
SUPPLY CHAIN INTEGRATION AND ITS IMPACT ON THE PERFORMANCE OF THE OPERATIONS MANAGEMENT SYSTEM-AN EXPLORATORY STUDY IN THE IRAQI FERTILIZER COMPANY, SOUTHERN REGION

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Abstract

The vision and mission of any company is determined by how interaction will be created between the organization's resources and then transformed into goods and services with the aim of conforming to design specifications on the one hand and achieving consumer satisfaction on the other hand. Therefore, the study aims to provide the company with useful information that supports the performance of the operations system in order to focus on Activities that add value to the product on the one hand and reduce waste and costs on the other hand. The study was conducted at the General Fertilizer Company / Southern Region through a field study and collecting information using a questionnaire tool composed Of (43) items, it was divided into internal sub-variables (within the company), which included (demand management, reliance on customer reaction, value added to the supply chain, response time to customer requests, warehouse management) and external sub-variables (outside the company) that were measured by (Managing the relationship with suppliers (external supply partners), (managing the relationship with the customer (customer orientation), physical distribution), and included the sub-variables of the dependent variable (performance of the operations system) with (quality, cost, flexibility, and delivery). As for the quantitative approach, it is measured with data. Quantitative using statistical methods (arithmetic mean and standard deviation) by analysis based on the SPSS program , In order to test the hypotheses of influence and correlation, the application program (SMART PLS) will be used, and the extent to which the independent variable (supply chain integration) explains it and its dimensions from the variance occurring in the dependent variable (operations management system performance) will be identified. Then the influence factor and correlation between the variables will be estimated. The study reached several results, the most notable of which is the presence of a significant and positive influence relationship of supply chain integration on the performance of the operations management system. This assumes that supply chain integration is a real function of the performance of the operations management system. Any increase in the (independent variable) will lead to a similar increase in the (dependent variable). The most important recommendations are: defining the company's vision and mission as to how interaction will be created between the organization's resources and then transforming them into products that aim to match the design specifications on the one hand and achieve consumer satisfaction on the other hand. second the operations strategy must be based on crystallizing its message in the form of competitive advantage.

Introduction

The first section: research methodology-

First: the research problem-

All industrial companies seek to meet the needs of the labor market and improve the quality of outputs in proportion to the requirements of rapid change imposed by intense competition. Through field visits to the company under study, it became clear that there are some problems in supply and production activities, including the emergence of cases of waste, an increase in levels of investment in inventory, and delays in delivery. Products, high costs. The problem can be summarized in the following questions:-

1-Is there awareness by senior management of the importance of the supply chain in raising the performance of the operations system and achieving the company's competitive advantage?

2 -Does removing wasteful activities and focusing at the same time on activities that add value to the final product contribute to raising the performance of operations?

3-Does the supply chain affect the level of performance of the production system and operations?

-Second: The goal of the research

The research aims to improve the performance of the company under study by relying on modern concepts that support production processes. The goal can be summarized as follows:

1- Providing the company under study with useful information that supports production operations in order to remove activities that cause waste and focus on activities that add value to the product.

2- Reducing the gap in the field of theory and application in the field of supply chain and improving the performance of the operations system in the company under study.

3-Ensuring the flow of materials from the supplier to the company by focusing on the supplier and the customer.

4- Providing consultations that achieve the desired production rates without delaying delivery.

5-Identifying the success factors of the supply chain that improve the performance of the operations system.

-Third: The importance of research

The importance of the research is evident through the following:-

1- Directing the attention of the managers of the company under study to the importance of and learning about the concepts of supply chain management and their impact on improving its overall performance by creating a competitive advantage.

2- Encouraging those interested in delving into and analyzing the relationship between the supply chain and the performance of the operations system and its implications for the competitive advantage and economic dimensions of the company under study.

-Fourth: The research hypothesis model

The independent variable is supply chain integration, while the dependent variable is the performance of the operations system.

Fifth: A research method

The scientific method of research was based on two main approaches: the descriptive approach and the quantitative (practical) approach. This is referred to as the descriptive approach, which

aims to understand the social and human problem from a multiple point of view, relying on the data collection tool (the questionnaire form), consisting of (43) items, which were distributed to a sample. Engineers and workers in production and operations management, as well as workers in warehouse management, and the independent variable (supply chain integration) was divided based on (Lambert, 2004:18) (Krajewski, et al, 2013:415) into sub variables. Internal (inside the company), which included (demand management, reliance on customer reaction, added value to the supply chain, response time to customer requests, warehouse management) and external sub-variables (outside the company) that were measured by (management of the relationship with suppliers (external supply partners)), customer relationship management (customer orientation), and physical distribution. As for the sub-variables of the dependent variable (operations system performance), they were measured by (quality, cost, flexibility, and delivery) based on (Leong et al, 1995:10) (Slack et al, 1998:35) As for the quantitative approach It is measured with quantitative data using statistical methods (arithmetic mean and standard deviation) and analysis based on the SPSS program. In order to test the hypotheses of influence and correlation, the application program (Smart PLS) will be used, and the extent to which the independent variable (supply chain integration) explains it will be identified and removed from the variation occurring in The dependent variable (operations management system performance) and its dimensions, then the influence factor and correlation between the study variables will be estimated.

- Sixth:- Research hypotheses:-

- The first main hypothesis: “There is a significant impact relationship between supply chain integration as an independent variable on the operations system performance variable (as a dependent variable).

-The second main hypothesis: “There is a significant correlation between supply chain integration and the performance of the operations management system.”

-Seventh: Scientific, spatial and temporal limits

Scientific boundaries: - They are represented by theoretical concepts and perceptions related to building the conceptual framework of the relationship and interaction between independent and dependent variables

Spatial boundaries: Covering the research requirements of the fertilizer company in Basra/the southern region

Time limits: The research began on 25/8/2023 until 11/1/2024.

The second topic: -The theoretical aspect

First - Integration of the supply chain :-

As a result of the tremendous development in production and technology and the high competition between international companies, companies operating in the industrial sector must increase their industrial capacity by responding quickly to the customer’s needs and desires in a timely manner. Supply chain integration activities are considered one of the most important activities in the production process and are very necessary in order to Improving the performance of the operations system

Therefore, (Mahbhashi 2010) defines supply chain management (SCM) as an integrated range of activities and practices that start from the activities of obtaining inputs, passing through the internal processes responsible for converting the inputs into finished products, and

ending with the activities of delivering products or services to the customer through distribution networks and marketing channels.

(Krajewski, et al, 2013:415) defined supply chain integration as the presence of a high degree of functional and organizational integration, and it should include the links between the organization, its suppliers, its customers, the new service, or product development, its relationship with the supplier, system fulfillment, customer service, and the operations relationship. , as well as internal and external links, which are integrated into the regular work routine and take the organization on Focus on the customer rather than just the customer's reaction. In the same direction, (Lambert & Cooper 2000:18) see that supply chain management means creating integration activities between basic business processes and multi-dimensional relationships in them, starting with inputs and ending with outputs, while(Thatte 2007:7) defined that supply chain management means the activities involved in production. Delivery of the final product begins with suppliers to customers. It is an attempt to create integration between managing supply and demand internally and between companies.

While(Klemencic 2006:72) believes that supply chain integration means working as a single unit instead of a fragmented supply chain, and the cornerstone of its integration is reducing wasted time and reducing response time to customer requests, Sukati defined supply chain integration as the degree to which All the activities of the organization and suppliers, and the integration of customers together (Sukati, et al, 2012, 2). From the above, we can conclude that there are factors Internal and external to the supply chain. Internal is represented by demand management, reliance on the customer's reaction, warehouse management, the relationship with the customer and the external supplier, in addition to physical distribution. By integrating all these factors as an integral part of the chain, it becomes a powerful tool for managing added value and eliminating waste in all its forms, which enables the company to work. High quality production, distribution and delivery on time and with high flexibility.

-Second Operations system performance

Supply chain integration activities reflect positively on the performance of the company's operations system, through the ease of flow of materials, production requirements, value addition, and waste removal, which provides strong support for the operations system(Slack et al,1998:35).

The operations performance system can be defined (as the harmonization between different activities to ensure that they work together to achieve the basic goals of quality, cost, delivery, and flexibility) as Slack believes, if the design of operations is based on improving the ability to respond quickly to operational requirements. It must take into account the advantages of speed of response by reducing production and delivery time. Also, if operations are designed to reduce costs, they must achieve the goals associated with reducing costs (Slack et al, 2010: 88). Researchers have agreed on the critical dimensions for measuring the performance of operations, which are (quality, cost, flexibility, speed Delivery)(Leong et al,1995:10)

-Third: The relationship of the supply chain to the performance of the operations system

The operations management in any company determines the strategic objectives of operations, such as quality, flexibility, and speed of meeting customer requests, in addition to designing the product or service so that it is acceptable to customers. The operations management also organizes the work environment well, and reduces waste in the production process of time,

effort, materials, resources, and plans. Managing daily, monthly, and weekly production operations. It also manages the company's purchases from various suppliers, and manages inventory in the company, to determine the required quantity of each item. (Ferry, 2017) believes that evaluating the performance of the supply chain within the overall framework of operations performance can be summarized as follows: -

- Reducing processing time
- Cost reduction
- Increase production capacity
- Improving the quality level
- Speed in delivery (reliability in delivery)
- Strategic flexibility (customer service flexibility, customer order flexibility, which means adapting to changes in the size of the order and its components, location flexibility, which means the ability to serve the customer in multiple locations, in addition to delivery flexibility, which means delivering to the customer before the specified time if the need arises

(Al-Rifai ,2016) confirmed that there are a number of basic benefits of supply management for the organization if its application occurs in reducing inventory by transporting the products directly to the place of purchase, then storing it and being responsible for it. As for its impact on the supplier, it includes: -

1-Customers: Contacting the customer is considered one of the most important tasks achieved by supply chain management, as it helps the organization achieve contact with the customer and deal with them, as the chain begins and ends with the customers through contacting them and getting to know their desires in terms of specifications, price, delivery time, and implementing those desires.

2- An efficient supply chain reduces costs and thus lowers the selling price, which increases the company's market share, sales, and cash flows.

3- Market value: - The supply chain achieves five things that lead to maximizing market value, which are sales growth, cost reduction, optimal use of fixed assets, distinguished completion of work, and finally the tax bracket specified. Under the efficient supply chain approach, the quantities of product that are produced flow. towards the market, resulting in high sales.

The third topic: the practical aspect-

First - a brief overview of the company under study:-

The General Fertilizer Industry Company, a government company, one of the companies of the Ministry of Industry and Minerals. At the beginning of 1976, a construction contract was signed with Mitsubishi Heavy Industries MH1 to establish two factories for the production of ammonia using the Haled Topsoe technology with a capacity of 1000 tons/day for each line, and two factories for the production of urea using the Snamprogett technology with a capacity of 1600 tons. tons/day for each line. The factory was operated in 1978.

The factory is located 3 km from Khor Al-Zubair Port and about 35 km from Umm Qasr Port. Khor Al-Zubair Port is considered specialized for exporting bagged urea and pepper according to advanced principles.....

-General objectives of the company:-

The company is committed to achieving customer satisfaction, achieving the highest profitability, and covering the needs of the Iraqi market for nitrogen fertilizers, with

continuous development and improvement of all its activities, and providing an encouraging climate to increase the loyalty of its employees. The company also seeks to maintain leadership in the field of fertilizer manufacturing technology in support of the national economy and achieve distinguished performance.

Second: Presentation of the results of data analysis:-

Table (1) Arithmetic means and standard deviations for the main internal variables of supply chain integration

| sequence | The main internal variables | arithmetic mean | standard deviation | effect |
|----------|--------------------------------------|-----------------|--------------------|--------|
| 1 | Demand management | 3.788 | .854 | high |
| 2 | Depending on the customer's reaction | 3.833 | .768 | high |
| 3 | Added value to the supply chain | 3.654 | .766 | high |
| 4 | Response time to customer request) | 3.723 | .872 | high |
| 5 | stores management | 3.714 | .814 | high |
| | Total | 3.742 | .814 | high |

Prepared: by the researcher

Table (1) indicates the presence of a high impact of the arithmetic means of the internal variables on the integration of the supply chain in the General Fertilizer Company, if the arithmetic means of the internal variables ranged between (3.788 - 3.714), with an overall arithmetic mean (3.742) and a standard deviation (.814), and the reliance came on the customer's reaction. With the highest arithmetic mean (3.833) and standard deviation (.768), which indicates the highest effect based on Relying on the customer's reaction came with the highest arithmetic mean (3.833 and standard deviation (.768), which indicates the highest impact based on the customer's reaction to the company under study, meaning that there is a great interest in collecting data and information about customers through information systems or marketing research, questionnaires and interviews, which It is considered the basic element of actual response to customer desires.

Table (2) Arithmetic mediation and elastic deviations of the main exogenous variables of the integrated supply chain

| Sequence | The main external variables | arithmetic mean | standard deviation | Effect |
|----------|--|-----------------|--------------------|--------|
| 6 | Managing the relationship with suppliers (Outsourcing partners) | 3.888 | .859 | High |
| 7 | Customer relationship management (Customer orientation) | 3.844 | .765 | High |
| 8 | physical distribution | 3.654 | .879 | High |
| | Total | 3.795 | .834 | High |

Prepared: by the researcher

Table (2) indicates that there is a high impact of the arithmetic means of the external variables of the supply chain if the arithmetic means of the internal variables ranged between (3.888 - 3.654) with an overall arithmetic mean of (3.795) and an overall standard deviation of (.834). The results recorded that managing the relationship with suppliers has the highest impact. The arithmetic mean is (3.888), which indicates the company’s focus on relations with suppliers and its shift of its view from being suppliers of raw materials and raw materials to real partners capable of increasing the added value of products, and actively contributing to developing the current product and innovating new products.

Table (3): Arithmetic means and standard deviations for operational system performance variables

| Sequence | The main variables for the performance of the operations system | arithmetic mean | standard deviation | Effect |
|----------|---|-----------------|--------------------|--------|
| 9 | Quality | 3.855 | .877 | High |
| 10 | Cost | 3.876 | .865 | High |
| 11 | Flexibility | 3.766 | .788 | High |
| 12 | Delivery | 3.822 | .888 | High |
| | Total | 3.829 | .854 | High |

Prepared: by the researcher

Table (3) indicates that there is a high effect of the arithmetic means of the operational system performance variables if the arithmetic means of the internal variables ranged between (3.876 - 3.766) with an overall arithmetic mean of (3.829) and an overall standard deviation of (.854), which indicates the highest cost effect in the sense of the company’s focus. The supply chain contributes to reducing costs, which increases sales and achieves savings, which leads to increased cash flows for the company.

Third: Hypothesis testing:-

After the necessary tests were conducted to ensure the quality of the data collected, the amount of influence between the variables of the study will be identified, as the study aimed to integrate the supply chain in the researched company, which leads to improving the performance of the operations system in the fertilizer company in Basra / the southern region. In order to test the hypotheses of influence and correlation, the application program (Smart PLS) will be used. The correlation relationship between the variables for each hypothesis will initially be tested, and then the extent to which the independent variable (supply chain integration) explains it and its exclusion from the variance occurring in the dependent variable (performance of the operations management system) will be identified. And its dimensions, then the influence factor and correlation between the study variables will be estimated, as two main hypotheses were assumed, which are as follows: -

First: The first main hypothesis: The researcher assumed that there is a significant and positive influence relationship between supply chain integration on the performance of the operations management system. This assumes that supply chain integration is a real function of the performance of the operations management system. Any increase in the (independent variable) will lead to a similar increase in the (dependent variable). The structural equation will be tested

(Sem -PLS), and the results will be extracted through the statistical program (Smart PLS) according to the (simple regression method), as the impact factor is estimated. (Beta) and the level of significance that appears on the arrow connecting the independent variable to the dependent variable, as shown in Figure (1) and Table (4), which are as follows:

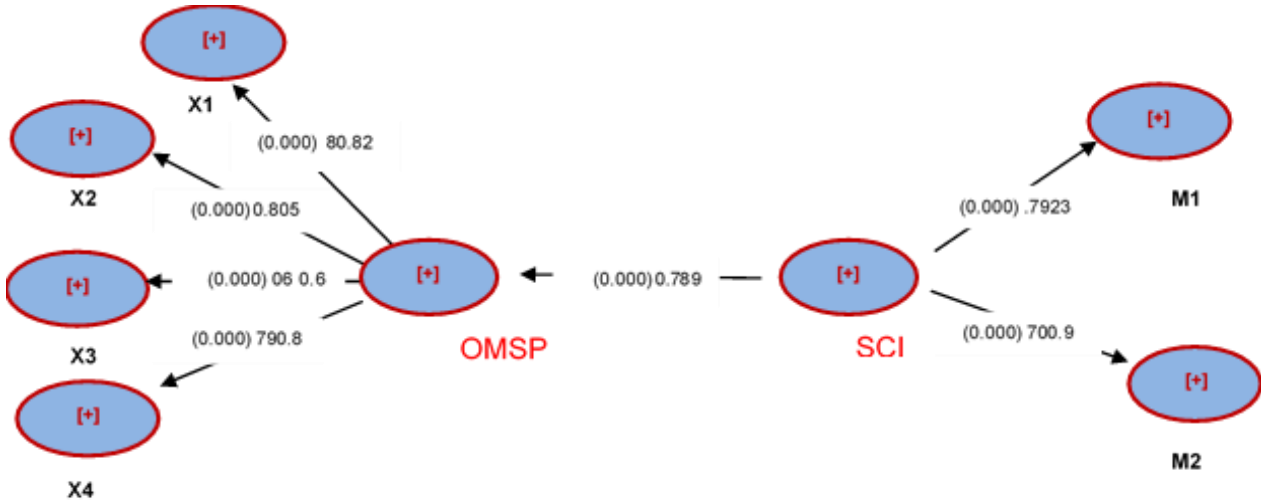


Figure (1) Results of a simple regression analysis test for supply chain integration in the performance of the operations management system.

Table (4) Test statistics of the impact factor of supply chain integration on the performance of the operations management system.

| | Original Sample (O) Impact factor | R | Standard Deviation (STDEV) | R ² | T Statistics ((O/STDEV)) | P Values Moral level |
|-------------|-----------------------------------|-------|----------------------------|----------------|--------------------------|----------------------|
| SCI -> OMSP | 0.794 | 0.812 | 0.092 | 0.60 | 8.982 | 0.000 |

According to the results of Table (4), it became clear that there is an influence relationship between supply chain integration and the performance of the operations management system. It reached (0.812), which is positive and acceptable at a significance level (0.05). As it became clear from Table (4), the coefficient of determination (R²) reached (0.60), which indicates that the integration of the supply chain explains an amount of (0.60) of the variance occurring in the dependent variable, the performance of the operations management system. The amount of effect reached (0.794). That is, any increase in the independent variable supply chain integration will lead to an increase in the performance of the operations management system by (0.794). It is significant at a significance level of (0.05). According to these results, this hypothesis is accepted at the level of this study.

Second: The second main hypothesis: The researcher assumed that there is a significant correlation between the integration of the supply chain and the performance of the operations management system. This assumes the performance of the operations management system. It is a real function of the integration of the supply chain, and any increase in (the independent variable) will lead to a similar increase in (the dependent variable). The structural equation will be tested (SEM-PLS), and the results will be extracted through the statistical program

(SMART PLS) according to (the regression method). Simple), as the effect factor (Beta) and the level of significance that appear on the arrow connecting the independent variable to the dependent variable are estimated as shown in Figure (3) and Table (2), which are as follows:-



Figure (2): Results of the simple regression analysis test on supply chain integration in the performance of the operations management system.

Table (5): Statistics of the impact factor test on supply chain integration on the performance of the operations management system

| | Original Sample (O) Impact factor | R | Standard Deviation (STDEV) | R ² | T Statistics ((O/STDEV)) | P Values Moral level |
|-------------|-----------------------------------|--------|----------------------------|----------------|--------------------------|----------------------|
| SCI -> OMSP | -0.601 | -0.636 | 0.076 | 0.32 | -7.801 | 0.000 |

According to the results of Table (5), it became clear that there is a correlation between the integration of the supply chain and the performance of the operations management system. It reached (0.636), which is positive and acceptable at a significant level (0.05). As it became clear from Table (5), the coefficient of determination (R²) reached (0.32), which indicates that the integration of the supply chain explains an amount of (0.32) of the variation occurring in the variable operations management system performance. As for the amount of effect, it is shown in Figure (2). The impact factor reached (0.601), meaning that any increase in the supply chain integration variable will lead to an increase of (0.601) in the performance of the operations management system, which is significant at a significance level (0.05). According to these results, this hypothesis is accepted at the level of this study.

Section Four: Conclusions and recommendations

First - conclusions

1-Supply chain integration activities reflect positively on the performance of the company's operations system, through the ease of flow of materials, production requirements, value addition, and waste removal, which provides strong support for the operations system

2-The operations management in any company determines the strategic objectives of operations, such as quality, flexibility, and speed of meeting customer requests, in addition to designing the product or service so that it is acceptable to customers.

3-The arithmetic average values indicated high, which indicates

- Great interest by the company under study in collecting data and information about customers through information systems, marketing research, questionnaires, and interviews, which are considered the basic element for actually responding to customers' desires. -The company's focus on relations with suppliers and shifting its view from being suppliers of raw materials and raw materials to real partners capable of increasing the added value of the products, and actively contributing to the development of the current product and the innovation of new products.

The company's focus is on the supply chain's contribution to reducing costs, which increases sales and achieves savings, which leads to increased cash flows for the company.

4- There is a significant and positive impact relationship for supply chain integration on the performance of the operations management system. This assumes that supply chain integration is a real function of the performance of the operations management system. Any increase in the (independent variable) will lead to a corresponding increase in the (dependent variable)

Second: Recommendations

1- It is necessary for the company to continue its interest with suppliers and establish good relations with them, provided that the relationship is based on trust and commitment because there is a mutual benefit between the two parties that would result in profits for both parties in the long term.

2-The company must build long-term relationships with customers, since these relationships provide a sustainable competitive advantage for the company, retain current customers and obtain new customers to achieve the highest profitability.

3- Ensuring that the added value of the product is achieved by using production resources of workers, machines, materials, specific production methods and methods provided to the final consumer or industrial user. The term "output" may be expressed by the volume of large production or the number of customers who benefit from the service during a specific period of time to raise the efficiency of the performance of the operations system. .

-4-Benefiting from feedback, which is represented by the reports that accompany the outputs and are related to the cost and volume of production, the quality of the products, delivery dates, and the level of loading, as these reports use some measures such as productivity, efficiency, or effectiveness as a method of control and to take corrective measures to evaluate performance, whether in planning, implementation, or both.

5- Defining the company's vision and mission regarding how interaction will be created between the organization's resources and then transforming them into products that aim to match the design specifications on the one hand and achieve consumer satisfaction on the other hand. The operations strategy must be based on crystallizing its message in the form of competitive advantage.

6- The company's ability to provide products in the appropriate quantity and time depends on the availability of the energy necessary to achieve this. Hence, the role of operations management is to make strategic (long-term) decisions related to providing this energy in terms of the type and number of capital production means such as machines and buildings, in addition to tactical (short-term) decisions such as controlling inventory, labor force, or contracting with suppliers.

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