ENHANCING SUPPLY CHAIN MANAGEMENT IN PROCESSED AGRICULTURAL FOOD PRODUCTS AT TOPS COMPANY LTD.

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Abstract

Tops Company Ltd identified inefficiencies in Supply Chain Management, such as shipment delays, a high spoilage rate, excessive staffing, obsolete processes, and poor coordination in Rawalpindi branch, Pakistan. This study aims to evaluate the current supply chain management in Tops Company Ltd and suggest plans to enhance the company's adaptability in the current market environment. Quantitative method is used to collect data with limited information, whether towards spoilage rates, lead times, stock turnover, etc., that leads to the company facing issues such as customer dissatisfaction and a spiraling effect on profits. To solve this problem, the company saw clear advancements after implementing new techniques and technologies, such as Radio-Frequency Identification for tracking supplies and goods, production automation, improved climate-controlled transportation, strengthening supplier partnerships, streamlined manufacturing, reduced wastage, increased product availability, and accelerated delivery timing. As a result, food spoilage rates dropped by 80 per cent, delivery times were decreased by 33 per cent, and stock turnover improved by 45 per cent. As a result of these changes, the company works more efficiently, has reduced costs, and fulfilled the needs and demanded of customers. Along with these changes, the company is still facing some more difficulties. These changes took a lot of resources, and getting everyone assured is very difficult. For the company's better future, it is essential to keep investing in new technologies, work closely with employees and suppliers to adapt to the global market environment and deal with unexpected setbacks.

Keywords: supply chain management, processed agricultural food, digital transformation, blockchain, Artificial Intelligence

Introduction

Supply Chain Management plays a very important role in enhancing the improvement of goods especially in the field of processed agricultural food sectors (Zhao et al., 2017). To produce high-quality agricultural food products in Tops Company Ltd, a well-functioning supply chain management is necessary at a very reasonable cost. But nowadays company has been facing many challenges that affects their performance of supply chain. The challenges that company has been facing include extravagant cost issues, inefficiencies in the production process, poor coordination in departments, uncertainty of raw material, persistent delays in shipment seasonal fluctuation, climate change and global supply chain disruption, etc. These issues hindered Tops Company's reputation in the market as they do not meet customers demand on time and maintain their product's quality consistent. This can put huge stress on the agricultural input procurement process. Also, quality control of perishable goods is a delicate concern in transportation, demanding state-of-the-art logistic solutions and storage facilities. Moreover, these issues can easily damage the company's reputation in the market (Bayir et al., 2022).

A second key challenge is the growing complexity of consumer expectations (Rosado-Pinto & Loureiro, 2020).. With the advancement in technologies, consumers nowadays pay full attention towards the production of their products, they also want to know from where this product came from, whether they are made ethically or they are environmentally friendly. This, therefore, also creates a need for the transparent supply chain practices which can be resource intensive in terms of implementation and management (Brun et al., 2020). Alongside increasing operational costs and pressures from a competitive market, these challenges underscore the need for adaptable strategies to revolutionise conventional supply chain models (Li et al., 2015). Overcoming these challenges will help Tops Company Ltd. strengthen its existing operations and gain a competitive advantage in the world's food processing industry. As such, this research studies new ways to enhance the supply chain of Tops Company Ltd. It examines what's bogging down the company's operations and potential remedies, including improved supplier management, new technologies and enhanced inventory and cold chain management. Transform the company's supply chain so that it is more resilient, more efficient and more agile in the face of market changes without compromising on low cost and high product quality (Carvalho et al., 2012).

Research aim: To evaluate the current supply chain management in Tops Company Ltd and suggest plans to enhance company's adaptability in the current market environment.

The following **objectives** have been set to achieve the aim:

1. To produce an analysis of current supply chain practices in Tops Company Ltd to highlight potential areas for improvement and refine them to eradicate bottlenecks.
2. To compare the company's practices to industry standards to identify opportunities for improvement, storage and distribution processes

Research object and methods

Research object: Supply Chain Management (SCM) practices at Tops Company Ltd.

By using secondary sources, this paper aims to discuss the latest trend in the concept of supply chain management. This work mainly focuses on the digital logistics revolution for processed agricultural items and automated warehouses

as its main emphasis. In supply chain management, secondary research is commonly used. This includes observing and organizing information already published in different journals, articles and academic papers. The data for this investigation was compiled and analysed from academic databases, peer-reviewed journals, and other scholarly publications. Some of these are Google Scholar, Elsevier, PubMed and Science Direct. Automation, the South Asian Journal of Operations and Logistics, the Intellectualization of Logistics and SCM, and The International Journal of Logistics Management are examples of how numerous specialized trade journals summarize the necessary data. Upon analysing the company's records and histories in the global supply chain management realm, the researcher studied and identified significant patterns for agricultural food product automation, regulation and inventory management in this research. Furthermore, this article also investigates new technologies and techniques in supply chain management, showing that these technologies help companies handle their agricultural processed food more effectively and efficiently.

This study used quantitative methods to collect data with limited information, whether towards spoilage rates, lead times, stock turnover, etc., that leads to the company facing issues such as customer dissatisfaction and a spiraling effect on profits. More specifically quasi- experimental quantitative method is used in table 3 with the help of post and pretest design without randomization and it is based on secondary data collection from the internal sources of company. This study used statistical data that shows the data-driven results are accurate and supported by objective evidence. The study also investigated previous researchers to gain complete insights into its findings and provide a thorough analysis of its problem. A systematic review of prior work contextualized the research problem, ensured it aligned with existing theories, and pointed out gaps for further investigation.

Research results and discussion

Results

This study identified many significant issues and potential answers to supply chain management concerns from Tops Company Ltd., in Rawalpindi, Pakistan. Unspecified data were obtained from multiple sources, and there were overlapping data collection processes, including SMS reports, weekly calls over the supply chain with retailers and distribution centres, as well as diverse riders which reported weekly calls. The analysis indicates issues with the current operational process; after conducting the study, we found that raw material supply is sometimes inconsistent, overstaffing during certain stages of the production is standard, downtime due to outdated machinery regularly, and significant to some extent less inefficient processes like manual inspection. Moreover, cross-department communication and coordination issues emerged, hindering our ability to respond quickly to customer needs. Proposed solutions were trialled, and inventory management systems such as Radio-Frequency Identification integration were found to provide visibility over stock levels/demographic cohorts. The enhanced engagement with the suppliers helped the company to obtain better predictability of raw materials and low lead times. The introduction of temperature-controlled logistics resulted in lower levels of damage during transit. Automation in manufacturing processes reduced dependence on human labour and accelerated production schedules. For example, these actions proved to be a good way of giving the company a more agile and effective supply chain.

Table 1. Current Challenges in Tops Company Ltd Supply Chain

Challenges	Impact	Example Cases
Shipment Delays	Not meeting customer deadlines	Jams and beverages shipment delay tarnished reputation
Bad Cold Supply Chain Logistics	Ruin of perishable materials during transport	15% of product loss between summer months
Overstaffing	Higher labour costs and inefficiency during low production times	Under-employed over the slow seasons
Manual Inspections	Production speed is slower and can lead to human error	Direct inspection of packaging and its contents

Source: Compiled by author according to Company's Staff

Table 1 identifies the significant issues that can be seen in the SCM processes of Tops Company Ltd. All the highlighted issues lead to operational inefficiencies and affect the productivity and quality of the product. For example, the "Outdated Transportation" issue causes product loss rates of as much as 15% in summer. This is most likely due to poor cooling systems or failures of other equipment that is not suitable for high-temperature environments, resulting in perishables being destroyed in transit. It also raised concerns about overstaffing, particularly during seasonal downtimes. Excess workforce translates into high labour costs, which could generate subsequent higher overheads and operational inefficiencies, which could ultimately become a drain on company resources when production is slow to a stop. Furthermore, "Manual Inspections" of packaging and contents are slowing production rates and increasing the risk of human error. While less costly in the short term, the classic approach compromises the speed and accuracy necessary to sustain high product quality. The problems identified in the table suggest that modernizing these SCM processes is critical to increasing operational efficiency, reducing costs, and providing consumers with higher-quality goods.

Table 2 signalize crucial developments in supply chain management and its impacts. These examples demonstrate how technology and process improvements can be leveraged to drive efficiency and cost reduction gains.

Table 2. Gains Through Proposed Solutions

Solution	Improvement	Impact
Reader-to-Inventory Transfers (Radio-Frequency Identification)	Monitoring your inventory in real time	30% reduction in stockouts
Cold Chain Transport	Improved preservation of perishables	20% reduction in spoilage
Automation in Manufacturing Processes	Quicker production, less labour-related constraints	25% decrease in production periods
Supplier Relationship Management	More consistent availability of the raw materials	15% improvement in lead times

Source: Compiled by author according to Company's Staff

Intelligent Inventory Tracking (Radio-Frequency Identification): Tracking of supplies is possible with the help of Radio-Frequency Identification technology. This minimizes human mistakes and enhances goods optimization, leading to a 30% decrease in stockouts as well. Company ensures that their products always meet customer's satisfaction by improving and boosting operational efficacy.

Temperature-Controlled Transport: This aspect involves protecting edible items, drugs, and other timely products. It is achieved by maintaining the required temperatures throughout the transport chain to ensure the quality of the product. Ultimately, this provides a 20% reduction in spoilage, saving huge reserves and helping reduce waste.

Manufacturing Process Automation: Automated solutions, such as robots and other computerized mechanisms, increase workflow efficiency, minimize reliance on manual labour, and decrease production time. The result is 25% shorter production cycles, allowing companies to meet their deadlines and react to the market efficiently.

Supplier Relationship Management: Coordination with suppliers always allows for a stable flow of commodities, developing more stable supply chains. Collaboration with these parties will enable businesses to clear 15% of lead times, which means they get finished products in customers' hands more quickly.

Table 3. Scores comparison before and after fine-interventions

Metric	Pre-Intervention Value	Post-Intervention Value	Change (%)
Stock Turnover Rate	3.1	4.5	+45%
Transportation Spoilage Rate (%)	15%	3%	-80%
Order Fulfilment Accuracy	82%	92%	+12%
Lead Times (days)	12	8	-33%

Source: Compiled by author according to Company's Staff

Table 3 highlights the significant improvements in Tops Company's supply chain metrics following the implementation of targeted interventions. Stock turnover was also terrific, jumping 45% from 3.1 to 4.5, highlighting better inventory management and a substantial increase in ERDs, for example, the Transportation spoilage rate plunged by 80% from 15% to 3%, reflecting improved handling and transportation processes. Even their order fulfilment accuracy improved and is now a neat 12% from 82% to 92%, so better business, happier customers. Our lead times dropped significantly, from 12 to 8 days, a 33% reduction, reflecting optimized processes and faster deliveries. Overall, these measures show that the interventions improve supply chain performance.

These results demonstrate the effectiveness of approaches used to achieve major operational improvements. The transport spoilage rate is significantly low, indicating that the processes and logistics are better, resulting in lower waste and, ultimately, lower costs. And this slightly improved order fulfilment is a more reliable and customer-oriented system, which means greater satisfaction. Finally, yet importantly, shorter lead times reveal more optimal processes and delivery. Comparatives that only technology could bring. This generic enhancement across multiple improvement dimensions showcases the impact and success of the solutions deployed.

Discussion

The study concluded that the proposed intervention had improved the supply chain efficiency of Tops Company Ltd. Not only did this mean lower spoilage rates, but temperature-controlled transportation also translated to better delivery reliability for consumers who wanted freshly available and high-quality products. The Inventory Tracking System was implemented live, filling pre-emptive lapses in stock management and improving fulfilment rates and customer satisfaction. Automation added to manufacturing replaced susceptible and slow manual examination processes that enabled swifter and more uniform production cycles. Likewise, enhanced supplier relationships helped eliminate raw material mismatches or delays in sourcing.

These results are consistent with previous studies in supply chain optimization. For instance, Lisbao et al., emphasised the importance of reducing operational discrepancies like late procurement and stock wastage, among others, to enhance overall performance in the food processing industry (Lisboa et al., 2024). Furthermore, Unhelkar et al., reflects on the increasing relevance of integrating technologies with supply chain networks to strengthen transparency and scalability, supporting the notion that Reader-to-Inventory Transfers and automation are fundamental drivers of logistics improvement in our analysis (Unhelkar et al., 2022).

However, as Basic et al., state, challenges like climate change and seasonal fluctuations keep the supply chain management players on their toes to continue innovating and adapting (Basić et al., 2023). Evidence of this can be seen

in the study of Holloway, suggesting that consumer demand for transparency and sustainability has permanently changed supply chain interactions, compelling enterprises to choose costlier, ethical and sustainable solutions (Holloway, 2024).

The implementation of these changes necessitates resources, including revamping operational structures and investing in new technology, notwithstanding the favourable results. Stakeholder support and transparency reports will be essential to the long-term effectiveness of these tactics. The study highlights the need of strategic planning, collaboration, and innovation in creating a robust, economical, and flexible supply chain.

Conclusion

1. This study found many issues circulating in Tops Company Ltd., in Rawalpindi, Pakistan, related to late product deliveries, outdated machinery, improper handling of perishable goods, and too many workers. Due to these issues, the company becomes less proficient and doesn't meet customer satisfaction.

This conclusion matches the first objective aim as it directly points out the problems that company is facing and how these issues affect the company's reputation and leads to customer's dissatisfaction.

2. The company saw clear advancements after implementing new techniques and technologies, such as Radio-Frequency Identification for tracking supplies and goods, production automation, improved climate-controlled transportation, strengthening supplier partnerships, streamlined manufacturing, reduced wastage, increased product availability, and accelerated delivery timing.

This conclusion matches the 2nd objective as it shows that company used modern methods for improvement in delivery, storage and other departments, highlighting the comparison of company's work with other industries.

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