantages	10	7.1%	1	100.0%
Supply Chain	Disadvantages	10	7.1%	1	100.0%

Table 2. Distribution of software, techniques, E-procurement advantages and disadvantages (frequency).

Category	Code	Count	% Codes	Cases	% Cases
Supply Chain	Techniques	7	5.0%	1	100.0%
Supply Chain	Software	7	5.0%	1	100.0%
Supply Chain	Disadvantages	10	7.1%	1	100.0%
Supply Chain	Advantages	10	7.1%	1	100.0%
Supply Chain	E-procurement	10	7.1%	1	100.0%

traffic. Accordingly, a main objective of our paper is to assess the influence of the economic crisis along with its risks on the supply chain management and the role of the strategies and measures that Lebanese companies have been adopting throughout this period to help mitigate the negative consequences of this crisis. Furthermore, a significant factor that is under consideration is the relation with their suppliers and what has changed due to the crisis. From the managers' perspective, they have a strong relationship with their suppliers. This can be justified by the fact that Lebanon is a small market, and, in many cases, businesses depend on local suppliers whom they try to build solid ties with hoping to continuously satisfy their customer's demand in terms of both quality and quantity. Yet, in some cases, the relation was somehow affected by the crisis; but these instances are modest. One manager claimed, “we have a very solid relationship with our main suppliers since we're working to improve transparency of the supply chain and boost visibility of value partner, establish greater control over and clearer expectations for all business communication, increase mutual awareness of business risks, it will not change due to our strong built relationship.” The positive relationship with suppliers improves the value chain and allow both parties to face risks with minimum losses. Also, one of the managers from a reputable company explained “being a big company where we daily consume big numbers from our suppliers helped us having a smooth relationship with them leading sometimes to a friendship and this helped us usually in getting many facilities on different levels such as the payment process, delivery and many more.” Another point of view is “the crisis affected this relation due decrease in orders and ordered quantities, to meet

the demand of the local market.” However, as mentioned above the majority expressed a positive association with suppliers.

When managers were asked about the measures that have been executed to minimize the consequences of the crisis, the answers were informative and reflected a good level of planning among Lebanese businesses and an ability to react to economic disturbances along with the uncertainty and risk it brings. They mentioned numerous actions related to stock management, forecasting, alternative raw materials, business, and environmental risks, etc. Among the interesting answers, one respondent explained “to minimize the consequences of the crisis, we should focus first on the need to strengthen our macro-economic policies, and our financial situation, as well as the desirability of improving the quality of information provided from and to the markets.” The economic crisis which is an uncontrolled external factor require the companies to preserve as much as possible their financial status and continuously update their data about changes in the market, in consumers' needs and the availability of resources. Another manager clarified “in order to minimize the consequences of the crisis we are facing we merged some delivery trucks and collapsed the working days of others where this helped us in reducing our fuel consumption. Another solution was to reduce our products in the market especially those who had a very high return leading to decrease our raw material consumption and a huge decrease in our bad returns.” The crisis along with the currency devaluation led to an enormous increase in fuel prices and in raw materials, which in return forced the companies to search for other alternatives. One of the explained alternatives is the consignment inventory whereby the “product is sold by a retailer, but ownership is retained by the supplier until the product has been sold. Because the retailer does not actually buy the inventory until it has been sold, unsold products can be returned.” This is a method by which companies diminish the risk of losses due to a decrease in purchasing power, which lead to lower levels of demand on certain products. When the discussion moved to strategies, interviewees showed high level of knowledge and experience. This can be associated with the fact that this is not the first time Lebanese companies witness economic instability and operate under uncertainty conditions. Political instability and turbulent economic environment have been prevailing in our country for several years and businesses have learned to survive under difficult conditions. Managers revealed several coping strategies that they have been formulating to deal with the crisis. “Various suppliers for the same product, different shipping timing, handle shipping ourselves instead of supplier in some cases, monthly inventory count,

on hand orders and production line overview to have a detailed vision on the consumption.” The search for different suppliers is a way to reduce cost through diversification. Another perspective is a focus on transforming some possible features of the supply chain to become digital “given today's volatile and disruptive environment, supply chain organizations must become more flexible, and the solution is digitalization”. It can be concluded that the sudden eruption of the Covid-19 followed by the crisis made the Lebanese companies realize the importance of becoming flexible and increase their level of adaptability to sudden incidences.” *Biggest lesson was to be able to quickly adapt to change and prepare for the worst as nothing can be considered stable.*” The various perspectives of the managers led to the generation of these diverse strategies that are important for their survival on one hand “keep a log for all purchased materials including expected arrival and availability versus the actual arrival enabling us to have a realistic pattern” and for their strategic planning on the other hand “establishing green initiatives across our supply chain. Going green is a business value that more customers nowadays are looking for. Customers are becoming extremely conscious of the steps that companies are taking to reduce their carbon footprint, so it's important to consider ways to reduce waste.” What captures our attention in the fact that even though those businesses are operating under extremely difficult conditions, they still think about developed plans and strategies such as going digital, using, and implementing technology, environmental friendliness, etc.

The above figure reflects the managers' and their companies' continuous efforts to formulate the best possible strategies that aid in their survival and prepare them for any unexpected future occurrences.

After analyzing the collected data, we can conclude that the concept of supply chain management represents a key issue for all decision makers of our selected sample. They are all concerned in the implementation of certain strategies for an excellent supply chain specifically during times of uncertainty such as the integration of business processes with high-tech for the operation management of inventory and risk mitigation in addition to aligning the supply chain with businesses' goals using and building an adaptive and agile supply chains.

5. Conclusions and recommendations

Over the years, the number of disastrous circumstances has been rising; As a result, there is a crucial need for specialists and researchers worldwide to prepare in advance for such circumstances.

The supply chain landscape is likely to continue to be marked by significant levels of volatility in the business environment for the foreseeable future. We argue that this volatility is very likely to get worse, and we need to consider not only the total change in key business parameters but also their rate of change, which will have a big impact on how supply chains are managed, designed, and run (Chauhan et al., 2023; Christopher & Holweg, 2011). In this paper, we attempted to highlight on supply chain management as one of the most important functions in businesses and for markets to function well. In Lebanon, companies have been impacted by dual negative incidences that have been influencing their normal operations: Covid-19 and the tremendous economic crisis. What we learned from the managers who helped us inflight our knowledge about the Lebanese businesses' situation is that crisis has been affecting them in different levels. There is a common agreement about the importance of supply chain management for the survival of their businesses; their ability to satisfy the demand of their customers and have a good competitive position in the market. Accordingly, they have been trying, with available internal technology and resources to take possible measures to face the crisis. Furthermore, they revealed an intention to formulate any potential strategies that can help them currently and, in the future, to face similar occurrences.

Circumstantial evidence suggests that Lebanese businesses are adaptable and agile in the face of supply chain disruptions. These businesses are responsive and fast to adjust their manufacture, sales, and promotion approaches to market situations. The management of a business can remain prepared to handle any unplanned disruptions to its operations thanks to flexibility.

Additionally, this study has certain limitations that encourage us to extend our investigation. A taxonomy of the existing literature, a text-mining and co-occurrence analysis of relevant terms, and a case study of Lebanon serve as the foundation for the provided analysis. Primary evidence from other nations whose economies have been severely impacted by an economic recession, particularly regional economies, would aid in confirming and expanding our findings. Furthermore, this paper will and can be used as a guideline for different Lebanese industries and decision makers. It highlights supply chain management problems, strategies, and potential solutions to overcome the impact of the economic crisis.

Conflict of interest

There is no conflict of interest.

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APPENDIX: Interview Questions

1. What is your educational level, position, and experience as well as knowledge about supply chain management?
2. Why is supply chain management important to you company?
3. What type of supply chain management software are available and used in your company (ERP, EDI, etc.)?
4. What is your main competitive advantage in supply chain management? What are some disadvantages?
5. How did the economic crisis affect your supply chain management practices?
6. What type of relationship do you have with your suppliers? Do you think this relationship will change due to the economic crisis?
7. What other techniques might the company use to improve the supply chain management?
8. To what extent is your company involved in JIT deliveries and e-procurement?
9. How do you attempt to prevent any interruption in the supply chain management due to the prevailing economic crisis?
10. What type of measures have been executed to minimize the consequences of the crisis?
11. What coping strategy did you learn from the recent disruption due to the crisis?
12. Have you prepared any measures to handle similar future occurrences?
13. Do you have any comments or suggestions related to SCM and/or to your job? What sort of future improvements would you propose?