FIRMS' PERFORMANCE BASED ON LOGISTIC COST, RETURNS AND SUPPLY CHAIN MANAGEMENT PRACTICES OF FOOD PROCESSING SECTOR IN JAMMU DISTRICT

By

Akanksha Mahajan

J-20-M-74-ABM

Project submitted to Faculty of Agriculture

in partial fulfillment of the requirements

for the degree of

MASTERS OF BUSINESS ADMINISTRATION

(AGRI-BUSINESS MANAGEMENT)

Division of Agricultural Economics and ABM
Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu
Main Campus, Chatha, Jammu 180009

2022

CERTIFICATE-I

This is to certify that the thesis entitled "**Firms' Performance Based on Logistic Cost, Returns and Supply Chain Management Practices of Food Processing Sector in Jammu District**" submitted in partial fulfillment of the requirements of the degree of **MBA (Agri-business Management)** to the **Faculty of Agriculture, Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu** is original work and has similarities with published work not more than minor similarities as per UGC norms of 2018 adopted by the University. Further the level of minor similarities has been declared after checking the manuscript with **URKUND** software provided by the University.

The work has been carried out by **Ms. Akanksha Mahajan**, Registration No. **J-20-74-ABM** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma. It is further certified that help and assistance received during the course of thesis investigation have been duly acknowledged.

Dr. Jyoti Kachroo
Director, Planning & Monitoring
Professor and Head (Agril. Economics)
Division of Agricultural Economics & ABM
(Major Advisor)

Place: Jammu

Date: 24.08.22

24.08.22
Head of the Division

Dean

CERTIFICATE II

We, the members of Advisory Committee of **Ms. Akanksha Mahajan**, Registration No. **J-20-M-74-ABM**, candidate for the degree of **MBA (Agri-business Management)** have gone through the manuscript of the thesis entitled "**Firms' Performance Based on Logistic Cost, Returns and Supply Chain Management Practices of Food Processing Sector in Jammu District**" and recommended that it may be submitted by the student in the partial fulfillment of the requirements for the degree.

Kachroo

Dr. Jyoti Kachroo
Director, Planning & Monitoring
Professor and Head (Agril. Economics)
Division of Agricultural Economics & ABM
(Major Advisor) &
Chairman Advisory Committee

Place: Jammu
Date : 24.08.22

Advisory Committee Members

Mrs. Sabbey Sharma
Assistant Professor
Div. of Agril. Economics & ABM
(Member from Major Subject)

Sabbey Sharma

Dr. Neeraj Gupta
Associate Professor
Division of Food Science and Technology
(Member from Minor Subject)

Dr. J.P. Singh
Professor,
Division of Agricultural Engineering
(Dean's Nominee)

Certificate -III

This is to certify that the project entitled "**Firms' Performance Based on Logistic Cost, Returns and Supply Chain Management Practices of Food Processing Sector in Jammu District**" submitted by **Ms. Akanksha Mahajan**, Registration No. **J-20-M-74-ABM** to the Faculty of Agriculture, Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu in partial fulfilment of the requirements for the degree of **MBA (ABM)**,was examined and approved by the Advisory Committee and External Examiner (s) on**11.10.2022**

(Prof. Jaya Bhasin)
Dean, School of Business Studies,
Central University of Jammu, Jammu
External Examiner

11.10.22
(Dr. Jyoti Kachroo)
Director, Planning & Monitoring,
Professor (Agril. Econ.) & Head,
Div. of Agril. Economics & ABM

Major Advisor

11.10.22
Head

Division of Agricultural Economics & ABM

Dean, Faculty of Agriculture

SKUAST- Jammu

ACKNOWLEDGEMENT

At the outset, I bow my head in great reverence to the omnipotent and omnipresent almighty, for her kindness and true love towards me and to every creature resending on this wonderful planet.

Word would not substitute to express my deep sense of gratitude and indebtedness to my advisor and Chairman of my advisory committee ***Dr. Jyoti Kachroo,*** *Director, Planning & Monitoring Professor & Head, Division of Agricultural Economics and ABM, Faculty of Agriculture, Sher-e-Kashmir University of Agricultural Sciences and Technology Jammu, for her invaluable guidance and help. She has been eminent teacher, guide and a well-wisher who stood by me with constant supervision throughout this research work. He has always been a role model for me to achieve this goal.*

I am immensely thankful and indebted to my co-advisor ***Mrs. Sabbey Sharma,*** *Assistant Professor, Division of Agricultural Economics and ABM, SKUAST-Jammu for her unstinted attention prudent suggestion and arduous guideline during course of their investigation and preparation of project report.*

I owe my sincere gratitude for the valuable advice, versatile assistance, guidance and immense encouragement given to me from time to time by my advisory committee members ***Dr. Neeraj Gupta,*** *Associate Professor, Division of Food Science and Technology, SKUAST-Jammu and* ***Dr. J.P. Singh,*** *Professor, Division of Agricultural Engineering, SKUAST-Jammu for their diligent guidance erudite suggestions, timely help, constructive criticism, constant and continuous encouragement during the course of investigation.*

I am extremely thankful to the Hon'ble Vice Chancellor, ***Dr. J.P. Sharma*** *and Dean, Faculty of FoA,* ***Dr. A. K Mondal,*** *for providing us with sufficient time for successful completion of our thesis.*

I deem it my privilege in expressing my fidelity to ***Dr. Sudhakar Dwivedi*** *(Professor, Division of Agricultural Economics & ABM),* ***Dr. S.P. Singh*** *(Associate Professor, Division of Agricultural Economics & ABM),* ***Dr. Anil Bhatt****(Assistant Professor, Division of Agricultural Economics & ABM),* ***Dr. Mallika Sharma*** *(Assistant Professor, Division of Agricultural Economics & ABM)for their precious advice and help throughout my master's study.*

I am failing short of words in expressing sincere and heartfelt tributes to all the non-teaching staff members of the Department of Agricultural Economics and ABM, especially ***Ms. Monika, Ms. Jyoti Devi, Mr. Harvinder Singh, Mr. Tarunjeet, Ms. Yamini, Mr. Manjeet Singh, Mr. Ramesh and Ms. Rani Devi.***

*All the words in lexicon will be futile meaningless if, I fail to express my gratitude towards my parents, **Mr. Joginder Pal**, **Mrs. Kumud Gupta and Mr. Sanchit Mahajan** sacrifice, affection, moral support and lots of care throughout my life. I express my indebtedness and most heartily devotion to them who set the foundation and were always with me during my ups and downs. **Mr. Dishant Joshi** is one person I'd like to thank for his help during my difficult times.*

*It is indeed a great pleasure to acknowledge the love and cooperation by my respected seniors **Mr. Niket Sharma, Vikas Gupta, Kajal Thapar, Arun Lalotra** and dear batch mates and friends **Sahil Naik, Ankush Saini, Yogesh Mahar, Arushi Sharma, Palvi Sharma,** for their caring eyes and helping hands and making the study periods very much memorable. My beloved juniors **Sumit Sutradhar, Astha Sood, Abhishek Thakur, Eva Sharma, Sakshi Dhiman, Ridhima** also deserve the acknowledgement and appreciation for their continuous support. Every beginning has an end to it but still I believe friends can scatter, friendship cannot. So, the time spend in SKUAST-Jammu will always remain engraved in my mind and soul.*

*Last but not least, I bow my head before the feet of almighty **Sai Ram** for showering their divine blessings to accomplish the daunting task ahead in my life.*

Akanksha Mahajan

AKANKSHA MAHAJAN

Place: Jammu

Dated: 24.08.22

ABSTRACT

Title of the thesis	:	**"Firms' Performance Based on Logistic Cost, Returns and Supply Chain Management Practices of Food Processing Sector in Jammu District"**
Name of the Student	:	**Akanksha Mahajan**
Name and Designation of Major Advisor	:	**Dr. Jyoti Kachroo (Professor and Head)**
Major Subject	:	**Agri-Business Management**
Degree to be awarded	:	**MBA (Agribusiness Management)**
Year of award of Degree	:	**2022**
Name of University	:	**Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu (J&K)**

ABSTRACT

India's food processing industry is one of the largest in the world, with results expected to reach $ 535 billion by 2025-26. India's food business is growing at 11 percent in the CAGR, while the food processing industry accounts for 32 percent of the food industry growth. The Indian food industry expects great growth, increasing its contribution to the world food trade every year. In spite of a large production base, the level of processing is low (less than 10%). In India, the food sector has emerged as the fastest growing and highly profitable sector due to its high value addition, especially in the food processing industry. The current study was conducted to investigate the relative performance of food processing units in the Jammu District in terms of logistics costs. A study of the supply chain management practices of food processing units in Jammu District was also attempted. The relative performance was studied using DEA, and the set considered for analysis consisted of 6 food processing units over a 5-year period from 2016 to 2020. The results show that only the Real Rana group of industries were efficient throughout the analysis period, while the rest were inefficient. During the analysis period, Rana enterprises and KC food products were relatively efficient for a few years. Six food processing units were surveyed in order to research supply chain management practices. We have concluded from our study that Real Rana Group of Industries was having the best supply chain among all selected industries because they have direct assess linkage to consumer like delivery like supermarkets, restaurants, hotels and retail shops. At the same time, we have observed that another selected industry i.e. Rana Enterprises have maximum increasing growth trend during the covid 19 period. So in case of Kamal Food Industry we have seen a downward trend due to lack of awareness of brand in the market.

Key words: Logistic sector, Processing units, Relative Performance, Supply Chain Management.

Akanksha Mahajan

Signature of the Student

Signature of Major Advisor

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER-1

INTRODUCTION

India's food processing industry is one of the largest in the world, with results expected to reach $535 billion by 2025-26. By 2024, the sector is projected to provide 9 million jobs. India's food business is growing at 11 per cent in the CAGR, while the food processing industry accounts for 32 per cent of the food industry growth. The Indian food industry expects great growth, increasing its contribution to the world food trade every year. In India, the food sector has emerged as the fastest growing and highly profitable sector due to its high-value addition, especially in the food processing industry. With about 32 per cent of the country's food market, the Indian government has contributed to the growth and development of the food processing industry. The government through the Ministry of Food Processing Industries (MoFPI) is making every effort to encourage business investment. Approves proposals for joint ventures (JV), international cooperation, industrial licenses, and a 100 percent shipping-focused unit. The Indian Food Processing Sector is critical in connecting Indian farmers with consumers in domestic and international markets. The Ministry of Food Processing Industries (MoFPI) is working hard to encourage investment across the value chain. The food processing industry employs roughly 1.93 million people in 39,748 registered locations, with a fixed income of $ 32.75 and a total result of $ 158.69. Sugar, edible oils, drinks, and dairy products are the primary industries of the Indian food processing business. The Government of India, through the Ministry of Food Processing Industries (MoFPI), is taking all necessary steps to increase investment in the food processing industry in India. People have become more health-conscious since the pandemic, and as a result, their tastes for food and its consumption have shifted. As a result, there is a greater demand for gluten-free, low-calorie, natural preservatives, colors, and flavors. Demand for Ready to Eat and Cook items is increasing. People are increasingly selecting novel culinary products as a result of the impact of social media on their life. The government has become more active in making labelling and information on packaging more consumer-friendly. Because the government has outlawed plastic, FMCG companies have been compelled to think differently about packaging alternatives, resulting in eco-friendly packaging for food goods. (www.investindia.gov.in)

PMKSY (Pradhan Mantri Krishi Sinchayee Yojana) has funded 41 Mega Food Parks, 353 Cold Chain Projects, 63 Agro-Processing Clusters, 292 Food Processing Units, 63 Back & Forward Linking Projects, and 6 Green Operating Projects across the country. The Indian Food and Vegetable Processing Sector, Poultry and Meat Processing, Fish, Grocery Store, Dairy Industry, and so on. The horticultural production was about 296.65 million tonnes during 2019-20. Between 2019 and 2020, milk output is expected to be 198.4 million tonnes. In 2019-20, it stands third in the globe in terms of egg production, with 114.38 billion produced. The world's second-largest fish producer - total fish production in 2019-20 was 14.16 million tonnes, accounting for 7.56 percent of global output. Food and food services, which are growing at CAGRs of 25 per cent and 15 per cent, respectively, are dominant. Over the last decade, the Food Processing Industry (FPI) has been one of the fastest expanding industries in the economy. It has the potential to help both domestic and foreign markets. This season, demand for eco-friendly and organic foods has been strong, and India has accurate estimates of all potential resources in the business. The Food Processing Industry can simply enter the foreign market and reap the benefits of global trade. In terms of food production, processing, supply, and consumption, India is the world's largest country. India's food market is rated sixth in the world, accounting for 70 per cent of total sales, and fifth in production, consumption, and export. India exports 13per cent of its total manufacturing output and 6 per cent of its industrial investment. Manufacturing and agriculture comprise 8.80 per cent and 8.39 per cent of India's GDP, respectively. The Indian food business is increasing at an 11 percent CAGR, with output expected to reach $535 billion by 2025. The food processing industry will be driven by retail demand and the rise of health-conscious consumers (www.researchgate.net).

The Indian government has adopted a favorable attitude toward foreign investment in this sector to bring India's food processing industry up to par with the best in the world and to be the preferred choice for processed foods. Under the automated route, 100 per cent FDI (Foreign Direct Investment) is permitted allowed in the sector, while the country forms alliances with other countries to enhance trade in processed foods and has given states a significant amount of autonomy Governments will look for partners to help the food processing industry grow. As an example, France and India have praised the Asian country's food for its "strategic relevance." in the agriculture and processing sectors. The opportunities for NRIs and PIOs in this sector are enormous, as the country examines best practices, technology, and other factors. Worldwide agricultural production, arable land, agro-climatic diversity, and so on, India is in the top three in the world. India is a major producer of fruits and vegetables, cattle, and milk. India is also a developing food and beverage sector, particularly for branded, health, and convenience foods. As it stands, it is one of the world's fastest expanding economies. The country's commercial and regulatory environments are changing and becoming more in line with global economic and food norms.

Supply chain infrastructure gaps, such as a lack of primary processing storage and distribution facilities, an inadequate link between production and processing, a lack of processable varieties, seasonability of operations and low capacity utilization, a lack of focus on quality and safety standards, a lack of product development and innovation, and supply chain institutional gaps are all challenges that the food processing sector is currently facing. Supply Chain Management refers to a network of facilities that create raw materials, transform them into intermediate items, and then finished products before delivering them to clients via a distribution system. It includes purchasing, manufacturing, and distribution (Lee and Billington, 1995). To improve the performance of the supply chain, supply chain management should be concerned with reducing or even eliminating uncertainties. The primary goal of supply chain management is to "optimize chain performance to maximize value at the lowest possible cost." Supply chain practice consists of seven components: agreed vision and goals, information sharing, risk and award sharing, cooperation, process integration, long-term connection, and agreed supply chain leadership (Min and Mentzer, 2004).

Academics and business management practitioners alike are interested in supply chain management, which is a rapidly evolving field. Aspects of marketing, economics, logistics, and organizational behavior are all important for developing insights into how and why different supply chain management arrangements emerge, as well as understanding the efficiency and competitiveness of industrial sector through repercussions of this system. Supply chain management (SCM) initiatives are becoming more popular in the food business, as they are in many other industries throughout the world, as organizations seek to decrease costs and enhance profitability in an increasingly competitive environment. According to Whipple and Frankel (2000), enterprises seeking competitive advantages are forming cooperative supply chain arrangements such as strategic alliances that utilize their strengths and unique resources.

The issue of logistic costs is one of the most difficult and complex because of its elaborate and ambiguous structure, as well as difficulties in identifying it. If India has the correct marketing tactics and an agile, flexible, and efficient supply chain, it has a significant opportunity to become a dominant global food supplier. The food supply chain is complicated because it includes perishable items and a large number of small stakeholders. The infrastructure connecting these partners in India is very poor. As a result, there is a lot of room for research in the food processing industry from the standpoint of supply chain management.

Performance measurement is the process of gathering and reporting data about an individual's, group's, or organization's performance. It may entail examining current processes and methods, as well as whether outcomes are by following per under what was intended or should have been achieved.

CHAPTER-2

THE PROJECT

2.1 Title and Statement of the problem

The project work entitled **"Firms' Performance Based on Logistic Cost, Returns and Supply Chain Management Practices of Food Processing Sector in Jammu District"** was carried out in different area of Jammu district during the year 2020-2022. In India, one of the major industries is food processing. After China, India is the world's second-largest producer of food goods. The expansion of the food processing sector will boost economic growth overall because it creates a crucial synergy between agriculture and industry, the two main pillars of the economy.

2.2 Food industry

Our life is not complete without food. The food industry is essential and important for every country. It is one of the 17 most important national sectors of the American economy. It is essential for social progress, nutrition, food security and safety for the general public. Among the main problems in the food industry are problems with product quality, health and hygiene. The food industry as a whole is made up of several different types of industries that produce a wide variety of food products. Farming, food production, food processing, preservation, packaging, distribution, retail are all covered.

2.3 Supply chain management

The food industry is primarily facing difficulties as a result of globalization, competition, and other regulations, supply chain policies are practically an essential component of every platform. With regard to any product, it is a final step forward from both parties. The global business or service development process for supply chain management has made significant strides in the market. Sustainability in the supply chain is no longer an afterthought and to attract eco-conscious customers. It is now an essential component of management, particularly in the supply chain. While regulations crack down on negative carbon footprints and other harmful practices, businesses incorporate sustainability initiatives into their main strategies to remain compliant. However, compliance and consumer interest are not the only factors driving the integration of sustainability into core supply chain management

2.4 Logistics

In 2021, the market for food logistics on a global scale was worth US$100.1 billion. IMARC Group projects that the market will grow at an 8.1 percent CAGR between 2022 and 2027 to reach US$ 154.5 billion. We are constantly monitoring and assessing the direct as well as indirect impact of the pandemic on various end use industries while keeping in mind the COVID-19 uncertainties. Food logistics is the planning, implementation, and control of the movement of various food products and beverages along a supply chain. It includes warehousing, warehousing, fleet management, material handling, order fulfilment, inventory management, and demand planning. It aids in ensuring that food products are stored at optimal temperatures in order to maintain freshness and quality. It also contributes to the creation of additional value, the improvement of efficiency, the reduction of costs, and the enhancement of the consumer experience. As more restaurants, cafes, and hotels rely on food delivery apps to deliver quick meals, the demand for food logistics is increasing globally. (www.imarcgroup.com)

2.5 Objectives of the Study

- To study the relationship between logistics cost and firms' performance in food processing sector
- To assess the return performance of selected units on the basis of logistics cost
- To explore the supply chain management practices of food processing units in Jammu District

2.6 Scope

- The study was helpful to know about the impact of logistic cost on firms' performance of food processing industries.
- The study was also very beneficial in the sense to assess the cost of return on the basis of logistic cost of selected food processing industries.
- This study was also helpful in identifying various marketing channels from processor to the wholesaler and retailer. Thus, paved the way to explore the supply chain management of food processing units by knowing the various market intermediaries.

2.7 Limitations

The study was subjected to certain constraints and limitations, listed below so that the findings of the study could be understood in right perspective and direction.

- The study is related only to the industry of area of Jammu city of J&K hence, the findings cannot be true representation of all industry.
- Respondent's ignorance to certain questions also posed as a barrier towards certain responses.
- The information was collected by personal interview method based on the questionnaire related data from processors. During survey relatable questions will be asked from the intermediaries and maximum possible efforts will be made to collect reliable information.
- On account of constraints related to time and resources, only six food processing units will be included in the analysis.
- The information provided by the respondents may not be fully accurate due to unavailable biases.
- Since I have used structured schedule, the respondent's responses were immediate and the time taken for deciding was less which led to responses with not much thought. Therefore, time constraints have also been a limitation in the study.

In spite of the above said limitations, as a researcher I tried my best to collect more and more information with conciseness and correctness.

CHAPTER-3

REVIEW OF LITERATURE

For the systematic advancement of knowledge, it is always required to analyze previous research work in a certain topic. As a result, it is required to review the previous research work related to the **"Firms' Performance Based On Logistic Cost, Returns And Supply Chain Management Practices Of Food Processing Sector In Jammu District"** A review of the research findings is provided below to make the study more sensible and useful:

3.1 To study the relationship between logistics cost and firms' performance in food processing sector

Richardson (1995) reported that logistics control is a major quantity of assets that has a direct impact on cash flow and the bottom line, provides value through continual productivity and service improvements, and has a strong relationship with a firm's customer service level and revenues.

Damme and Zon (1999) offered the activity-based costing technique to accounting for logistics costs, which assists top management in analyzing financial data to make logistics decisions.

H.I. Hsiao *et al.* (2010) the study looked at how different logistical activities affect logistics service performance. It established and examined four layers of logistics activity outsourcing: transportation (level 1), packaging (level 2), transportation management (level 3), and distribution network management (level 4). A research framework was developed to analyze the impact of varying levels of outsourcing decisions on perceived logistics service performance, as well as the moderating function that supply chain complexity may play in the hypothesized correlations. According to these data, outsourcing has no direct impact on service performance (delivery dependability, flexibility, and lead-time) at any of the four levels. However, as the degree of demand complexity increases, so does the performance when outsourcing level 4 operations. Furthermore, chilled foods outperform non-chilled items in terms of service performance. These findings demonstrate the intricate links that exist between levels of outsourcing, performance, and supply chain features.

Shah and Sharma (2012) examined that many scholars have looked into how to manage logistical flexibility. The current dynamics in logistics system flexibility have resulted in the operational and strategic usage of information technology. To acquire a lasting competitive edge, cooperative dairies must harness the capabilities of information systems in order to increase logistics flexibility. There is a study vacuum in the impact of information system characteristics on the flexibility of cooperative dairy logistics systems. This study investigates the impact of logistics operating system and logistics planning system characteristics on co-operative dairy logistics flexibility.

Gino Marche *et al.* (2014) accurately represented the body of research on environmental sustainability in logistics and transportation published over the chosen era, and the results. According to the findings of the study, marketing competency has a beneficial effect on performance.

Vlachos IP (2016) evaluated the impact of reverse logistics capabilities on company performance and the mediating function of logistics strategies by analysing three reverse logistics capability theories: (a) the firm's resource-based view, (b) transaction cost economics, and (c) institutional theory.

Akbari (2018) conducted a structured literature review (SLR) and systematic investigation into logistics outsourcing research in order to identify knowledge gaps and suggest future research directions in the logistics outsourcing discipline.

Blazkova and Dvoulet (2018) analyzed how industry, year and strong outcomes impact the profitability of firms operating in the food processing industry. It investigate whether the profits of a few companies (considered as outliers) are able to influence the value of the year, the factory and the industry and to determine the relative value of these many firm results.

Gimenez (2019) demonstrated the integration process by comparing two levels of internal integration (logistics marketing and logistics production) and analyzing the relationship between both levels of internal integration and the level of external integration. The internal or external integration from the standpoint of logistics, but very few looked at both levels of integration at the same time. This varies from previous research in that it investigates the sequence of integration stages in an integration process.

Tripathy and Shaik (2020) analyzed and showed that the ratio was highly correlated and positively with strong performance. The results obtained are therefore consistent in all measurement methods. Pecking order theory and static trade-off theory, both seem to explain the decisions of Indian food processing companies among other financial structure ideas.

3.2 To assess the return performance of selected units on the basis of logistics cost

Fagan (1991) found that as the global sourcing was rapidly becoming an important business strategy; capturing and evaluating the logistics costs associated with the global supply chain was becoming critical and important in uncovering strategic benefits. He showed that numerous factors significantly increased the logistics costs, which may outweigh the benefits of doing business with international suppliers.

Christopher (1992) was the first to propose that competition had changed from firm-to-firm to supply-chain level.

Londe and Pohlen (1994) inferred from previous research that controlling logistics costs will become increasingly critical for enterprises seeking a competitive advantage. Managers will need more accurate and focused costing information for logistical tasks or services to ensure profitability. The success of these initiatives was mainly dependent on the firm's cost accounting system's ability to connect expenses to individual logistics activities.

Porter (1998) founded that a strategy can only lead to above-average performance if it is long-term. The idea is to choose a strategy that is best suited to the firm's capabilities while also being difficult to duplicate by competitors.

Vorst *et al*. (1998) conducted a simulation based study to explore SCM’s effect on logistical performance indicators in food supply chain and found that uncertainty minimization drastically boosts service level.

Ashraf (2000) noted the interest on capital locked in carrying the inventory, store maintenance and storage charges, and material losses were the significant components in the overall cost of inventory management for both big and medium scale units, according to his study on business performance of cooperative oil mills.

Gregory A. Baker (2003) illustrated the impact of formal strategic planning on corporate performance has been studied, but the results have been inconsistent. In this study, 200 executives from five food processing sectors were polled to investigate the link between formal strategic planning and financial performance. Confirmatory factor analysis were used to evaluate a multiple indicator measure of strategic planning. The results of the strategic planning-performance model show that using strategic planning tools improves financial performance as assessed by the three-year average pretax return on assets.

Han *et al.* (2009) resulted that integrated information and integrated logistics management improved the quality management practices of the processors. The application of integrated information also facilitated integrated logistics management. While quality management practices had significant impact on firm performance, the findings indicated neither integrated information nor integrated logistics management were significantly related to firm performance. However, integrated information had an indirect impact on firm performance through quality management practices.

Olayinka (2010) identified three types of expenses as essential elements in reducing costs and improving the effectiveness of warehousing services in manufacturing companies: picking/retrieval costs, packing costs, and loading costs.

Drnevich *et al.* (2011) described that environmental dynamism has a negative impact on the contribution of standard capabilities and a positive impact on the contribution of dynamic capabilities to the relative performance of firms. Although heterogeneity is less significant for standard capabilities, it strengthens the contribution of dynamic capabilities to relative firm performance. Interestingly, we discovered that a process-level performance measure provided stronger evidence for the direct effects of capabilities, whereas a firm-level measure provided stronger evidence for the influences of environmental dynamism and heterogeneity.

Marche *et al.* (2014) accurately represented the body of research on environmental sustainability in logistics and transportation published during the timeframe specified. According to the findings of the study, marketing capability has a positive effect on performance.

Nor *et al.* (2016) revealed that Malaysian SME's (Small and Medium enterprises) were having financial sourcing issues and were up against constraints such as human resources, business competitiveness, infrastructure, and government policy. Furthermore, the outputs of the multiple logistic regression model revealed significant impacts on innovations from financial barriers, particularly in regard to financial assistance from the government or financial institutions, such as high interest rates or profit charged, complicated loan application process, and inability to take advantage of promotional financial packages by financial institutions for food processing SME's (Small and Medium enterprises) in Malaysia.

Jagtap *et al.* (2020) demonstrated that food Logistics 4.0 is an acronym coined from Industry 4.0 that refers to all areas of food logistics management that are based on cyber-physical systems. It claimed that Real-time information and interconnectedness of things, along with revolutionary technology, will revolutionize and enhance food logistics. It has enormous potential in terms of offering transparency, quick food delivery at a lower cost, flexibility, and the capacity to supply the right quality product at the right place and right time. Its primary focus is on food logistics, which includes resource planning, warehouse management, transportation management, predictive maintenance, and data security. Some of the technologies mentioned are the Internet of Things, Block chain, Robotics & Automation, and artificial intelligence.

Mostafa (2021) demand the need for a third-party logistics service provider has grown in importance as organizations strive to improve customer experience while lowering logistics expenses. Some tasks are performed by a third-party logistics provider. Multi-criteria decision making, statistical methodologies, mathematical programming, Artificial intelligence, and hybrid methods were all used to choose a third-party logistic supplier (or integrated method). This paper offered an ill-defined integrated method to evaluating and choosing third-party logistics service providers. The Fuzzy Analytical Hierarchy Process (FAHP) is used to establish the weights of the evaluation criteria in phase one of this procedure. The Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) is utilized in phase two to evaluate, sequence, and make the ultimate Decision. While searching for the optimum solution, the goal was to reduce the effects of mistakes such as human judgment and preferences. The fuzzy set is found using two methods: the extent analysis approach and the geometric mean methodology. A study of papers from 2014 to 2018 was undertaken to determine the most commonly cited criterion, and seven were identified: reputation, information technology implementation, information sharing, service cost, reliability, quality, and geographic location.

Deng *et al.* (2021) suggested that future review ratings were significantly correlated with acknowledgement and action. The hotel class can further moderate the relationships between these factors and hotel revenue. This study offers recommendations on how to manage company resources to respond to online consumer reviews in a way that improves financial performance.

3.3 To explore the supply chain management practices of food processing units in Jammu District

Bowersox and Closs (1996) demonstrated that in order to be fully effective in today's competitive business, companies must develop integrated behaviour that includes customers and suppliers. Supply Chain Management refers to the expansion of integrated behaviours through external integration (SCM).

Song and Zipkin (1996) developed an inventory-replenishment policy to take advantage of supply-conditions information. The authors presented an inventory-control model that includes a Markovian model of the supply system. The replenishment lead times change as the system evolves. The optimal policy has the same structure as standard models, but its parameters change dynamically to reflect current supply conditions. Contrary to popular belief, a longer lead-time does not always imply more inventory in this context. Lead-time is important, but so is order coverage.

Hobbs (1998) analyzed the current trends and future prospects of SCM of agri-food sector and established that enhanced attention on food security, free foreign trade reign, flow of foreign investments and the agri-food industry's Supply chain management practices have changed as a result of the diversity of consumer choice and technological advancements.

Sohal and Perry (1999) stated that customer requirements and technological innovation had been driving organizations to look for ways to gain a competitive advantage through total supply chain management, according to the report. The ceReals industry certainly operates in a competitive environment that is constantly changing and readjusting.

Anna and Kristina (2014) analyzed a total of 159 published papers identified in 9 planning and supply chains, of which 104 focused on food handling. It was noted that food products have different characteristics and that the characters in the food supply chain work in a particular area.

Simatupang and Sridharam (2002) defined information sharing as access to private data between business partners, allowing them to track the progress of products and orders as they move through various supply chain processes. Some of the elements that comprise information sharing on inventory status and location, as well as performance status, were identified by the author. It was also stated that sharing information about key performance and process data improves supply chain visibility, allowing for more effective decision making.

Tan *et al.* (2002) claimed that supply chain integration, information sharing, customer service management, geographic proximity, and JIT capabilities were significant aspects of supply chain management techniques.

Vickener *et al.* (2002) founded that investment in supply chain management technology was extensive in the US food industry, particularly in the restaurant or food-away-from-home (FAFH) subsector. Inventory turns in the restaurant subsector nearly doubled from 1980 to 1995, rising from 26 to 51. This means that FAFH inventories were replenished once a week, as opposed to the 14-day supply maintained two decades ago. Over the same time period, total market capitalization increased by 17 per cent year on year, from $5 billion to $53 billion. According to the estimated co-integration model, they discovered that for every one unit increase in inventory turnover, the FAFH industry's market capitalization increased by $479 million during the analysis period. As a result, the equity capital market places a premium on efficient inventory management in the food system and rewards firms that develop, adopt, and implement supply chain technologies.

Lee (2004) concentrated on five supply chain techniques that are critical to achieving supply chain responsiveness. Outsourcing, strategic supplier partnerships, customer relationships, information exchange, and product modularity are examples of these.

Chen and Paulraj (2004) explored long-term relationships, cross-functional teams, supplier base reduction, and supplier involvement in their supply chain management studies.

Min and Mentzer (2004) investigated the long-term relationships, information sharing, collaboration process integration, and supply chain leadership that underpin supply chain management methods in their study.

Bhatnagar and Sohal (2005) studied supply chain competitiveness in terms of facility site variables, supply chain uncertainty, and manufacturing processes. The authors proposed that cost, infrastructure availability, business services, labour, political stability, closeness to markets, accessibility to suppliers, and location of important rivals be considered when deciding where to locate a plant.

Blanchard and David (2010) suggested that supply chain management includes the planning and management of all activities involved in sourcing and procurement, conversion, and logistics management. Coordination and collaboration with channel partners, including as suppliers, intermediaries, third-party service providers, and customers, is also included. Supply chain management integrates supply and demand management both inside and between organizations.

Bhagat *et al.* (2014) stated the concept of agriculture supply chain management is relatively new in agribusiness management literature, the supply chain itself has been around for a few decades. Stable networks and shared relationships between input suppliers, producers, processors, merchants, and retailers resulted in efficient and equitable agricultural supply chains. Significant progress has been achieved in the development of new methodologies for assessing the structure and dynamics of agricultural food chains and networks in recent years. The goal of this article was to investigate the essential elements that affect agriculture supply chain management by combining research from many agribusiness disciplines, as well as to investigate the links and associations that will promote effective agriculture supply chain management. The report also examined numerous research models in order to gain a better knowledge of logistics, networks, and interactions in agricultural supply chains. This study, as a whole, gives a better knowledge of the important parts of agriculture supply chain management and the impact of their interdependence on supply chain, value chain, and network performance.

Dharni and Sharma (2015) analyzed that logistics and supply chain management was its infancy in the field of food processing. There was a great deal for improvement in supply chain management processes especially in the context of information quality, as well as backlinks.

Porter (1985) stated that a firm's competitive advantage is determined not only by its value chain, but also by how it fits within its broader value system.

Fawcett (1992) stated that responsiveness in the logistic process is a critical component in the provision of a responsive supply chain strategy.

Zhong *et al.* (2016) stated the big data for supply chain management in the service and manufacturing sectors: difficulties, opportunities, and future perception.

CHAPTER-4

RESEARCH METHODOLOGY

A methodology is typically a guiding system for issue solving that includes particular features such as categories, tasks, procedures, approaches, and instruments. The goal of this project was to investigate the relationship between logistics cost and firms' performance in food processing sector in India. The research was named "**Firms' Performance Based on Logistic Costs, Returns, and Supply Chain Management Practices of the Food Processing Sector in Jammu District**". This chapter describes the sampling area and tools used in this study.

4.1 Description of study area

4.2 Locale of the study

4.3 Sample size and sampling method

4.4 Collection of data

4.5 Analytical tools

4.1 Description of Study Area

The study was conducted in Jammu, which was chosen on purpose because it is one of the most densely populated cities in J&K. It has a diverse population of individuals from various religions, castes, occupations, cultures, languages, and eating habits. Jammu is the winter capital of Jammu and Kashmir, an Indian union territory.

Jammu is located on the banks of the Tawi River and has a land area of 240 km^2 that is bounded to the north by the Himalayas and to the south by the northern-plains. Jammu is the union territory's second most famous town. It is located in the Shivalik highlands on uneven ridges of low elevation. The town develops and unfolds around the Tawi river stream, with the new city dominating it from the north and the new 28 neighbour spreading around the southern side of the river Tawi. Jammu is also known as the town of temples because of its historic temples and Hindu shrines; it is the most visited area in the union territory. It is bordered by the nearby samba district.

The location of Jammu is 32.73 N 74.87 E. It is situated on the rocky crests of the Shivalik hills and averages 300 metres (980 feet) above sea level. The Shivalik mountain ranges encircle it on all sides, and the Trikuta ranges circle to the northwest, 600 miles away from New Delhi, the capital of India.

Jammu, like the rest of northwestern India, has a tropical climate with high summer temperatures of up to 46 degrees Celsius and occasional temperatures below 40 degrees Celsius in winter. The hottest month is June, with highs of 40.6 degrees Celsius, and the coldest month is January. The minimum temperature is 7 degrees Celsius. The average annual rainfall is 42 inches (1100mm), with plenty of rain from June to September, but winters can be quite rainy. In the winter, the dense smoke creates major disruptions as temperatures dip to 2 degrees Celsius or below. In the summer, particularly in May and June, excessive sunlight or hot winds can elevate temperatures by up to 46 degrees Celsius. The wettest months after a hot season with torrential rains and thunderstorms might see up to 669 mm of rain.

Jammu is connected to the Kashmir district by the 44th national highway that passes through the city. Poonch and Jammu are connected by NH 1B. Jammu is 68 kilometres from Udhampur city and 80 km from Kathua city. Jammu is 49 kilometres from Katra, a well-known tourist destination.

The airport in Jammu is located in the city. It offers both direct flights to major cities like Mumbai, Bengaluru, Hyderabad, and Chennai as well as connecting flights to places like Srinagar, Delhi, Amritsar, Chandigarh, Leh, and Ambala.

A significant cultural and commercial hub in Jammu's administrative region is Jammu City. The R.S. Pura region in Jammu produces some of the most well-liked local basmati rice, which is then processed at rice mills spread throughout Jammu. The industrial park in Bari Brahmana has a significant industrial presence and produces a wide range of items, including carpet and electrical goods, in addition to the rice mills that are dispersed around Jammu.

According to the 2011 census, there are 5,02,197 people living in Jammu City. In comparison to women, who made up 47.3 per cent of the population, men made up 52.7 per cent of the total. In contrast to the national average of 940, there were 898 females for every 1000 males. Male literacy was 93.3 per cent, while female literacy was 85.82 per cent, making Jammu's average literacy rate 89.66 per cent much higher than the national average of 74.4 per cent. 8.47 per cent of people in the population were under the age of six. The urban agglomeration of Jammu is home to 657,314 people. The majority of the Hindu population in Jammu and Kashmir reside in the

Jammu region.

4.2 Locale of the study: -

The study was conducted purposively on the basis of highest number of Food Processing Units in Jammu District out of 10 District of Jammu Region.

4.3 Sample size and sampling method: -

The present study was based on random sampling type of research where in the different Food Processing Units was randomly selected and the sample size of six Food Processing Units was taken from Jammu District.

4.4 Collection of data

To accomplish the objectives of this study, the relevant data will be collected from primary sources. The primary data will be collected with the help of questionnaire. Data will be collected through survey method from the respondents. The research was conducted using DEA SOLVER LV (V5). Data on the selected organizations output variable, net profit to sales ratio, and input variable, logistics cost to sales ratio, were collected.

4.5 Analytical tools

For analysis of data, statistical tools such as descriptive tables; decision making unit (DMU) compound annual growth rate (CAGR), returns to scale (RTS), Supply Chain Management adopted by selected food processing industries was find out with the help of questionnaire. These were the technique that were adopted.

1. To study the relationship between logistics cost and firms' performance in food processing sector

a) Decision Making Unit (DMU)

The term DMU was introduced to cover, in a flexible manner, any such entity, with each such to be evaluated as part of a collection that utilizes similar inputs to produce similar outputs. In the context of the study DMUs were the companies.

b) Compound Annual Growth Rate (CAGR)

The rate at which a given present value would "grow" to a given future value in a given amount of time. The formula is

$$CAGR = (EV / SV)^{1/n} - 1$$

Where:

EV = Investment's ending value

SV = Investment starting value

n = Number of investment periods (month, years, etc.)

2. To assess the return performance of selected units based on logistics cost

i) Returns to Scale (RTS)

The term returns to scale refers to the changes in output as all factors change by the same proportion (what happens to the output rate when each input rate is increased by the same proportion).

a) Increasing Returns to Scale (IRS)

If output increases by a larger proportion than the increase in each input then there is increasing returns to scale i.e. if all factors are increased in a given proportion, output produced increases in a greater proportion.

b) Decreasing Returns to Scale (DRS)

If output increases by a smaller proportion than the increase in each input then there is decreasing returns to scale i.e. if all factors are increased in a given proportion, the output produced increases in a smaller proportion.

c) Constant Returns to Scale (CRS)

If output increase by a same proportion as increase in input then there are constant returns to scale i.e. if all factors are increased in a given proportion, the output produced increases in exactly the same proportion.

3. To explore the supply chain management practices of food processing units in Jammu District

An appropriate supply chain network adopted by selected food processing was studied with the help of a questionnaire.

CHAPTER-5

RESULTS

The results pertaining to the present study **"Firms' Performance Based on Logistic Cost, Returns and Supply Chain Management Practices of Food Processing Sector in Jammu District"** have been presented in this chapter along with appropriate Tables and Figures.

The technique of random sampling was used to select respondents. Total of six food processing industries was taken who gave valuable information. The collected data was analyzed by using tabular analysis (decision making unit, compound annual growth rate, and returns to scale, supply chain management) to arrive at meaningful conclusions.

Table 5.1: Annual growth rate of different variables: Ishita Food Products

Financial year	Sales (Lakhs)	Net Profit (Lakhs)	Logistic cost (Lakhs)	Net Profit to Sales Ratio	Logistic cost to Sales Ratio
2016	653426.81	79281.22	31813.3	12.13	4.87
2017	778567.66	83423.22	35675.29	10.71	4.58
2018	859432.51	87628.51	46302.79	10.2	5.39
2019	924536.24	95326.81	58572.81	10.31	6.34
2020	825643.21	86524.34	50248.21	10.48	6.09
CAGR	**6.61**	**3.13**	**15.14**	-	-

The mission of Ishita Food Products is to offer the highest quality foodstuffs and spices. The business was founded in 1994 and has its headquarters in Jammu, the city of temples. Food items like Soya Chunks, Vermicelli, Sewian, Roasted Dalia, and Pasta are manufactured and processed by our company. We also specialize in all kinds of spices.

Information about various variables of Ishita Food Products has been presented in table 5.1. CAGR was found to be positive in the case of Sales, Net profit and Logistics cost. Maximum CAGR was observed in the case of Logistics cost (15.14 per cent) while minimum CAGR was observed in the case of Net profit (3.13 per cent).

The maximum increase in sales was in the financial year 2019 and the maximum increase in the logistics cost was in the financial year 2019.

Table 5.2: Annual growth rate of different variables: Surya Biscuits industries Pvt. Ltd

Financial Year	Sales (Lakhs)	Net Profit (Lakhs)	Logistics Cost (Lakhs)	Net Profit to Sales Ratio	Logistic Cost to Sales Ratio
2016	476351.13	30291.01	4191.21	6.36	0.88
2017	594429.72	41513.23	3934.22	6.98	0.66
2018	601171.51	47753.44	40113.09	7.94	6.67
2019	767881.36	50371.22	42517.28	6.56	5.54
2020	799521.01	60012.06	50536.73	7.51	6.32
CAGR	**13.79**	**15.61**	**27.07**	-	-

Surya Biscuits Industries is headquartered in Jammu and Kashmir. They are the manufacturers of biscuits and cookies and their products are sweets & confectionary: biscuits & bread, chocolate & cookies.

Information about various variables for Surya Biscuit Industry Pvt. Ltd has been presented in table 5.2. CAGR was found to be positive in the case of Sales, Net profit and Logistics cost. Maximum CAGR was observed in the case of Logistics cost (27.07 percent) while minimum CAGR was observed in the case of Sales (13.79 per cent).

The maximum increase in sales was in the financial year 2020 and the maximum increase in the logistics cost was in the financial year 2020.

Table 5.3 Annual growth rate of different variables: KC Food Products

Financial Year	Sales (Lakhs)	Net Profit (Lakhs)	Logistic Cost (Lakhs)	Net Profit to Sales Ratio	Logistic Cost to Sales Ratio
2016	224371.78	28216.36	10854.43	12.57	4.84
2017	238628.74	34379.15	13769.93	14.41	5.77
2018	227411.14	39080.45	11813.76	17.18	5.19
2019	371667	56889	14167.85	15.31	3.81
2020	214371.78	40046	15962.45	18.68	7.45
CAGR	**3.58**	**12.79**	**8.33**	-	-

KC Food Products is a leading biscuit producer in India, with over 25 years of expertise in the biscuit manufacturing sector, allowing us to develop high-quality products that are nutritious and have passed several quality control checks before reaching our clients. With its immaculate line of quality products, KC Biscuits has earned a recognized name in India.

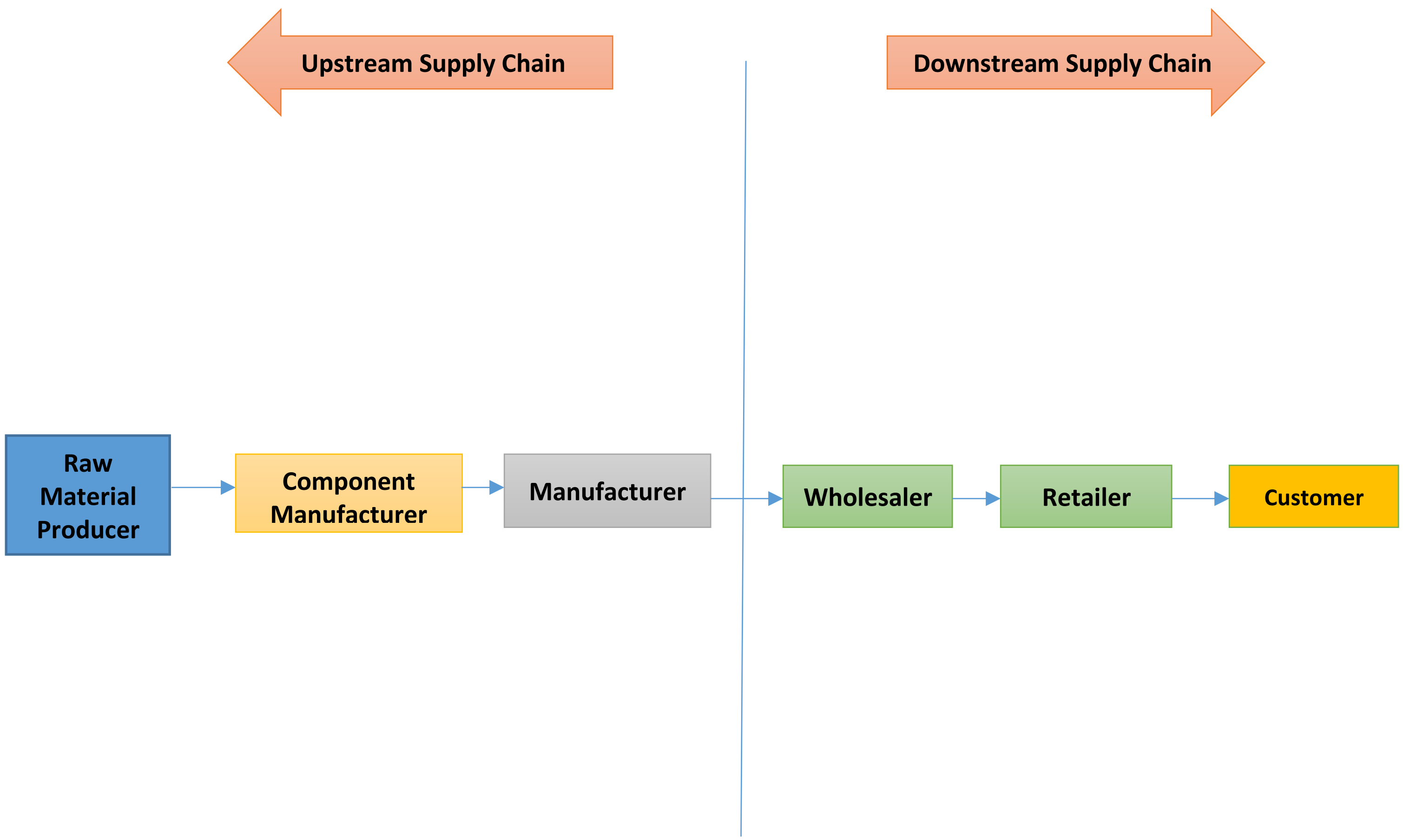


Fig 5.7: Supply chain model of Ishita Food Products

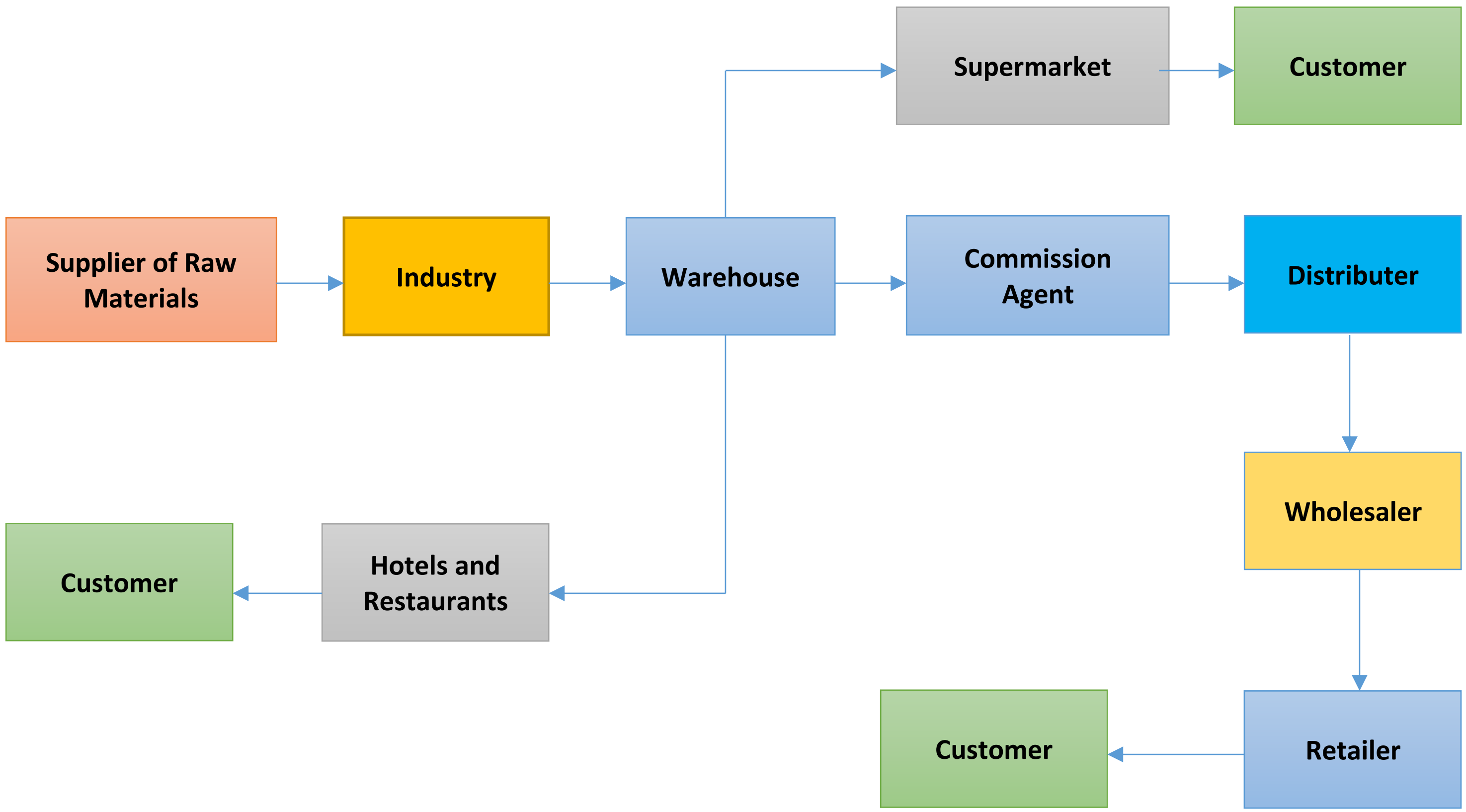


Fig 5.10: Supply Chain Model of Rana enterprises and Real Rana Group of Industries

Information about various variables for KC Food Products Pvt. Ltd, has been presented in table 5.3. CAGR was found to be positive in the case of Sales, Net profit and Logistics cost. Maximum CAGR was observed in the case of Net profit (12.79 per cent) while minimum CAGR was observed in the case of Sales (3.58 per cent).

The maximum increase in sales was in the financial year 2019 and the maximum increase in the logistics cost was in the financial year 2019.

Table 5.4: Annual growth rate of different variables: Rana Enterprises Ltd

Financial Year	Sales (Lakhs)	Net Profit (Lakhs)	Logistics Cost (Lakhs)	Net Profit to Sales Ratio	Logistics Cost to Sales Ratio
2016	30516.66	5377.81	1151.83	17.62	3.77
2017	34951.82	3743.01	1328.14	10.71	3.8
2018	36353.07	2704.42	1541.07	7.44	4.24
2019	78020.44	6880.52	2410.66	8.82	3.09
2020	50559.42	6035.42	1823.07	11.94	3.6
CAGR	**19.87**	**8.76**	**16.35**	-	-

Rana Enterprises operated as a sole proprietorship. Packaging Foods, Instant Coffee, Basmati Rice Food, Edible Mustard Oil, Dry Fruits, and other products are manufactured, exported, and traded. We are a well-known Exporter and Trader of high-quality Dry Fruits. They are made with high-grade raw materials by industry quality standards.

Information about various variables for Rana Enterprises has been presented in table 5.4. CAGR was found to be positive in the case of Sales, Net profit and Logistics cost. Maximum CAGR was observed in the case of Sales (19.87 per cent) while minimum CAGR was observed in the case of Net profit (8.76 per cent).

The maximum increase in sales was in the financial year 2019 and the maximum increase in the logistics cost was in the financial year 2019.

Table 5.5: Annual growth rate of different variables: Real Rana Group of Industries Ltd

Financial Year	Sales (Lakhs)	Net Profit (Lakhs)	Logistic Cost (Lakhs)	Net Profit to Sales Ratio	Logistics Cost to Sales Ratio
2016	14376.07	383.09	162.12	2.66	1.13
2017	37675.75	471.63	247.16	1.25	0.66
2018	52567.58	838.36	93.49	0.18	0.18
2019	54397.87	934.56	309.68	1.72	0.57
2020	65342.22	1150.46	169.2	1.76	0.26
CAGR	**40.43**	**33.42**	**3.16**	-	-

Rana Group Industries are the manufacturer of Packaging Foods, Instant Coffee, Basmati Rice Food, Edible Mustard Oil, and Dry Fruits. They are a well-known Exporter and Trader of high-quality Dry Fruits. They are made with high-grade raw materials following industry quality standards. These dry fruits are fresh and have a high nutritional value. Clients can get them in packing sizes at cheap prices. These dry fruits are delivered to customers within the time range indicated by them.

Information about various variables for the Real Rana Group of Industries, has been presented in table 5.5. CAGR was found to be positive in the case of Sales, Net profit and Logistics cost. Maximum CAGR was observed in the case of Sales (40.43 per cent) while minimum CAGR was observed in the case of Logistics cost (3.16 per cent).

The maximum increase in sales was in the financial year 2020 and the maximum increase in the logistics cost was in the financial year 2020.

Table 5.6: Annual growth rate of different variables: J.D. Food Industry

Financial Year	Sales (Lakhs)	Net Profit (Lakhs)	Logistics Cost (Lakhs)	Net Profit to Sales Ratio	Logistics Cost to Sales Ratio
2016	59528.28	1237.45	2797.89	2.08	4.7
2017	87319.36	1832.56	3901.36	2.1	4.47
2018	102305.01	1286.84	5113.8	1.26	5
2019	123557.72	1874.56	6729.2	1.52	5.45
2020	112083.67	1632.89	5264.98	1.46	4.7
CAGR	**17.5**	**5.94**	**19.84**	-	-

J.D. Food industry is a manufacturer and supplier of namkeen and other products. They are produced in compliance with industry quality requirements using premium raw materials.

Information about various variables concerning J.D. Food Industry has been presented in table 5.6. CAGR was found to be positive in the case of Sales, Net profit and Logistics cost. Maximum CAGR was observed in the case of Logistics cost (19.84 per cent) while minimum CAGR was observed in the case of Net profit (5.94 per cent).

The maximum increase in sales was in the financial year 2019 and the maximum increase in the logistics cost was in the financial year 2019.

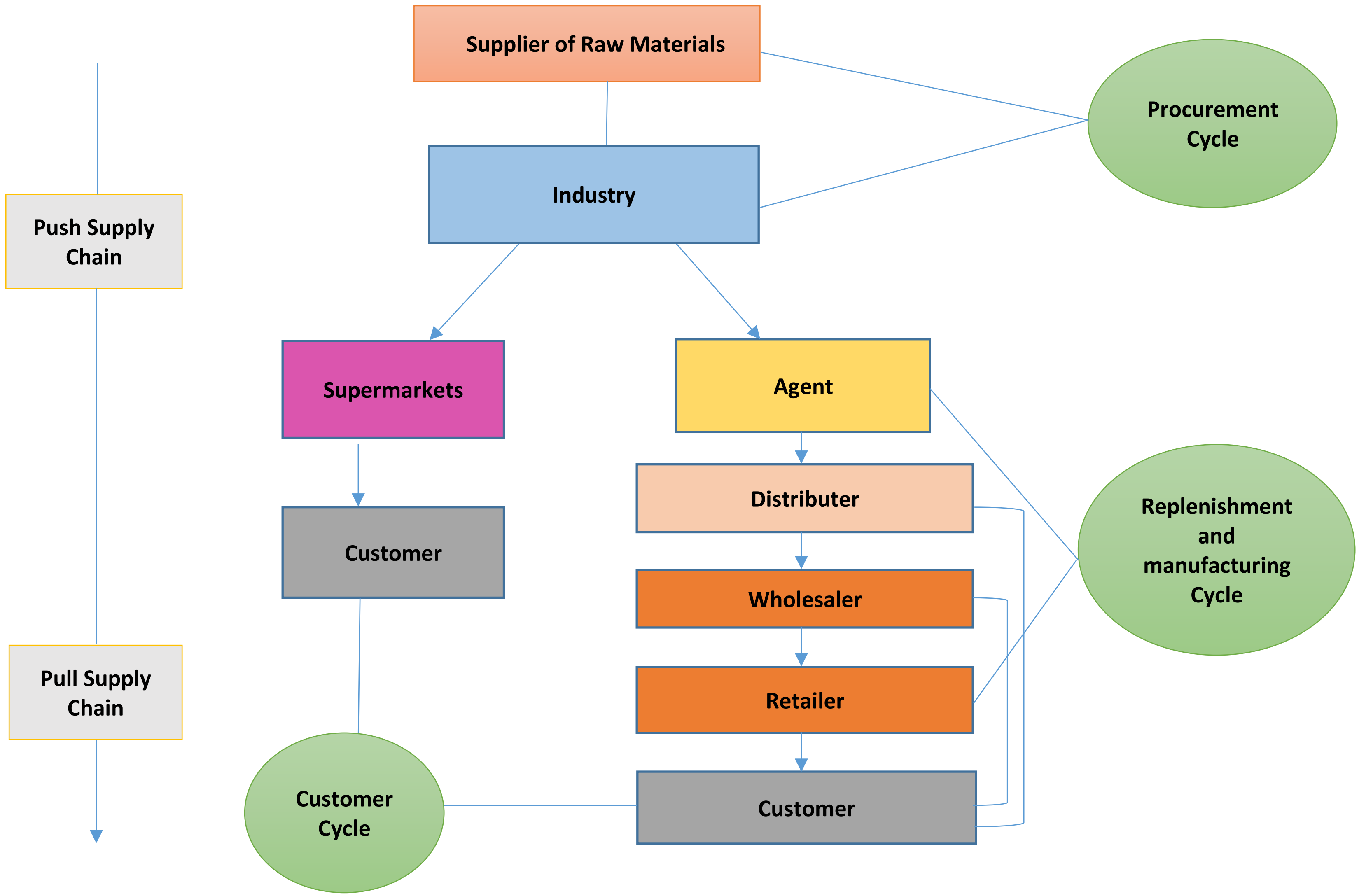


Fig 5.11: Supply Chain Model of J.D. Food Industry

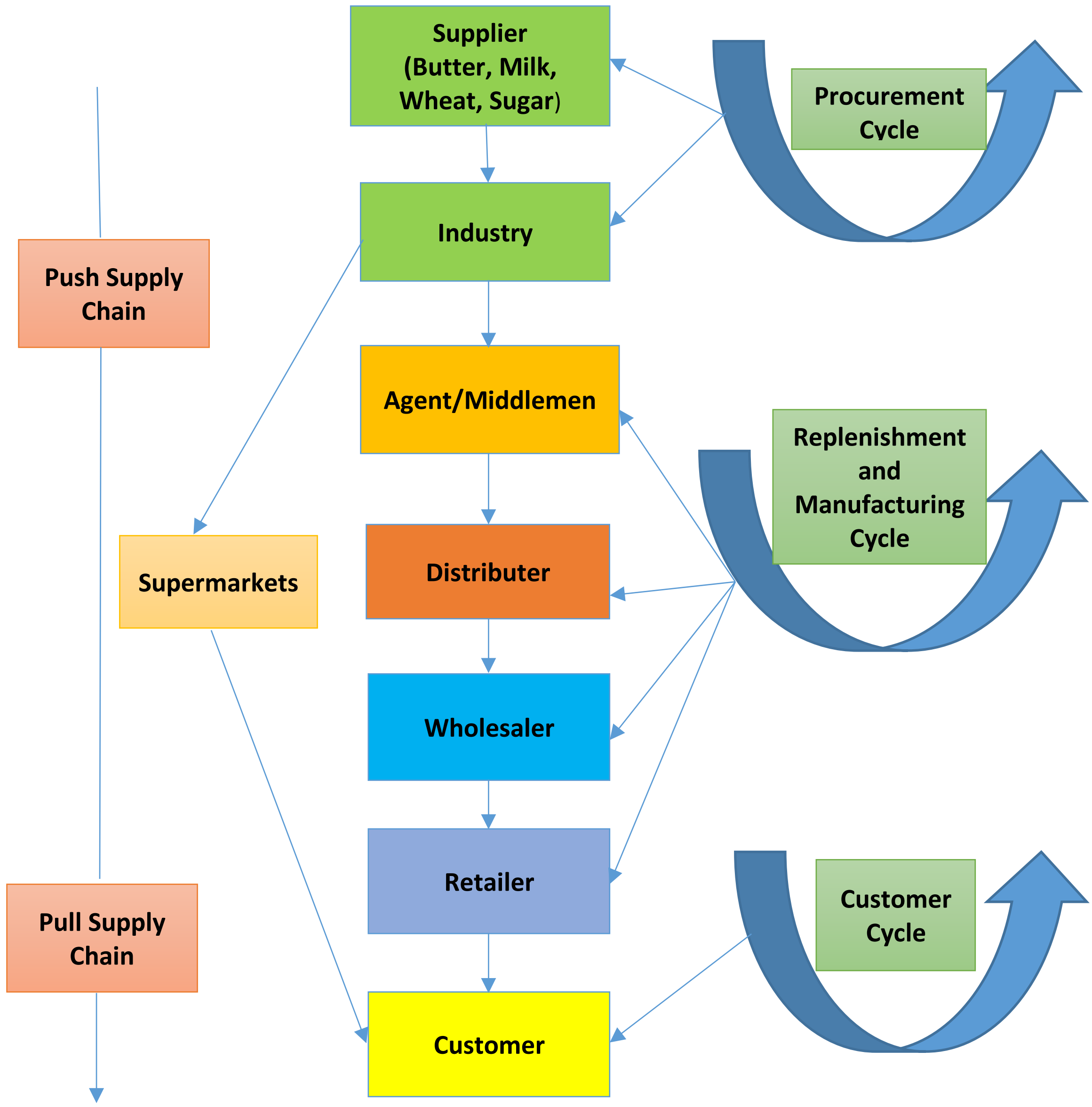


Fig 5.8: Supply chain model of Surya Biscuit Industry

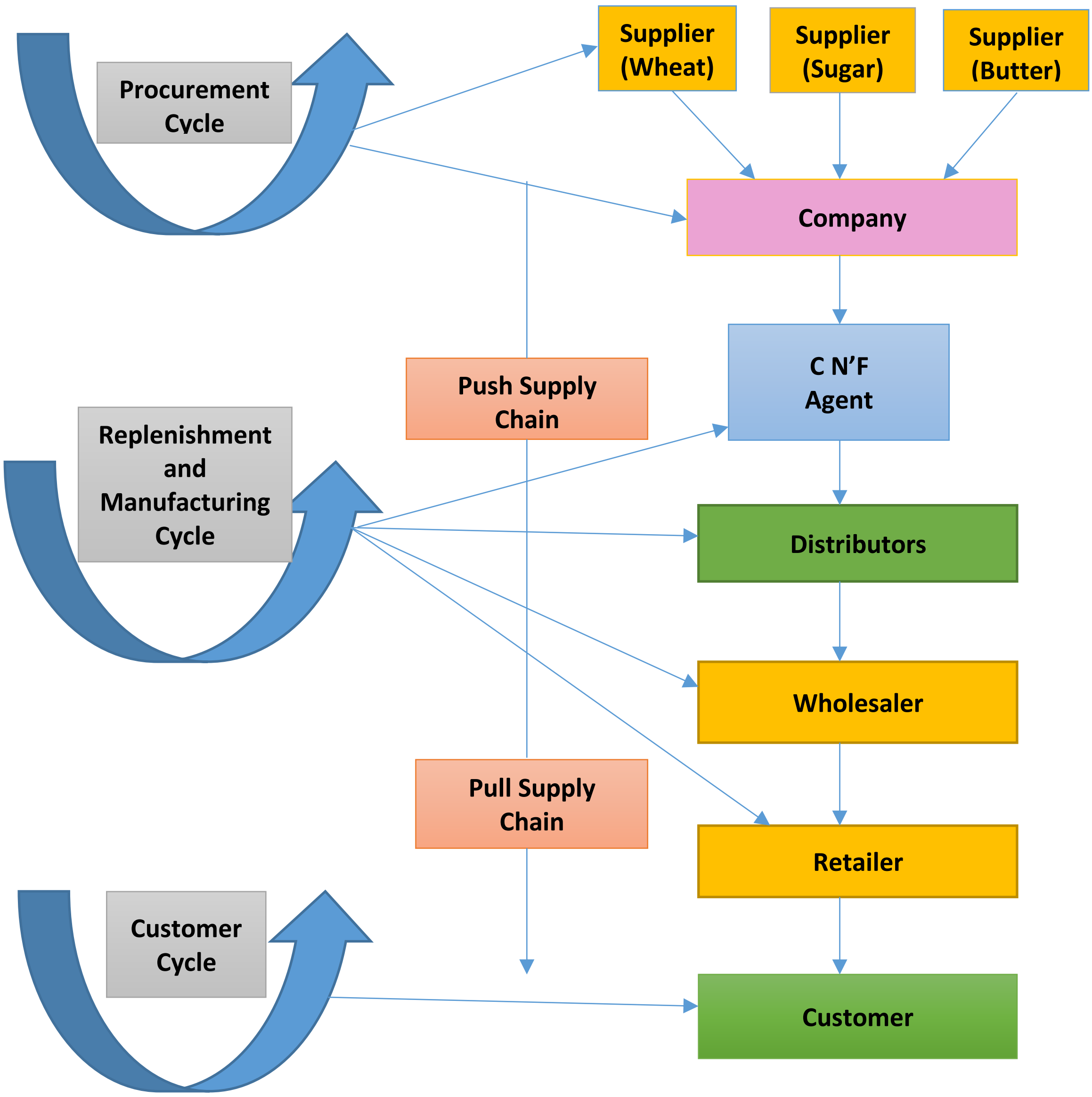
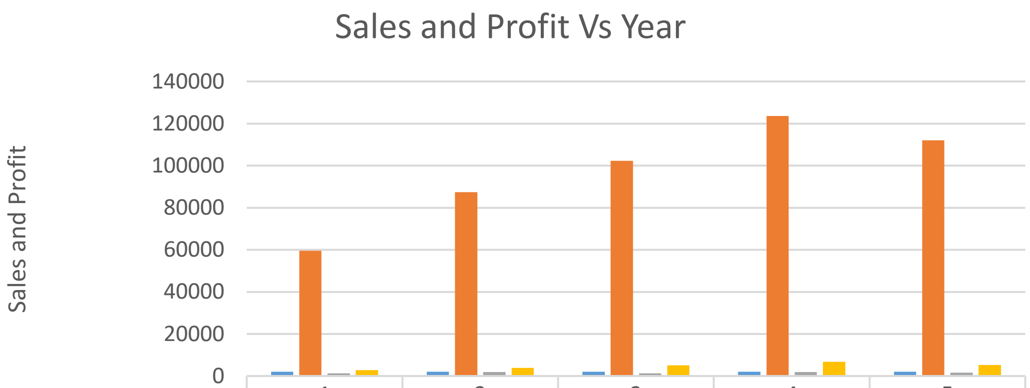


Fig 5.9: Supply Chain Model of KC Food Products

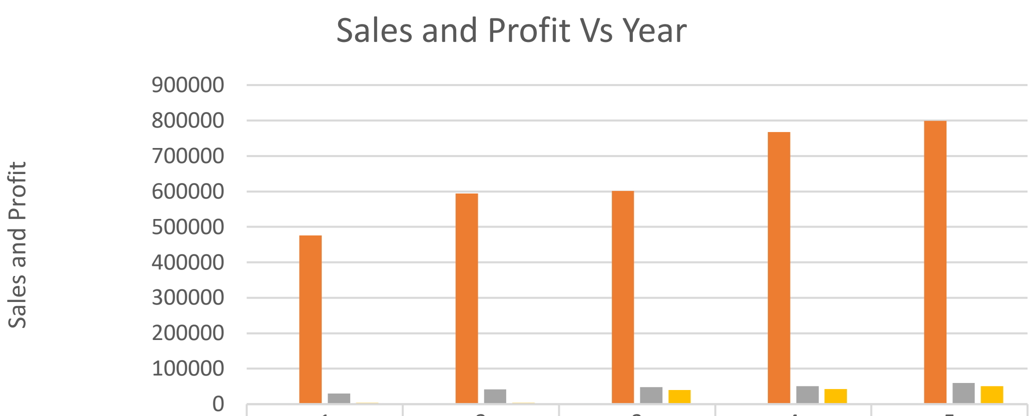


	1	2	3	4	5
Financial Year	2016	2017	2018	2019	2020
Sales (lakhs)	59528.28	87319.36	102305.01	123557.72	112083.67
Net Profit (Sales)	1237.45	1832.56	1286.84	1874.56	1632.89
Logistics Cost (lakhs)	2797.89	3901.36	5113.8	6729.2	5264.98

Financial Year

Financial Year Sales (lakhs) Net Profit (Sales) Logistics Cost (lakhs)

Fig. 5.1: Annual growth rate of different variables: Ishita Food Products



	1	2	3	4	5
Financial Year	2016	2017	2018	2019	2020
Sales (lakhs)	476351.13	594429.72	601171.51	767881.36	799521.01
Net Profit (lakhs)	30291.01	41513.23	47753.44	50371.22	60012.06
Logistics Cost (lakhs)	4191.21	3934.22	40113.09	42517.28	50536.73

Financial Year

Financial Year Sales (lakhs) Net Profit (lakhs) Logistics Cost (lakhs)

Fig 5.2: Annual growth rate of different variables: Surya Biscuits industries Pvt. Ltd

Relative efficiency of Companies: Year wise Analysis

This section examines the relative efficiency of the DMUs included in the study year by year. The DEA technique was used to compute the relative efficiency of DMUs. DMUs with a technical efficiency of one were efficient, whereas those with a technical efficiency of less than one were inefficient.

Table 5.7: Relative Efficiency of DMUs for 2016

DMUs	CRSTE	VRSTE	Scale	Return to scale
Ishita Food Products	0.345	1.000	0.344	DRS
Surya Biscuit Industry	1.000	1.000	1.000	CRS
KC. Food Products	0.360	0.360	0.997	IRS
Rana Enterprises	0.646	0.725	0.892	IRS
Real Rana Group of Industries	0.780	1.000	0.780	IRS
J.D. Food Industry	0.187	0.199	0.942	IRS
Mean	**0.553**	**0.714**	**0.826**	

Where,

CRSTE = Technical Efficiency from Constant Returns to Scale DEA,

VRSTE = Technical Efficiency from Variable Returns to Scale DEA

Scale = Scale Efficiency (CRSTE/VRSTE)

IRS= Increasing Returns to Scale

DRS= Decreasing Returns to Scale

CRS= Constant Returns to Scale

It can be seen from table 5.7 that except Surya biscuit industry ltd. all other companies were relatively inefficient. Ishita food products was found most inefficient with CRSTE of 0.345 and VRSTE of 1.000 and scale of 0.344 in 2016. KC. Food Products, Rana enterprises, Real Rana group of industries and J.D. Food Industry was found at IRS stage with scale of 0.977, 0.892, 0.780, 0.942 respectively in 2016. Ishita food was found at DRS stage in 2016. The mean efficiency of all the companies was 0.826 scale with CRSTE 0.553 and VRSTE 0.714 which signifies that all this companies collectively are at IRS stage in 2016.

Table 5.8: Relative Efficiency of DMUs for 2017

DMUs	CRSTE	VRSTE	Scale	Return to scale
Ishita Food Products	0.222	1.000	0.221	DRS
Surya Biscuit Industry	1.000	1.000	1.000	CRS
KC. Food Products	0.237	0.239	0.989	IRS
Rana Enterprises	0.267	0.407	0.655	IRS
Real Rana Group of Industries	1.000	1.000	1.000	CRS
J.D. Food Industry	0.147	0.148	0.995	DRS
Mean	**0.479**	**0.632**	**0.81**	

It can be seen from table 5.8 that except surya biscuit industry and Real Rana group of industries all other companies were relatively inefficient. Ishita food products and J.D. Food industry was found most inefficient with CRSTE 0.222, 0.147 and VRSTE of 1.000, 0.148 and scale of 0.221, 0.995 in 2017. K.C. Food Products and Rana enterprises was found at IRS stage with scale of 0.989 and 0.655 respectively in 2017. When we compare the mean scale of all the companies from 2016 to 2017 we can conclude that there is a decrease in efficiencies.

Table 5.9: Relative Efficiency of DMUs for 2018

DMUs	CRSTE	VRSTE	Scale	Return to scale
Ishita Food Products	0.211	1.000	0.211	DRS
Surya Biscuit Industry	0.133	0.786	0.168	DRS
KC. Food Products	0.369	1.000	0.368	DRS
Rana Enterprises	0.196	0.432	0.453	DRS
Real Rana Group of Industries	1.000	1.000	1.000	CRS
J.D. Food Industry	0.036	0.575	0.061	DRS
Mean	**0.324**	**0.799**	**0.377**	

It can be seen from table 5.9 that except Real Rana group of industries all other companies were relatively inefficient. Ishita food products, surya biscuit industry, K.C. Food products and Rana enterprises was found most inefficient with CRSTE 0.211, 0.133, 0.369, 0.196 and VRSTE of 1.000, 0.786, 1.000, 0.432 and scale of 0.211, 0.168, 0.368, 0.453 in 2018. When we compare the mean scale of all the companies from 2017 to 2018 we can conclude that there is a decrease in efficiencies.

Table 5.10: Relative Efficiency of DMUs for 2019

DMUs	CRSTE	VRSTE	Scale	Return to scale
Ishita Food Products	0.414	1.000	0.413	DRS
Surya Biscuit Industry	0.311	1.000	0.311	DRS
KC. Food Products	1.000	1.000	1.000	CRS
Rana Enterprises	0.733	0.739	0.990	IRS
Real Rana Group of Industries	1.000	1.000	1.000	CRS
J.D. Food Industry	0.105	0.495	0.211	DRS
Mean	**0.594**	**0.872**	**0.654**	

It can be seen from table 5.10 that except KC. Food products and Real Rana group of industries all other companies were relatively inefficient. Ishita food products, surya biscuit industry and J.D. Food industry was found most inefficient with CRSTE 0.414, 0.311, 0.105 and VRSTE of 1.000, 1.000, 0.495 and scale of 0.413, 0.311, 0.211 in 2019 respectively. Rana enterprises was found at IRS stage with scale of 0.990. When we compare the mean scale of all the companies from 2018 to 2019 we can conclude that there is an increase in efficiencies.

Table 5.11: Relative Efficiency of DMUs for 2020

DMUs	CRSTE	VRSTE	Scale	Return to scale
Ishita Food Products	0.253	1.000	0.253	DRS
Surya Biscuit Industry	0.175	0.960	0.181	DRS
KC. Food Products	0.369	1.000	0.368	DRS
Rana Enterprises	0.487	1.000	0.486	DRS
Real Rana Group of Industries	1.000	1.000	1.000	CRS
J.D. Food Industry	0.055	0.617	0.089	DRS
Mean	**0.390**	**0.930**	**0.396**	

It can be seen from table 5.11 that except Real Rana group of industries all other companies were relatively inefficient. Ishita food products, surya biscuit industry, K.C. Food products, Rana enterprises and J.D. Food Industry was found most inefficient with CRSTE 0.253, 0.175, 0.369, 0.487, 0.055 and VRSTE of 1.000, 0.960, 1.000, 1.000, 0.617 and scale of 0.253, 0.181, 0.386, 0.486, 0.089 respectively. When we compare the mean scale of all the companies from 2019 to 2020 we can conclude that there is a decrease in efficiencies.

Table 5.12: Year-wise Comparison of Relative Efficiency of all DMUs

	2016				2017				2018				2019				2020			
DMUs	CRSTE	VRSTE	SCALE	RTS	CRSTE	VRSTE	SCALE	RTS	CRSTE	VRSTE	SCALE	RTS	CRSTE	VRSTE	SCALE	RTS	CRSTE	VRSTE	Scale	RTS
Ishita	0.345	1.000	0.344	DRS	0.222	1.000	0.221	DRS	0.211	1.000	0.211	DRS	0.414	1.000	0.413	DRS	0.253	1.000	0.253	DRS
Surya	1.000	1.000	1.000	CRS	1.000	1.000	1.000	CRS	0.133	0.786	0.168	DRS	0.311	1.000	0.311	DRS	0.175	0.960	0.181	DRS
KC Food	0.360	0.360	0.997	IRS	0.237	0.239	0.989	IRS	0.369	1.000	0.368	DRS	1.000	1.000	1.000	CRS	0.369	1.000	0.368	DRS
Rana	0.646	0.725	0.892	IRS	0.267	0.407	0.655	IRS	0.196	0.432	0.453	DRS	0.733	0.739	0.990	IRS	0.487	1.000	0.486	DRS
Real Rana	0.780	1.000	0.780	IRS	1.000	1.000	1.000	CRS	1.000	1.000	1.000	CRS	1.000	1.000	1.000	CRS	1.000	1.000	1.000	CRS
J.D	0.187	0.199	0.942	IRS	0.147	0.148	0.995	DRS	0.036	0.575	0.061	DRS	0.105	0.495	0.211	DRS	0.055	0.617	0.089	DRS

Supply Chain Models of different Food Processing Industries

Ishita Food Products

The supply chain is divided into two main streams based on the availability of raw materials and finished goods. Firstly, the upward supply chain consists of manufacturers which are the results of components manufacturers that further depend on the availability of raw materials producers.

The second part of the supply chain which is also known as the downward supply chain deals with the availability of final goods to the last buyer. It enters the market from the wholesaler which is the stock-keeper of the finished goods produced by the manufacturer. They then distribute the final goods to the retailer who is responsible for making final goods available to the final customer. As observed from the supply chain model of Ishita food products; the final goods involve intermediaries between the manufacturers and final consumer (customer).

The overall model is quite feasible and capable of satisfying customer needs without creating much difference in the price of manufacturer and retailer.

Surya Biscuit Industries

The supply chain model of the Surya biscuit industry is divided into two types: the first part which is push supply chain consists of various distributors of the final product. Intermediaries between the industry and the final consumer include agents/ middlemen, distributors, wholesalers, and retailers. Middlemen place a pivot role between the industry and distributer. They work on a commission basis. The distributor is the stock broker of the final goods and is responsible for managing the supply chain based on demand within different wholesalers. Wholesalers are the stockholders who supply final products to a retailer for the consumer and services. Retailers are the last point of the supply of the final product to the consumer.

The second part of the supply chain involves a pull supply chain which is based on consumer demand in the market. Industry supplies directly to the supermarket which is the junction between finished product and customer. The supply chain model also evolves in 3 different cycles which are responsible for the smooth flow of supply chain. Firstly the procurement cycle is responsible for the procurement of raw materials such as butter, milk, wheat, and sugar. Secondly based on the demand for final goods industries regulate the procurement cycle and Replenishment

Cycle. Replenishment and manufacturing cycle is involved in proper distribution and disbursement of final goods within distributor and wholesaler that regulate the supply of final goods. The manufacturing cycle is responsible for regulating the production of final goods in the industry based on demand in the market.

Lastly, the customer cycle is based on the demand of consumers for final goods.

K.C. Food Products

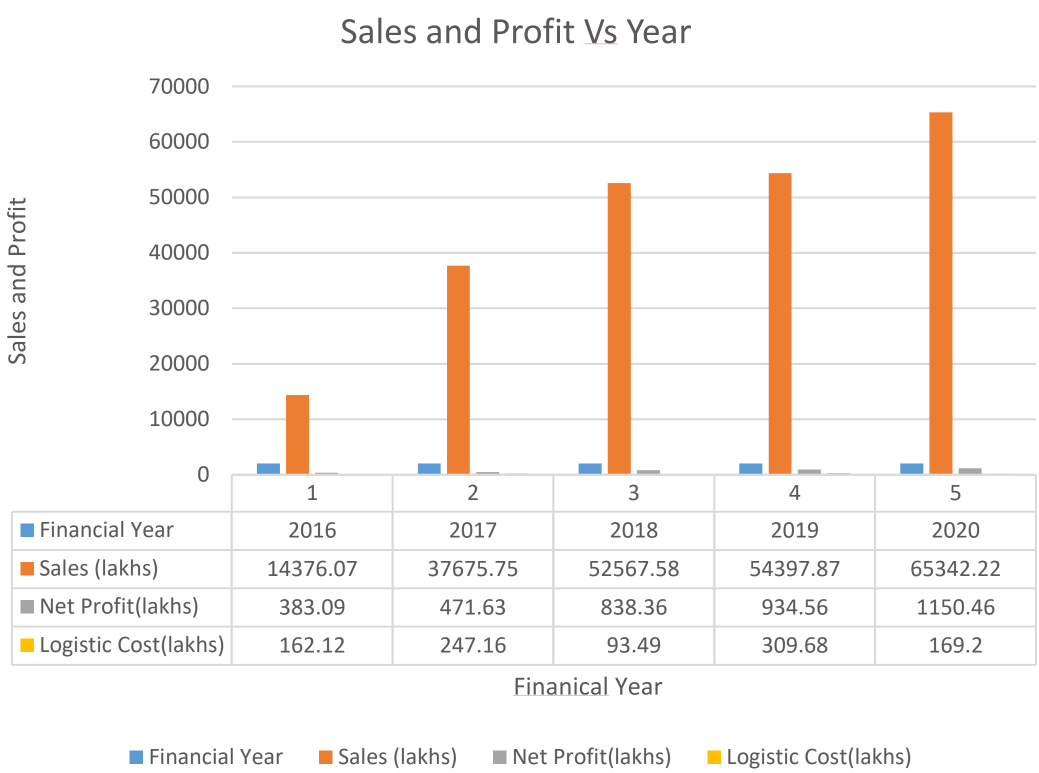
The supply chain model of KC Food Products is divided into two types: the first part which is push supply chain consists of various distributors of the final product. Intermediaries between the industry and final consumer include CNF agents, distributors, wholesalers, and retailers. They work on a commission basis. The distributor is the stock broker of the final goods and is responsible for managing the supply chain based on demand within different wholesalers. Wholesalers are the stockholders who supply the final product to the retailer for the consumer and services. Retailers are the last point of the supply of the final product to the consumer.

The second part of the supply chain involves a pull supply chain which is based on consumer demand in the market. The supply chain model also evolves in 3 different cycles which are responsible for the smooth flow of supply chain. Firstly the procurement cycle is responsible for the procurement of raw materials such as butter, wheat, and sugar. Secondly based on the demand for final goods industries regulate the procurement cycle and Replenishment Cycle. Replenishment and manufacturing cycle is involved in proper distribution and disbursement of final goods within distributor and wholesaler that regulate the supply of final goods. The manufacturing cycle is responsible for regulating the production of final goods in the industry based on demand in the market.

Lastly, the customer cycle is based on the demand of consumers for final goods.

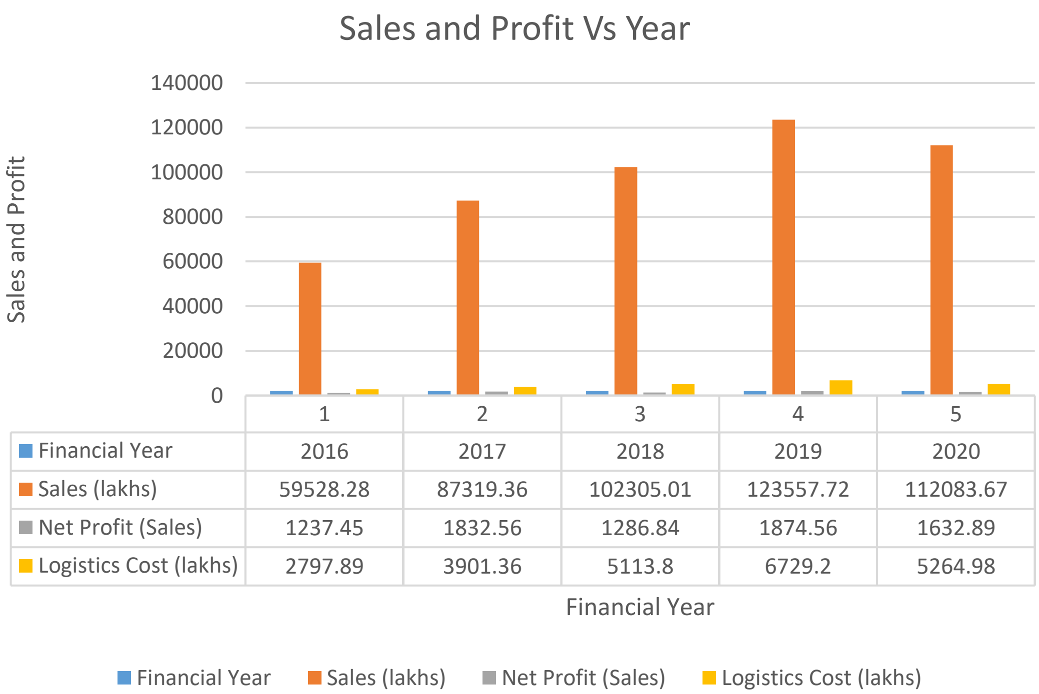
Rana Enterprises and Real Rana Group of Industries

Rana Enterprises and Real Rana Group of Industries involves in various forward and backward-linked enterprises in the market that make them more efficient in customer outreach. They purchase raw materials from various suppliers and manufacturers in the industry which store them further after production in the



	1	2	3	4	5
Financial Year	2016	2017	2018	2019	2020
Sales (lakhs)	14376.07	37675.75	52567.58	54397.87	65342.22
Net Profit(lakhs)	383.09	471.63	838.36	934.56	1150.46
Logistic Cost(lakhs)	162.12	247.16	93.49	309.68	169.2

Fig 5.5: Annual growth rate of different variables: Real Rana Group of Industries Ltd



	1	2	3	4	5
Financial Year	2016	2017	2018	2019	2020
Sales (lakhs)	59528.28	87319.36	102305.01	123557.72	112083.67
Net Profit (Sales)	1237.45	1832.56	1286.84	1874.56	1632.89
Logistics Cost (lakhs)	2797.89	3901.36	5113.8	6729.2	5264.98

Fig 5.6: Annual growth rate of different variables: J.D. Food Industry

warehouse. These warehouses are the main junction for distributer to various marketing channels and customer outreach. The warehouse supplies final goods to the supermarket that have direct interaction with the customer. Warehouses are the source of supply to various intermediaries such as commission agents, dealers, wholesalers, and retailers. Warehouses are the center for supply in hotels and restaurants which provide the final product to the customer directly.

J.D. Food Industry

Supply chain management of the J.D. Food industry is divided into the push supply chain which involves the interaction of industries to the customer end market and the pull supply chain which is based on intermediaries for the customer end in the market. Push supply chain industries sell final products in the supermarket where the customer could directly purchase final goods. Thus supply chain is based on customer demand and is more efficient in the marketing channel. Pull supply chain involves intermediaries between industry and commission agents, distributors, wholesalers, and retailers for the supply of final goods to the customer.

This model involves three cycles in supply chain management i.e. procurement cycle, replenishment cycle & manufacturing cycle, and customer cycle. The procurement cycle refers to regulating the demand for raw materials by the industries based on the demand of customer for the final good. Replenishment and manufacturing cycle regulate the stock of final product in the market based on the demand of customers that vary in different areas. Agents act as a bridge between industry and distributer and work on commission bases. The distributor is the stock broker to regulate the supplier's final goods based on the demand of different wholesalers. Wholesalers are the stockholder of the final product who is the responsible for the supply of the final product to different retailers. Retailers are the final point of purchase of supply to the customer. The customer cycle depends on the purchasing power and wants for final product.

CHAPTER-6

DISCUSSION

6.1 Annual growth rate of different variables for six food processing industries

The annual growth rate of different variables for six enterprises was observed from the financial year 2016-2020.

According to table 5.1, it was observed that the highest sales of Ishita food products were observed in the year 2019 at ₹ 924536.24 and the highest net profit was observed at ₹ 95326.81 in 2019 and similarly, the logistic cost was also highest at ₹ 8572.81 in 2019 respectively. The lowest sales for the same industry was ₹ 65342.81 and the lowest net profit was ₹ 79281.22 similarly, logistics cost was the lowest at ₹ 31813.30 in the year 2016.

By analysis of fig 5.1; Sales and profit for different years are discussed. Maximum sales were observed in the year 2019 as compared to other years. Sales for 2019 were ₹ 123557.72. The profit was highest in the year which stands for ₹ 1874.56 in the year 2019. The logistics cost was found to be highest in 2019 was ₹ 6729.20.

According to table 5.2, it was observed that the highest sales in the Surya biscuit industry were observed in the year 2020 at ₹ 799521.01 and the highest net profit was observed at ₹ 60012.06 in 2020 and similarly, the logistic cost was also highest at ₹ 50536.73 in 2020 respectively. The lowest sales for the same industry were ₹ 473651.13 in 2016 and the lowest net profit was ₹ 30291.01in 2016 and logistics cost was the lowest at ₹ 3934.22 in the year 2017.

By analysis of fig 5.2; Sales and profit for different years are discussed. Maximum sales were observed in the year 2020 as compared to other years. Sales for 2020 were ₹ 799521.01. The profit was highest in the year which stands for ₹ 60012.06 in the year 2020. The logistics cost was found to be highest in 2020 was ₹ 50536.73.

According to table 5.3, it was observed that the highest sales of KC Food Products were observed in the year 2019 at ₹ 371667.00 and the highest net profit was observed at ₹ 56889.00 in 2019 and the logistic cost was also highest at ₹ 15962.45 in 2020 respectively. The lowest sales for the same industry were ₹ 214371.78 in 2020 and the lowest net profit was ₹ 28216.36 and the logistics cost was lowest at ₹ 10854.43 in the year 2016.

By analysis of fig 5.3; Sales and profit for different years are discussed. Maximum sales were observed in the year 2019 as compared to other years. Sales for 2019 were ₹ 371667.00. The profit was highest in the year which stands for ₹ 56889.00 in the year 2019. The logistics cost was found to be highest in 2020 was ₹ 15962.45.

According to table 5.4, it was observed that the highest sales of Rana Enterprises were observed in the year 2019 at ₹ 78020.44 and the highest net profit was observed at ₹ 6880.52 in 2019 and similarly, the logistic cost was also highest at ₹ 2410.66 in 2019 respectively. The lowest sales for the same industry were ₹ 30516.66 in 2016 and the lowest net profit was ₹ 2704.42 in 2018 and the logistics cost was the lowest at ₹ 1151.83 in the year 2016.

By analysis of fig 5.4; Sales and profit for different years are discussed. Maximum sales were observed in the year 2019 as compared to other years. Sales for 2019 were ₹ 78020.44. The profit was highest in the year which stands for ₹ 6880.52 in the year 2019. The logistics cost was found to be highest in 2019 was ₹ 2410.66.

According to table 5.5, it was observed that the highest sales of Real Rana Group of Industries were observed in the year 2020 at ₹ 65342.22 and the highest net profit was observed at ₹ 1150.46 in 2020 and similarly logistic cost was also highest at ₹ 309.68 in 2019 respectively. The lowest sales for the same industry was ₹ 14376.07 and the lowest net profit was ₹ 383.09 and the logistics cost was the lowest at ₹ 93.49 in the year 2018.

By analysis of fig 5.5; Sales and profit for different years are discussed. Maximum sales were observed in the year 2020 as compared to other years. Sales for 2020 were ₹ 65342.22. The profit was highest in the year which stands for ₹ 1150.46 in the year 2020. The logistics cost was found to be highest in 2020 was ₹ 309.68.

According to table 5.6, it was observed that the highest sales of J.D Food Industry were observed in the year 2019 at ₹ 123557.72 and the highest net profit was observed at ₹ 1874.56 in 2019 and similarly logistic cost was also highest at ₹ 6729.20 in 2019 respectively. The lowest sales for the same industry was ₹ 59528.00 and the lowest net profit was ₹ 1237.45 and similarly, logistics cost was the lowest at ₹ 2797.89 in the year 2016.

By analysis of fig 5.6; Sales and profit for different years are discussed. Maximum sales were observed in the year 2019 as compared to other years. Sales for 2019 were ₹ 123557.72. The profit was highest in the year which stands for ₹ 1874.56 in the year 2019. The logistics cost was found to be highest in 2019 was ₹ 6729.20 Relative Efficiency of DMUs in different years.

From table no. 5.7, it is found that the relative efficiency for the year 2016 of Ishita food products has decreased return to scale, Surya biscuit industry is in constant return to scale whereas KC. Food products, Rana enterprises, Real Rana group of industries, JD Food industry is in increasing return to scale.

From table no. 5.8, it is found that the relative efficiency for the year 2017 of Ishita food products, JD Food industry have decreasing return to scale, Surya biscuit industry, Real Rana group of industries is in constant return to scale whereas KC. Food products, Rana enterprises are in increasing return to scale.

From table no. 5.9, it is found that the relative efficiency for the year 2018 of Ishita food, Surya biscuit industry KC. Food products, Rana enterprises, JD Food industry is in decreasing return to scale whereas Real Rana group of industries is in constant return to scale.

From table no. 5.10, it is found that the relative efficiency for the year 2019 of Ishita food products, Surya biscuit industry, JD Food industry have decreasing return to scale, KC. Food products, Real Rana group of industries are in constant return to scale whereas Rana enterprises are in increasing return to scale.

From table no. 5.11, it is found that the relative efficiency for the year 2020 of Ishita food products, Surya biscuit industry, KC. Food products, Rana enterprises, JD food industry is in decreasing return to scale whereas Real Rana group of industries is in constant return to scale.

Supply Chain Management

It had been analyzed that model of all six food processing industries to study the various types of supply chain management which are implemented in these industries. In Ishita food products we found that supply chain management was divided into two supply chains one for procuring raw materials i.e. upstream supply chain and then a second one for downstream supply chain which consists of intermediaries in the marketing channel. It could be observed that the pivot junction of the upward supply chain depends upon the component manufacturer which is further dependent on raw materials producers. The downstream channel has intermediaries such as wholesalers, retailers, and consumers.

Surya biscuit industry is divided into two supply chains i.e. push and pull, push supply chain depends on the supplier of butter, milk, sugar, and wheat. This also creates a procurement channel for obtaining these raw materials. Pull supply chains contain intermediaries such as middlemen, dealers, wholesalers, and retailers to finally reach a consumer. It comprises replenishment and the manufacturing cycle. There is a direct linkage between industry and consumer via supermarkets that helps to know the customer cycle.

The supply chain of KC food products is again divided into a push and pull supply chain. The company procures its three major raw materials such as wheat, sugar, and butter from suppliers that found the procurement cycle. The company then outreaches customers through intermediaries such as CNF agents, distributors, wholesalers, and retailers which form a pull supply chain. It also comprises replenishment and manufacturing cycle to manage the demand and supply of products.

The supply chain of Rana enterprises and the Real Rana group of the industry consists of their main junction as warehouses. The final product is stored in warehouses that have three different channels for supplying the demand of the consumer. The first channel consists of intermediaries such as commission agents, dealers, and retailers. The second supply chain has direct outreach to the consumers through hotels and restaurants. The third supply chain consists of supermarkets for direct consumer outreach.

JD food industry is again divided into push and pull chains while the push supply chain consists of suppliers of raw materials for the industry. Pull supply chain is for consumer outreach to different channels which consist of supermarkets that have direct access to consumers while the other intermediaries such as agents, dealers, wholesalers, and retailers. The procurement cycle describes the relationship between suppliers of raw materials and industry. The replenishment and manufacturing cycle consists of all intermediaries and the customer cycle consists of intermediaries from both channels.

CHAPTER-7

SUMMARY AND CONCLUSIONS

7.1 Summary

The project entitled **“Firms’ Performance Based on Logistic Cost, Returns and Supply Chain Management Practices of Food Processing Sector in Jammu District”** was carried out in the Jammu region. A total of six food processing industries were taken from the Jammu district. The information was collected through a questionnaire. The acquired data were analyzed to determine the investigation's objectives. This chapter provides a concise summary of the current investigation's findings.

7.1.1 To study the relationship between logistics cost and firms’ performance in Food processing sector

It had been concluded that Ishita food products showed an average sale of growth of 6.61 per cent CAGR and net profit growth of 3.13 per cent CAGR for 5 years but the logistics cost is growing at a rate of 15.14 per cent CAGR which is considerably high compared to the other two indicators. This is one of the major reasons why Ishita food products have decreasing return to scale for a particular five years of analysis. Surya biscuit industry showed an average sales growth of 13.79 per cent CAGR and a net profit growth rate of 15.61 per cent CAGR for 5 years but the logistics cost had been growing at a rate of 27.07 per cent CAGR which is considerably high. As sales and net profit showed good growth rates but were unable to compete with logistics cost growth rates. This is one of the major reasons why the Surya biscuit industry has been underperforming from time to time. KC food products showed an average sale growth of 3.58 per cent CAGR and a net profit growth rate of 12.79 per cent CAGR for 5 years but the logistics cost had been growing at a rate of 8.33 per cent CAGR which is considerably low compared to sales and net profit growth rate. This is the reason why KC food products had an average return to scale for the last 5 years. The growth of KC food products is not on the charts but it is sustainable. We conclude that Rana enterprises showed an average sale of growth of 19.87 per cent CAGR and net profit growth of 8.76 per cent CAGR for 5 years but the logistics cost is growing at a rate of 16.35 per cent CAGR which is considerably high but the sales and net profit have high growth rate which is enough to sustain of logistics cost. Rana enterprises have been performing averagely over the years. It concluded that the Real Rana group of industries showed an average sale of growth of 40.43 per cent CAGR and net profit growth of 33.42 per cent CAGR for 5 years but the logistics cost is growing at a rate of 3.16 per cent CAGR which is considerably low as compared to sales and net profit which has approximately 12 times higher growth rate than logistics cost. The Real Rana group of industries is one of the best-performing industries selected for this study. It had a good return to scale over the last 5 years and shows more potential for the growing stage. We conclude that the J.D food industry showed an average sale of growth of 17.5 per cent CAGR and net profit growth of 5.94 per cent CAGR for 5 years but the logistics cost is growing at a rate of 19.84 per cent CAGR which is considerably high compared to sales and net profit. J.D's food industry had performed poorly over the past five years.

7.1.2 To assess the return performance of selected units based on logistics cost

By 5-year analysis using the DEA technique, it had been concluded that the return to scale for all the six companies which was selected randomly showed various results. Ishita food products were underperforming from 2016 to 2020 and were one of the most inefficient industries which continuously showed a decreasing return to scale. Surya biscuit industry showed a constant return to scale in 2016-17 but from the year 2018-2020, its return to scale decreased drastically and ended at 0.181 in 2020. KC food products showed a good return to scale during 2016, 2017, and 2019 but underperformed during 2018 and 2020. Rana enterprises showed increasing return to scale during 2016, 2017, and 2019 but its return to scale decreased in 2018 and 2020. The Real Rana group of industries is one of the most promising industries in this following study as its return to scale has been increasing or in constant phase during these five years. JD food industry's return to scale had been increasing during the first year of analysis but its return to scale had been decreasing drastically after 2016.

All the six industries which were considered for this analysis to assess the return performance of their selected units only based on logistics cost. Only the Real Rana group of industries was the most efficient industry for handling logistics followed by Rana enterprises. All the other industries considered in this analysis had fluctuating efficiency for logistics except Ishita food products which seriously need to consider their logistics cost efficiency for better business.

7.1.3 To explore the supply chain management practices of food processing units in Jammu District

It had been concluded that supply chain model of Ishita food products had only two Intermediaries between manufacturers and customers which makes the efficiency in price spread better. The manufacturer buys its raw materials from component manufacturer which makes raw materials more product oriented and ready to use manufacturers. Supply chain model of surya biscuit industry have four intermediaries between industries and customers which increase the price spread through a longer channel. The procurement of raw materials are through suppliers directly. Supply chain model of KC food products have four intermediaries between company and customer which makes the price spread more efficient and dedicated for raw materials in bulk. In supply chain model of Rana enterprises and Rana group of industries, it had been observed that a horizontal linkage in distribution between industry and consumer was present. The supply chain model had three channels which were connected by the junction in the form of warehouse. From the warehouse customer outreach had maximum intermediaries for retail type distribution and for direct outreach to consumer and the other channels have outreach like super markets & restaurants. For the procurement of raw materials supplier with all the raw materials were connected. Supply chain model of J.D food industry is divided into two different channels for customer outreach one is of retail type which involve four intermediaries between customer and consumer while the other one had supermarkets as a bridge between industries and consumer.

Conclusion

- A decreasing return of scale is observed in Kamal Food Industry in the given timeline of study which implicates that the Kamal Food Industry is observed to have a downward trend due to the lack of awareness of the brand in the market.
- From the observed data, we can conclude that Rana Enterprises has been observed to have a maximum increasing trend (an exception to the year in Covid-19).
- Real Rana Group of Industries Pvt. Ltd. was observed to have the best supply chain among the overall six industries. Since it has direct access to various consumer-end delivery like supermarkets, restaurants, hotels, and retail shops.

Recommendations

- There is a direct relationship between an increase in sales and net profit and the decrease in logistic costs for Ishita Food Products and J.D Food Industry. Thus, industries are recommended to improve their logistics management to reduce costs.
- It is recommended to Ishita Food Products, Surya Biscuit Industry and K.C Food Products to have a comprehensive study of supply chain management and measures to be taken to have direct access to the consumer outreach.
- For Rana Enterprises and Real Rana Group of Industries it is suggested to improve its business efficiencies.

REFERENCES

Akbari, M. 2018. Logistics outsourcing: a structured literature review, *Benchmarking: An International Journal*, **25**(5) 1548-1580.

Anna, F. and Kristina, L. 2015. Capturing food logistics: A literature review and research agenda, *International Journal of Logistics Research and Applications*, **18**(1): 16-34.

Ashraf Ali F. 2000. *Business performance of co-operative oil mills- A Management Appraisal*. M.Sc. (Agri.) Thesis, Univ. Agric. Sci., Dharwad.

Baker, R. 2003. Strategic Planning and Financial Performance in the Food Processing Sector, **25**(2): 470-482.

Bhagat, Deepak, Dhar, U. R. 2011. Agriculture Supply Chain Management: A Review. *IUP Journal of Supply Chain Management,* **8**(3): 7-25.

Bhatnagar R and Sohal A S. 2005. Supply chain competitiveness: measuring the impact of location factors, uncertainty and manufacturing practices. Technovation, **25**: 443- 56.

Blanchard and David. 2010. Supply Chain Management Best Practices 2nd Edition, John Wiley & Sons.

Blazkova, I. and Dvoulety. 2018. The causes of firm performance variation in the food processing industry in the context of the outlier effect, *Management Research Review*, **41(**8): 968-986.

Bowersox D.J., and Closs D.J., 1996. Logistical Management: The Integrated Supply Chain Process, McGraw-Hill.

Chen I.J., and Paulraj A., 2004. Understanding Supply Chain Management: Critical Research and a Theoretical Framework. *International Journal of Production Research*, **42**(1): 131- 163.

Christopher M.L., 1992. Logistics and Supply Chain Management, Pitman, London. Deng, Tianjie and Lee, Young Jin and Xie, Karen.2021. Managers' Responses to Online Reviews for Improving Firm Performance: A Text Analytics Approach, NY.

Dharni, Khusdeep and Sharma, R.K., 2015. Supply Chain Management in Food Processing Sector: Experience from India. *Inder Science,* **21**(1): 115-132.

Fabio R. Chaddad, Mario P. Mondelli. 2012. Sources of Firm Performance Differences in the US Food Economy, *Journal of Agricultural Economics,* **64**(2): 382-404.

Fagan M.L., 1991. A guide to global sourcing. *The Journal of Business Strategy* **21**: 5.

Fawcett S.E., 1992. Strategic Logistics in Coordinated Global Manufacturing Success. *International Journal of Production Research,* **30**(5): 1081-2000.

Gimenez, C. 2019. Logistics integration processes in the food industry, *International Journal of Physical Distribution and Logistics Mangement,* **36**(3): 231-249.

Hsiao, H.I., R.G.M. Kemp, J.G.A.J. van der Vorst, S.W.F. (Onno) Omta. 2010. A Classification of logistic outsourcing levels and their impact on service Performance: Evidence from the food processing industry, *International Journal of Production Economics,* **124**(1): 75-86.

Han, J., Trienekens, J.H., and Omta, S.W.F. (O). 2009. Integrated information and logistics management, quality management and firm performance of pork processing industry in China", *British Food Journal*, **111**(1): 9-25.

Hobbs, J.E., 1998. Innovation and Future Direction of Supply Chain Management in the Canadian Agri-Food Industry. *Canadian Journal of Agricultural Economics/Revue Canadienne/d'Agroeconomie,* **4**(6): 525-537.

I.P., 2016. Reverse logistics capabilities and firm performance, the mediating role of business strategy. *International Journal of Logistics Research and Applications*, **19**(5): 424-442.

Jagtap, S., Bader, F., Garcia-Garcia, G., Trollman H, Fadiji, T., Salonitis, K., 2021. Food Logistics 4.0: Opportunities and Challenges. *Logistics,* **5**(1): 2.

Jałowiecki Piotr, Wozniakowski Tomasz, Zabkowski Tomasz. 2014. Some Remarks on Logistics Investments among Polish Food Processing and Agribusiness Companies, *Information System in Management,* **3**(2): 122-133.

John, T., Mentzer., 2004. Developing and Measuring Supply Chain Management Concepts, *Journal of Business Logistics,* **25**(1): 63-99.

Keramidou I, Mimis A. and Pappa E., 2011. Performance evaluation of the poultry sector in Greece. J Food Agric Environ, **9**: 431-437.

Lee H.L., 2004. The Triple-A Supply Chain. *Harvard Business Review,* **82**(10): 102-112.

Londe, B.J., Pohlen, T.L., 1994. Implementing Activity-Based Costing (ABC) in Logistics, *Journal of Business Logistics,* **15**(2): 11-12.

Hau L. Lee and Corey Billington, 1995. The Evolution of Supply-Chain-Management Models and Practice at Hewlett-Packard, *Interfaces,* **25**(5): 42-63.

Marchet, G., Melacini, M. and Perotti, S. 2014. Environmental sustainability in logistic and freight transportation: A literature review and research agenda, *Journal of Manufacturing Technology Management,* **25**(6): 775-811.

Noha A Mostafa, Asmaa Galal, Hesham Elawady. 2021. A Proposed Approach for Selecting Third Party Logistic Alternatives. *The Egyptian International Journal of Engineering Sciences and Technology,* **35**(2): 48-56.

Nor Ghani Md. Nor, Abul Bashar Bhuiyan, Jamaliah Said, Syed Shah Alam. 2016. Innovation barriers and risks for food processing SMEs in Malaysia: A logistic regression analysis. *Malaysian Journal of Society and Space* **12**(2): 167-178.

Olayinka, S.A. 2010. Impact of inventory and warehousing costs in total logistics cost of manufacturing companies in Southwestern, Nigeria, *Medwell Journals,* **4**(1): 14-19.

Paul L. Drnevich, Aldas P. Kriauciunas. 2011. Clarifying the conditions and limits of the contributions of ordinary and dynamic capabilities to relative firm performance. *Strategic Management Journal,* **32**(3): 254-279.

Porter M.E., 1985. Competitive Advantage, Free Press, NY, Porter M.E., 1998. Competitive Strategy: Techniques for Analyzing Industries and Competitors, Free Press, New York, NY.

Richardson H.L., 1995. What value logistics. Cost/Value Series, Part III, T&D, August.

Simatupang T.M., and Sridharan R., 2002. The Collaborative Supply Chain. *International Journal of Logistics Management*, **13**(1): 15-30.

Sohal A., and Perry M., 1999. Supply chain activities for improved customer’s responsiveness. Logistics in the Information Age, Conference Proceedings, Florence, Italy, 297-302.

Song J.S., and Zipkin P.H., 1996. Inventory control with information about supply conditions. Management Science, **42**(10): 1409-1419.

Tejas R.S., Mahendra Sharma. 2012. 3PLSP scale for co-operative dairies in Indian context. *Asia Pacific Journal of Marketing and Logistics*, **24**(3): 515-532.

Tejas R.S., Mahendra Sharma. 2012. Prioritising Information System Characteristics for Managing Logistics flexibility for Indian cooperatives Sector, *International Journal of Logistics System and Management*, **12**(4): 395-41.

Tripathy, S. & Shaik, A., 2020. Leverage and firm performance: Empirical evidence from Indian food processing industry. *Management Science Letters*, **10**(6): 233-1240.

Van Damme D.A., and Van der Zon F.L.A., 1999. Activity based costing and decision support. *International Journal of Logistics Management*, **10**(1): 71-82.

Vickner S.S., Trienekens J.H., and Omta S.W.K., 2002. Equity market valuation of supply chain management technology adoption, Paradoxes in Food Chains and Networks. Proceedings of the Fifth International Conference on Chain and Network Management in Agribusiness and the Food Industry, Noordwijk, Netherlands, **20**(4): 352-357.

Vorst, J., Beulens, A.J., Wit, W.D., and Beek, P.V. 1998. Supply Chain Management in Food Chains: Improving Performance by Reducing Uncertainty. International Transactions in Operational Research, **5**: 487-499.

Zhong, R.Y., Newman, S.T., Huang, G. Q., and Lan, S. 2016. Big Data for supply Chain management in the service and manufacturing sectors: Challenges, Opportunities, and future perspectives. *Computers & Industrial Engineering*, **101**: 572-591.

Division of Agricultural Economics and ABM

Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu

"Firms' performance based on logistic cost, returns and supply chain management practices of food processing sector in Jammu District"

SCHEDULE

DEMOGRAPHIC PROFILE OF THE RESPONDENT AND BASE LINE DATA

Dear Respondent,

I Akanksha Mahajan, student of Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu, doing my project on **"Firms' performance based on logistic cost, returns and supply chain management practices of food processing sector in Jammu District"** would be grateful to you if you could kindly cooperate with my work for betterment of my knowledge. All the data will be kept confidential and will be used just for analysis of the project. I request you to tick the option which in your opinion believes to be true.

Section – I

Demographic Profile

Full Name :

Industry :

Address :

Questionnaire

1. (a) Are logistics / Supply chain operations integrated in your organisation OR functions such as sourcing, transportation, warehousing is handled by different departments?

Integrated ☐ Handled by different departments ☐

(b) Who is responsible for logistics (please provide designation) in your organisation?

2. Rate the priority given to logistics in your organisation.

Extremely High ☐ Very High ☐ High ☐ Low ☐ Very Low ☐

3. Please rate the following as per their use by your organisation by putting a tick against the appropriate choice.

Facility/Issue	Regular	Quite often Sometimes	Rarely	Never
Refrigerated trucks				
Air-conditioned Storage structures				
Third party logistics				
ERP software				
CRM software				
SCM software				

4. Please provide the information for the following table in context of your organization.

	% Owned	% Rented / Leased	Total
Transportation facilities			100%
Warehousing facilities			100%

5 What is the share of your logistics cost to the total cost?

Less than 7° ☐ 7%-9% ☐ 9%-11% ☐ 11%-13% ☐
13%-15% ☐ More than 15% ☐ Do not know ☐

6. Please rate the following statements in context of your organisation as per the extent of your agreement. The item scales are live point Likert type scales with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

Statement	5	4	3	2	1	Not applicable
We consider quality as our number one criterion in selecting suppliers						
We regularly solve problems jointly with our suppliers.						
We have helped our suppliers to improve their product quality.						
We have continuous improvement programs that include our key suppliers						
We include our key suppliers in our planning and goal-setting activities.						
We actively involve our key suppliers in new product development processes.						
We frequently interact with customers to set reliability, responsiveness, and other standards for us.						
We frequently measure and evaluate customer satisfaction.						
We frequently determine future customer expectation.						
We facilitate customer's ability to seek assistance from us.						
We periodically evaluate the importance of our relationship with our customers.						
We inform trading partners in advance of changing needs.						
Our trading partners share proprietary information with us.						
Our trading partners keep us fully informed about issues that affect our business.						
Our trading partners share business knowledge of core business processes us.						
We and our trading partners exchange information that helps establishment of business planning.						
We and our trading partners keep each other informed about events or changes that may affect the other partners.						
Information exchange between our trading partners and is timely.						
Information exchange between our trading partners and is accurate.						

Information exchange between our trading partners and is complete.						
Information exchange between our trading partners and is adequate.						
Information exchange between our trading partners and is reliable.						
Our products are designed for modular assembly.						
We delay final product assembly activities until customer orders have actually been received.						

7. What is the average export as % of total turnover related to logistics / supply chain management related to your organisation ?

Name of Unit: ………………………………………..

Establishment year: ………………………………………..

Turnover (Rs. Crores): ………………………………………..

Number of employees: ………………………………………..

Type of organisation: Public limited ☐ Partnership ☐ Private limited ☐

Cooperative ☐ Any other ☐

Average exports as % age of total turnover

Major Products:

……………………………………….............

…………………………………………….....

………………………………………………

8. Marketing Channel

Manufacturer – Commission agent – Retailer – Consumer ☐

Manufacturer – Trader – Wholesaler – Retailer – Consumer ☐

Manufacturer – Wholesaler – Retailer – Consumer ☐

Manufacturer – Consumer ☐

VITA

Name :	Akanksha Mahajan
Father's Name :	Joginder Pal
Mother's Name :	Kumud Gupta
Date of Birth :	08-04-1998
Nationality :	Indian
State/Country :	Punjab
Permanent Address :	Ward No. 11, Krishna Avenue, Phase No. 4, Teh. & Distt.: Pathankot (Pb.).
Pin code :	145023
Mobile No. :	+91-9872766408/ 9646103208

EDUCATIONAL QUALIFICATIONS

Bachelor's Degree :	B.Sc. (Hons.) Agriculture
University and Year of Award :	DAV University
OGPA :	7.57/10
Master's Degree :	MBA (ABM)
University and year of award :	SKUAST, Jammu (2022)
OGPA :	8.59/10

CERTIFICATE – IV

Certified that all necessary corrections as suggested by the external examiner and advisory committee have been duly incorporated in the thesis entitled **"Firms' Performance Based on Logistic Cost, Returns and Supply Chain Management Practices of Food Processing Sector in Jammu District"**, submitted by **Ms. Akanksha Mahajan**, Registration No. **J-20-M-74-ABM.**

Kachroo 13.10.22

Dr. Jyoti Kachroo
Director, Planning & Monitoring
Professor (Agril. Econ.) & Head
Div. of Agril. Economics & ABM
(Major Advisor)

Place: Jammu

Date: 13.10.22

Kachroo 13.10.22

Head of the Division