Summer Internship Report

On

"Leveraging Amul's strong reverse supply chain to eliminate plastic from its supply chain"

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DECLARATION

I, Akshat Darak, hereby declare that the presented report of internship titled "**Leveraging Amul's strong reverse supply chain to eliminate plastic from its supply chain"** is uniquely prepared by me after the completion of two months' work at Ahmedabad Branch of Amul.

I also confirm that the report is only prepared for my academic requirement, not for any other purpose. It might not be used with the interest of the opposite party of the corporation.

Akshat Darak

Roll no-201104

MBA-FT (20-22)

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ACKNOWLEDGEMENT

The internship opportunity I had with Amul was a great chance for learning and professional development. Therefore, I consider myself as a very lucky individual as I was provided with an opportunity to be a part of it. I am also grateful for having a chance to meet so many wonderful people and professionals who led me though this internship period.

I express my deepest thanks to Mr. Sabya Sachi, Plant head Amul Ahmedabad for taking part in useful decision & giving necessary advices and guidance and arranged all facilities to make life easier. I choose this moment to acknowledge his/her contribution gratefully.

It is my radiant sentiment to place on record my best regards, deepest sense of gratitude to Mr. Ishaan Gupta for their careful and precious guidance which were extremely valuable for my study both theoretically and practically.

I perceive as this opportunity as a big milestone in my career development. I will strive to use gained skills and knowledge in the best possible way, and I will continue to work on their improvement, in order to attain desired career objectives. Hope to continue cooperation with all of you in the future,

Sincerely,

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Executive Summary

GCMMF (Gujarat Cooperative Milk Marketing Federation Ltd, Anand) is India's largest food marketing organisation. It is the Gujarat Dairy Cooperatives' apex body. Dairy cooperatives in Gujarat have built an economic network that connects more than 3.1 million village milk producers with millions of Indian consumers during the previous five and a half decades. The average amount collected by these cooperatives is 9.4 million litres of milk each day from their producer members, more than 70% of whom are tiny, marginal farmers and landless labourers, including a significant number of tribal people and reserved castes. This paper examines the "Amul Vidya Awards," a novel approach to customer service.

The project deals with the present supply chain of the flavoured milk product range and a problem solving initiative of removing the plastic involved in packing of milk. The report is broken down into three sections. The first section provides background information on the company. The second section delves into the specifics of project work. The final section comprises lessons learned during a summer internship.

Chapter 1

INTRODUCTION

THE INDIAN FMCG MARKET - AN OVERVIEW

With a market value of $13.1 billion, India's FMCG sector is the fourth largest in the country. This industry is distinguished by well-established distribution networks and fierce competition between organised and unorganised segments. FMCG in India has a strong and competitive MNC presence across the entire value chain. The FMCG market is expected to increase to $33.4 billion in 2015, from $11.6 billion in 2003. The middle and rural segments of India's population are the most promising FMCG markets, with opportunities for brand makers to convert them to branded products. Most product categories in India have low per capita consumption and penetration, such as jams, toothpaste, skin care, and shampoos, but the potential for growth is enormous. The Indian economy is accelerating at breakneck speed, keeping up with rising urbanisation, literacy rates, and per capita income.

The large corporations are growing in size, while small businesses are catching up. According to AC Nielsen research, MNCs own 62 of the top 100 brands, while Indian enterprises own the rest. Thirteen corporations own these 62 brands, with Hindustan Lever owning 27 of them. Thums Up comes in third, followed by Pepsi. Britannia is ranked fifth, followed by Colgate (6), Nirma (7), Coca-Cola (8), and Parle (8). (9). Historically, the soft drink and tobacco industries have been wary of disclosing these figures. Personal care, cigarettes, and soft drinks are the three major categories of FMCG. They are in charge of 35 of the top 100 brands.

Market Size:

The food and grocery market in India is the sixth largest in the world, with retail accounting for 70% of total sales. Food processing is one of the most important industries in India, accounting for 32% of the total food industry and ranking fifth in terms of production, consumption, export, and expected growth. It accounts for 8.80% of manufacturing GVA and 8.39% of agricultural GVA, as well as 13% of India's exports and 6% of total industrial investment. The Indian gourmet food sector is currently valued at US$ 1.3 billion and is expected to grow at a CAGR of 20% over the next five years (CAGR). The organic food sector in India is expected to triple in size by 2020.

The online meal ordering sector in India is still in its infancy, but it is rapidly growing. The organised food sector has a bright future, with online meal delivery companies like FoodPanda, Zomato, TinyOwl, and Swiggy growing in popularity through partnerships. The internet meal

delivery market increased by 150 percent year on year in 2016, reaching $300 million in Gross Merchandise Value (GMV).

Government Initiatives:

- The Indian government has taken the following key initiatives to enhance the food processing sector:
- The Indian government is attempting to boost growth in the food processing sector by leveraging measures such as 100 percent foreign direct investment in food marketing and other federal and state-level incentives, as well as a strong focus on supply chain infrastructure.
- The Government of India announced a Rs 8,000 crore dairy processing infrastructure fund in the Union Budget 2017-18.
- The Indian government has eased FDI restrictions in the food e-commerce sector, allowing up to 100 percent FDI in an automated manner.
- The Food Safety and Standards Authority of India (FSSAI) plans to invest Rs 482 crore to modernise 59 current food testing laboratories and build 62 new mobile testing labs across the country in order to improve India's food testing infrastructure.

Future:

Total quality management (TQM) systems, such as ISO 9000, ISO 22000, HACCP, GMP, and GHP, will benefit the food processing industry in the future. It would enable rigorous adherence to quality and hygiene requirements, as well as preserving consumer health, preparing the company for worldwide competition, enhancing product acceptance among international customers, and keeping the company technologically up to date with global best practises.

DAIRY INDUSTRY

India's dairy sector has expanded dramatically in the last decade, and the country is now one of the world's leading suppliers of milk and value-added milk products. Cooperatives have helped the dairy industry grow in many parts of the state. In 1997-98, the state had 60 milk processing plants with a total processing capacity of 5.8 million litres per day. Aside from these processing plants, the state also has 123 government and 33 cooperative milk chilling centres.

India also has the lowest per-litre milk cost in the world, at 27 cents, compared to 63 cents in the US and $2.8 in Japan. Multinational corporations intend to expand their operations in the country in order to capitalise on the low cost of milk production and increase output. Some of these milk producers have already received quality standard certificates from the authorities. This will help them promote their processed products in international markets.

The urban market for milk products is expected to grow at a rate of roughly 33% per year by 2005, reaching around Rs.43,500 crores. This increase will be fueled by a greater emphasis on the processed food sector, as well as an increase in milk conversion into milk products. By 2005, the value of Indian dairy products is expected to reach Rs 10,000 million. The market is currently worth approximately Rs7,00,000 million.

Milk Production from 1950 to 2020

- 1950 – 17 million tonnes
- 1996 – 70.8 million tonnes
- 1997 – 74.3 million tonnes
- (Projected) 2020 – 240 million tonnes
- Expected to reach- 220 to 250 mt – 2020

India contributes to world milk production rise from 12-15 % & it will increase up to 30-35% (year 2020).

AMUL’S HISTORY

The first Amul cooperative was formed as a result of a farmers' meeting called by Morarji Desai on January 4, 1946 in Samarkha (Kaira district, Gujarat) on the advice of Sardar Vallabhbhai Patel in order to combat rapacious milk contractors. Sardar's plan was to organise farmers and give them control over production, procurement, and marketing by delegating these tasks to skilled experts, thereby eliminating the middlemen who were a blight on farmers' prosperity.

On that day in January 1946, a decision was made: village milk producers' cooperatives should be federated into a district union and solely manage the sale of milk from Kaira to the government-run Bombay Milk Scheme. The Anand cooperative pattern arose as a result of this. The colonial authorities rejected the cooperative. Farmers have declared a milk strike. After fifteen days, the administration surrendered. Anand's Kaira District Cooperative Milk Producers' Union Ltd. was founded on December 14, 1946. Mr. V. Kurien founded this cooperative society. This organisation was founded in the small Gujarati village of Anand. Originally, the Anand pattern included village-level dairy cooperatives and a district-level processing entity known as a "union." As a result of the Kaira Union's success, similar milk unions sprouted up in other districts. In 1973, they established the Gujarat Cooperative Milk Marketing Federation Limited in order to more effectively and economically market their products (GCMMF Ltd.). GCMMF was appointed as the sole distributor of Amul's original product line, which included milk powder and butter. The menu now includes ice cream, ghee, cheese, chocolates, shrikhand, paneer, and other items. These products have resulted in Am.

In Anand, a quality control expert suggested the brand name AMUL, which is derived from the Sanskrit word amoolya, which means "priceless." The Amul brand was introduced for the first time in 1955. Today, 173 milk producer cooperative unions and 22 federations contribute significantly to the supply of packaged milk and milk products. Quality packed milk is now available in over 1,000 locations throughout India.

COMPANY PROFILE

GCMMF LTD: Amul

Gujarat's milk producers came together in 1946 and decided to form their own organisation to improve the marketing capacity of the dairy cooperative movement. They established Gujarat Co-operative Milk Marketing Federation Limited (GCMMF). Mr. V.Kurien was the founder of this co-operative society, which was founded in a small village in Gujarat called Anand.

The Gujarat Cooperative Milk Marketing Federation (GCMMF) is the largest food product marketing organisation in India. It is a state-level apex body of milk cooperatives in Gujarat that aims to provide remunerative returns to farmers while also serving the interests of consumers by providing high-quality, value-for-money products.

Gujarat Co-operative Milk Marketing Federation Ltd. (GCMMF) is a company that is owned by 2.2 million milk producers in Gujarat, India. Its products, which include milk powders, liquid milk, flavoured milk (Amul Kool), Sweetened Condensed Milk, butter, ghee, cheese, chocolate, ice cream, pizza, paneer, shrikhand, Cream, Mithaee, Amul Masti, Dahi, and the Amul shakti & Nutramul brand of health food drink, are widely used throughout India and abroad, and have helped Amul become the largest food brand in India today with an

Dr. V. Kurien, Chairman of GCMMF and the "Milk Man of India," has made it his primary goal to build a strong Indian society economically through an innovative cooperative network, to provide quality service and products to end-consumers, and to provide good returns to farmer members. According to Dr. Kurien, "We've taken a risk that few others have. We are continuing

on a path that fewer and fewer people are willing to take. We must take a path that few people can even imagine taking. We must, however. We have faith in the goals and dreams of millions of our countrymen."

IT (Information Technology) has played an important role in the development of the Amul brand. The logistics of collecting approximately 7 million litres of milk per day from 11,400 separate Village Cooperative Societies across Gujarat and then storing, processing, and producing milk products at the respective 12 District Dairy Unions are incredible. The installation of 4000 Automatic Milk Collection System Units (AMCUS) at Village Societies to capture member information, milk fat content, volume collected, and amount payable to each member has proven invaluable in ensuring fairness and transparency across the Amul organisation.

Amul was one of the first major organisations in India to have a website, launching in 1996. This site has been used to create an intranet for Amul distributors as well as a cyber-store for consumers, making it one of India's first examples of e-commerce activity.

Amul and .coop

Mr. B M Vyas, the CEO of Amul, recently stated, "Amul is not a food company; it is an IT company in the food business." He recognised that the most efficient way to connect milk producers and consumers in order to provide the best returns for both is through IT innovation.

This is why Amul has enthusiastically embraced the concepts underlying.coop. Not only will the TLD allow Indian consumers to recognise an established brand they can trust online, but it will also allow Amul to begin trading competitively throughout the world, reaching markets that were previously inaccessible.

Mr. Subbarao Hegde, the CIO, stated, "The most effective tool we have for communicating with our members and the millions of consumers who buy Amul products every day in India is information technology. Coop not only reflects the cooperative values that shape our own organisation, but it will also provide us with a critical business advantage as we seek to expand the Amul brand globally."

GCMMF (Amul) was named the winner of the prestigious international CIO 100 Award from IDG's CIO Magazine (USA) for resourcefulness in the use of technology as a result of this alignment of business purpose and technology. On August 19, 2003, the entire cooperative's efforts were recognised at the CIO 100 symposium and award ceremony in Colorado Springs, USA. Mr. Subbarao Hegde accepted the award on GCMMF's behalf. The CIO 100 award is covered in detail in the August 15, 2003 issue of CIO as well as on their website, www.cio.com.

THE THREE-TIER AMUL MODEL

The Amul Model consists of a three-tiered cooperative structure. A Dairy Cooperative Society at the village level is affiliated with a Milk Union at the district level, which is further federated into a Milk Federation at the state level. The above three-tier structure was established to delegate the various functions; milk collection is handled by the Village Dairy Society, milk procurement and processing is handled by the District Milk Union, and milk and milk product marketing is handled by the State Milk Federation. This not only eliminates internal competition but also ensures that economies of scale are achieved. The above structure is known as the ‘Amul Model' or ‘Anand Pattern' of Dairy Cooperatives because it was developed at Amul in Gujarat and then replicated all over the country as part of the Operation Flood Programme.

- Responsible for Marketing of Milk & Milk Products
- Responsible for Procurement & Processing of Milk
- Responsible for Collection of Milk
- Responsible for Milk Production

Village Dairy Cooperative Society (VDCS)

The main functions of the VDCS are as follows:

- Collection of surplus milk from the village's milk producers and payment based on quality and quantity

- Providing members with support services such as Veterinary First Aid, Artificial Insemination, cattle-feed sales, mineral mixture sales, fodder & fodder seed sales, animal husbandry & dairying training, and so on.

- Selling liquid milk to the village's residents

- Milk supply to the District Milk Union

As a result, the VDCS is an independent entity managed locally by milk producers with assistance from the District Milk Union.

District Cooperative Milk Producers' Union (Dugdh Sangh)

The main functions of the Union are as follows:

- Milk is obtained from the District's Village Dairy Societies.

- Organizing raw milk transportation from the VDCS to the Milk Union.

- Veterinary care, artificial insemination, cattle-feed sales, mineral mixture sales, fodder & fodder seed sales, and other input services are provided to producers.

- Providing milk producers with training in cooperative development, animal husbandry, and dairying, as well as specialised skill development and leadership development for VDCS employees and Management Committee members.

- Providing management support to the VDCS, as well as regular oversight of its operations.

- Set up chilling centres and dairy plants to process the milk brought in by the villages.

- Within the District, selling liquid milk and milk products

- Process milk into various milk and milk products in accordance with the State Marketing Federation's requirements.

- Decide on milk prices to be paid to milk producers, as well as fees for support services supplied to members.

State Cooperative Milk Federation (Federation)

The main functions of the Federation are as follows:

- Milk and milk products processed or made by Milk Unions are sold.

- Organize a distribution network for the sale of milk and milk products.

- Organizing milk and milk products transit from the Milk Unions to the market.

- Creating and maintaining a brand for milk and milk products marketing (brand building).

- Providing technical inputs, managerial assistance, and counselling services to Milk Unions and their members.

- Milk surpluses from Milk Unions are pooled and distributed to Milk Unions in need.

- Establish feeder-balancing Dairy Plants to process the Milk Unions' surplus milk.

- Organizing a bulk procurement of raw ingredients used in the production and packaging of milk products.

- Decide on the milk and milk product prices that will be paid to Milk Unions.
- Identify the goods that will be manufactured at various Milk Unions (product mix) and the capacity that will be required.
- Plan long-term milk production, procurement, and processing, as well as marketing.
- Providing technical know-how and arranging financing for the Milk Unions.
- Designing and delivering training in the areas of cooperative development, technical support, and marketing.
- resolving conflicts and maintaining the integrity of the entire structure

Today, there are approximately 176 cooperative dairy unions formed by 1.25 lakh dairy cooperative societies, with a total membership of around 13 million farmers on the same pattern, who are profitably processing and marketing milk and milk products, whether it is Amul in Gujarat or Verka in Punjab, Vijaya in Andhra Pradesh, Milma in Kerala, Gokul in Maharashtra, Saras in Rajasthan, or a Nandini in Karnataka. With huge investments from these farmers' institutions, this entire process has resulted in the establishment of over 190 dairy processing factories across India. These cooperatives now gather around 23 million kilogrammes of milk each day and pay more than Rs.125 billion to milk producers each year.

Impact of the Amul Model

The World Bank's recent evaluation report gives a higher rating to the effects of Operation Flood Program. It has been proven that a 20-year investment of Rs. 20 billion under the Operation Flood Programme in the 1970s and 1980s increased India's milk production by 40 million metric tonnes (MMT), from around 20 MMT before the flood to more than 60 MMT at the conclusion of the flood. An investment of Rs. 20 billion over a period of 20 years created

an incremental return of Rs. 400 billion each year. This has been the most beneficial World Bank-funded project anywhere in the world. The impact of these efforts can be seen as India's milk production continues to rise, reaching 90 MMT. Despite this fourfold increase in milk production, milk prices have not dropped during the period and have continued to rise.

Between 1971 and 1996, the country's milk production tripled as a result of this movement. Similarly, per capita milk consumption more than doubled from 111 grammes per day in 1973 to 222 grammes per day in 2000. Thus, these cooperatives have not only aided in the economic development of India's rural society, but they have also provided a critical component for improving the Indian society's health and nutritional needs. Few Indian industries have such parallels of development encompassing such a large population.

These dairy cooperatives have been instrumental in improving the social and economic status of women in particular, as women are primarily involved in dairying while men are primarily involved in agriculture. This has also provided the women with a consistent source of income, resulting in their economic emancipation.

COMPETITORS

Nestle

Nestlé India is a subsidiary of the Swiss company Nestlé S.A. Nestlé India is a vibrant Company that provides global-standard products to Indian consumers and is committed to long-term sustainable growth and shareholder satisfaction. It has seven factories and a large number of co-packers.

In all aspects of its business, the Company insists on honesty, integrity, and fairness, and expects the same from its relationships. This has earned it the trust and respect of every stratum of society with which it comes into contact, and it is recognised as one of India's "Most Respected Companies" and one of the "Top Wealth Creators of India."

The Mother Diary- Delhi was established in 1974 as part of the Operation Flood Programme. It is now entirely owned by the National Dairy Development Board (NDDB).

Mother Dairy markets and sells dairy products under the Mother Dairy brand (such as liquid milk, Dahi, ice creams, cheese, and butter), the Dhara range of edible oils, and the Safal range of fruits and vegetables, frozen vegetables, and fruit juices on a national scale through its sales and distribution networks. .

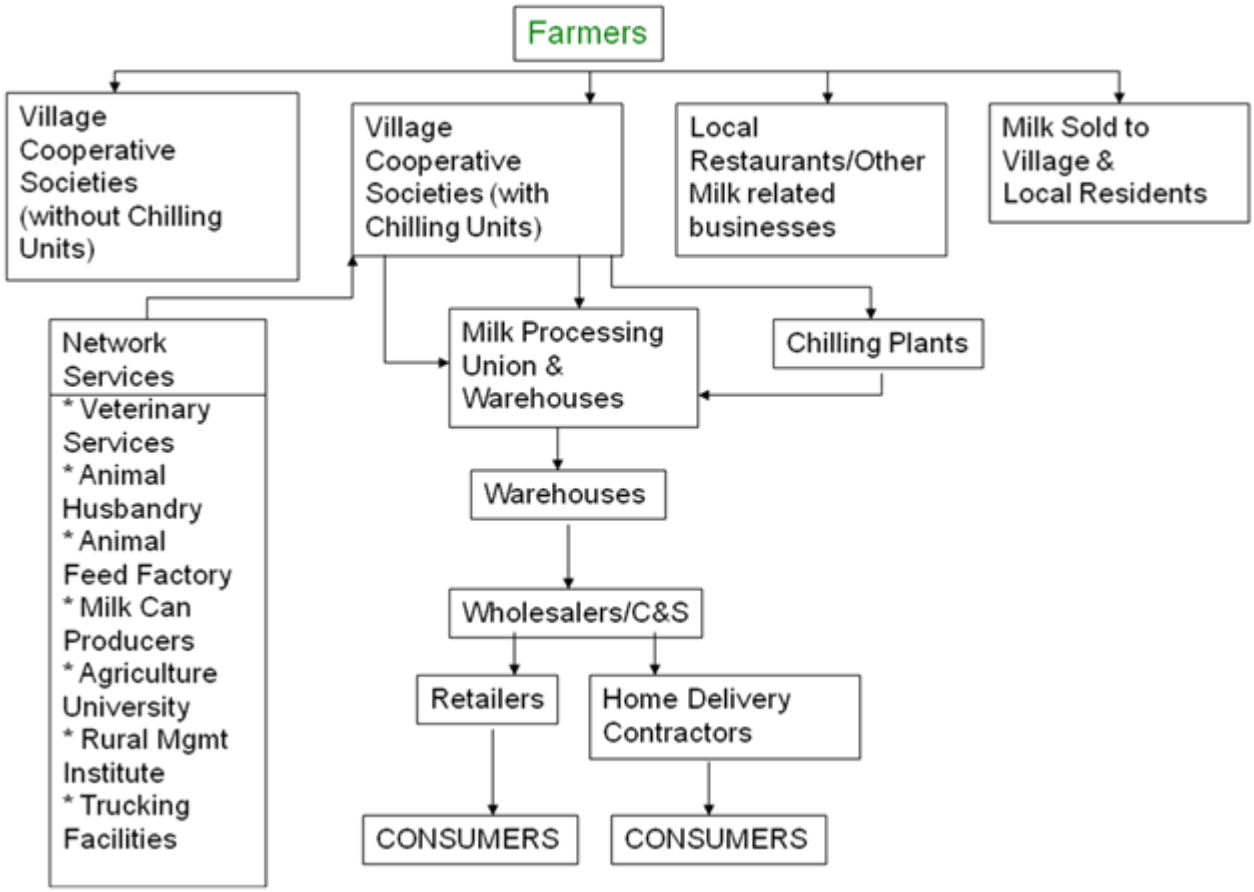
Britannia

Britannia is an ancient term for Great Britain, as well as the island's personification. The name is Latin, derived from the Greek form Prettanike or Brettaniai, which originally referred to a group of islands with individual names, such as Albion or Great Britain. However, by the 1st century BC, Britannia had come to be used specifically for Great Britain. The Roman Empire began its conquest of the island in AD 43, establishing a province known as Britannia, which eventually came to encompass the parts of the island south of Caledonia (roughly Scotland). The Britons are the province's native Celtic inhabitants. In the second century, Roman Britannia became a goddess, armed with a spear and shield and wearing a centurion's helmet.

The Latin name Britannia survived the Roman withdrawal from Britain in the fifth century, becoming the name for the island in most European and other languages, including English Britain and modern Welsh Prydain. The Latin form was revived during the English Renaissance as a rhetorical evocation of a British national identity after centuries of decline.

The personification of the martial Britannia was used as an emblem of British imperial power and unity, particularly after the Acts of Union in 1707, which united the Kingdoms of England and Scotland. Since then, she has appeared on British coinage on a regular basis.

Amul's Supply Chain



COMPLETE LIST OF AMUL PRODUCTS

Bread spreads:

• Amul Butter

•Amul Lite Low Fat Bread spread

• Delicious table margarine

Powdered milk:

• Amul spray infant milk food.

• Amul infant full cream milk powder

• Sagar skimmed milk powder

• Sagar tea coffee whitener

• Amulya dairy whitener

Fresh Milk:

• Amul fresh milk

• Amul gold milk

• Amul taaza double toned milk

• Amul lite slim and trim milk

• Amul fresh cream

• Amul kool chocolate milk

• Amul kool flavoured bottled milk

• Amul kool flavoured tetra pack

• Amul Shakti toned milk

• Amul masti spiced butter milk

Cheese Range:

• Amul Pasteurized Processed Cheddar Cheese

• Amul Processed Cheese Spread

• Amul Pizza (Mozzarella) Cheese

• Amul Shredded Pizza Cheese

• Amul Emmental Cheese

• Amul Gouda Cheese

Curd Products:

• Amul Masti Dahi (fresh curd)

• Amul Butter Milk

For cooking:

• Amul/Sagar pure Ghee

• Cooking Butter

• Amul malai paneer

• Utterly delicious pizza

• Mithai Mate

Milk Drink: Amul Kool Flavored Milk

• Amul Kool Kesar

• Amul Kool Coffee

• Amul Kool Strawberry

• Amul Kool Mango

Health Beverage:

• Amul Shakti White Milk Food

• Nutramul

Mithaee Range (Ethnic sweets):

• Amul Shrikhand (Mango, Saffron, Almond Pistachio, Cardamom)

• Amul Amrakhand

• Amul Mithaee Gulabjamuns

• Amul Mithaee Gulabjamun Mix

• Amul Mithaee Kulfi Mix

UHT Milk Range:

• Amul Shakti 3% fat Milk

• Amul Taaza 1.5% fat Milk

• Amul Lite Slim-n-Trim Milk 0% fat milk

• Amul Shakti Toned Milk

Chocolate & Confectionery:

• Amul Milk Chocolate

Chapter 2

Project Details

Project Title:

Leveraging Amul's strong reverse supply chain to eliminate plastic from its supply chain

Purpose:

This internship is intended to cover theoretical as well as practical aspects of the industry. The primary goal of this internship is to comprehend the entire supply chain and reverse supply chain of flavoured milk, as well as to replace and redesign it with more environmentally friendly glass bottles. This will not only improve my knowledge of the subject, but it will also assist the company in eliminating the use of plastic in this entire product line.

Problems of using plastic bottles.

Health hazards of Plastics

Plastics may be simple and convenient to use on a daily basis. However, we cannot ignore their negative effects on our health. Overuse of plastics and a lack of proper recycling will have many negative effects on our health in the long run. Plastics are hazardous to manufacture and use, and they present a significant recycling challenge. As a result, when it comes to plastics, there is a full circle of problems and challenges that must be addressed.

Plastics manufacturing and the health risks associated with it Plastics are made with highly toxic chemicals, the majority of which are carcinogens. They are known to have effects on the nervous system, blood, kidneys, and other organs. Many harmful additives, such as plasticizers, are added to plastics during the manufacturing process. Bis(2-ethylhexyl) adipate, also known as DEHA, is a plasticizer found in PVC-based plastic wraps. DEHA has been the subject of much debate in recent years due to its potential health risks. In some lab animals, it was shown to be carcinogenic and estrogenic. DEHA is classified as a human carcinogen by the US EPA.

Lead poisoning is another common occurrence in the field of plastic manufacturing. Lead stabilisers such as lead sulphate or lead stearate are frequently used as additives in PVC plastics. These lead compounds are supplied in the form of powders when used in the manufacturing process, exposing workers to the risk of poisoning. The Texas Health Department reported a lead poisoning investigation at a plastic pigment manufacturer in 1992. Seven of the twenty-two workers had blood lead levels (BLL) greater than 40 g/dl (Coyle 2005).

Lead is a hazardous chemical that can cause serious health issues. When it enters the human body, it is distributed throughout the body in the same way that other minerals are. It can harm

red blood cells and impair their ability to transport oxygen to organs and tissues that require it. Lead has a proclivity to accumulate in bones and remains in them over time. Lead interferes with blood cell formation.

bone production and calcium absorption Long-term lead poisoning has a number of serious health consequences, including a decrease in bone growth and muscle development, a damaged nervous system, speech and language problems, unconsciousness, and so on.

Leaching of chemicals

High temperatures frequently cause plastics to leach chemicals. Harmful chemicals have been discovered to leach from plastic items such as plastic bottles and plastic containers. Bisphenol A, also known as BPA, was discovered to have leached out of plastic bottles made of Polycarbonate. This is a common component found in plastic bottles as well as metal can linings. This chemical is found in plastic bottles designed for babies, making the situation even more dangerous. Frequent wear and tear of bottles, such as washing them in dishwater, can result in the leaching of this chemical. In fact, new and old bottles filled with room temperature water released the same amount of BPA in a study. When exposed to boiling water, these bottles released BPA up to 55 times faster (Szabo 2008).

BPA is not present in every plastic bottle. It is found in polycarbonate plastics with a recycling code of 7. Scientists discovered that BPA has an effect on brain development and reproductive function in animal tests. It is classified as a “endocrine disruptor,” which means it can mimic the effects of sex hormones in the body. It is known to mimic oestrogen by binding to the same receptors throughout the human body that natural female hormones do. This chemical is expected to promote the growth of human breast cancer cells. . There haven't been enough human studies to conclude that BPA is extremely dangerous to humans, but animal tests have raised concerns among scientists.

In terms of their effects on humans When BPA was approved for use in food containers for the first time in 1963, its negative effects were unknown. However, studies conducted since 1976 have shown that low doses of BPA can be harmful. According to one study, BPA stimulated receptors in a foetal mouse prostrate at a thousand times higher rate than estradiol, a sex hormone that represents the major oestrogen in humans. These mice went on to develop cancer and other health problems (Biello 2008). Concerns about BPA have spread to other parts of the world as well. When studies revealed that BPA was leaching out of baby bottles, Japanese manufacturers resorted to using natural resins instead of BPA to line cans in 1997. Even though

BPA has the advantages of being inexpensive, shatterproof, and lightweight, there are other alternatives to using BPA to avoid potential health hazards. In at least some applications, polyethylene and polypropylene plastics would be suitable replacements for BPA. In addition to Polycarbonate, we can break down the seven plastic resin codes and dangerous chemicals it leaches into the following resin categories.

Polyethylene Terephalate (PETE or PET):

Soft drink, mouthwash, and detergent containers all contain it. It is known to leach "antimony trioxide," which causes respiratory and skin irritation, as well as an increase in the number of miscarriages and other menstrual difficulties in women who are exposed for an extended length of time.

Polystyrene

Egg cartons, Styrofoam containers, plastic cutlery, and take-out containers all contain it. It is known to leach styrene, an endocrine disruptor similar to BPA that mimics the female hormone oestrogen. It has the potential to harm women's reproductive and developmental systems, as well as their nervous systems.

Polyvinyl chloride (PVC)

Toys, squeeze bottles, shampoo bottles, cooking oil bottles, and even medical tubing all use it. PVC has been labelled as one of the most dangerous consumer goods ever created. It emits phthalates (DEHP) or butyl benzyl phthalates (BBP) (BBzP). These compounds, like BPA, are endocrine disruptors that mimic the female hormone oestrogen. They've also been linked to asthma and allergy symptoms in youngsters, as well as effects on the spleen and kidneys, bone development, and body weight. Since 1999, the use of DEHP or BBzP in the manufacture of children's toys has been prohibited in Europe (Become Plastic Aware n.d.).

Other health problems

Plastics pose health risks not only during their manufacture and consumption, but also after their destruction by incineration. Incineration pollutes the air, water, and land, exposing employees to toxins such as carcinogens. Their recycling is difficult enough, but the fact that used plastics thrown into the environment never disintegrate adds to the difficulty. They are broken down into tiny fragments over time, which are not biodegradable by soil microbes.

Their accumulation over time increases soil toxicity, which has a variety of negative consequences for soil-dependent plant and animal life.

Plastic Waste and Environmental Impacts

Plastic Waste

One of the most pressing issues today is the annual trash generated by the usage of plastics, as well as the long-term effects on the ecosystem. Municipal Solid Waste (MSW) created in 2006 was 251 million tonnes, according to EPA data, and there are numerous strategies to manage MSW, including source reduction, recycling, composting, landfills, and combustion, in that order (EPA, Municipal Solid Waste 2008). Figure 1 demonstrates that, whereas each person in the United States creates about the same amount of MSW each day, total MSW generation has grown. Figure 1: Rates of MSW generation from 1960 to 2006. (EPA 2007, Municipal Solid Waste Generation, Recycling and Disposal in the United States)

Plastics make up roughly 12% of overall MSW production, which is around 29.5 million tonnes per year, according to. According to the EPA's "Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2006," a significant amount of materials were recycled or composted in that year, but other tables and data show that plastic has the lowest recycling rate of all MSW materials. Plastics had the lowest recovery rate as a percentage of generation, at 6.9%, according to the statistics, and another graphic depicting the recycling rates of chosen materials revealed that plastic products have the lowest recycling rates (plastic HDPE milk and water bottles, plastic soft drink bottles, and tires) had average recycling rates of 30%, while other materials had higher rates of recycling. In greater detail, nondurable goods made of plastic had insignificant recovery as a percentage of generation, whereas durable goods, containers, and packaging made of plastics had recovery rates of 6.0 percent and 10.6 percent, respectively, which were lower than recovery rates of any other material (EPA, Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2006, 7). “2006 MSW Characterization Data Tables” displays information on plastics recovered and dumped in 2006 by various categories and plastic types.

resins. Despite the fact that plastics make up a small percentage of total MSW, they have the lowest recycling and recovery rates of all the materials in MSW, and the environmental repercussions of plastic waste are unavoidable. The increasing amount of plastic garbage and the little amount of plastic that is recycled have two important environmental consequences:

one is increased petroleum consumption and global warming, and the other is the accumulation of plastic waste in nature. .

Consumption of Petroleum and Global Warming

Petroleum is used in traditional plastics. When we blame rising oil prices on oil firms, the global economy, or conflicts, we overlook the fact that plastic manufacture is a major contributor to petroleum usage. In the United States, for example, 31.2 billion litres of water are bottled each year, requiring 900,000 tonnes of plastic. A water bottle requires 3.4 megajoules of energy to make, whereas a barrel of petroleum can generate 6,000 megajoules. According to estimations, 17.6 million barrels of oil are used each year to create water bottles, which is enough oil to power 1.5 million automobiles on US roads for a year (BusinessShrink 2008). Apart from that, the production of traditional petroleum-based plastics contributes significantly to global warming. Producing one pound of conventional plastic releases two to three pounds of carbon dioxide (Marshall 2008). When one considers the enormity of the plastics sector, it's easy to estimate how much carbon dioxide is released into the atmosphere as a result of its production.

Environmental Impact

The Pacific Ocean is one of the best examples of plastic garbage accumulating in the environment. Plastics from cargo ship waste float on the water and drift with the current, accumulating to form a massive rubbish patch in the middle of the ocean (Burns 2007, 34-39). With an area the size of Alaska, it has a wide variety of plastics. Also, because plastics do not disintegrate but rather break down into smaller and smaller pieces as a result of environmental forces such as sunlight, wind, and waves, many sea animals mistake them for food and eat them. It can build up in their tummies and end up as food on our plates. Large plastic waste and fishing nets can entangle aquatic species and attract other predators, which can lead to even worse problems.

Initiatives against the Use of Plastic

Slowly but steadily, public opinion is turning against plastic, particularly single-use plastic, which is the most polluting. More and more projects are being launched in opposition to it, and we may soon see the industry as a whole adopt a new path.

The Ellen MacArthur Foundation (EMF) and the United Nations Environment Programme (UNEP) announced the New Plastics Economy Global Commitment in 2018. Danone, PepsiCo, and Coca-Cola Co are among the 250 corporate signatories. All of the signatories agreed to take a few major actions by 2025:

to eliminate unneeded or problematic plastic packaging; to move away from single-use models and toward reuse models where practicable; to use recyclable content in all of their plastic packaging; and to make all of their plastic packaging reusable, biodegradable, or recyclable.

While these attempts to make plastic packaging recyclable and enhance our recycling infrastructure are positive steps forward, synthetic substitutes and slightly different alternatives may be the way to go. There are far more environmentally friendly packaging options available, one of which the beverage industry has previously used. That would, of course, be glass packing.

Use of Returnable or Recyclable Glass Bottles

The last ever returnable glass Coca-Cola bottle died in 2012, marking the end of an era in beverage history. In the early days of the industry, soft drinks and glass bottles were best friends since the glass bottles could withstand the pressure of carbonation. .

Returning glass bottles, on the other hand, had nothing to do with sustainability or environmental preservation back in the day. The price and difficulty of the manufacturing process were used to motivate consumers to return glass bottles to the producer with a bottle refund charge. As a result, the bottles were treated as business property, and customers were encouraged to return them to be refilled and reused.

The plastic bottle eventually eclipsed the glass bottle because it was considerably easier and less expensive to transport plastic properly. When compared to glass bottles, plastic bottles were thought to be lighter, more resistant to breaking, and hence superior in every sense. The environmental impact was not taken into account or analysed.

The Advantages of Glass Milk Bottles

Reusable

The best thing about glass milk bottles is that they can be reused after we've finished drinking them. Glass milk bottles are washed and refilled after being returned, and then sent out to customers full of new milk. While there are transportation issues to consider, preventing the creation of a new plastic bottle for each purchase of milk is a win for glass.

Require Less Energy Per Use

When it comes to deciding whether glass or plastic bottles are superior, there are several factors to consider. Because glass requires twice as much energy to manufacture, it emits more CO2 throughout the manufacturing process than plastic when measured by weight.

However, this is only true at the point of manufacture; when the increased energy requirements of a glass milk bottle are averaged over the lifecycle of a bottle that is used repeatedly, glass wins every time.

Glass is Recycled More

Plastic bottles are recycled at a rate of 29 percent, according to the Container Recycling Institute. Glass, on the other hand, has a recycling rate of 37 percent.

Furthermore, when it comes to recycling plastic, there are numerous complexities5. The recycling of various types of plastic waste varies. While most curbside collections accept plastic milk bottles, what happens to them once they've been collected varies greatly depending on the capacity and ability to process them.

Furthermore, despite the best efforts of many, much of the single-use plastic we use ends up in nature. Plastic that ends up in the water or a landfill takes hundreds of years to decompose1. When you consider that 91% of plastic isn't recycled, it's clear that it has to go somewhere.

Furthermore, recycled plastic is often reduced into inferior products. Recycled plastic milk bottles, for example, are more likely to be found in plastic outdoor furniture than in any other food-related application. As a result, plastic milk bottles will very certainly be referred to as "new plastic."

Glass, on the other hand, has a more deliberate quality to it. Glass is heavier and breaks readily when tossed away, both of which people are aware of. As a result, consumers appear to be more inclined to recycle a glass bottle carefully than a plastic bottle6.

Meanwhile, glass milk bottles that are not returned for filling and have reached the end of their useful life are 100 percent recyclable and can be recycled many times. Furthermore, when it comes to recycling, glass has a quick turnover. It can be reused within 30 days after being recycled by customers. .

Even better, recycling glass emits fewer CO2 emissions and uses less energy than using new plastic3. This is due to the polluting materials required to manufacture new plastic, as well as the fact that plastic recycling requires more complexity and processing, resulting in increased energy use.

Safer

Glass milk bottles are safer to store and consume when it comes to milk. Chemical leaching2 is one of the dangers associated with plastic milk bottles. As a result, contaminants may leach into the milk, posing a health danger.

Glass milk bottles do not pose the same health risks as plastic milk bottles. Natural resources such as sand and limestone are used to produce glass. Furthermore, the FDA considers it to be the only container that is completely safe.

Due to its natural composition, glass is chemically inert. This means that it does not consist of reactive chemicals.

Easier to Use

Consumers, let's face it, like simplicity. When the cap of a plastic milk bottle is squeezed, it can leak. We've undoubtedly all had a leaking plastic bottle at some point in our lives.

When crushed at the bottom of a supermarket bag under heavier objects, a glass bottle holds its shape and does not leak. They're also more durable and stable to hold, albeit you must maintain them upright.

Benefits of Glass bottles

Glass is often an excellent replacement for plastics. Below are five reasons why choosing glass is better for human health.

1. Chemicals are not leached into food and beverages

Since glass is not made from hormone-disrupting chemicals, like BPA or phthalates, these types of chemicals will not leach from the container into your food and drinks. So using more glass food and beverage containers helps protect the purity of your diet.

2. Heating glass in microwaves is safer than heating plastics

Plastic is more likely to leach chemicals when heated, but glass does not.

3. Glass is safer over time

Even routine wear and tear, such as cleaning and use, causes plastics to leach toxins. Dishwashing and microwaving, for example, allow increased chemical leaking from plastic containers. .

4. Food stored in glass tastes better

Plastic is a porous material that can retain the flavours of food or products previously stored in the container. Glass is a non-porous material that does not retain flavours from previously kept things, potentially enhancing the “good taste” of nutritious foods.

PRESENT FORWARD SUPPLY CHAIN

The Amul supply chain can be broken down into the following steps: 2.2 million farmers from 12 districts, including Kaira (kheda), Sabar Kantha, Baroda, Panchmahal, Rajkot, Bharuch, Mehsana, Banas Kantha, Surat, Ahmedabad, Valsad, and Gandhi nagar, visit milk collection centres every morning and afternoon to sell the milk their buffaloes have produced in the morning and afternoon. In the previous year, total milk procurement averaged 47.32 litres per day, with a peak of 62 litres. Computers and computerised milk testers are available in all milk procurement centres (EMTs). EMTs ensure that milk components are tested and measured efficiently. The computers control the automatic milk collection system, which ensures that milk payment bills are prepared quickly, that operations are transparent, and that milk collecting is more efficient.

The milk is subsequently sent to chilling depots in each of the member unions' villages. GCMMF covers 10852 communities, each has its own village cooperative society. VDC is also in charge of the milk collection system. After that, the milk is distributed to the 12 member unions. They all run a state-of-the-art dairy that processes this raw material that has gone from far-flung villages to the district headquarters. AMUL's different items, such as butter, milk powder, cheese, dahi, and premade dishes like gulab jamun, pizza, and so on.Are produced at these numerous sites and marketed by GCMMF through various distributors within the country and internationally. Amul is a giant in part because it was founded on the back of a cooperative movement. It incentivizes women and farmers to collect milk from their cows and sell it to them. It has been able to eliminate the middlemen by handling milk supplies from cattle farmers and transferring it directly to the factory.

The supply chain's complexity and dynamism make assessing the interaction impacts extremely difficult. Increased network member cooperation has resulted in a variety of changes at all levels — operational, tactical, and strategic — as well as the formation of practises and strategies for improving the chain's performance. The following are the most prominent among them:

I Information sharing, which is frequently dynamic, in order to better planning and execution. Sharing POS data is a famous example of mitigating the bullwhip effect's distortions and

reducing apparent demand fluctuation among chain partners. Typically, cost sharing is included in information sharing.

(ii) Concentrate on each player's key competencies. The goal is to ensure that each work is completed by the best entity for the job. As a result, businesses have become willing participants in handing over control to a network partner in exchange for better performance. VMI is a direct product of such a shift in management thought in several industries. Similarly, with a focus on supply chain, the importance of third parties in offering specific skills such as logistics has expanded significantly.

(iii) Capacity enhancement: It aids network partners in enhancing their capabilities and becoming more competitive.

Milk procurement

Total milk procurement by our Member Unions averaged 93.02 lakhs kilogrammes (9.30 million kgs) per day in 2012-13, indicating a 6.68 percent increase over the 87.19 lakhs kilogrammes (8.7 million kgs) per day attained in 2008-09. As is customary, the largest procurement was reported in January 2012, at 122.5 lakh kgs per day.

The distribution network

Through its network of over 3,500 distributors, Amul goods are available in over 500,000 retail outlets in India. To buffer inventory of the complete spectrum of products, there are 47 depots with dry and cold warehouses.

Rather than using the cheque mechanism used by other large FMCG businesses, GCMMF uses advance demand draughts from its wholesale dealers. This method adheres to GCMMF's idea of sustaining cash transactions throughout the supply chain, while also reducing dumping. .

Third-party service provider management All other activities, including as milk collecting logistics, dairy product distribution, product selling through dealers and retail outlets, provision of animal feed, and veterinary services, were entrusted to third parties.

Following are the major issues analyzed with respect to the SCM of Amul:

• Larger lead time:-

Many third parties are not part of the organised sector, and many are poorly managed with little regard for quality or service. The failure of machinery, for example, causes a delay in reaching retailers and end users due to antiquated and obsolete modes of transportation. The notion of just-in-time was not implemented in previous years; instead, all GCMMF branches were involved in route scheduling and had dedicated vehicle operations. Because the product is perishable, it must invest in cold storage, which adds to the cost of distribution and warehousing. As a result, the necessity for JIT was felt, and the concept was established to avoid any delays or product destruction. Dealers' return on investment is improved by implementing a just-in-time inventory strategy (ROI).

• Gap between demand and supply:-

There is a large disparity between demand and supply due to unprofessional and inexperienced 3PL providers. During peak season, the corporation is unable to meet the demand for particular products from merchants. Because of the long lead time, the company was unable to obtain raw materials on time and also make final products in sufficient quantities to meet the demands of merchants and consumers. Amul chose to concentrate on business activities that affect farmers, such as supply, distribution, and internal operations.

The supply chain initiative's key goals were to improve forecast accuracy to match supply with demand and delivery performance to avoid stock-outs, resulting in a dependable and trusted brand image without spending excessively. These measures were made in order to lessen reliance on cold storage.

• Suppliers:-

Small and marginal farmers with severe liquidity issues, illiteracy, and lack of training were typical member-suppliers. AMUL and other cooperative Unions used a variety of tactics to expand milk production and ensure consistent growth. First, procurement prices were determined to generate a fair and reasonable return in the short term. Second, because of the financial issues, cash payments for the milk supply were made as soon as possible.

• Managing Third Party Service Providers:

GCMMF and AMUL practised core competency and the role of third parties in supply chain management long before these concepts were recognised and became mainstream. From the start, it was clear that milk processing and dairy product production were the unions' primary activities.

As a result, the unions concentrated their efforts on these operations and the development of related technology. GCMMF was in charge of marketing (including brand creation). The rest of the work was delegated to other parties. These include milk collecting logistics, dairy product distribution, product sales through dealers and retail outlets, and some veterinarian services, among others.

Recommendations & suggestions

• Amul should enhance its distribution system, as it has already adopted ERP in the company, but retailers suffer as a result of its distributors' lack of discipline, which affects consumers. .

• We understand that the distributors' schedules and transportation systems cannot be capsulated, but they can limit their faults. To avoid accidents, for example, drive carefully.

• Manpower must be at least 18 years old. (We have seen tiny children loading and unloading the trays from the truck in several of the areas) Amul should notify their dealers in advance before introducing any additional perks or plans, so that the incentives can reach the appropriate hands at the right time. Distributors, on the other hand, reap the rewards of retailers.

• Raw material coding should be done in an easy-to-understand manner.

• Shorten the time it takes to resolve consumer/retailer issues.

• To ensure proper milk inflow, payment to milk providers should be made on time.

• Amul should also introduce certain household-oriented programmes. It has plans for businesses, but none for individuals. This section is the largest user of milk, and such starting programmes might be quite beneficial when entering a new area.

• A world-class cold chain would aid in delivering quality assurance to consumers throughout the region for refrigerated and frozen food distribution.

• To avoid waste, logistics and transportation services should be professionally managed.

• Exploration of the unfamiliar terrain via the internet.

• Closer and deeper relationships with business associates, such as wholesalers, should be established.

Reverse Supply Chain

Reverse logistics refers to the part of a supply chain that processes items that are returning inwards or going backwards. As a result, the term "reverse logistics" was coined.

Returns, inward disposal/recycling of packaging materials, recycling/responsible disposal of materials from previously sold products, and so on are all examples of this.

According to The Council of Logistics Management, the entire definition of reverse logistics is "the process of executing, regulating, and planning the cost-effective flow of finished goods, raw materials, and in-process inventory." The flow is from the point of consumption (the consumer) to the point of origin (the manufacturer), with the goal of correctly disposing of or recapturing value.

Process flow of reverse supply chain

Product Acquisition. This task—retrieving the used product—is critical to the establishment of a lucrative chain. Product returns must be properly managed in terms of quality, quantity, and timing. Otherwise, businesses may be inundated with returned products of varying quality, making efficient remanufacturing impossible. To arrange collection, businesses will frequently need to work closely with retailers and other distributors.

Reverse Logistics. Products must be transported to facilities for inspection, sorting, and disposition after they have been collected. A reverse logistics network does not have a single “best” design; each must be tailored to the products involved and the economics of their reuse. Bulky items, such as tyres, will require very different handling than small but delicate items, such as cameras. Companies should consider not only transportation and storage expenses, but also how rapidly the value of returned products depreciates and the necessity for product control. Outsourcing logistics to a specialist will make sense in many circumstances.

Inspection and Disposition. Return product testing, sorting, and grading are time-consuming and labor-intensive processes. However, if a corporation subjects returns to quality standards and employs sensors, bar codes, and other technology to automate tracking and testing, the process

can be expedited. In general, a company should try to make disposition judgments as early as feasible in the returns process, depending on quality, product configuration, or other factors. This can save money on logistics and help remanufactured items get to market faster.

Reconditioning. Companies can extract value from returned products by reconditioning and reusing components or totally remanufacturing them for resale. Because the timeliness and quality of returned products can be unpredictable, reconditioning and remanufacturing operations are substantially less predictable than traditional manufacturing. Making sensible judgments early in the chain, especially when accepting and sorting returns, will assist to reduce manufacturing unpredictability and, as a result, costs.

Distribution and Sales If a corporation wants to sell a recycled product, it must first establish whether there is a market for it or if it needs to be created. If it's the latter, expect the corporation to spend a lot of money on consumer education and other marketing initiatives. Not only the original purchasers, but also new customers in different markets, are potential clients for remanufactured products or components.

Benefits of Optimized Reverse Logistics

Optimized reverse logistics generates financial gains while also having a favourable influence on the environment and corporate culture. Refining the processes for what happens to products after they are delivered aids in customer retention and cost savings.

A benefit of well-executed reverse logistics is the product data obtained while communicating with customers after delivery. Data provides insight into a company's supply chain as well as the chance to improve products and/or customer service.

Optimized reverse logistics also leads to better supply chain visibility, which leads to benefits like:

- Cost reduction
- Greater customer satisfaction

- Better customer retention
- Faster and better service
- Loss reduction
- Improved brand sentiment
- Waste reduction and greater sustainability
- Challenges of Reverse Logistics

A challenge of reverse logistics is that the flow has to be two-way. For it to be effective, managers must set up the proper infrastructure. This frequently necessitates the use of software that can automate and track each phase of the reverse logistics process. Management must also continuously monitor and analyse the organization's reverse logistics processes after the infrastructure is in place to maintain efficiency.

To gain a complete picture, companies must track both inbound and outbound logistics. The receipt of raw materials or items from the supplier to the manufacturer is managed by inbound logistics. The processes that convey finished items to the end customer are known as outbound logistics. Inbound and outbound logistics are both measured from the standpoint of the manufacturer, but reverse logistics can occur at any point in the supply chain. .

7 Strategies to Optimize Reverse Logistics

Companies require coherent plans that account for speed, efficiency, and cost to maximise reverse logistics. Consider policies, partners, data, capacity, logistics, and transportation while taking action.

The seven strategic ways to optimize reverse logistics are:

Evaluate Relevant Policies and Agreements

Examine and change the procedures for returns and repairs at your organisation. These policies should be straightforward and take into account the underlying causes of returns and repairs. Returns and repairs policies can be competitive differentiators for a company.

Collaborate with Suppliers

Close engagement with suppliers can assist guarantee that customers have a seamless, integrated experience rather than one that is disconnected and difficult to traverse.

Use Data to Optimize Processes

You can learn why customers are returning things by collecting data on product returns. After that, you can alter your sales, product design, and forward logistics operations as needed.

Track products forward and backwards

When you link raw materials to completed goods and client orders, you can track ingredients in the event that you need to issue recalls—rather than issuing them for entire lines, you may pinpoint the problem and issue recalls selectively.

Return Centers should be centralised.

You can better classify products and determine the appropriate next step for each of them with a centralised return centre. Businesses can more efficiently determine how to reclaim product value with the help of a centre. If your organisation doesn't have the financial resources to set up a separate returns centre, consider dedicating a section of your warehouse or factory to returns.

Examine Logistics and Transportation

Review the forward and reverse logistics and transportation processes on a regular basis. Check to see whether some of these procedures and transit can be combined. You can save trips, time, and money if your delivery trucks can pick up empty pallets as they drop off full pallets.

Automate

Use cloud-based logistics software to help streamline operations. For example, a software system can track asset recovery, manage refurbishment and provide business intelligence analytics.

Methodology:

The primary source of data was a real-life scenario constructed by people who took use of the advantages of the cheapest form of packing, plastic. Plastic is being used more than ever before, with the majority of it being used for packaging purposes. In most cases, the alternatives to plastic are glass, paper, or cardboard; nonetheless, plastic is the most durable, viable, and flexible option, not to mention the cost factor, on which most manufacturing companies rely. Manufacturing companies may boost their profit margins simply by lowering packaging costs, which stimulates the use of plastic.

Surfing the internet was another essential source of information. Surfing the web can assist in gaining a comprehensive understanding of how people are profiting from the use of plastic. An exact picture may be examined and analysed by surfing the internet, which is a crucial element in deciding to work on this project. It helps to comprehend the severity with which the issue of excessive plastic use was raised.

Alternatives to plastic bottles

1. Glass bottles-While glass is a delicate material, it is uncompromising in that it keeps drinks tasting wonderful, preserves its original integrity, and stays colder for longer than plastic out of the refrigerator. It's also infinitely recyclable, and each time it's remade, it retains its quality. .
2. Ceramic-Ceramic isn't new by any means, but it isn't as common in the market as it once was. With its sturdiness and capacity to keep colder for longer, this is an age-old, eco-friendly form of bottle that functions similarly to glass. Ceramic containers, on the other hand, are heavier to carry than glass and can be delicate; however, thanks to recent technological advancements, they aren't as unwieldy as they once were, and they typically include covers that reinforce them so they don't shatter.

3. Aluminium Bottles -Aluminium bottles are used in a wide range of industries and have a wide range of uses. One of these uses is in the packaging of beverages such as tea, soda, and beer. An epoxy or enamel covering is applied to aluminium bottles to improve usage and longevity. Because aluminium is 100 percent recyclable, aluminium bottles can be recycled multiple times. They are available in a wide range of designs, profiles, combinations, and styles. Some bottles feature industry-standard features that make using caps and closures simple. In addition to lug finishes, crown caps, thread with plastic sleeves, and continuous thread finishes, aluminium bottles are available in a number of standard finishes. Depending on your preferences, you can acquire an aluminium container in any shape or design. These bottles are more up front, but they are inexpensive to maintain.

Conclusions

In recent years, improper plastic disposal has resulted in marine litter, which has caused numerous environmental issues for marine flora and animals around the world. Some believe that eliminating plastic and replacing it with glass or other materials is the best way to fix the problem and lessen the environmental impact of food packaging, however there have been few scientific studies to back this up. This study investigated four packaging methods capable of holding 1 litre of pasteurised milk: a PET bottle, an R-PET bottle, a non-reusable glass container, and a reusable glass bottle. Using the LCA methodology, the final goal was to determine what is the least environmentally damaging solution, taking into account global warming potential, stratospheric ozone depletion, terrestrial acidification, fossil resource scarcity, water consumption, and human carcinogenic toxicity impact categories. Furthermore, a marine litter indicator was devised to assess the impact of probable dispersion into the sea.

The R-PET bottle has the lowest environmental impact across all LCA categories, followed by PET bottle, returnable glass bottle with 8 use cycles, and non-returnable bottle. This is due to the use of less virgin resources, its light weight, and lower energy usage during the manufacturing and transportation phases. The non-returnable glass bottle has the greatest environmental impact, while returnable glass bottles produce better results: when using the

same bottle multiple times, there is only a production and disposal phase, and the majority of the environmental impacts are associated with the cap, label, washing, and transportation phases. Even with 30 usage cycles before disposal, the impact of the glass bottle is not comparable to that of the R-PET bottle. Perhaps by reducing the weight of the glass bottle as much as feasible and changing the top, the bottle's environmental impact could be lessened, but more research is needed to ensure bottle shock resistance. Non-returnable glass bottles are the worst material option, according to the MLI, followed by PET, R-PET, and finally returnable glass bottles. In terms of this indicator, increasing the incentives for bottle restitution and investing in glass bottle reuse will help to reduce marine litter. Furthermore, methodological improvements to this indicator could be made, such as the addition of additional components or the application of specific weights for each parameter, as expected but not implemented in this work.

In conclusion, the study's considerations and findings show that improving public awareness of environmental issues, as well as investing in plastic recycling and recycled plastic such as R-PET, can help to reduce pollution in the seas and oceans, as well as prevent maritime flora and fauna damage.

Chapter 3

Learnings

This internship was quite beneficial to me in terms of learning how new initiatives are executed in a corporation. It also aided me in incorporating some of the textbook concepts into the project in order to give it a sense of completion. The following are some of the project's significant takeaways.

- Studying Amul's supply chain gave me a lot of insight into how a large corporation like Amul handles its supply chain efficiently and effectively.

- Redesigning the reverse supply chain and considering promotional techniques necessitated a lot of brainstorming, which resulted in a slew of novel concepts.

- We talked about how to keep glass bottles from breaking and eliminate the risk of breakage during transportation from the manufacturing facility to various distribution outlets, and we came up with a few ideas.

- I had to engage with a lot of stores while working on the ordering channel optimization task. This taught me how to deal with people, which is an important soft skill in today's competitive environment.

- Patience, tenacity, and ongoing efforts were essential in persuading consumers to embrace newer and emerging technologies, which is a critical ability in emerging, tech-savvy developing markets.

- I learned a lot about Amul Preferred Outlets and how to open them, as well as how to communicate them to potential customers. Learned how to expand the business arm by persuading people to create an APO and outlining the advantages of doing so. Also, describing all of the little elements for forming an APO, as well as answering their questions, gave me a complete understanding of the APO and the APO opening procedure.