

Impact of Supply Chain Efficiency and Effectiveness on Organic Farms Profitability

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ABSTRACT

In farming and agriculture, supply chain costs must be evaluated to determine the extent to which processes of production contribute to an effective value proposition and whether elements of production contribute to profitability. The study aimed to examine the impact of supply chain efficiency and effectiveness on organic farms' profitability in Ontario, Canada. The methodology adopted by the researcher to study this phenomenon was a qualitative approach, while the research design was a literature-based review. Thematic and content analysis methods were also utilized, which helped the researcher identify two themes which are Supply Chain and Distribution Channel Impact on Organic Farms and Recent Trends in Organic Farm Profitability. The findings of the study indicated that the supply chain of organic farms in Canada has been ineffective and inefficient. Distribution was noted to be a major challenge for these organic farms, which has led to organic foods not attaining the same breadth and depth as conventionally farmed goods. The findings also indicated that even if organic foods have reached more markets, they are still not the focus in stores. Such scenarios have had a negative impact on the profitability of organic farms. Additionally, the findings also revealed that ineffectiveness in the supply chain has made the organic farms compete with fake products which are sold at low prices, which ultimately contribute to loss of profits to the organic farms. The findings also indicated that even though distribution still remains a challenge for organic farms, there is an emerging solution. The use of cooperative food systems and a network of local organic food co-ops are an emerging answer to the distribution problem contributing to supply chain ineffectiveness and inefficiency.

Keywords: Supply Chain, Food Chain, Profitability, Organic Food, Farming and Agriculture

INTRODUCTION

The supply chain of production is typically one of the most significant concerns in most industries. Supply chain management in the business flow of services and goods management between different locations and businesses encompasses the storage and moving of the raw materials, work-in-process, final products, and distribution to the consumption end for the customers to access the finished goods. Accordingly, this process implies that the supply chain is involved in transforming the raw materials sourced from the suppliers to finished goods to promote the consumers' value in buying them and acquiring the competitive advantage in the industry an organization operates. The process impacts the operational costs of a business based on the need to enhance the value to the customers. Supply chain costs emerge from how value is added to the finished good.

The value addition needs to be considered in the scope of how it is that they contribute to the profitability of operations. In farming and agriculture, supply chain costs must be evaluated to determine the extent to which processes of production contribute to an effective value proposition and whether elements of production contribute to profitability. Even though the farmer input involves part of the value creation, the cost incurred by the business to transport the raw materials should also be considered in the evaluation of the firm's profitability and value addition. Costs such as the cost of feed for animals, fertilization, and pest removal are important factors. However, it is also important to consider the cost of in and out-freight and getting products on shelves. Since there are different farming and agriculture strategies, examining the extent to which these strategies impact profitability is important. The organic farm is a strategy based on the overall value of a supply chain where food free of genetically modified organisms (GMOs), pesticides, antibiotics, and industrial processes is put in place (Arif et al., 2017).

Hamzaoui-Essoussi and Zahaf (2012) described the supply chain for organic foods as including distribution channels where the higher cost of organic food production creates a product differentiated from conventional production where higher prices emerge from the higher cost of production and a lack of economies of scale. Additional research focused on organic farms in Ontario, Canada, exposed the problem of the producer as being one that is similar to those faced by organic farmers in other regions where the supply chain has an impact on profitability. For organic farmers in Ontario, the profitability of production in organic farms is challenged by the difference in approach taken to production and distribution by conventional farmers. Accordingly, a review analysis on the

effect of supply chain effectiveness and efficiency in influencing the profitability of organic farming in Ontario, Canada, has been undertaken in the research paper presented.

Theoretical Framework

Diverse theories have been developed to demonstrate the effect of the supply chain effectiveness and efficiency in a given organization's performance or activity. The various supply chain theories are critical in signaling the effect of the supply chain costs on the profitability of the organic farms in Ontario province, Canada. The three critical theories of the supply chain are principal-agent theory, network perspective, resource-based view, and transaction costs analysis in dealing with the third-party logistic (TPL) (Helldorsson, Mikkola, and Kotzab, 2007). The principal-agent theory provides that interim-firm contracting should be preferred in contracting third-party logistics to ensure an efficient agreement between the seller and buyer.

The rationale behind this theory is to develop the best efficient combination of behavioral and outcome incentives, TPL and shipper (Helldorsson, Mikkola, and Kotzab, 2007). This scenario of determining if the cost of supplying the raw materials will be based on a behavioral outcome such as miles covered, salaries, or hours consumed. Consequently, a farm expecting a supply of raw materials can determine the cost paid to the shipper based on the efficiency of moving the goods to the required site and the miles covered. Moreover, the principal-party theory is employed in the development of the new product. The theory indicates that a firm should decide which part of the new product will be developed by the suppliers and how it will be performed (Laosirihongthong et al., 2020). This decision is based on the cost benefits and product differentiation improvements the firm will accrue by involving the different suppliers. Consequently, the theory demonstrates an organic farm can reduce the supply chain cost on the work-in-progress by selecting certain firms meeting its interested improvements and enhancing its market attractiveness.

The second theory of transaction costs analysis indicates that a rational business should decrease the supply chain cost by reducing transport firms and engaging in long-term and close cooperation with minimal operators (Helldorsson, Mikkola, and Kotzab, 2007). The rationale behind the theory is that the decision will reduce the transaction costs related to communication with fewer contractors, negotiation and contract writing costs, and contract enforcement costs. The long-term and close relations with the few selected contractors have

the effect of inducing trust and cooperation in the supply of the raw materials consistently and minimizing transportation costs, which are critical supply chain costs. Consequently, the extent to which the organic farms in Ontario have managed the number of transactions is crucial in determining the effect of the supply chain costs on their profitability, as provided by the theory. A high level of transaction in moving the raw materials to the farmland and transporting them to distribution sites reduces their profitability due to low-profit margins.

Equally, the theory is employed in the work-in-progress during the new product development decision. The transaction costs analysis theory indicates that an effective supply chain in the development of a new product should be undertaken through modulation to reduce costs. A modular system has the advantage of enabling a firm to undertake new product development using the parts available, which promotes economies of scale (Ketokivi and Mahoney, 2020). This aspect means the product architecture should use standard components to control market governance and maximize unique products. The theory suggests organic farms in Ontario using standardized components in the development of the new product will enhance their profitability due to economies of scale.

The network supply chain theory is based on the trust and openness of the parties involved in the supply chain network has an effect on the cost. Accordingly, the theory provides that a firm has the effect of reducing the supply chain management costs if it develops trust and openness with the suppliers and contractors due to the benefit of mutual adjustments based on market or production changes (Helldorsson, Mikkola, and Kotzab, 2007). Equally, mutual improvements between the parties on logistical systems and administration of the movements across the supply chain are possible with open and trust relationships, which are vital in enabling a firm to avoid wastages and reduce costs. (Wieland, 2021)

The network supply chain theory in the work-in-progress part of the supply chain indicates interchangeable components available in a company should be employed in new product development to reduce costs.

Thus, components should be interfaced to reduce the cost of developing new products instead of acquiring new parts. The theory means organic farms will enhance their profitability costs by minimizing the supply chain cost through the interfacing of compatible raw materials available instead of buying new ones in the development of new products for the consumers.

The last theory of resource-based perspective provides that an effective and efficient supply chain is one in which a firm has stringent boundaries perception in relating with the various parties involved. This aspect implies that the firm should develop a limited degree of relationship with the parties on its capabilities and resources (Helldorsson, Mikkola, and Kotzab, 2007). This approach means the firm will determine where and when to engage in close and long-term relations, share confidential information with different parties, and limit closeness with the other parties based on diverse interests, capabilities, and resources. The approach can enable a firm to manage the supply chain management cost-effectively since it will limit the commitments beyond its financial and other resources capabilities.

The theory proposes firms should be considerate of the potential of competitors to imitability certain essential assets such as technology and management of available resources in making a decision to develop a new product (Laosirihongthong et al., 2020). A firm with an inability to manage resources in new product development and secure its uniqueness from imitation should avoid undertaking the new product development due to its adverse effect on the capital it has invested to the advantage of competitors. Accordingly, profitable organic farms in Ontario are one that assesses the viability of the new products based on availability and management of resources and security of its unique asset due to the potential of fear of failing to recover the invested capital. Consequently, the various supply chain theories should inform if the supply management of the organic farms in Ontario has contributed positively or negatively to the profitability of the companies and farmers.

Analysis and Design Methodology

Research method refers to the approach and the technique that is utilized to gather data to be analyzed in order to obtain a better comprehension of the situation under study. The most appropriate research method for this study was the qualitative approach. Qualitative methodology was preferred since it is a naturalistic, inductive, interpretive, and emergent approach that is applied to study social problems. The approach was also applied to the current study because it allows the researcher to use multiple sources of data, inductively analyze the gathered data, and interpret the findings in a subjective way (Shakouri and Nazari, 2014). Therefore, the qualitative approach enabled the researcher to compare and contrast information collected from several sources and interpret the information subjectively in order to get insights on the topic

under study. According to Tenny et al. (2017), scholars can utilize the qualitative research method to dig deep into publications and acquire extensive information. The design applied in the study was a literature-based research design. This design can be applied as a methodology to base arguments on what is and is not known regarding the situation being evaluated by the researcher (Newman and Gough, 2020).

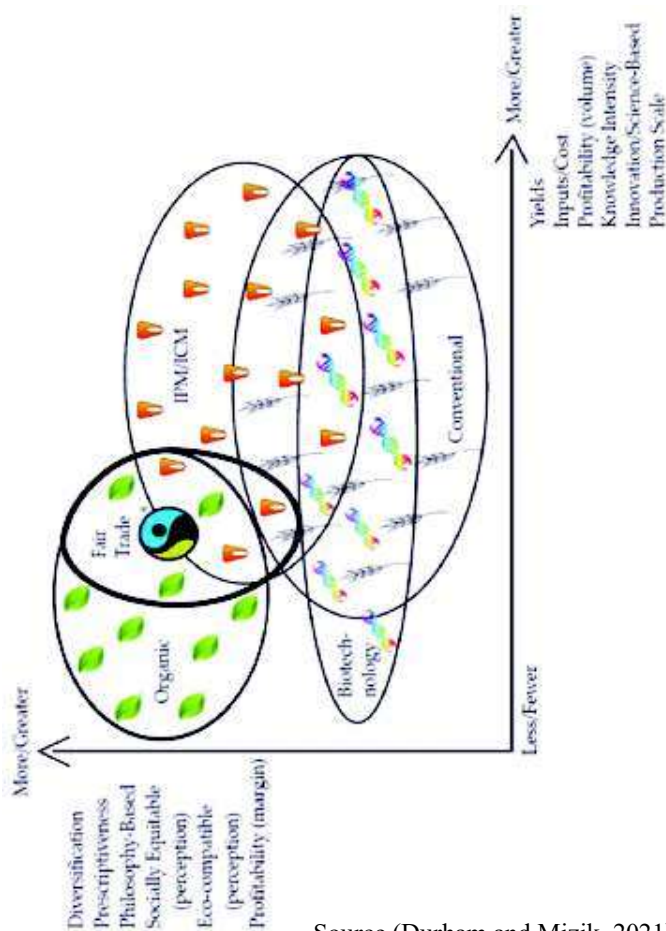
The researcher searched systematically the reputable sources to identify the most appropriate articles for the review. Inclusion and exclusion criteria were developed to help with the data collection process. The studies that were incorporated in the study were only those associated with supply chain efficiency and effectiveness and organic farms' profitability. Websites, podcasts, newspapers, and other non-reliable sources of data were excluded. Thematic and content analysis of secondary data was the data analysis approaches utilized in the study. Thematic analysis was conducted initially to help the researcher assemble the data from multiple sources. The thematic analysis emphasizes majorly on patterns that lead to recognition of the major themes from the gathered data. After thematic analysis, the researcher did a content analysis which allowed the researcher to be familiar with the data collected by critically analyzing the major themes that were developed from the content analysis approach. This also allowed the researcher to interpret the identified themes in order to attain the aims of the study.

Findings

Supply Chain and Distribution Channel Impact on Organic Farms

The objective of the organic farm is to be an element in the food chain, which contributes to the sustainability of production while remaining harmonious with the environment (Hamzaoui-Essoussi and Zahaf, 2012). While it began as an alternative niche industry, organic farming has emerged as one of the key contributors to the diversity of options in the food chain and the development of technologies, which can support sustainability and green alternatives to the response of needs in the food chain. Organic farms are held to a higher standard in Canada, and farms must be certified as organic producers to label their foods organic. Their certification must be upheld by audits of their farms performed annually. Organic farms have greater production costs because these farms do not rely on factors, making production cheaper and eliminating waste. The GMOs, unlike organic farming, use enhancing productivity, which reduces production costs significantly.

Thus, the ability of GMO producer to maximize profits are higher than for the organic farmers. Organic farms' use is expected to enhance the health ecosystem while ensuring the ingredients employed do not harm natural resources, which increases production costs, unlike GMO farming practices. These are considered to be value-adding elements of the production process, which is why farms must be certified that they include this in their operations. Organics also have smaller production windows, which constrain farm profitability even further. Their windows are smaller because GMOs are engineered to experience different conditions. At the same time, the distribution of organic foods has not



Source (Durham and Mizik, 2021)

reached the breadth and depth that conventionally farmed goods have reached. As a consequence, while organic foods are reaching more markets, they are still not a centerpiece in these stores, and alternative and organic-themed markets are the prime locations for the sale of these products. This scenario has an adverse effect on the profitability of organic farming, unlike conventional farming and GMO farming. The diagram demonstrates the profitability comparison of the various agricultural practices and their market perception.

One major finding on the supply chain efficiency and effectiveness in influencing the profitability of the organic farms in Ontario is meeting the market demand. The market demand for organic food across Canada has been increasing over the years. However, the available supplies to meet the increasing demand have been decreasing. Consequently, consumers opt for conventional and GMO foods due to increasing prices for organic foods as the demand expands. Consequently, the effectiveness of the supply chain management of the organic farms to improve on their distribution end to consumers has been, which has affected the profitability adversely.

| Characteristics | Conventional | Conventional plus Biotechnology | Organic | IPM |
|------------------------|----------------|---------------------------------|----------------------------------|----------------------------|
| Yield | Normal | Up to 15% higher | At least 10% lower | Comparable to conventional |
| Pesticide cost | Normal | Lower | Much lower | Much lower |
| Fertilizer cost | Normal | Normal | Much lower | Normal |
| Labor cost | Normal | Lower | Higher (+15%) | Higher |
| Product variety | Specialization | Specialization | Diversification | Diversification |
| Product price | Normal | Normal | High price premium | Normal |
| Gross margin | Normal | Much lower | Generally higher | Higher |
| Pricing/business model | Volume | Volume | Margin | Margin |
| Environmental benefits | Normal | Higher | Much higher (at the micro level) | Much higher |

Source (Durham and Mizik, 2021)

Additionally, the supply chain management in Ontario is facing the challenge of lack of organic land farming. According to the GEP (2020) organization, Canada is faced with insufficient land availability for viable organic farming due to the vast it demands to generate adequate products to meet the market demand and get positive returns. The diminishing availability of land has a negative impact on organic farming in Ontario due to the shortage of supplies and inadequate revenue to make a profit. Equally, organic farming runs the risk of generating inconsistent quality of supplies due to overuse of the available land, which affects the competitiveness of Canada in serving the global market. The failure of organic farms to fight the penetration of counterfeit products is also affecting the profitability of the industry (GEP, 2020).

Ensuring the genuine products of a given company are not countered by fake ones is a critical play in the supply management at the end of distribution to consumers, retailers, and wholesalers. Indeed, the supply management of the various firms is expected to deploy market intelligence teams to check on the violation and interference of their products from abuse. Consequently, the penetration of counterfeit organic farm products demonstrates a poor and ineffective supply chain that is costing the industry's profitability negatively.

A close reflection of the economic comparative analysis undertaken in the graph above indicates organic farming has the least profitability than the rest of the agricultural practices. However, the diversification, eco-compatible, philosophy based. Social equitability and profit margin perceptions are highest for organic farming. Consequently, organic farming can promote its profitability in the future with effective and efficient management due to the highest market perception it attracts. The analysis indicates consumers are highly in preference and taste of the organic foods, but management bottlenecks might be affecting the ability of the practice to maximize the positive market perception it holds. Similarly, the table below demonstrates the various organic farmers.

The table below presents a summary of the different types of farmers categorized by the different crop production systems that they adopt. The characteristics of interest were yield, pesticide cost, fertilizer cost, labor cost, product variety, product price, gross margin, pricing model and environmental benefits. The farmers adopted either a conventional system, conventional plus

biotechnology system, organic system, or Integrated Pest Management System (IPM).

Recent Trends in Organic Farm Profitability

Some answers to the problems of productivity and performance in these farms are coming from current research. Dias, et al. (2017) discovered that farm greenhouse systems technologies in Ontario are leading to greater productivity and less waste. Even still, the profitability of organic farming in Ontario is further challenged by the cost of land and the difficulty of financing. A further contribution to the difficulties these farms face where a lack of economies of scale contribute to difficulties in dealing with covering fixed costs (Rotz, et al., 2017). According to Hamzaoui-Essoussi and Zahaf (2012), sales of organic foods in Canada are only 1% of conventionally farmed goods.

However, as these foods come more into favor, sales are increasing. This is evidence that in addition to additional costs of greater waste, costlier production, and smaller production windows, economies of scale possibilities are meager in comparison to productivity in conventional farms. While distribution remains a challenge, the use of cooperative food systems and a network of local organic food co-ops is emerging as an answer to the problems of sales for these farms.

Equally, cultural trends are contributing to a greater appetite for organic food (Sumner et al. 2016). Culturally, the higher quality of organic foods is becoming increasingly valued against the lower cost of GMOs. Essentially, the supply chain and distribution channels create greater costs and less efficiency of fixed costs than conventional production methods.

DISCUSSION AND ANALYSIS

The four theoretical frameworks of the supply chain are crucial in demonstrating the crucial role played by an effective and efficient supply chain management to influence the profitability of a given company or industry. The theories depict the supply chain has the potential of causing the operation costs of a company to increase or decrease, which has an impact on the profit generated (Helldorsson, Mikkola, and Kotzab, 2007). Accordingly, an analysis of the findings has been demonstrated to determine if the supply chain of organic farms has been effective and efficient and its effect on its profitability. A close reflection of the data findings reflects the supply chain of the organic

farms in Canada has been ineffective and inefficient due to the adverse effect it has contributed to the industry. The findings indicate the supply chain has failed to ensure the logistical plans on ensuring adequate land is acquired to generate enough supplies for the growing market demand is realized.

This scenario has contributed to the poor performance of the organic farms over the years. Indeed, the transactional cost analysis theory depicts those organic farms can increase their profitability by undertaking an efficient supply chain, minimizing the number of contractors, and negotiations to avoid high costs while maintaining their optimal yield capacity. Similarly, the network-based model demonstrates the supply chain should have utilized interchangeable raw materials to reduce costs and enhance the yield of the farms without compromising on the quality of the final products (Zubariu, et al., 2021). Additionally, the findings indicating there has been an increase from counterfeit products into the market indicate an ineffective and inefficient supply chain, which has hurt profit generation. The ineffectiveness of the supply chain management has caused the organic farm industry to compete with fake products trading at low prices. Consequently, the revenue the genuine and legally recognized organic farms have been lost to unscrupulous firms and cartels, which hurt the profitability performance of the industry.

Additionally, the profitability of the organic farms in Ontario, Canada, has been adversely affected due to the poor supply chain in managing the exploitation of the market preference demonstrated by social-equitable and eco-compatible shared by the consumers. The eco-computable and social-equitable market reputations of a given company or industry have emerged as critical opportunities for winning consumer loyal due to the positive effect on their social welfare (Ahmed, et al., 2020). Effective and efficient supply chain management work on the corporate social responsibility (CSR) attributes to win the preference of the consumers to optimize the revenue and profit generation. However, the findings reflected in the attached chart indicate the organic farms have the greatest ranking on the corporate social responsibility attributes but have the least profit volume compared to the rest of the various agricultural practices. Consequently, the supply chain has been inefficient and ineffective in utilizing this essential concept, which has hurt the profitability of organic farms.

CONCLUSION

Supply chain management is crucial in determining the success of a given company or industry. The various supply chain theories evaluated demonstrate the influence of supply chain management in determining if a firm or industry is cost-effective. The cost-effectiveness of a company is crucial in affecting the profit generation positively or negatively. The supply chain efficiency and effectiveness of the organic farms in Ontario are critical in information the owners and management if they are enhancing or hurting the wealth generation. Overall, the findings have indicated that the supply chain for organic farms in Ontario, Canada, is at the start of evolution and has become dependent on technological advancement in order to create stronger efficiencies in the marketplace. There are several limitations that they currently face. Examples of limitations are; they are largely tied to the cost of production and distribution and failure to effectively penetrate the market to the extent that conventionally farmed goods have.

One of the anticipated results at the start of the study was that inefficiency and ineffectiveness in the supply chain negatively influence the profitability of organic farms. The findings of the study indicated that the supply chain of organic farms in Canada is currently ineffective due to the distribution limitation, which has negatively affected profitability. This finding of the study was consistent with the premeditated finding.

The findings of the study indicated that technology and cultural changes where there is greater acceptance of organically farmed goods are the keys to success for these farms going forward. Exploiting technology may lower costs and lead to organic food as a culturally preferred good, creating a greater value proposition while establishing a stronger competitive advantage. These firms will continue to struggle economically as profitability will continue to be a challenge in this small section of the market; however, it is possible that these firms will be able to positively turn around the limitations they currently face as the popularity of alternative markets space becomes more prevalent. These farms are not performing well now. However, they are likely positioned to perform well in the future. It is recommended that farmers stay abreast of current research related to organic farms and understand how new technologies will contribute to profitability.

Equally, the industry should improve on its productivity to meet the growing market demand. The supply chain management should be improved to ensure the industry is meeting the market demand to make it more profitable in the future. Similarly, fighting on the counterfeit organic farm products penetrating the market is a critical role the supply chain management should undertake due to the adverse effect on the profitability of the industry and the risk it poses of cause the increasing consumer preference to depreciate due to their health concerns. A decrease in consumer preference and taste can sink the critical economic industry to massive losses. At the same time, it is suggested that these farmers continue to work together to create a place in the market for their goods. Alternatives are working; however, they require viable shelf space. A public that values organic goods will be necessary, and the trajectory is aimed in that direction. This section of the farming and agriculture industry is poised for growth; farmers just need to understand how to effectively get their farms there.

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