An Analysis of the Impact of Agricultural Supply Chains on Society: A Post-COVID Perspective

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Abstract

As a result of the Covid pandemic that has occurred over the last few years, the global agricultural supply chain has shown itself to be extremely vulnerable to disruptions as a result of the disruptions caused by this pandemic. In the wake of the COVID-19 pandemic, companies around the world have faced unprecedented challenges as well as challenges relating to the cross-border flow of components and materials in the agricultural industry as a result of the outbreak. It seems that such disruptions are more frequent and more intense than ever before as a result of the ongoing challenges of climate change as well as the changing geopolitical landscape. As farming is able to flourish in this dynamic environment of constant change by utilizing digital technology to find new ways to protect supply chains in an uncertain climate by leveraging digital technologies, they can find new ways to secure their supply chains in an uncertain climate by leveraging digital technologies. This recent pandemic has had a profound impact on every aspect of the value chain in the agriculture sector, from the raw materials sourced in the farming sector to the final consumer, all of which are affected by the recent pandemic. The commercial, operational, financial, and organizational resilience of many small and marginal farmers around the globe is being tested. This has resulted in a number of small and marginal farmers being exposed to risks and exposing their resiliency gaps as a result. Considering that none of us can predict what is going to happen in the future, we can only learn from the past and prepare for the uncertain future that lies ahead of us. Although there's no doubt that a lot of supply chains have become complacent over the past few years, the urgency to implement a supply chain which can adapt to the future is greater than ever with the discovery that many have become complacent over recent years. One silver lining of this situation is that we have the experience, the intelligence, and the technology available to us at all times in order to resolve supply chain disruptions as quickly as possible.

Keywords: *global supply chain, agriculture, technology advancement, digitalization, nearshoring, pandemics*

Introduction

There are a lot of farmers who do not have a good understanding of the agricultural supply chain. The farmers produce their agricultural products and then sell them to middlemen, where they can only make a very marginal profit on the sale of these products. Currently, farmers can be learning the basics of supply chain in order to improve their financial

situation and provide competitive advantage and serviceability, which will help them reach out to their consumers and keep their loyalty to their brand. As part of the agricultural supply chain, all processes take place, from the supplier, to the farmer, to the processor, to the distributor, to the retailer, to the consumer.

The advent of new technology has led to a fundamental change in the way supply chains function globally in the agricultural sector as a result of the onset of new technologies. In rural areas, the demand for goods and services is increasing at an accelerated rate, and the supply chains in these areas are also undergoing a rapid change in response to this. It has become evident that, due to the increasing reliance on technology and innovations in modern operations, rural supply chains are becoming more complex in the context of their far-reaching reach. There are a number of factors that contribute to this blurring of the lines between the skillsets of blue collar and white collar professionals working in rural supply chains and farming operations as a result of these factors. A combination of physical skills and technological skills is needed in order for an organization to be able to sustain and grow at present, and in the future, as well. Because of these aforementioned supply chain issues in the farming sector dominating discussions in the farming sector, many farming communities have lost focus on existing transformation mandates as a result of a lack of focus on existing transformation mandates. At this time, there are a number of issues driving discussions and requiring attention, such as driver shortages, logistics provider capacity issues, inflation, shipping delays, increases in freight costs, dwindling inventory levels, labor shortages, and increases in demand. In order to better serve the needs of the farm, the agricultural operational leads have been instructed to change their focus from large change projects to the day-to-day operations of the farm and its staff. In response to this, farmers are also learning how to manage crisis response while also developing a long-term strategy that goes beyond the immediate setbacks that have been experienced.

It has been reported that agricultural production delays have been a significant part of the news coverage of COVID-19. Various agricultural products have been reported to be in short supply and have limited logistics capacity, which has resulted in empty shelves and a long lead time for consumers to purchase the products due to a lack of supply of key commodities. In addition to the bad news, there is also some good news to report. Since the outbreak of the pandemic, a greater emphasis has been placed on the evaluation and evolution of supply chains as a result of this. To prepare for the new post-pandemic normal following the devastating pandemic, the agriculture industry is evaluating and investing in long-term supply chain strategies in order to prepare for a new post-pandemic normal after the devastating pandemic.

It has been reported that farmers and rural areas continue to be adversely affected as a result of the ongoing global logistics disruptions caused by the COVID-19 pandemic, because major international ports and airports, which are primarily located in Taiwan, South Korea, and the United States, have closed. As a result, the flow of consumer goods into key markets has been restricted, such as the United States, the UK and Japan.

There was a time when supply chain management was one of the hottest topics in the agriculture industry during the 1980s. In the agricultural sector, there has been a trend in recent years to move farming to countries that are more affordable in terms of cost, as globalization becomes more and more prevalent as a result of globalization becoming the new norm in farming. In order to gain a competitive advantage in the global marketplace, the implementation of business technology was focused on the integration and visibility of these new global supply chains that were being implemented. There is no doubt that in the 2000s and 2010s, the world's attention was largely devoted to the newer technologies associated with an increasingly connected world. Supply chain management was largely left behind in the shadows during the early days of these exciting new technologies that were transforming the world.

A key consideration on the journey toward the development of automated response systems is the provision of seamless, real-time access to data that is relevant to the stakeholders involved in supply chain planning. Although internal company data sets can provide reliable information on logistics, transactions, and inventory, many organizations lack a good understanding of their entire supply chain as a result of underutilizing the vast amount of freely available external data that is available to them. It is possible to gain a deeper understanding of how shocks can affect an organization's supply chain operations by combining external information with existing internal data in combination with external information. Due to the falling costs of cloud-based data storage and computation, aggregating these various data sources and gaining real-time insight from them has also become easier over time, since the costs of cloud-based data storage and computation have fallen.

In order for the farming community as a whole to be able to put the pieces together, come up with a solid strategy, and execute the plan that makes the most sense for them to be able to put the pieces together, come up with a solid strategy, and execute it on a supply chain transformation plan, those pieces must be considered by farmers as they put together a coherent strategy.

Digitalization and Agricultural Supply Chains

According to United Nations estimates, the number of people on Earth is expected to grow from 7.7 billion in the year 2050 to 9.7 billion in the year 2080. Moreover, we are in the midst of global warming effects that will lead to a shortage of agricultural production in the next few decades as a result of global warming. In the era of the advance of digital technologies, one of the most crucial technologies that must be incorporated into digital technologies in order to overcome the problem of agriculture supply chain is Artificial Intelligence technology.

Agricultural players face an increasingly challenging environment in which to operate today, but digital and analytics offer powerful tools that can unlock new value for those who know how to use them, and who are willing to learn how to utilize them. In spite of the fact that there are a lot of pitfalls on the way to adoption, there are also many benefits to success. It is

clear that digital and analytics technologies can provide well-placed industry leaders with new sources of competitive advantage by helping them unlock a new source of value within the agricultural supply chain, creating a new source of competitive advantage.

Efforts are being made to manage change across a wide range of stakeholders, including farmers and players in the agriculture sector. It is imperative that farmers prepare themselves for changes in crop-collection planning and logistics, as well as for the potential upside to the changes: an increase in compensation for their crops as a result of these changes are likely to occur. According to one agricultural company, when it optimized its supply chain with a digital twin, up to two thirds of farmers saw a change in their crop collection period and crop compensation increased by 3 to 5 percent as a result. In addition to a mindset shift, agricultural supply-chain teams also need to change their approach. The use of digital twins for planning and addressing exceptions should be encouraged rather than relying on frequent rescheduling and firefighting procedures as a means of managing exceptions.

In order for the supply chain to be successful, adequate data sharing needs to be implemented. It has been reported that many producers, transportation vendors, and distributors do not trust the system or each other. A Mckinsey study claims that equal and simultaneous access to the entirety of the supply chain information strengthens transparency and trust between all participants, facilitating new ways of collaborating and strengthening existing partnerships between the participants.

As a modern technology, supply control towers can promote collaboration between supply chain participants in order to enhance efficiency and productivity. Data pertinent to the supply chain network is input into a repository by each member of the network, which is accessible to other members of the network. A company can analyze operational data in real-time and obtain a clear understanding of the entire product journey through the use of this technology. Taking this approach will allow them to manage risks, gain more control over their processes, and be able to settle any insurance claims as quickly as possible.

The advancements in digital and analytics technologies offer a way of optimizing the supply chains associated with agriculture. In recent years, agriculture has been capturing more data than ever before, on everything from agronomy to weather to logistics to market volatility, and the industry has been gathering more data than ever before. Over the last few decades, data storage capacity has increased, storage costs have plummeted, and computational power has increased. Meanwhile, both predictive data science and prescriptive optimization techniques have matured and gained visibility in recent years.

One of the most compelling ways to use digital and analytics technologies is to create a digital twin of the physical supply chain from the farmer up to the end customer and to use that digital twin to run virtual simulations and optimizations in the virtual environment. There are different elements that can be included in a digital twin when it comes to the supply chain and its interfaces, including procurement, production, inventory points, transportation,

warehousing, and the points of sale for finished products. A variety of objective functions can be calibrated using mathematical models and based on the needs of the organization, such as profit, throughput, cycle time, and inventory optimization can be included in the mathematical model.

Agriculture is typically transformed in a step-by-step manner, with new procedures and technologies being introduced gradually, equipment being updated, and staff being trained as new procedures and technologies are introduced. In spite of this, as we face the impending food crisis, we should take a holistic approach to digitalizing the agriculture supply chain in order to achieve the best results. Taking into account that smart technologies such as AI, blockchain, and IoT are interconnected, ensure flexibility and reliability, and are compatible with each other, they should all be adopted together to achieve their full potential. The implementation of these essential technologies might require significant investments at the beginning, but they are likely to provide a very effective protection from unexpected disruptions which could result in millions of dollars being saved in the future.

Agricultural Supply Chain Issues: New Strategies - Post Pandemic

There are a variety of supply-chain processes across industries that are inherently complex, with multiple functions interacting with different, potentially conflicting objectives, and with varying degrees of dependence between material and information flows. Additionally, the fragmentation of the inbound and outbound networks within the agriculture supply chain further complicates the situation. There are typically three steps in the agriculture supply chain: from farmers to intermediate silos, from silos to transformation plants, and from transformation plants to clients. There are multiple decisions that must be made at each step.

It is important to recognize that agricultural companies, including food processors, input providers and agricultural product manufacturers, can take advantage of a four-step approach to end-to-end supply planning in order to respond to agricultural supply chain shocks caused by such notable events as the pandemic. This approach involves integrating data sources to enable real-time monitoring; simulation to produce various supply chain scenarios; deployment of appropriate optimization algorithms for real-time responses to shocks; and complete automation of the first three steps to produce automatic response systems as a result of integrating data sources.

It is a well-known fact that when it comes to a farm, there is no such thing as a static environment. To increase their competitiveness in the market, farmers, as well as the agricultural sector in general, have begun to employ a strategy called nearshoring in order to increase their competitiveness in the field. In order to increase profitability and efficiency, the main purpose behind this is to establish manufacturing capacity closer to the end consumer, target market, or even to the farm itself in order to improve profitability and efficiency. Furthermore, it has also demonstrated itself to be very useful not only in the agricultural sector, but also in a wide range of other fields as well. In order to maximize the logistics, operational,

and cost benefits of nearshoring, it is crucial that not only the location of farms be considered when it comes to nearshoring, but that it is also important to consider how the farms are likely to evolve their farming operations in the future in order to maximize the benefits of nearshoring. As a result of the use of Industry 4.0, there are several ways in which the use of Industry 4.0 applications, technologies and processes, and the connectivity that makes them possible, can be used to maximize agility, planning capacity and output as a result of this use of Industry 4.0.

On the other hand, it should be noted that nearshoring facilities do not operate in a vacuum and a high-performance, on-premises wireless network is only one of the requirements for a farming facility to be able to operate efficiently and effectively. Having access to information and specifications regarding production, as well as resources for essential activities such as basic supply and demand of agricultural products, in order for farmers and rural workforce to be able to operate effectively, is crucial to their ability to have a high level of efficiency on their part. There is no doubt that corporate agro companies have been establishing offshore farming facilities for a long time in order to take advantage of lower production costs, as well as the availability of labor, in order to take advantage of lower production costs. Although this operating model was under pressure in the rural regions, it was still in use in the urban areas. Whenever they became single modalities, they soon became a logistical liability, since once they became single modalities, they were no longer under pressure to be able to provide the same level of service that they provided before, as they had become single modalities.

In addition to providing supply chain resilience to a supply chain, nearshore farm production has many other advantages. A company located close to its customers will be able to give them a more rapid response time and will be able to adapt to ever-changing regional regulations and requirements because it is so close to its customers. As a result, shipping is easier and more cost-effective, and products reach their intended markets in a shorter period of time thanks to the faster delivery process. In addition to reducing the impact of currency fluctuations on their income, local farmers are able to reduce the cost of customs and duty charges to their customers by eliminating these charges. In order to ensure that their supply chains are well protected against disruptions in the future, more and more farms are turning to nearshoring as a means of safeguarding their supply chains.

Conclusion

It has been estimated that billions of dollars of losses have been incurred across the global agricultural supply chain due to events such as extreme weather conditions, pandemics, and the invasion of Ukraine. The development of automated planning systems that can handle high levels of uncertainty is likely to result in an improved preparedness for food security risks

and greater cost savings for organizations that are affected by global supply chain shocks in the future.

In order to remain competitive in the agricultural industry, it has become increasingly necessary to address some long-standing supply issues, re-engineer farm products to address these issues, and raise awareness of these issues so that they can be addressed in order to remain competitive in the agricultural industry. To ensure that the rural sectors are positioned to meet this growing demand, it is imperative that in order to position them in this new era of rural development, more resilient and cost-effective supply chains are being developed to ensure that they are in a position to meet these growing needs in the rural sector. Despite the fact that there is no surprise that many supply chain managers in the agro sector are currently experiencing difficulties related to a lack of visibility across extended supply chains, it may come as no surprise that there are problems. Leading agricultural companies and farmers are using advanced technologies in order to enhance visibility and boost their ability to respond to major disruptions and variables within their domestic, regional, and global supply chains. As a result, they are able to improve visibility and boost their ability to respond significantly.

This problem can largely be solved by using digital technologies and implementing digital transformation, so that farmers will be able to facilitate a seamless flow of information across the value chain and make better informed decisions based on insights that can be gathered. In order to gain a better understanding of their spending, it has become increasingly essential for agro companies to make use of spend analytics tools and software packages in order to gain a deeper insight into what they are spending. You can improve your buying leverage and negotiating power through the consolidation of expenditures, which allows you to drive more value for your organization or push for improvements by consolidating expenditures. In the rural sector, consolidation of spending is often a prelude to farmer consolidation, which reduces the variance in quality and price across multiple geographies for the same product or service that is being offered at the same time.

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