

# Sustainable Supply Chains in the KSA 2030 Vision

Lojain Mohammad <sup>a</sup>

a: Industrial Engineering, Taif University, Makkah region, Saudi Arabia

Email: lojainalmansuri@gmail.com

## Abstract

Sustainable supply chains are a must in the industrial field today. The Kingdom of Saudi Arabia is one of the countries that aims to apply and use the concept of sustainability in every field and aspect of life. One of these fields is the industrial field, specifically supply chains. This scientific paper studies in immediate depth the relationship between the concept of sustainability in the supply chain and how it relates to the Kingdom's 2030 vision. Moreover, the paper has my study on possible ways to apply sustainable technologies in supply chains in the Kingdom of Saudi Arabia. The Kingdom of Saudi Arabia is known as the biggest oil and gas supplier country in the world. And companies such as Saudi Aramco have a huge supply chain network system that connects Saudi Arabia with oil and gas stations all around the world. The paper aims to create better sustainability in the supply chain throughout the 2030 vision. I will rely on the descriptive-critical approach to explain this connection. The research aspires to address the problem of supply chains lacking sustainability, which the vision seeks to take care of and care to find while clarifying the application of this vision to one of the leading Saudi companies. Through this work, I hope to assist Saudi startup businesses in developing a sustainable supply chain and understanding that supply chains can take various forms and are not limited to the production process, as well as reinforce the importance of our government's hard work to strengthen the concept of sustainability through the National Transformation Program and Saudi Arabia Vision 2030.

**Keywords:** Sustainability, Supply Chain, Saudi Vision 2030, Supply Chain Management, Sustainability Application.

# Introduction

A sustainable supply chain is a must in the industrial field today. The Kingdom of Saudi Arabia is one of the countries that aim to apply and use the concept of sustainability in each field and side of life. One of these fields is the industrial field, specifically supply chains.

The Kingdom of Saudi Arabia is known as the biggest petrol supplier country in the world. And companies such as Aramco have a huge supply chain system and network that connected Saudi Arabia with the world's gas stations.

In this paper, I will explain the keywords, discuss some of the Saudi examples in the application of sustainable supply chain, and finally, there will be an analysis of the applied strategies and how to advent from them.

## 1. Sustainability

The concept of sustainability has invented in the 1980s, it represents a very sensitive equation between the economy, environment, and equity. The concept of sustainability is slightly misunderstood with the concept of Earth's protection. Sustainability cares for human life improvements as well as sustaining the Earth's condition as much as possible for the next generations.

### 1.1. Sustainability Definitions

The United Nation created the World Commission on Environment and Development in 1987 that has stated the sustainability definition as an economic activity that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987:39).[1]

The sustainability concept cares more about Earth's condition in the upcoming ages/ years than the concept of Earth's Protection from pollution. Sustainability is also considering three pillars known as the "3 E's" which stand for equity, the economy, and the environment, also referred to as the "3 P's" and stand for "Planet, Profit, and People." (Portney, K. E. 2015).

Therefore, sustainability can be defined as long-term economic, environmental, and social equity. And the implementation of this idea helps to give us a better quality of life that endures for a long time, satisfies our needs, and maintains a healthy universe for future generations.

### 1.2. Sustainability Technology and Applications

Sustainability technology is concerned with the use of natural resources and recycling, in terms of reducing non-biodegradable materials. Some sustainable technologies that are used in Industry 4.0 are blockchain, big data and analytics, industrial Internet of things, and simulation (Bai et al., 2020) [10]. These technologies are consuming less energy therefore, their pollution is considered to be less in order for the earth's sustainability.

### Augmented Reality Technology

In the subject of supply chains, augmented reality technology is quite beneficial. I would see it as an expansion of reality since it reveals more significant information about what lies ahead. Take Google Maps as an example; we use it to look for routes or even destinations that are close to a particular location.

AR reduces the wasted time and effort of tracking the shipments in the inventory. Since it displays all the information of the items in inventory such as its sale, the date of storage, and the demand for that item, it consumes a lot of time that would be spent on checking thousands of items, especially in large businesses.

What makes AR a sustainable technology, then? I may argue that it is the capacity to inexpensively and simply visualize the movement of the supply chain, preventing the waste of natural resources and enabling businesses to bring their products to life.

### Virtual Reality Technology

Virtual Reality technology is as important as augmented reality. It has been defined as "the use of advanced technologies, such as computers and different multimedia peripherals, to create a simulated environment that people experience as comparable to real-world objects and events" (Pehlivanis et al., 2004).

As explained by (Pehlivanis et al., 2004) there are some parts of the logistics – distribution process among the supply chain – that need to be simulated using virtual reality since the planning process would be enhanced and become clearer.

Material Handling Parameters	
<b>Conveyors</b> <ul style="list-style-type: none"><li>• Accumulating</li><li>• Non-accumulating</li><li>• Indexing and other special purpose</li><li>• Fixed window or random spacing</li><li>• Power and free</li></ul>	<b>Storage Systems</b> <ul style="list-style-type: none"><li>• Pallet storage</li><li>• Case storage</li><li>• Small part storage</li><li>• Oversize items</li><li>• Rack storage or blocked stacked</li><li>• Automated storage and retrieval systems with storage-retrieval machines</li></ul>
<b>Transporters</b> <ul style="list-style-type: none"><li>• Unconstrained vehicles, Fork Lifts</li><li>• Guided vehicles</li><li>• Bridge cranes and other overhead lifts</li></ul>	

Figure.1 Logistics parts that could be simulated via VR – Pehlivanis et al., 2004

Virtual reality has contributed a lot to serving the logistics sector. Some of the fields that benefit from VR are layout planning and concept creation, production simulation, training of operators, and operational use. With the revolution 4.0 in industry, virtual reality technology become valuable for training purposes. New operators these days are introduced to their jobs through virtual reality as it is more efficient, less costly, and sustainable than assigning a trainer. Moreover, any development on a process or task that the planning department contributes can be simulated and introduced with the sense of reality throughout virtual reality. Meanwhile, it is used for operational activities such as evaluation of the capacity of the system for new demands, equipment downtimes, and change over time operations.

Virtual reality and sustainability go hand in hand quite well. For instance, implementing VR in manufacturing lines will decrease machine downtime, which will minimize the requirement for vehicle trips for repair and, as a result, reduce CO<sub>2</sub> production. VR also offers a long-term return because it improves supply chain workers' understanding of how work flows, network transportation, and new plans.

## 2. Supply Chain

Supply chain definition was first given by Keith Oliver – a British logistician – when he was interviewed in Financial Times which is a British journal. He described the supply chain as a sequence of the production process, that starts from providing raw materials by a supplier and then manufacturing the product. After that, distribute the product to the stores, and then deliver it to the consumer through the logistic party ([Wikipedia](#)).

The supply chain has been also, defined by many authors who are interested in this field. It has been defined as "a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer."(Mentzer et al. 2001). La Londe and Masters, have defined it as the involvement of a set of firms that pass materials forward in the manufacturing process to reach the end user's hand (La Londe & Masters 1994).[4]

There are three degrees of supply chain complexity: A simple example is when the supermarket provides the goods from the suppliers and you as an end user buy them. Supply chains are categorized into three categories: direct supply chain, expanded supply chain, and ultimate supply chain. A direct supply chain contained a direct supplier, a firm, and a direct customer. Meanwhile, the expanded supply chain contained of a supplier for the direct supplier, and a customer for the direct customer. Moreover, the ultimate supply chain has three parties such as a financial provider for the supplier and the firm. (Mentzer et al. 2001)

So, the supply chain is the process that involves a raw materials or information provider (i.e., supplier), an organization that converts them into useful products or services, a logistic provider (i.e., distributor), and a customer or sometimes it could be an end-user (i.e., consumer). The sequence of the flow can get complicated depending on either the business field and its objectives, or the type of products and services the business provide. The complexity of the chain is not only confined to the business, but it is also, affected by the market that the business is competing in.

## 2.1. Supply Chain Management (SCM)

Supply Chain Management was first documented back in 1982 by Keith Oliver and Michael Webber when they realized that "the traditional approach of seeking trade-offs among the various conflicting objectives of key functions along the supply chain was no longer working well. We needed a new perspective and, following from it, a new approach: Supply Chain Management." (Martin Christopher 1992) The concept of supply chain management and logistics are sometimes misunderstood. Martin Christopher has explained the difference between them in his book *Logistics and Supply Chain Management* when he stated that "logistics is a planning orientation and framework that seeks to create a single plan for the flow of products and information through a business." Meanwhile, he expressed supply chain management as "it builds upon this framework and seeks to achieve linkage and coordination between the processes of other entities in the pipeline and the organization itself." (Martin Christopher 1992).

Supply chain management is a philosophical concept that focuses on utilizing the firm's suppliers' processes, technology, and capability to enhance competitive advantage. Supply chain management's importance is embodied in integrating the process of providing products flow from the suppliers down to the consumers throughout strategies. [6]

## 3. Kingdom of Saudi Arabia Vision 2030

According to official sources, in 2016 Mohammad bin Salman, the deputy crown prince, revealed the "Saudi Vision 2030," which consists of 15-year goals and a comprehensive strategy to achieve them. [7]

As deputy crown prince Mohammad bin Salman said *"We are determined to build a thriving country in which all citizens can fulfill their dreams, hopes and ambitions. Therefore, we will not rest until our nation is a leader in providing opportunities for all through education and training, health, housing, and entertainment"*.

Our wise leadership believes that the actual wealth of the nation lies in the ambition of its human resources and the promise of the younger generation. Through Vision 2030, it strives to create a strong, wealthy, and stable economy that offers boundless opportunities for everyone and builds a sustainable future for the next generation to live a healthy, safe, and good life. This is done through some possible processes such as strengthening the private sector through increased partnership chances, fostering healthy work prospects for residents, and securing everyone's long-term prosperity. The three primary pillars of the Kingdom's strategic vision are a dynamic society, a booming economy, and an aspirational country. [8]

### 3.1. Saudi Vision 2030 and Sustainability

*Our vision is a strong, thriving, and stable Saudi Arabia that provides opportunity for all - Mohammad bin Salman.*

Through its 2030 vision, the kingdom is prepared to create a sustainable future where the next generation can live in safety, health, and goodness. Through building a sustainable economy, and implementing eco-friendly technologies inside industries, the most key aspect is to train people to think sustainably! To encourage people to take the initiative and take the necessary remedial steps to stop environmentally harmful, and unsustainable practices in their communities.

### 3.2. 2030 Vision and Supply Chains

Our Kingdom is known for its worldwide supply chain since it is located in the center of the world, and its history in trade and supply chains since ancient times. Saudi Aramco, Saudi Airlines,

and Al-Rajhi Banking & Investment Corp. are good examples of transforming goods/products/information, from Saudi Arabia to anywhere worldwide and vice versa. This is what makes the value of our kingdom in the world and this importance has been recognized by our wise leadership. Saudi Arabia is right at the crossroads of important international trade routes, 24°N 45°E, between three continents: Asia, Europe, and Africa. Therefore, the kingdom is working on maximizing the benefits of our exceptional and strategic geographic position, agreeing on new strategic partnerships to grow the economy and help Saudi companies to increase exports of their products. It will leverage the proximity of energy sources and our distinctive logistical offer to stimulate a new phase of industrialization and to catalyze exports and pre-experts. One of the goals is to raise Saudi Arabia ranking in the Logistics Performance Index from 49 to ensure the Kingdom is a regional leader.

**4. Saudi Aramco and Sustainability in Supply Chains**

Supply chain management is the key role to chase in a competitive industry of business in order to stay successful. Moreover, supply chain management application results in the enhancement of quality, customer satisfaction, business growth, and reputation. Aramco has developed strong customer retention and satisfaction. Customer retention is the indicator that the customer will repurchase and assist in predicting the customer's long-term behavior. Meanwhile, customer satisfaction is the process of attracting the customer to keep on a long relationship with the product or service provider. That is exactly what Aramco has done with its customers for oil and gas products and services around the world.

To understand the supply chain in Saudi Arabia in general and Aramco in specific, here is a figure:

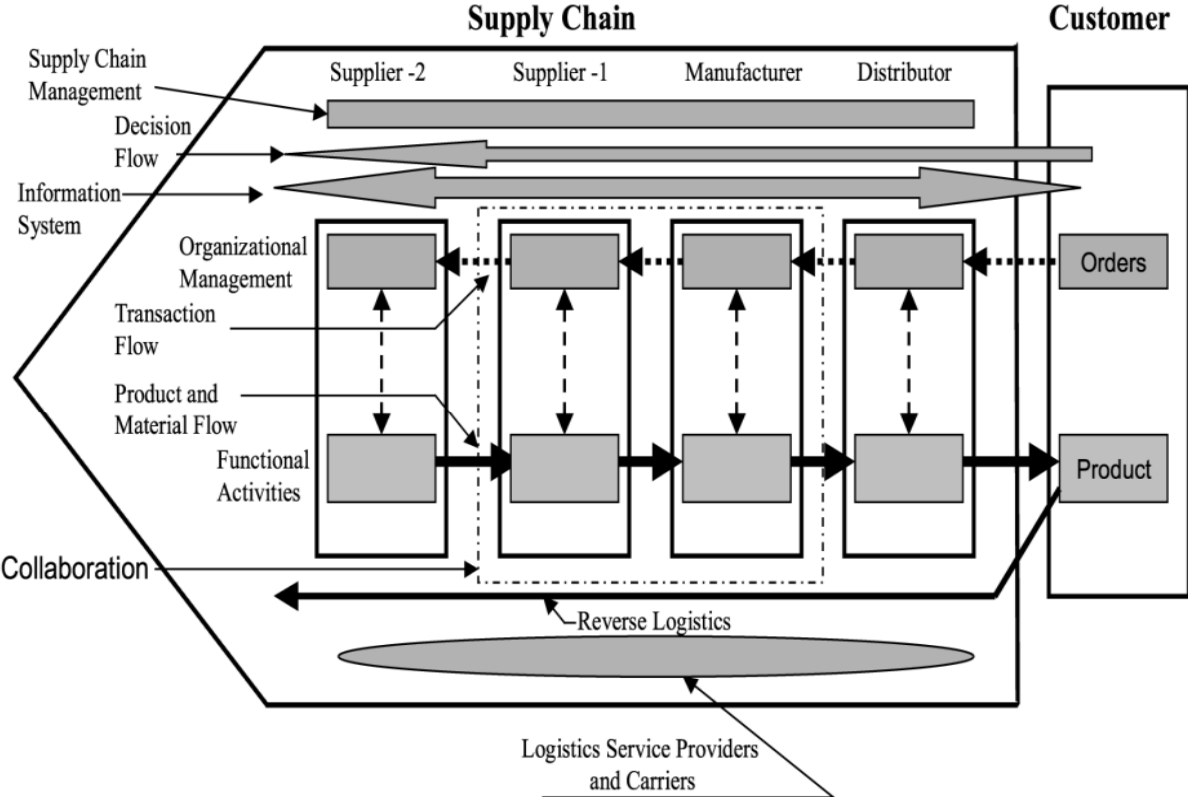


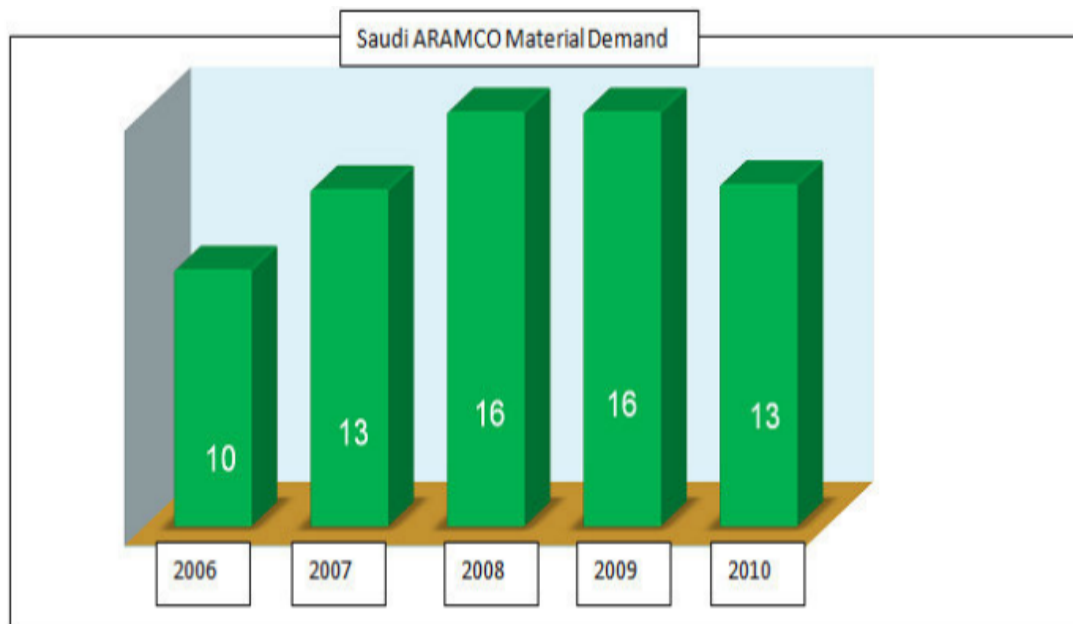
Figure.2 Supply chain management model – Stefan and Martin,2008

Supply chain management has driven attention in Saudi Arabia, and more companies now are thinking in a more innovative way to overcome the challenge of facing an unpredictable demand, therefore, creating local competition which is healthy for the local economy. Businesses need to allocate a critical supply chain partner appropriately in order to maintain their competitiveness. The power to develop and put into action efforts that close the gap between a supply chain and a strategic supply chain belongs to strategic supply chain partners. Empowering individuals, integrating knowledge, and forming alliances are a few of these bridges. (Imran and Rizwan, 2013).

Organizations must assess their progress in meeting customer needs and maximizing the use of productive resources in order to be successful businesses and reach their long-term objectives (Neely et al., 2005). (Hallgren & Olhager, 2009). Now the question is, how to measure supply chain performance? Outbound logistics, sales, and customer satisfaction are three of the six main supply chain operations that can be utilized as composite performance measurements, according to Chan and Qi (2003). The performance of supply chain management as measured by this study's focus on revenue, order fulfillment, just-in-time delivery, customer satisfaction, and lead time.

Due to a comprehensive arrangement that covers everything from sourcing raw materials to end-user purchases, the advantage of implementing supply chain management in firms would be an increase in sales and market share (Ferguson, 2000). A study by Tunc et al. (2017) found there are associations between supply chain characteristics and company sales. Order fulfillment strategies assist organizations in responding to high levels of demand. Just-in-time deliveries release orders at the scheduled time and place, from the right source, with the right price, to the scheduled place.

However, ARAMCO experiences a huge and persistent growth in the production and supply industry concerning consumer base. The 2007 financial crisis resulted in a change of supplies in various countries. The international fight against global warming activities and misuse of non-renewable resources has also had an impact on the industry.



Saudi Aramco: Supply Chain Management – Essay,2022

### **Sustainability applications in Saudi Aramco**

When it comes to the lead in technology among Saudi companies, Aramco is the one. The company has noticed the importance of applying advanced technologies in logistics such as Augmented Reality, Virtual Reality, drones, and self-driving technologies by signing agreements to use the technology inside their facilities, in order to meet the aspirations of Vision 2030. The company was eager to apply sustainable concepts in each of its activities, and this was evident in its efforts to embrace this concept [9].

Some of these technologies fall under various areas related to the supply chain, including data flow blockchain, automated data collection, big data analytics, and transportation. Among these technologies drones, self-driving vehicles, augmented reality, and virtual reality are related to warehouse management which is an important station before the product is being distributed to the customer.



## **Conclusion**

On the one hand, the concept of sustainability is considered new and caught the attention of international organizations. It is a package that incorporates high standards of living, long lifespans of the surroundings (i.e., products, good financial statements, good academic state), and a healthy environment to counterbalance this standard of living in the future.

On the other hand, supply chain management is a concept that seeks the linkage between supply chain parties and the organization, considering enhancing the performance of the supply chain operations toward reputation, customer satisfaction, and growth in the market.

However, this work has combined these two concepts and investigated potential supply chain applications, whether the supply chain can be sustainable, and how the leadership of Saudi Arabia embraced the duty to promote the use of sustainable technologies by both Saudi organizations and non-Saudi organizations. Much of the work on embracing sustainability by start-up businesses is driven by these businesses' desire to find better ways of working using the technologies that have been discussed. This obligation is significant, and it falls on the shoulders of companies to devote it.

## **Acknowledgment**

The author thanks Dr. Dalia Saber, an assistant professor in the industrial engineering program at Taif University, for her encouragement to complete this work.

## References

- [1] Portney, K. E. (2015). THE CONCEPTS OF SUSTAINABILITY . In *Sustainability*. essay, London, England.
- [2] Stanciu, A.-C., Constandache, M., & Condrea, E. (2014). Concerns about the sustainable performance of firm in the context of Quality Management Systems Implementation. *Procedia - Social and Behavioral Sciences*, 131, 340–344. <https://doi.org/10.1016/j.sbspro.2014.04.127>
- [3] Wahyuni, Dina. (2010). The Importance of Supply Chain Management in Competitive Business: A Case Study on Woolworths.
- [4] Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining Supply Chain Management. *Journal of Business Logistics*, 22(2), 1–25. <https://doi.org/10.1002/j.2158-1592.2001.tb00001.x>
- [5] Fawcett, S. E., & Rutner, S. M. (2014). A longitudinal view of supply chain education: Assessing the challenge of retaining relevance in today's dynamic marketplace. *The International Journal of Logistics Management*.
- [6] Shyam, R. (2015). Importance of Supply Chain Management. *International Journal of Engineering and Management Research (IJEMR)*, 5(2), 197-201.
- [7] Rashad, M. (2016). Saudis await prince's vision of future with hope and concern. *Reuters.com* (24 April 2016). <http://www.reuters.com/article/us-saudi-plan-idUSKCN0XL0B2> (Diakses pada 3 Mei 2019).
- [8] Alshuwaikhat, H. M., & Mohammed, I. (2017). Sustainability matters in national development visions—Evidence from Saudi Arabia’s Vision for 2030. *Sustainability*, 9(3), 408.
- [9] Humoud, A. A., & Al-Ghamdi, S. M. (2008, October). Applications of Multiphase Technologies Optimize Upstream Operation in Saudi Aramco. In *SPE Asia Pacific Oil and Gas Conference and Exhibition*. OnePetro.
- [10] Bai, C., Dallasega, P., Orzes, G., & Sarkis, J. (2020). Industry 4.0 technologies assessment: A sustainability perspective. *International journal of production economics*, 229, 107776
- Pehlivanis, K., Papagianni, M., & Styliadis, A. (2004). Virtual reality & logistics. In *Proceedings of the International Conference on Theory and Applications of Mathematics and Informatics* (pp. 377-384).
- Ahmed, A. The Importance of Supply Chain Management Practices in Increasing Customer Satisfaction and Customer Retention: Evidence from Saudi Arabia.
- Ali, S. I., & Ali, S. R. (2013). Strategy and Factors Affecting the Supply Chain of Manufacturing Industries in Saudi Arabia. *European Journal of Business and Management*, 5(30), 63-77.

- Althaqafi, T. (2021). Determinants influencing the supply chain performance in Saudi Arabia. *Uncertain Supply Chain Management*, 9(1), 187-194.