

02-014

ANALYSIS OF SUPPLY CHAIN MANAGEMENT IN THE JORDANIAN CONSTRUCTION SECTOR.

Abo Sae'a, Amer ⁽¹⁾; Ferrer Gisbert, Pablo S. ⁽²⁾; Fuentes Bagues, José Luis ⁽²⁾

⁽¹⁾ University of Jordan, ⁽²⁾ Centro de Investigación en Dirección de proyectos, innovación y sostenibilidad (Universitat Politècnica de València)

The process of manufacturing and supplying products and services in the construction industry from raw materials to the final customer goes through several stages. Efficient supply chain management - managing the flow of information, materials, services and revenues - is becoming one of the reasons for the success of Jordanian construction companies. It enables them to reduce costs for customers and suppliers, increase added value and profit margins, build strong relationships with suppliers and distributors, and even stimulate sustainable development. The transition to electronic forms of supply chain management, using databases linking construction companies, is recommended.

Keywords: Jordanian construction sector; supply chain management; suppliers.

ANÁLISIS DE LA GESTIÓN DE LA CADENA DE SUMINISTRO EN EL SECTOR DE LA CONSTRUCCIÓN JORDANO.

El proceso de elaboración y suministro de productos y servicios de la industria de la construcción desde las materias primas hasta que llegan al cliente final pasa por varias fases. La gestión eficaz de la cadena de suministro; relacionada con la gestión del flujo de información, materiales, servicios e ingresos; se está convirtiendo en una de las razones del éxito de las empresas de construcción jordanas. Esta les permite reducir costes para clientes y proveedores, incrementar el valor añadido y el margen de beneficios, establecer relaciones sólidas con proveedores y distribuidores, e incluso estimular el desarrollo sostenible. Se recomienda la transición hacia formas electrónicas de gestión de la cadena de suministro, mediante bases de datos que vinculen a las empresas de construcción.

Palabras claves: Sector de construcción jordano; gestión de la cadena de suministro; proveedores.

Correspondencia: Pablo S. Ferrer Gisbert pferrer@dpi.upv.es



©2021 by the authors. Licensee AEIPRO, Spain. This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

The main motive behind adopting a supply chain (SCM) in the building and construction industry is the successes achieved by it in developing other industrial sectors. Therefore, in the second half of 1990 researchers and decision-makers in the building and construction industry adopted a supply chain management philosophy to develop a more effective and competent building and construction industry (AL-Barazi, 2020). However, the building and construction industry differ from other industries. One of the most important reasons behind this difference is the nature of construction projects, production processes at the site, and temporary work systems related to the construction projects. Research efforts have been made to draw on the experience of other industries in supply chain management and apply it to construction industry. Jordan, as a developing country, has witnessed a huge economic development recently due to the increase in investment and the emergence of new regulations aiming to solve the housing problem and develop infrastructure. These procedures need to reconsider the principles, methods, and strategies of supply chain management, which serves the requirements of the Jordanian construction environment whether they are social or economic ones (Ghassan, 2019).

Therefore, the study is aimed at resolving the following key question: What is the nature of supply chain management in the Jordanian construction sector in terms of definition, strategies, and competitive advantages, the dimension integration, practices, principles, supply chain according to the value chain, orientation, sustainable supply chain? Additionally, the study aims to offer suggestions and recommendations to policymakers and decision-makers in this sector to draw up developed policies and strategies relating to the supply chain in the Jordanian construction industry in a way that fulfills the requirements of this industry. This study adopted the methodology of conducting interviews, and questionnaires with some contractors, suppliers, decision-makers, construction consultative offices about supply chain management in addition to conducting a critical review of the previous studies and research on supply chain management generally and supply chain management in Jordanian construction sector particularly.

2. Definition of supply chain management

Supply chain management is considered to be one of the modern administrative methods adopted by the Jordanian construction sector to face challenges in the era of economics and information technology. According to the Jordanian construction sector's plan (2019), this definition includes a comprehensive set of functional activities, which go through specific channels to transfer raw materials into end products and make tangible valuable additions to them from the perspective of the client, who will get the final product. This definition is based on making entries to achieve deep integration of suppliers with clients to make construction industry products in the required quality, cost, and set time. Supply chain management in the Jordanian construction sector represents a network of facilitation and distribution alternatives, which include warehouses, factories, operation centers, distribution centers, trading offices, undertakings/assignments offices so that this network carries out functions and activities of prediction, purchase, storage management, information management, quality insurance, scheduling, production, distribution, delivery, and finally serving the end client in the supply chain. This definition is based on a set of characteristics, which are represented by the presence of a network of companies whether they are suppliers, customers, or companies of a different nature, as these companies establish a series of integrated works within functional, organizational, or geographical frameworks (AL-Assaf, 2020) intending to offer a valuable construction product to the end client within the supply chain in the construction industry. This definition equally refers to the value chain, and this reflects the concept that the value is added to the products and services while they are offered in or through the chain (Al-Amiri, 2018). The supply chain in the Jordanian construction sector is a congregation of companies with

separate works and consists of two elements: The first element is the supply, which starts with the beginning of the supply chain and ends with internal processes in companies. The second element represent demand, which starts in the chain from the point in which the company's output is delivered to the current client and ends with the end client in the chain. As to the demand chain, it is purchases and distribution as a part of the value chain. The vital part of a supply chain is also a way to develop value and possess it through structuring and coordinating activities, which were separate in markets in the past in addition to the association of these activities effectively to perform internal processes to develop business network activities, which adds a value of sustainable competitive advantage to the end client (Artima, 2019).

3. Jordanian construction sector's supply chain's strategies

Construction organizations aim to employ supply strategy by affecting the nature of activities, efficiency, and effectiveness of the supply chain and the relationship between supply chain members (AL-Barazi, 2020). Supply chain strategy is defined as a set of objectives of priority to supply chain management and the ways to measure them to build and finance potential logistic success in terms of entering new markets and reducing logistic, capital investment costs in the Jordanian construction sector (Ghassan, 2019).

Studies have differed in measuring supply chain strategy in the construction sector. Few studies considered this strategy as a one-dimensional variable, whereas most studies viewed it as a multi-dimensional variable and classified it into two dimensions, which are efficiency and response according to the strategic priorities, which supply chain aims to achieve (AL-Amiri, 2019). Some studies have classified this strategy into four strategies according to the nature of the environment, and these strategies are efficiency, flexibility, response, and surrounding (Al-Assaf, 2020). Based on (Jordanian contractors' union's strategy, 2020), it has been classified into a two-dimensional curve, which is represented by the following:

1. Agile supply chain strategy: It is defined as the employment of market knowledge and virtual organizations to seize opportunities in changeable markets. This strategy reflects how capable the supply chain is of adjusting the supply chain's processes to changeable consumer's needs. The implementation of agile strategy depends on the flexibility of construction industry systems, and the diversity of Jordanian construction products at the local, regional, and international levels, thus a high response to it. Response and flexibility constitute a basic requirement to implement the agile strategy without ignoring the two dimensions of quality and cost. The agile strategy became compatible with Jordanian construction organizations whose products are characterized by diversity, a low volume of production, high-profit margin, and competition based on the specifications (Jordanian contractors' union's strategy, 2020).
2. Lean supply chain strategy: This strategy focuses on the flow of value, cutting the loss, and emphasizing the scheduling level. This strategy is aimed at minimizing the loss, and non-value-added, which are related to time, labor, machines, space, and storage through the supply chain, which enables Jordanian construction organizations to provide high-quality and low-cost products. This strategy matches with Jordanian construction organizations, which work in a stable environment in terms of demand prediction, lack of product diversity, and a primary focus on cost (Jordanian contractors' union's strategy, 2020).

4. Competitive advantages related to Jordanian construction sector's supply chain

Competitive advantages in the construction industry describe the manufacturing choices of main competitive capabilities. Most studies have shown that competitive advantages relating

to the Jordanian construction sector's supply chain are represented by flexibility, quality, cost, and delivery (Hamad, 2020), while many researchers added other dimensions, such as customer service, knowledge, and creativity (Rashwan, 2019).

Competitive advantages are related to the Jordanian construction industry's organizations' capabilities in two ways:

- First way: Competitive advantages lead to developing competencies and capabilities.
- Second way: Capabilities and competencies determine competitive advantages Jordanian construction sector's strategy focused on four main competitive advantages, which are as follows:
 - Quality: It reflects how much focus is given to improving the supply chain's processes and activities to increase clients' satisfaction.
 - Flexibility: It represents how the supply chain responds to changes occurring in clients' needs.
 - Cost: It represents how the supply chain aims to provide products characterized by low cost and great benefits, considering the value that represents benefits divided by cost.
 - Delivery: This dimension is related to the time factor in terms of the ability to deliver products quickly and reliably (Rashwan, 2019).

Literature about the Jordanian construction industry has produced two forms to build competitive advantages in the Jordanian construction industry and they are represented as follows:

- Exchange form: It focuses on determining competitive advantages which need to be invested in (Mohseb, 2018).
- Accumulative form: It shows that competitive advantages are complementary to construction organizations' works (Greeb, 2020).

5. The dimensions of Jordanian construction sector's supply chain's integration

Supply chain management in the construction industry shows the level of integration between these activities through improving the relationships between supply chain units to reach excellent performance. Supply chain integration in the construction industry includes cooperation between functional managements, suppliers, and consumers to achieve results, which serve the interests of all construction organization's parties. Cooperation is an essential element of construction supply chain integration since it requires effective communication between different departments, and coordination of joint efforts especially if it is at the strategic level. Supply chain integration leads to promoting cooperation between the company and its partners in the supply chain at the internal and external levels to achieve the effectiveness and efficiency of the flow of products, services, information, cash, and decisions to deliver the highest possible value to the client. Supply chain integration is considered to be vital for the continuity of the excellent performance of the construction organization centers (Cantor et al, 2012 and Jordanian engineers' strategy, 2020) on three dimensions:

- First dimension: External integration.
It refers to the construction organization's ability to build, develop and maintain cooperative, intimate relationships with all parties of the supply chain at the local, regional and international levels and the exchange of information with suppliers as well as involving them in planning and coordinating supply chain activities. This means the main elements in building external integration are cooperation between the company, suppliers, and

consumers, exchanging information, and joint coordination regarding construction organization's plans (Abbsi& Nilsson, 2012).

- Second dimension: Internal integration

It refers to the extent to which an organization's departments and its administrative units work cooperatively and interact with each other to resolve the disputes that may arise inside the construction organization and produce satisfactory results for all parties (Ameer&Othman, 2012).

- Third dimension: Strategic integration

It refers to the conformity of supply chain with construction organization's objectives, as effective strategic integration requires opening effective communication channels and achieving conformity between the company's long-term strategic orientation and the rest of local, regional and international supply partners to serve the joint interests of the company and supply sources (Carter & Jennings,2002).

6. Jordanian construction sector's supply chain's practices

Researches started to have an interest in describing supply chain practices as studies on the Jordanian sector (Artima, 2019), (Al-Amiri, 2018) provided a complete classification of these practices into material and immaterial practices. On the one hand, material practices include flexible manufacturing processes, total quality management's practices, managing relationships with clients and suppliers, and logistical practices, on the other hand, immaterial practices include senior management and its commitment to sustainability, inferiors' participation, and managing work teams (Carter & Rorgers, 2008).

Jordanian construction sector strategy defined the supply chain management practices. It is defined as the practices aimed to achieve the local, regional and international sustainability of the Jordanian construction industry through the supply chain from manufacturing processes, remanufacturing, and designing distribution channels to returns management (Jordanian construction sector strategy, 2020).

The "Strategic plan of the Jordanian construction sector" (2020) determined the most important practices of supply chain management in the construction industry. These practices are represented by internal environment management, purchase, cooperation with clients and suppliers, green environment design, and environment protection.

According to "Jordanian cement producers' strategy" (2020) the most significant practices of supply chain management should be represented by the sustainable design of construction products, the sustainable design of processes, cooperation to achieve the sustainability of demand-side, and processes that achieve sustainability in demand-side.

The "Jordanian iron producers' strategy" (2020) suggests that the most important practices of supply chain management in the sustainable construction industry in Jordan are represented by green manufacturing, green purchase, green logistics, green design, and green environmental management.

From the perspective of administrative abilities and capabilities, the practices of supply chain management are achieving cooperation and trust through the supply chain, the exchange of information between business partners through the supply chain, strategic orientation inside the supply chain, risk management inside the supply chain to ensure the continuity of the

supply chain's processes, which interact with material and human potentials of the supply chain (Jordanian Iron producers' strategy, 2020).

A "Training plan of Jordanian engineers" (2020) aimed at analysing the Jordanian construction sector's supply chain management practices suggested that these practices are represented by the following:

- Green manufacturing.
- Reduction of energy consumption and pollution.
- Social responsibility.
- Administrative practices: (purchase management, storage management, public relations management, and human resources management).

Information systems relating to the electronic supply chain. (Jordanian Iron producers' strategy, 2020).

7. Jordanian construction sector's supply chain's design principles

Jordanian construction organizations are built on improving the performance of the Jordanian construction sector's supply chain at the local, regional and international levels through achieving a balance between customers' requirements as well as achieving growth in profitability. These efforts reflect many supply chain management's conditions, which work together, and could increase the proceeds and achieve better supervision of cost, and better usage of assets in addition to customer satisfaction. Successful application of these principles will persuasively prove their effectiveness in satisfying customers and achieving more growth (Wernerfelt, 2012). If supply chain becomes the center of attention for construction organizations, it is essential to determine the public orientation necessary for this supply to work, which is interpreted in the form of a set of principles that construction organizations have to adhere to when designing their supply chain. These principles are represented by the following as suggested by "Strategic plan of Jordanian ministry of work and Housing" (2020):

1. Dividing customers based on service needs: Construction organization divides its customers according to the traditional standard, which is based on construction industry quality. As to supply chain management, it classifies its customers according to their requirements, which facilitates the process of the provision of superior quality construction products to all of the organizations' customers.
2. Allocating a network for supply chain management: When designing a supply chain network, it needs to achieve a balance between the requirements of providing construction product to customers, and the profits accrued to every section of the customers.
3. Monitoring demand changes in the market: Supply chain has to ensure, through all of its various activities and processes, finding out the potential changes occurring in the local, regional, and international construction industry's markets in demand patterns, which will lead to making more consistent predictions that enable the organization to allocate its resources perfectly.
4. Identifying the closest products to the customer: Construction organizations bear high storage costs in addition to the costs associated with what is achieved and expected from production. Therefore, construction organization has to delay delivering construction

industry products with late due dates, which can be provided to the customers without taking too much time.

5. Developing a strategy for managing raw materials sources: It can be achieved by working with main suppliers to cut the overall costs of raw materials through holding a competition between them to get the lowest price.
6. Designing a technology-based supply strategy: Technology is considered to be the most essential pillar of the success of the construction industry's supply chain management provided that it includes a clear vision of the flow of information and products and contributes to supporting the decision-making process through construction organization levels.
7. Determining the indications of supply channels performance measure: Adopting indications to measure the actual performance so that the profitability of each distribution channel is determined helps the construction organization to supervise performance.

8. Modern orientations of supply chain management in Jordanian construction sector

Many modern orientations have emerged to orient supply chain management towards achieving a particular objective or in response to changes and developments, which took place in the local, regional and international environment of the Jordanian construction industry, and the dire need to keep up with them. The most important orientations are reverse supply chain, electronic supply chain, supply chain and partnership and green supply chain (Ghassan, 2020). The following describes each of these orientations:

1. Reverse supply chain: It represents all the processes related to the reuse of products and materials. It is a vital element of the green supply chain since it provides means to recycle and reuse products. The reverse supply chain focuses on several issues, such as cost strategy, total quality, customer service, and environmental considerations. There are quantitative approaches to designing a reverse supply chain such as handling and storage, and necessary materials retrieval management in the production process. Two main types of reverse supply chain systems have been identified and they are open-loop systems, and closed-loop systems (Carrada et al., 2018).
2. Electronic supply chain: Electronic supply chain refers to the natural combination of supply chain and electronic trading. Supply chain management in the construction sector is based on the electronic, structural relation, which depends on technological relationships and technological enablement. There are their elements of preparing and executing supply chain management in the construction sector:
 - a. Electronic networks: A network has to fulfill customers' requirements through great flexibility of supply chain in customer service.
 - b. Response: It is the response to the customer starting from the main subject of supply chain strategy to the market value of the supply chain. It can be improved through profit growth by bringing about integration between construction organizations in connection with the response.
 - c. Technology: These systems are related to computer systems such as (MRP) and help in preparing schedules and making decisions related to production, design, financing, purchases, and storage (Chand et al., 2018).
3. Supply chain and partnership: which will establish a relationship of partnership and closeness between a construction company and a supplier, if available. Among these elements are orientations, participation in success, mutual trust, and joint learning in

addition to the conduct and actions that are supposed to be exercised by the construction company in its attempt to foster a partnership relationship, which determines the scope of relationship with suppliers (Jordanian engineering unions, 2020).

4. Green supply chain: It means integrating environmental thinking into the construction sector's supply chain management including design, supply resources, and manufacturing. Green supply chain management is aimed at minimizing or cutting losses including hazardous chemicals, carbon emissions, wasted energy, and solid wastes along the supply chain. The integration of environmental aspects into the supply chain aims not to have a negative effect on the environment generally and on construction organizations particularly. This leads to the conclusion that the green supply chain is nothing but a normal (traditional) supply chain with an ecological view, which balances the construction organization's objectives and environment protection priorities (Jordanian engineering unions, 2020).

9. Jordanian construction sector's supply chain according to value chain

One of the advantages of the value chain is that it is a strategic analysis means, which allows the organization to gain competitive advantages. At the level of Jordanian construction organizations, Jordanian construction strategy suggests that Jordanian construction organizations can use a value chain to organize their local, regional, and international business. The value chain can be used whether it is absolute or comparative. From the viewpoint of absolute value (Jordanian construction sector's strategic plan, 2020) and Porter's framework, studies on the supply chain in the Jordanian construction sector emphasized that any construction organization which wishes to improve its overall performance has to be within the value chain belonging to the supply chain. From the viewpoint of comparative value, it is good to compare the value chain of an organization with that of competitors (Chen et al., 2010).

To sum up, it can be said that analysing the chain value of any construction organization requires the identification of the necessary activities to achieve organization objectives, the identification of the costs of each activity, and comparing the planned cost with construction activity's proceeds to distinguish the activities that add value from those that do not so that they can be excluded or their efficiency can be increased. Based on Porter's thoughts on competitive advantages, and value chain, the supply chain is supply chain management through organizational, strategic and tactical coordination of activities in various departments of the organization as well as activities done inside the supply chain, which aim to improve efficiency in the long run. "Jordanian engineers' union strategy" (2020) consists of a framework, which explains supply chain based on the value chain, and it is represented in Table 1.

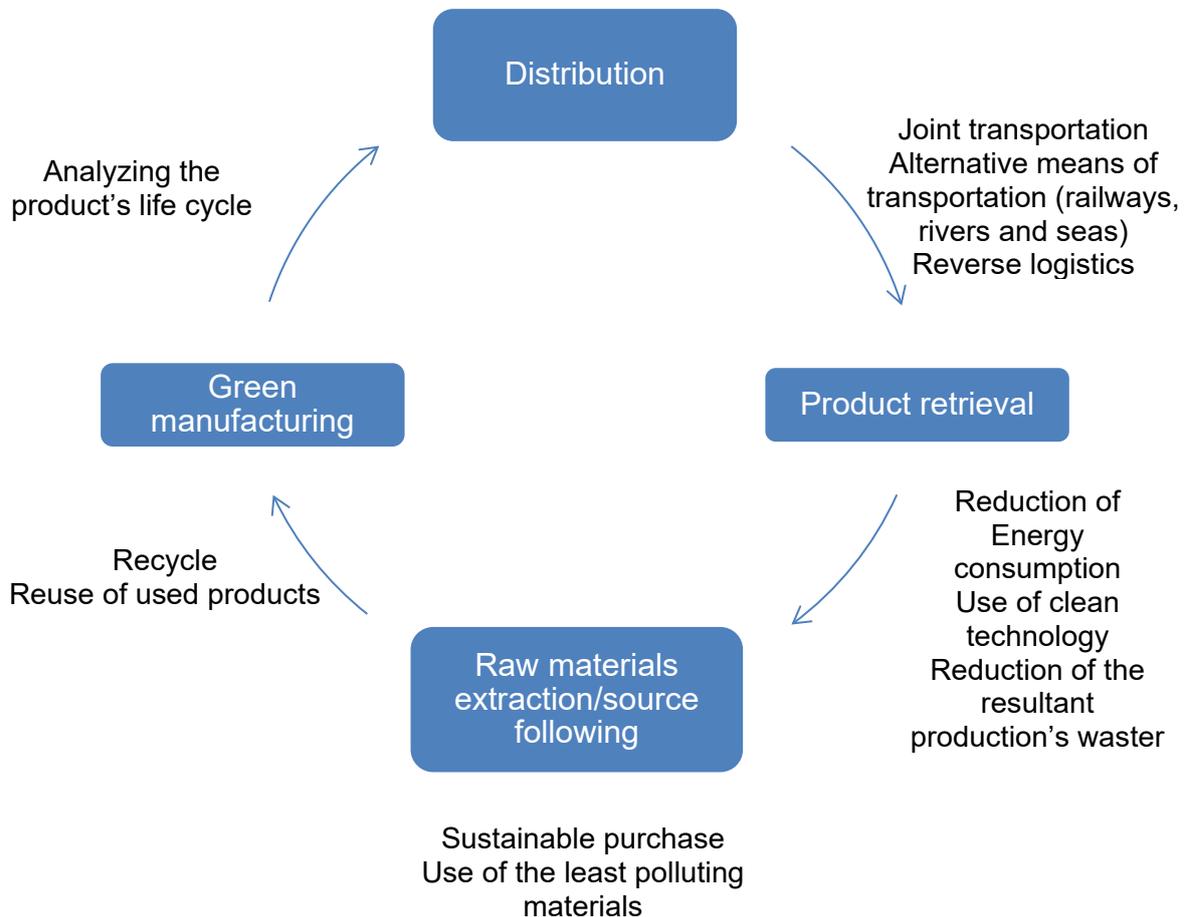
Table 1: Jordanian construction sector’s supply chain according to value chain (Source: Jordanian engineers’ union strategy, 2020)

Customer	Supply chain flows	Supply chain	
satisfaction/creating value/profitability/competitive advantages	- Production	Public environment	
	- Services		
	- Information	Cooperation between centers (Job changes, suppliers instalments, relationships follow-up, and supply structures)	
	- Financial resources	Cooperation between departments (trust, commitment, risk, inferiority and behaviors)	<ul style="list-style-type: none"> ● Marketing ● Sales ● Research and development <ul style="list-style-type: none"> ✓ Marketing ✓ Production ✓ Purchases ● Supplier ● Information system ● Financing ● Customer service
- Demand predictions	Supplier’s supplier ↔supplier ↔institution ↔mediating institution ↔customer ↔c customer’s customer		

10. Sustainable supply chain in Jordanian construction sector

Supply chain management is a promising field to achieve sustainability in construction sectors. It is a critical element in trying to lessen the negative environmental, social, and economic effects. It is apparent that academics and the business sector are interested in applying and adopting sustainability principles in supply chain management in all sectors, especially the construction sector due to its numerous trading benefits since a sustainable supply chain is about managing environmental, social, and economic effects to encourage good practices of governance (Lindgreen et al,2009). The aim of a sustainable supply chain in the construction sector is to create and develop an environmental, social, and economic value for all interest groups in the construction organization in the long run. Therefore, decision-makers and policymakers in the Jordanian construction sector aim to include the United Nations’ companies’ principles in supply chain relationships. Jordanian construction organizations can enhance the sustainability of their activity through these principles and at the same time attains the objectives of sustainable development in their business. Jordanian construction sector’s strategic plan, 2020 has demonstrated that the concept of a sustainable supply chain can be expressed in the Jordanian construction sector through the form showed in Figure 1.

Figure 1: Elements of sustainable supply chain in Jordanian construction



11. Critical review of previous studies

Owing to the importance of the topic of supply chain and being one of the modern concepts, there are many previous studies, which was the focal point of this study to present them as a part of this study:

1. Study (Thatte, 2007), which is titled 'Competitive advantage of a firm through supply chain responsiveness and SCM practices'.

This study aimed to determine whether supply chain practices lead to the organization's obtainment of competitive advantages. The study concluded that good management of supply chain contributes to developing and promoting the organization's ability to compete through providing products, which are characterized by low price, high quality, and the potential for innovation and development through linking relationships with clients in order to raise the response rate to different customers tastes on the one hand and strengthen the relationship

with suppliers to provide the necessary and appropriate input to the production process on the other hand.

2. (Baban, 2013) which is titled 'Exploring the effects of supply chain structure on supply chain integration in manufacturing industry'.

The study aimed at focusing on the importance of the integration of supply chain activities, the requirements of forming a network of systems, and the relationships which help it achieve balance between its objectives and those of suppliers and customers. The study also concluded that organizations attach considerable importance to the process of searching for suppliers, evaluating them and selecting the most appropriate from them. However, the problem lies in how to manage a relationship with suppliers with each party's reservation about the exchange of information with the other party, especially if there are many mediators and in particular there is a possibility that this information could reach competitors, which is reflected on the organization and the competitiveness of its products. The study suggests the employment of information and communications technology and linking a direct relationship with suppliers to add some kind of trust and security to transactions since it has an effect on promoting the level of association between the organization and its suppliers, which make it possible to manage the whole supply system effectively.

3. (Pettersson, 2013) which is titled 'Measuring supply chain cost'.

This study aimed at determining the ways to measure the costs of supply chain management. The study concluded that measuring supply chain performance depending on the element of cost is done through classifying costs into ones related to manufacture, warehouses management, and capital distribution, as well as the costs associated with the processes of readying the factory and workers for the production process with presenting the elements which is taken into account in each cost and the way to calculate them.

4. (Bala, 2014) which is titled 'Supply chain management: Some issues and challenges'.

The study aimed to realize supply chain management and how it leads to improving the organizations' performance in an international competitive environment. The study concluded that the assessment of supply chain's performance leads to identifying the problems confronted by the organization and the opportunities that can be seized. Therefore, measuring and supervising the performance of supply chain is necessary to know what is required of them, which in turn provides the ability to deal with changes under the integration of activities and functions. According to the study, this would lead to achieving the clients' satisfaction and improving the organization's productivity.

5. (Katlo, 2015), which is titled 'Management of supply chain costs to support competitive abilities- a suggested strategic entry'.

The study aimed at determining the mechanism for making use of the relationships between supply chain's members to reduce costs. The study concluded that there is a need for cooperation in forming supply chains since cooperation has importance for supply chain's members, particularly if the end product and its ingredients is local, as international competitiveness requires manufacturing to the degree that enable the organization to compete in all aspects such as quality, performance and price. Benefit is brought to all supply chain's members in various forms, such as creating new fields to reduce cost or the increase in costs, which helps control the market and achieve the desired market share, which leads to increasing profits accrued to supply chain members. The study put forward the idea of creating alliances and coalitions between the institutions which forms supply chains among them in order to gain the advantages offered by these alliances, especially in relation to the element of costs reduction.

6. (Theeb, 2019), which is titled 'The use of the model of objectives' programming in supply chain management'.

The study aimed at directing the use of supply chain management to raise the level of organizations' performance by using the method of objectives programming. The study concluded that the use of this method would solve different problems encountered by the organization. The study recommends the need to use it in parallel with building strategic relationships.

Conclusion of previous studies

Supply chain management, which emerged and evolved in a changing working environment, constitutes and was the focal point for researchers and practitioners equally in all work areas. Although there are differences in analyzing and interpreting this concept, its importance is still agreed upon. In this framework, it can be said that supply chain management is nothing but management, which seeks to direct various necessary phases to satisfy the needs and wishes of the end customer in supply chain in addition to its relationships and interactions with suppliers and customers to improve its profitability and market share. To achieve this objective, the performance of supply parties has to have a better advantage than that of competitors. Studies also suggested the need to have a general conception of the principles for building a baseline assessment of the effectiveness, which make it easy to measure its effect (the effectiveness and efficiency of supply chain) on the performance of its production processes and competitive advantage.

12 Conclusion

After presenting and analyzing the study's data, the study concluded a number of indications associated with supply chain in Jordanian construction sector. These indications are represented by the fact that supply chain contributes greatly to achieving the desired objectives of the organization, from buying raw materials, storing them and converting them into products to marketing them. Good management of supply chain substantially contributes to improving the performance of each of the organization's processes, especially if modern technology and information systems are made use of in addition to control and coordination between different processes in order to reduce costs and respond to various requirements at the required time, quality and budget. The concept of supply chain is related to the practices of strategic management, sustainable development, environmental management, social responsibility and governance. Additionally, value chain plays a role in helping understand the activities and processes of supply chain and contributes partially to the assessment of supply chain's performance. Supply chain, which is characterized by high competency and effectiveness, has a positive effect on the performance of processes and productivity, as the presence of cooperative, strategically dimensional relationships between the chain's parties would support the consistency of the organizational performance, help raise it in future to higher levels through recording high levels of productivity, competency, effectiveness, cost, profitability, and quality. This was what the study concluded. Consequently, the study recommends decision-makers in Jordanian construction organizations the following:

- Focusing on the need to develop simple and clear indicators, which are constantly updated, enabling Jordanian construction organizations to assess the effectiveness of supply chain and perform the processes belonging to the construction organization objectively. These indicators have to have the two characteristics of comprehensiveness and diversity to include rates, abilities, sums, and numbers, which can be followed chronologically and compared with standard values or the values of competing institutions.
- Jordanian construction organizations have to use scientific models to manage its storage of raw materials in a way that achieves an increase in the rate of assets cycles,

which in turn leads to improving its profitability and ensuring the continuity of its constructional processes.

- Focusing on the expansion of Jordanian construction organizations' activities to include projects related to the input of its constructional processes, such as building alliances, possession, and creating institutions, which undertake transporting and providing raw materials, which will help in achieving stability in relationships between supply chain's parties. This positively affects the improvement in the flexibility and reliability of supply chain (controlling the time for delivery performance and the increase in the rate of instructions at the set time). It allows raising its performance to better levels.
- Making more efforts to provide the requirements for building cooperative relationships between supply chain's partners through targeting new markets, targeting current markets with new specifications, targeting new markets with current products or developing specifications for current markets. This enables a Jordanian construction organization to strengthen its relationships with its suppliers and customers through concluding long-term contracts as a result of stability and assurance about safety and reliability of its transactions with supply chain's parties in order to support the effort to develop construction organization's performance to customers' tastes on the one hand, and improving the quality of constructional system's input on the other hand (front and back coordination).
- Directing attention to the adoption of modern orientations of supply chain management since they have positive effects on construction organizations' performance, especially in relation to the increase in the speed of completing transactions and the flow of information between different parties of supply chain (adopting the orientation of electronic supply chain) in addition to improving the image of these organizations in front of the audience (adoption of green supply chain orientation) and minimizing the loss of production process (the orientation towards reverse supply chain).
- Using quantitative and qualitative methods to run the production system in Jordanian construction organizations to improve the competency and effectiveness of its production processes and formulating plans, that match with the potentials of construction organizations and market needs through producing unbiased and more realistic results to bear a lower level of risks.
- Increasing the added value of workers in production through encouraging them to adopt diverse incentives whether financially or morally to improve the productivity of the construction organization.

Directing the attention of policymakers in this sector towards encouraging local industries related to construction industry such as extractive industries (extraction of raw materials and making them ready for use), the activities of a service type (institutions for transporting raw materials and goods), or in relation to the operation of construction projects (expansion in tax incentives, and providing the appropriate infrastructure for construction projects).

References

- Abbasi, M., & Nilsson, F. (2012). Developing environmentally sustainable logistics: Exploring themes and challenges from a logistics service providers' perspective. *Transportation Research Part D: Transport and Environment*, 46, 273-283.
- Al-Amiri, H. (2018). *The effect of efficiency of information technology factors on the improvement in electronic supply chain performance*. Published master's thesis, Middle

East University, Amman, Jordan.

- Al-Barazi, T. (2020). *The effect of supply chain management on the organization's performance: Field study in industrial companies listed in Kuwait market for financial papers*. Published Master's thesis, Middle East University, Amman, Jordan.
- Al-Aseef, S. (2020). Success factors of applying supply chain management system and their relation to beneficiaries' satisfaction in government organizations in Saudi Arabia. *Jordanian Journal of business management*, 8(1), 61-81.
- Ameer, R., & Othman, R. (2012). Sustainability practices and corporate financial performance: A study based on the top global corporations. *Journal of business ethics*, 108(1), 61-79.
- Artima, H. (2019). *Information technology and its role in improving supply chain performance in Jordanian business organizations*. Unpublished dissertation, Arab Amman University of higher education, Amman, Jordan.
- Bala, k (2014) "Supply chain management: some issues and challenges -A review" *International journal of current engineering and technology*, volume 4, number 2, Los Angeles, USA, April 2014.
- Baban,p.(2013),"Exploring the effects of supply chain structure on supply chain integration in the manufacturing industry" thesis for the degree of doctor of philosophy in engineering, University of Exeter, United Kingdom, 2013.
- Cantor, D. E., Morrow, P. C., & Montabon, F. (2012). Engagement in environmental behaviors among supply chain management employees: An organizational support theoretical perspective. *Journal of Supply Chain Management*, 48(3), 33-51.
- Carter, C. R., & Jennings, M. M. (2002). Logistics social responsibility: An integrative framework. *Journal of business logistics*, 23(1), 145-180.
- Carter, C. R., & Rogers, D. S. (2008). A framework of sustainable supply chain management: Moving toward new theory. *International journal of physical distribution & logistics management*, 38(5), 360-387.
- Cerrada, P., Moragues-Faus, A., Zwart, T. A., Adlerova, B., Ortiz-Miranda, D., & Avermaete, T. (2018). Exploring the contribution of alternative food networks to food security: A comparative analysis. *Food security*, 10(6), 1371-1388.
- Wernerfelt, A. S. (2012). Knowledge sharing among green fashion communities online: Lessons for the sustainable supply chain. *Journal of fashion marketing and management: An international journal*, 16(2), 176-192.
- Chand, P., Thakkar, J. J., & Ghosh, K. K. (2018). Analysis of supply chain complexity drivers for Indian mining equipment manufacturing companies combining SAP-LAP and AHP. *Resources Policy*, 59, 389-410.
- Chen, L., Zhao, X., Tang, O., Price, L., Zhang, S., & Zhu, W. (2010). Supply chain collaboration for sustainability: A literature review and future research agenda. *International Journal of Production Economics*.
- Ghassan, M. (2019). *The effect of supply chain's abilities on achieving competitive advantage: Case study of a group of Qiwar's companies in Jordan*. Published Master's thesis, Middle East University, Amman, Jordan.
- Greeb, M. (2020). *The practices of green supply chain and their effect on construction organizations' performance*. Unpublished Master's thesis, College of Trade, Suez University, Egypt.

- Hamad,Z. (2020). *The effect of supply chain integration on organizational performance and the role of environmental disturbance: An applicable study on Jordanian construction companies*. Unpublished Master' thesis, Middle East University, Jordan.
- Jordanian contractors' union, (2020). *Strategic plan of Jordanian construction sector*. Amman: Jordan.
- Jordanian contractors' union, (2020): *Strategic plan of Jordanian construction sector*. Amman: Jordan.
- Jordanian engineers' union, (2020): *Training plan of Jordanian construction sector*. Amman: Jordan.
- Jordanian engineers' union, (2020): *Jordanian construction sector strategy*. Amman: Jordan.
- Jordanian engineers' union, (2020): *Strategic plan of Jordanian construction sector*. Amman: Jordan.
- Jordanian cement producers' association. (2020): *Jordanian cement producers' strategy*. Amman: Jordan.
- Jordanian iron producers' association. (2020): *Jordanian iron producers' strategy*. Amman: Jordan.
- Katlo,H,(2015) 'Management of supply chain costs to support competitive abilities- a suggested strategic entry'. Applied study in the Syrian Arab Republic, Ph.D. Thesis in Accounting Philosophy, Faculty of Commerce, Ain Shams University, Egypt
- Lindgreen, A., Swaen, V., Maon, F., Defee, C. C., Esper, T., & Mollenkopf, D. (2009). Leveraging closed-loop orientation and leadership for environmental sustainability. *Supply Chain Management: An International Journal*, 14(2), 87-98.
- Mohseb, A. (2018). A proposed framework for the application of green supply chain to improve the productivity of industrial works organizations. *Trading sciences journal*.
- Pettersson,p.(2013) "Measuring supply chain cost" *International journal of production economics*, Volume 143, Issue 2, Elsevier publisher, Amsterdam, Netherlands, 2013.
- Rashwan, A. (2019). *The effect of the requirements of reaching the cleanest production on performance to boost the competitive capability in Egyptian construction organizations*. Unpublished doctoral thesis. College of Trade, Alexandria University, Egypt.
- Thatte ,A,(2007)"Competitive advantage of a firm through supply chain responsiveness and SCM ,Ph.D Thesis in philosophy degree in manufacturing management ,The university of Toledo,Ohio,USA.
- Theeb,S,(2019), which is titled 'The use of the model of objectives' programming in supply chain management', An applied study on the spinning and weaving sector in Egypt, PhD thesis in Business Administration Philosophy, Tishreen University and Syria

Comunicación alineada con los Objetivos de Desarrollo Sostenible

