Sonargaon University

Internship Report

on

Transportation Management of Ice cream & Frozen Foods (Cold chain) Kazi Farms Group

Submitted by:

Md.Atikur Rahman

ID# EMBA2303030015

Program: EMBA (SCM)

Semester: Fall-2024

Submitted To :

Department of Business Administration

Sonargaon University (SU)

Dhaka-1215

Submitted for the partial fulfillment requirement of the degree of Bachelor of Business Administration.

Date of Submission: 28th December, 2024

Sonargaon University

Internship Report

on

Transportation Management of Ice cream & Frozen Foods (Cold chain) Kazi Farms Group.

Submitted by:

Md.Atikur Rahman

ID# EMBA2303030015

Program: EMBA (SCM)

Semester: Fall-2024

Supervised by

Shahnaz Sharmin

Lecturer

Department of Business Administration

Sonargaon University (SU)

Submitted for the partial fulfillment requirement of the degree of Bachelor of Business Administration

Date of Submission: 28th December, 2024

LETTER OF TRASMITTAL

28th December, 2024

Shahnaz Sharmin
Lecturer
Department of Business Administration Sonargaon University

Subject: Submission of Thesis Report on " Transportation Management of Ice cream & Frozen Foods (Cold chain) Kazi Farms Group.

Dear Madam,

Here is the internship report on the topic of "**Transportation Management of Ice cream & Frozen Foods (Cold chain) Kazi Farms Group (**Based on the study of EMBA Internship Program) that you permitted me to conduct on the basis of the given proposal.

Studying various theories, approaches, strategies and methods & applying them during the internship program at Kazi Farms Group enriched my knowledge as well as experience. I have come to know about the Transportation Supply Chain in Bangladesh, its prospect & strategies which will help me further in my study.

I appreciate your approval & its topic & procedure. If your need any further assistance in the overview of my internship report regarding any issue, please ask me.

Yours Sincerely

Md.Atikur Rahamn
ID: EMBA2303030015
Major: EMBA(SCM)
Semester: Fall-2024

Certificate of Supervisor

It is certified that the thesis entitled **"Transportation Management of Ice cream & Frozen Foods (Cold chain) Kazi Farms Group "**is a piece of research work done by Mr. Rafiqul Islam under my guidance and supervision for the degree of EMBA Major in Supply Chain Management to be awarded by Sonargoan University (SU), 147/I, Green Road, Panthapath, Dhaka, and that the candidate has put the attendance of more than 80% hrs with me.

Shahnaz Sharmin
Lecturer
Department of Business Administration
Sonargaon University (SU)

STUDENT'S DECLARATION

I am **Md.Atikur Rahman** , a student of EMBA Program, Department of Business Administration, Sonargaon University, hereby declare that the internship report titled "**Transportation Management of Ice cream & Frozen Foods (Cold chain) Kazi Farms Group** " has been prepared after the completion of my internship at Ice cream & Frozen Food at Ashulia Factory under the intensive supervision and guidance of **Shahnaz Sharmin,** Lecturer, Department of Business Administration, Sonargaon University.

I also declare that this report is an original work and no part of this report has been copied from elsewhere. In addition, I would also like to mention that this report has not been published or submitted for being published or submitted for awarding any degree, diploma or recognition.

_____

Md.Atikur Rahman

ID: EMBA2303030015

Program: EMBA (SCM)

Semester: Fall-2024

Letter of Authorization

This is to certify that **Md.Atikur Rahman Bearing ID: EMBA2303030015**, student of EMBA Program, Sonargaon University, has completed the internship report under my supervision. He has worked with **Transportation Management of Ice cream & Frozen Foods (Cold chain)** as an intern and completed the report entitled "Transportation Management of Ice cream & Frozen Foods (Cold chain)" as a partial requirement for obtaining EMBA Degree. He has completed the report by himself. He has been permitted to submit the report.

Md. Atikur Rahman bears a strong moral character and a very pleasing responsibility. It has indeed been a great pleasure working with him. I wish him all success in life.

Shahnaz Sharmin
Lecturer
Department of Business Administration
Sonargaon University (SU)

ACKNOWLEDGEMENT

I would like to extend my gratitude for the invaluable assistance and sincere cooperation provided by various individuals in the preparation of this report. It's impossible to adequately thank all the wonderful people who directly or indirectly contributed to the successful completion of this report. I am deeply appreciative of their kind collaboration and support. First and foremost, I would like to express my thanks to the divine power. Additionally, my foremost appreciation goes to my supervisor, Shahnaz Sharmin, Lecturer at Sonargaon University (SU), for her crucial guidance, scholarly insights, and unwavering support throughout my study period.

Moving forward, I am grateful to Md. Meshkat Hossain,Asst. General Manager - Transport and Logistics,Kazi Farms Group, from whom I gained significant knowledge. I also extend special thanks to ice cream & Frozen Foods (Cold chain) delivery Team of Transport, along with heartfelt gratitude to all the other individuals at Kazi Farms Limited Transport Team. I am thankful to the various staff members from different departments who generously contributed their valuable time and assistance in helping me gather data for this report.

Executive Summery

Transportation is one of the crucial element of logistics and supply chain management. As far as goods are concerned, these days, manufacturers can obtain both their raw materials and components from a variety of often quite remote source for use at their main production site. The very important characteristic of of the demand for transport that is always linked to other demands if the other demand drops, or rises the associated demand for transport is also similarly affected. In fact it is very important indeed to the economy and as per Bangladesh Bureau of Statistics GDP from Transport in Bangladesh increased to 2272407 BDT Million in 2023 from 2143986 BDT Million in 2022.

The importance of transport sector is essential for the economic growth of a country. The government of Bangladesh realize that transportation is the life line of economy of the country. In recent years, Bangladesh government has made breakthroughs in the communication system by implementing mega projects which are playing an important role in achieving the economic growth of the country.

Kazi Farms group has realized that there is no substitute for a for a modern transportation system in the development supply chain strategy as a ice cream & Frozen sector and introduced a large transport fleet management that ensure product safety, time bound and customer satisfaction. Kazi Farms long-term goal is to act as a role model in transport sector in Bangladesh and their slogan is “Adopt Good Practice To Improve the Street.”

In Kazi Farms Group I had the opportunity to work, study, research and make report on this company in my study work program. This internship report provide some interesting insight into the activities of transport management, importance of transportation on supply chain, create customer awareness by branding on vehicles and lot about transport in a ice cream sector.

Table of Contents

S. L.	Particulars	Page No.
Letter of Transmittal		***I***
Certificate of Supervisor		***II***
Student's Declaration		***III***
Letter of Authorization		***IV***
Acknowledgment		***V***
Executive Summary/ Abstract		***VI***
Chapter 1	**Introduction**	12
1.1	Background of the Study	13
1.2	Origin of the Study	13
1.3	Rationale of the Study	14
1.4	Objectives of the Study **(Will be Divided into Broad and Specific Objectives)**	14
1.5	Limitations of the Study	15
Chapter 2	**LITERATURE REVIEW**	16
2.1	Literature Review	17
2.2	Relationship between the influence of infrastructure and regional sustainable development	17-19
2.3	Models for evaluating transport infrastructure projects	19
Chapter 3	**METHODOLOGY**	21

3.1	Scientific research (phase)	22-24
3.2	Limitations of the Report	24
Chapter 4	**ORGANIZATIONAL OVERVIEW**	25
	Will be Arranged in terms of Related Study	
4.1	Background of the Organization.	26
4.2	Products Information	26-29
4.3	Management Profile	29
4.4	Vision	30
4.5	Mission	30
4.6	Core Values	30
4.7	Corporate Information	31 -32
Chapter 5	**Analysis of Transportation Management of Vehicle Repair & Maintenance**	33
5.1	Information of Supervisor's	34
5.2	Key Responsible area	34
5.3	Internship Experience Reflections on Learning & Growth	35
5.4	Personal and Professional Growth	35
5.5	Ethics in a workplace to improve upon	37 - 38
5.6	Good Leader or A Team Player	38
5.7	Worksite new skill development New skills development at my worksite such as	38 – 39
5.8	Internship Experience and expect from supervisor	39
5.09	Internship Experience shaped career interest and goals	39
5.10	Action and Activities	39 – 43

5.11	Key Learning on Internship	43
5.12	Internship learning and value add	44 - 45
Chapter 6	**Findings**	46
6.1	Findings	47
Chapter 7	**Conclusion & Recommendations**	48
7.1	Recommendations	49
7.2	Conclusions	50
Chapter 8	**References**	51
8.1	References	52- 53

Chapter 1

Introduction of the study

1.1 Background of the Study

The study learn the activities, concepts & applications of transportation in supply chain in Bangladesh which must be studied & reviewed closely. Transportation as very much effective part of logistics and supply chain management is a key elements in business activities of a company. Kazi Farms realise that the internal supply chain will be collapsed by taking the support of 3rd Party logistics or rented fleet, Hence KFG was adamant to establish its own vehicle fleet. At the continuous growing age of KFG, Top management realized without a smooth transportation system it's difficult to achieve business excellence in Bangladeshi market. KFG transport acts as a bridge whole supply chain process and the entire supply chain process completed according to schedule by efficient transport fleet management. Branding on their company vehicle also create a brand awareness, professional image a business and builds a high level of trust among the customers. There is very good prospect of speed up poultry industries in Bangladesh as well as economic wellbeing. Transportation enable strategic collaboration between the various entities to reach the objective that organization has set.

1.2 Origin of the Study:

The origin of a study in Kazi Farms Transport would typically refer to an investigation into specific areas of their transportation operations to address challenges, optimize efficiency, or assess impacts on the business. Kazi Farms Group, a leading poultry producer in Bangladesh, likely has a transport division responsible for the movement of goods such as poultry, feed, or equipment across various locations.

A study in this context might originate from

Operational Needs: Evaluating logistical challenges like delayed deliveries, high costs, or inefficiencies in fleet management.

Regulatory Compliance : Understanding and adhering to regulations regarding the transportation of live animals, perishable goods, or hazardous materials.

Sustainability Goals : Assessing the environmental impact of transportation operations and exploring econ-friendly alternatives.

1.3 Rationale of the Study

The transportation system plays a pivotal role in the success and efficiency of supply chain operations, particularly in the poultry industry, where timely delivery of live birds, feed, and other perishable goods is crucial. At Kazi Farms, one of the leading poultry companies in Bangladesh, the transport system is a key component in maintaining product quality, reducing costs, and ensuring customer satisfaction.

Despite its critical importance, challenges in transportation, such as logistical inefficiencies, high operational costs, and delays, can significantly impact the company's profitability and reputation. Additionally, the growing demand for sustainable practices necessitates a reevaluation of transport strategies to minimize environmental impact.

This study aims to analyze the current state of Kazi Farms' transport system, identify its strengths and weaknesses, and propose actionable recommendations for improvement. By examining operational processes, stakeholder feedback, and industry benchmarks, the research will contribute valuable insights to optimize the company's logistics operations.

The findings of this study are expected to benefit not only Kazi Farms by improving its transport efficiency but also the broader poultry industry by providing a case study for best practices. Furthermore, addressing transport challenges aligns with the company’s vision of maintaining quality and sustainability in its operations.

1.4 Objectives

To analyze and enhance the transportation operations of Kazi Farms, ensuring efficiency, cost-effectiveness, and sustainable practices.

Specific Objectives

1.Operational Efficiency:

- Identify bottlenecks in the existing transportation system.
- Evaluate the efficiency of route planning and scheduling.
  Assess the maintenance practices for transportation vehicles.

2.Cost Management

- Analyze the cost structure of transportation operations.
- Investigate opportunities for cost reduction without compromising quality.

3.Service Quality Improvement

- Evaluate customer satisfaction with the delivery process.
- Explore measures to minimize delays and errors in transportation.

4.Sustainability

- Assess the environmental impact of transportation activities.
- Recommend strategies to adopt greener logistics practices.

5.Technology Integration

- Examine the use of technology in fleet management and logistics.
- Propose innovative technological solutions to enhance performance.

6.Workforce Optimization

- Study the skills and performance of the transportation team.
- Recommend training and development programs to improve staff productivity.

7.Compliance and Risk Management

- Review compliance with regulatory requirements in transportation.
- Identify and mitigate risks associated with logistics operations.

1.5 Limitations of the Report

- Data is not much available on related topic.
- Some of the information is not appropriate to use or classify
- For conducting the study there is also a time limitation
- Relevant information about the transportation was not presented by the respondents. Secondary data source have been used in this report. By using the google platform for information collect.

Chapter2
LITERATURE
REVIEW

2.1 LITERATURE REVIEW:

Based on Montero (2015), the economic development measured by the increase in Gross Domestic Product (GDP) in the long-term can reduce poor rates and improves education, health, transportation and housing conditions. The principal indicator is the Human Development Index (HDI), which calculates the relationship between quality of life and economic development.

For this reason, the tripod of sustainability – social, economic and environmental - has become the subject of great questions in different areas, including the transportation of cargo. The social and environmental criteria are gaining rel- evince in this scenario over the years. The quantification of economic benefits from transportation are usually observed in long-term periods. It is made from the knowledge of costs to direct users and their externalities (Rabello Quadros et Nassi, 2015).

2.2 Relationship between the influence of infrastructure and regional sustainable development

Many studies indicate the relationship between the regional development and transport infrastructures under economic, social and environmental aspects. The more regions are served and the better the design of a route, the better the consequences for that environment. In Brazil some researchers seek to prove this relationship through significant variables (Sehn, 2009; Silva et Netto, 2010; Lis- boa, 2014; Campos, 2015; Montero,
2015).

According to Montero (2015) the Brazilian railroads continue collaborating for the development of the country. In this study, state GDP and operating income of the company are correlated during the year. On the other hand, trying to understand the influence that a new railroad can have on municipality, Campos (2015) analyzes the impacts on four variables: income, tax collection in the municipalities involved, employment, and product. The projections are calculated from the variables of municipality GDP per capita, municipality service tax (ISSQN), average income of the worker and formal employment.

Lisbon (2014) identifies some benefits to the region that receives subway stations: the economic development, real estate valuation for the region, the reduction of traffic in the adjacent road system and urban development centered on public transport. A highlight for

this study was the identification of stakeholders in an infrastructure project: private and public actors.

For Silva et Netto (2010), a more qualitative multi-criteria method is important to relate the increase of infrastructure

efficiency in the country and sustainable development. In this context, thirty stakeholders evaluated different projects under seven criteria: job creation, intertidal connection, environmental impact, social welfare (HDI), costs and benefits, recovery of environmental liabilities, and project execution period. On the other hand, Sehn (2009) adopts a more economic methodology that uses NPV, IRR and B/C (benefits and costs) indicators. The study proposes that only financial success is enough to make a project viable.

According to Montero (2015) the Brazilian railroads continue collaborating for the development of the country. In this study, state GDP and operating income of the company are correlated during the year. On the other hand, trying to understand the influence that a new railroad can have on municipality, Campos (2015) analyzes the impacts on four variables: income, tax collection in the municipalities involved, employment, and product. The projections are calculated from the variables of municipality GDP per cap- ita, municipality service tax (ISSQN), average income of the worker and formal employment.

Barefoot Soleure (2015) conducted a study that considers cost-benefit analysis (CBA) at the Danish Ministry of Transportation. The VPL is calculated by the difference between the benefits and costs throughout the project. The primary variables are: environmental disturbance in the

construction period, construction and maintenance cost, travel time reduction, work completion cost, taxes, and local pollution.

Another study that considered many variables to analyze the potential impact of transport infrastructure is consolidated through sixteen criteria: travel time, distance, traffic, average speed, age group, number of local inhabitants, family income, CO2 emissions, land occupation rate, births and deaths, GDP, distance between accommodation and work, number of vehicles in the region, and number of migrations and marriages (Noguéset González González, 2014).

However, according to Yu et Liu (2012) the analysis is more focused on highway safety, which is a social, environmental and economic criterion at the same time. For this evaluation

are considered: investment, daily average traffic, reduction of fatal accidents, reduction of total accidents, percentage of growth, and project continuity period.

2.3 Models for evaluating transport infrastructure projects

Infrastructure project evaluation models has the objective to compare two or more alternatives, or even to justify investments from long-term viability. However, a model may also have references in qualitative methods when it is necessary to consider the opinion of the people involved or if it is not possible to give it real values.

Chen et al. (2015) analyze the energetic efficiency of 29 regions in China through a quantitative and qualitative mod- el. The variables of the model are: air quality level, energy consumption, employment, capital invested in assets, CO2 emissions, and GDP.

The use of Activity-Based Costing (ABC) is widely used for many applications, including transportation. For transport infrastructure, this analysis is also used, since it considers the trade-off between benefits and costs generated by high- ways, helping the decision maker in the choice of invest in an alternative.

Eco-Mobility (EM) model considers, besides the ABC, the risk analysis (Monte Carlo simulation) and the multi criteria complementary analysis of decision. Eco-Mobility evaluates alternatives from the sustainability perspective, adopting variables, such as visual impact on cities, economic impact on the region, improved number of users of public transport, and impact on logistics flexibility (Barefoot Selling, 2015).

The Micro Ben Cost model was developed in the 1990s by the Texas Transportation Institute and is still used nowadays. It helps to evaluate track safety and the increased transport capacity on a highway. The benedicts are the reduction: in the number of accidents, of travel time, and of vehicle operating cost (McFarland et al., 1993).

HDM-4 is a model developed and used by the World Bank. It proposes an evaluation of the performance with regard to four technical criteria: type of pavement, traffic volume, maintenance standards, and regional characters- tics. Benefits are identified from three groups. The first one is economic: travel time, reductions in operating costs, and number of accidents. The second one is environmental: environmental impacts (air pollution and energy efficiency). The last one is social: social benefits, and traffic jam (Kerali, 2000).

From the HDM-4 model they also constructed a multi criteria analysis model to optimize necessary investments in highways (Odoki et al., 2015). The criteria present different weights and are classified within the sustainability tripod: traffic jam, energy efficiency, accessibility to schools, hospitals and commerce, number of accidents, atmospheric emissions, and comfort to users. Computational General Equilibrium (CGE) is another model that contributes to estimating only economic impacts: truck operating costs, and travel time (Wang et al., 2013).

The choice of transport projects is also based on the ABC in the European Union. It considers nine factors: operation and maintenance costs, travel time, air pollution, investments in the road, noise, road toll revenue, accidents, climate change, and vehicle operating cost. All data are mon-

Chapter 3

METHODOLOGY

3.1 Methodology :

Bibliometric analysis is delineated into two distinct domains: performance analysis and science mapping, each serving a unique purpose in the scholarly inquiry. Performance analysis is concerned with quantifying the scholarly output and influence of research entities, utilizing metrics such as the number of publications and citation frequency per year or per entity. These metrics serve as proxies for research productivity and its consequential impact within the academic community. The research methodology was segmented into five distinct phases: initiating with a literature review, followed by data gathering and pre-processing, proceeding with bibliometric analysis, then conducting keyword analysis, and culminating with cluster and content analysis.

Phase 1: Literature review: an exhaustive search for relevant literature was undertaken to utilize the reputed international database. The selection of Scopus as the preferred database was informed by its status as the most extensive abstract and citation repository of peer-reviewed materials, widely recognized and utilized by the global academic community [24,25]. A carefully curated array of keywords was employed to sift through the database, focusing on their occurrence within the titles, abstracts, or keywords of the research articles.

Search Criteria: The query was structured as TITLE-ABS-KEY, targeting the conjunction of “food,” “cold,” “chain*," “logistic*“, “management,” and “supply chain*." The search yielded a total of 118 scholarly articles spanning from 2002, marking the year of publication of the inaugural document, to 2024, defining the period under review. Initially, The Scope of the search was intentionally broad, not confined to any specific document types, however, to analyze the articles in several software such as VOSviewer and for accessibility purposes.

Phase 2: Data Acquisition and Preprocessing: The procedure for data acquisition involved the extraction of various data points, such as titles, subject domains, types of documents, affiliations, geographical origins, and years of publication. This data underwent a preprocessing phase to ensure its uniformity and precision for subsequent analytical processes. The cleansing of the dataset was meticulously carried out by reviewing the abstracts or keywords of the articles, which facilitated the exclusion of 114 articles. The criteria for exclusion encompassed articles not authored in English and non-open access documents, those irrelevant to the theme of the FCCLM (i.e., off-topic papers), and instances of duplicate entries.

Phase 3: Bibliometric Analysis: Employing VOSviewer software, a bibliometric analysis was performed to explore the domain of food cold chain management. This analytical approach is instrumental in delineating the primary research foci, uncovering gaps in the existing body of knowledge, and observing the developmental trajectory of the field over time [26]. Such insights are invaluable for both researchers and industry practitioners, enhancing their comprehension of the prevailing challenges within food supply chain management and pinpointing avenues for future investigation and innovation. Furthermore, bibliometric analysis plays a pivotal role in recognizing prominent scholars and institutions within this sphere, thereby promoting collaborative engagements and fostering a culture of knowledge exchange among professionals [22]. It is also adept at cataloguing publications based on their country of origin and publishing source, offering a perspective on the research's geographic and publication outlet distribution. Moreover, it facilitates the identification of the most prolific articles, institutions, and journals within this research area.

Phase 4: Keyword Analysis: The analysis of keyword co-occurrence was executed using VOSviewer, notably incorporating a network graph to visually depict keyword interrelations. This stage of analysis, conducted via VOSviewer's mapping functionality, entails calculating the prevalence of specific keywords. This process is crucial for discerning the most commonly addressed themes within food supply chain logistics and management research. The outcomes of this analysis are instrumental in highlighting the focal points of study within the field.

Phase 5: Cluster and Content Analysis: Cluster analysis, a technique for categorizing similar entities within a dataset, was employed to organize keywords into groups according to their co-occurrence patterns. The outcome of the cluster analysis in VOSviewer is visually represented by a clustered heatmap, which illustrates the connections among keywords and their aggregation into coherent groups. Such clustering is pivotal for unveiling patterns, trends, and relationships within textual data that might not be readily discernible through mere textual review. The objective of conducting cluster analysis was to pinpoint predominant clusters and themes, thereby guiding the delineation of prospective research trajectories grounded in these thematic clusters. This endeavour entailed a thorough examination and interpretation of the scholarly articles to extract and synthesize principal concepts.

The selection of this methodological framework was predicated on its capacity to facilitate a holistic and detailed scrutiny of the prevailing scholarly discourse on food cold chain management. By integrating both bibliometric and content analytical techniques, this approach enabled the identification of salient trends, patterns, and future research avenues within the ambit of this field.

3.2 Limitations of the Report:

- Data is not much available on related topic.
- Some of the information is not appropriate to use or classify
- For conducting the study there is also a time limitation
- Relevant information about the transportation was not presented by the respondents.

Secondary data source have been used in this report. By using the google platform for information collect.

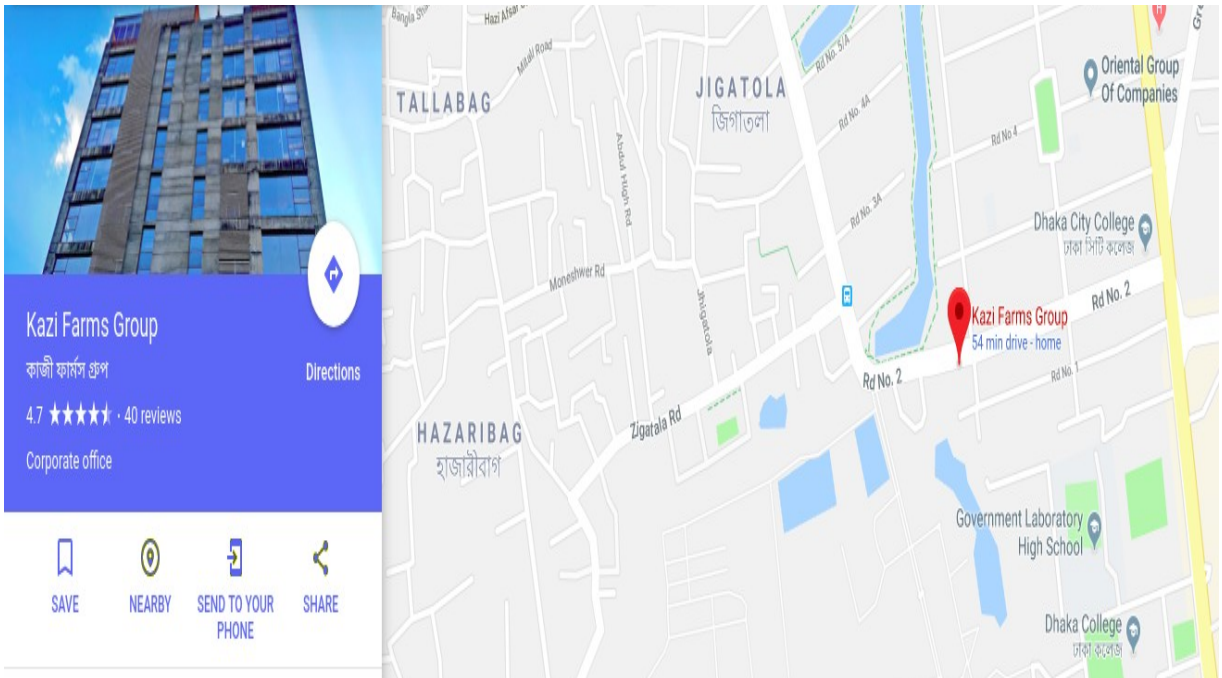
Chapter -04
ORGANIZATIONAL OVERVIEW

4.1 ORGANIZATIONAL OVERVIEW

Kazi Farms Group is one of the biggest businesses the poultry industry in Bangladesh. Kazi Zahedul Hasan, the Managing Director, was awarded Business Person Of The Year for 2004 in Bangladesh. Kazi Farms Group is the main financial donor of Central Womens University (www.cwu.edu.bd), the first private University established in Bangladesh for women only.Kazi Farms Group also contributes to the operation of Kazi Zahural Huq College in Mary Gopinathpur, Gopalganj.

Kazi Farms Limited was established in 1996 as a hatchery for imported eggs; the following year it started its own parent farms. In 2004 production started in our grand-parent (GP) farms. which was responsible for Bangladesh's first exports of hatching eggs and day-old chicks in 2004. In that year, our Managing Director, Kazi Zahedul Hasan, was named Businessperson of the Year by the Daily Star/DHL Business Awards.

Kazi Media Limited- Deepto TV, which is a private cable & satellite television channel in Bangladesh. Its commercial transmission started from 18 November 2015 and as a sister concern of Kazi Farms Group.



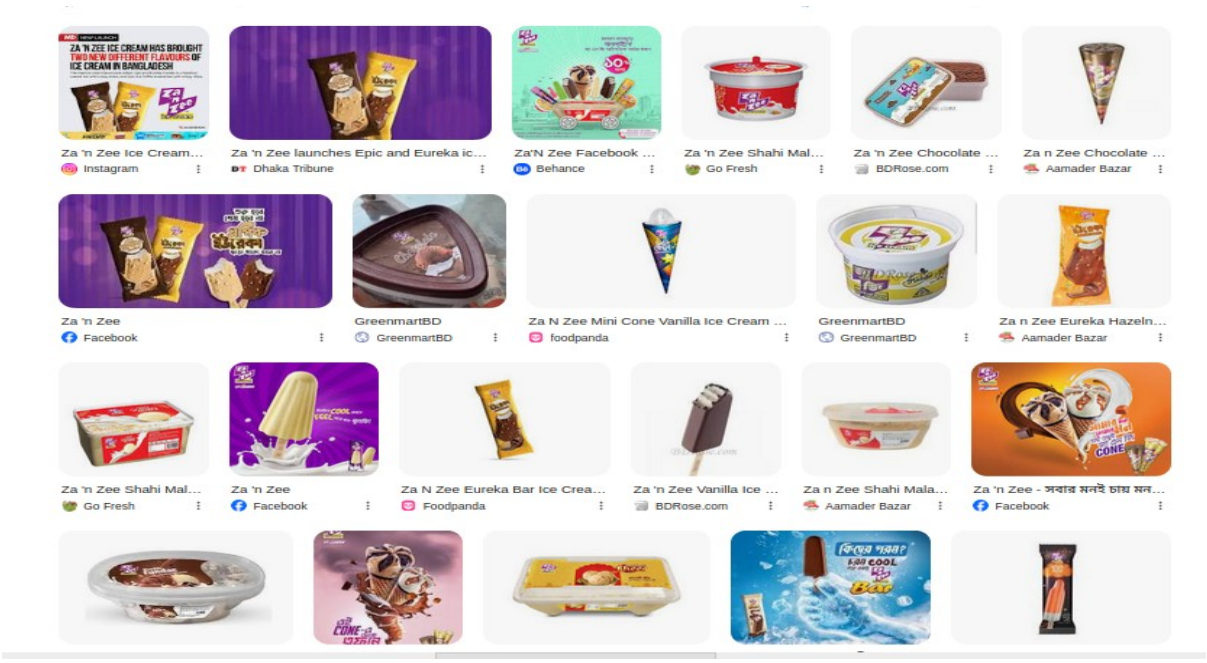
4.2 Products:

Our Product: Za ‘n Zee ice cream :

Za ‘n Zee contain natural milk fat. Also the 9 flavors Za ‘n Zee has chosen to launch are quite extraordinary: Za 'n Zee ice creams item:

- Cup -100 ml
- Tub- 500 ml
- Tub- 1 liter
- Bar
- lolly
- Cone
- Malai
- Ice cream Sandwich
- Rock 'n Roll
- Triple Rocker (Ice cream cake)

Picture:



Bellissimo ice creams items.

- Bellissimo Perfetto Chocolate Cone Ice Cream 121ml
- Bellissimo Perfetto Vanilla Cone Ice Cream 121ml
- Bellissimo Premium Chocolate Ice Cream 1litre
- Bellissimo Premium Dolce Malai Ice Cream 1Litre
- Bellissimo Premium Supremo Chocolate Ice Cream 102ml
- Bellissimo Premium Supremo Vanilla Ice Cream 102ml
- Bellissimo Primo Chocolate Bar Ice Cream 70ml

Picture:

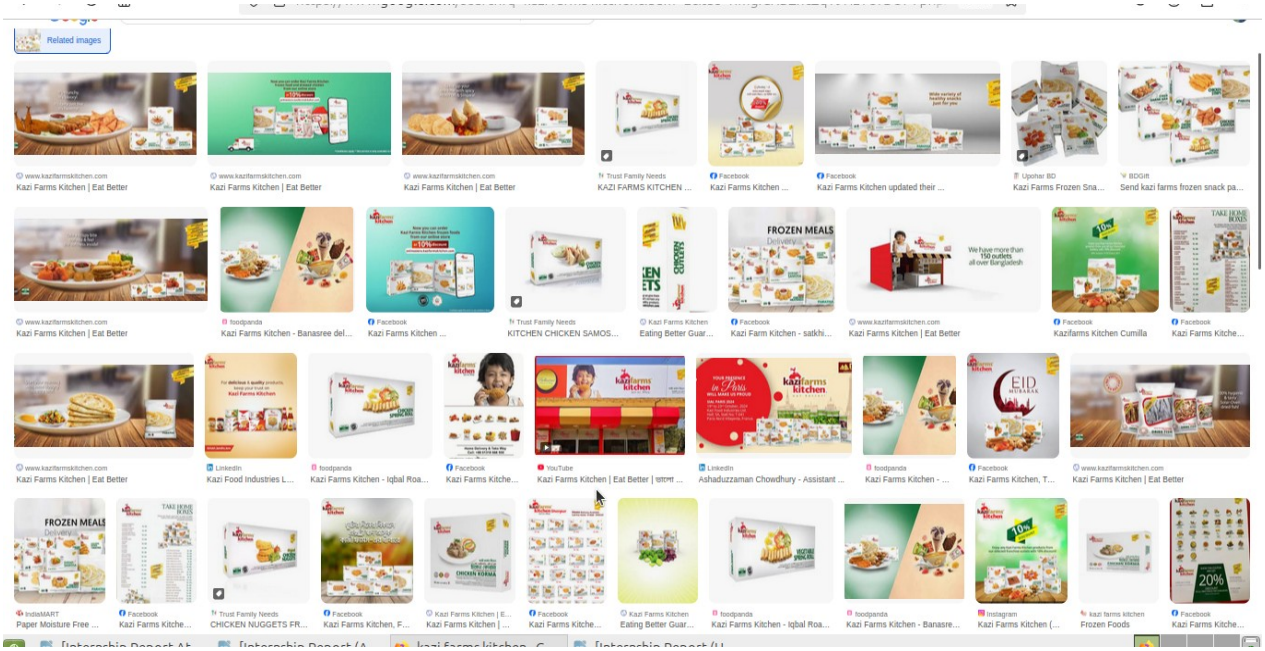


Kazi farms Kitchen:

A market is a place where two people are gathering to exchange of goods and services. The parties involved are usually buyers and sellers. The market may be physical like a retail outlet, where people meet face-to-face, or virtual like an online market, where there is no direct physical contact between buyers and sellers.

Kazi Farms Kitchen is both physical and non-physical market where people buy their products from super stores and Franchise outlets. The continuously targeting the Job holder person as well as young people who don't have to cook their own meal. Kazi Farms Kitchen communicate their customers both online and offline. They organize several campaigns during special events and also give discount during Ramadan season and Kazi Farms Kitchen always committed to give healthy and fresh foods to their customer.

Picture :



4.3 Management Profile

Mr. Kazi Zahedul Hasan, is the founder and Managing Director of Kazi Farms. He is an architect/engineer, obtained his M. Arch. degree from Harvard University in the USA. He was a professor of the Department of the Architecture at Bangladesh University of Engineering and Technology (BUET), Dhaka and the School of Environmental Design, King Abdul Aziz University, Jeddah, Saudi Arabia. Mr. Hasan is a member of the American Institute of Architects as well as the member of the Royal Institute of British Architects.

Dr. Perween Hasan, wife of Mr. Kazi Zahedul Hasan, an obtained M.A. in English from Dhaka University, and another M.A. and a Ph.D. (History of Fine Arts) from Harvard University. USA. Presently, she is a professor at Dhaka University. She is a Director of all sister concern of Kazi Farms Group.

Mr. Kazi Zeeshan Hasan is a Director of Kazi Farms Limited and its sister companies and he is directly involved in management of sales and raw materials purchase. He received training in feed milling and raw materials evaluation from Cargill Indonesia. He completed his B.A. in Economics from Oberlin College, USA, and his M. Theological Studies from Harvard University, USA, and also his M.Sc. from the London School of Economics,

Mr. Kazi Zahin Hasan is also a Director of Kazi Farms Limited & its sister companies. He is responsible for the production operations of Kazi Farms Group. He completed his B.A. in Economics from Oberlin College, USA, and also his Master of Public Administration degree from Columbia University, USA. He acquired knowledge of training in poultry in the U.S.A. and Thailand.

4.4 Vision

Our overarching goal is to establish ourselves as a role model to be followed among transport and logistics service providers in Bangladesh, we will achieve this through efficient fleet management, creative business planning and outstanding customer service.

4.5 Mission

Our aim is to introduce a transport system that ensures :

a) Product safety.

b) On time delivery.

c) Affordability.

4.6 Core Values and Commitments:

Core Values:

Producing high-quality products: Kazi Farms aims to produce high-quality chicks, feed, eggs, and chicken.

- Promoting healthy lifestyles: Kazi Farms aims to create premium agro-based products and services that promote healthy lifestyles.
- Meeting customer satisfaction: Kazi Farms aims to gain customer satisfaction by providing products that meet their needs.
- Responding to needs: Kazi Farms aims to respond quickly to the needs of stakeholders, society, and the environment.
- Being a trusted company: Kazi Farms aims to become the most trusted company in Bangladesh.

Commitments:

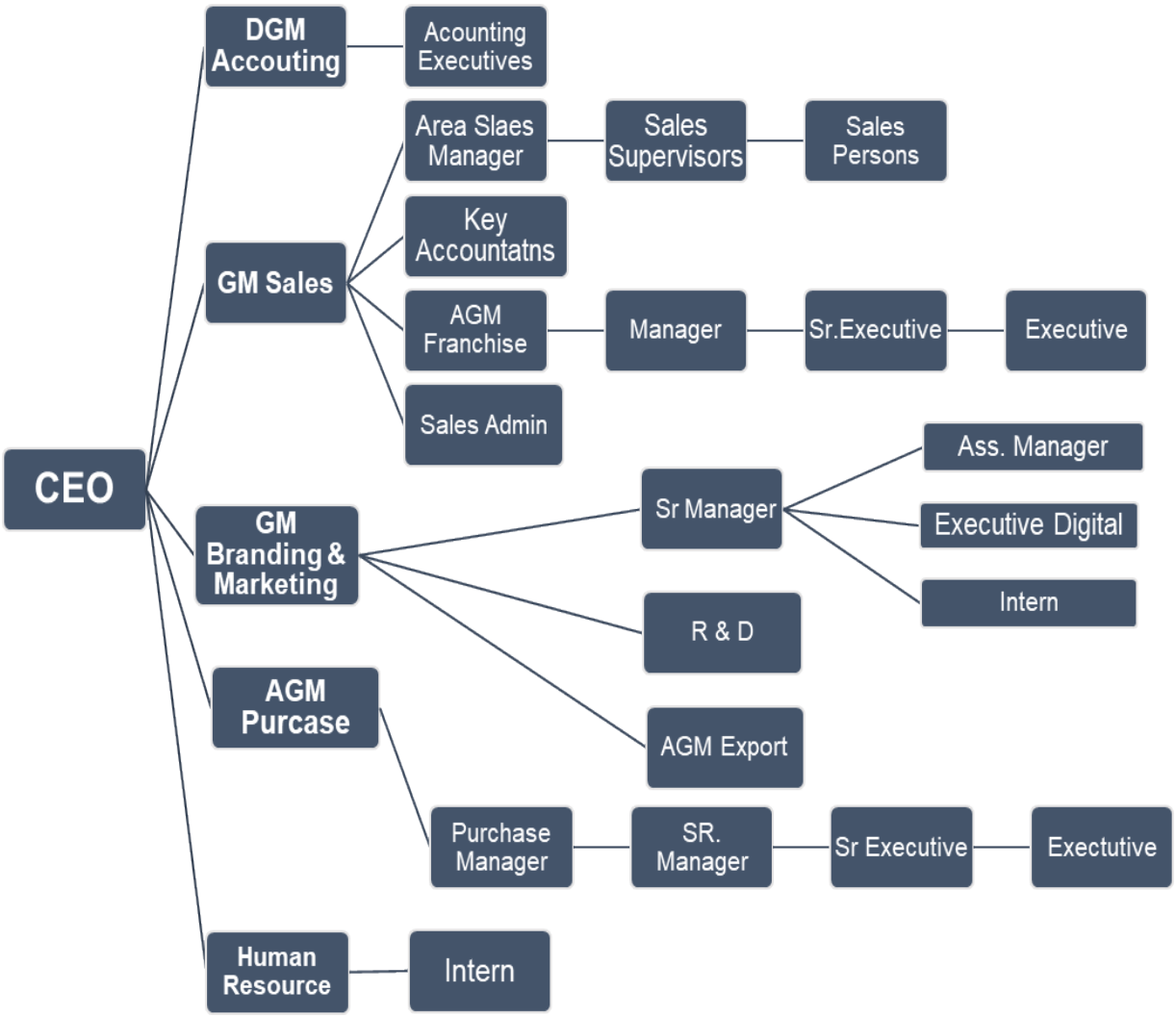
- Market dominance: Kazi Farms Group has secured a dominant position in the market.
- Commitment to the economy: Kazi Farms Group has made commitments to the Bangladeshi economy.

4.7 Corporate Information:

Company Type	Private
Industry	Poultry
Founded	1996
Founder & Managing Director	Kazi Zahedul Hasan
Headquarters	House No.35,Road 02,Dhanmondi,Dhaka 1205
Number of Employees	10,000
Website	Kazifarms.com

4.8 Organizational Structure:

Kazi food industries limited is the one of the biggest Ice cream & frozen food manufacturing company in Bangladesh. Currently they are following "Hierarchical Structure" to run their business. The hierarchical model is the most popular organizational chart type.


CEO
DGM Accouting
Acounting Executives
GM Sales
Area Slaes Manager
Sales Supervisors
Sales Persons
Key Accountatns
AGM Franchise
Manager
Sr.Executive
Executive
Sales Admin
GM Branding & Marketing
Sr Manager
Ass. Manager
Executive Digital
Intern
R & D
AGM Export
AGM Purcase
Purchase Manager
SR. Manager
Sr Executive
Exectutive
Human Resource
Intern

Chapter 5

Analysis of Transportation Management of Ice cream & Frozen Foods (Cold chain)

Kazi Farms Group

5.1 Supervisor's Information

Name: Md.Atikur Rahman

Designation: Senior Executive (Transport)

Email:atikur.rahman@kazifood.com

Contact-No: 01787-682604

Kazi Food industriesLimeted,

Beron,Sarker Market, Ashulia,Savar,Dhaka

5.2 Key Responsible area:

- Fleet Management by Data Analysis.
- Legal Practices of KFG Transport Employees
- Product Safety, Vehicle Safety and Cost Optimization.
- Transport Unit Management
- Smooth Ice cream & Frozen food delivery.

❖ **Fleet Management by Data Analysis:**

Monthly Reporting to supervisor on following issues with data analysis, Findings & Comments /Suggestions:

1. Vehicle Trip Expenses,
2. Driver Expenses,
3. Fuel Expenses
4. Vehicle capacity utilization
5. Comparison of Organization(Vehicle) wise Utilization Report
6. Driver Duty Hour Calculation Reports
7. Driver and Helper 8 hours duty policy maintain
8. Monitor Vehicle Tracking System (VTS) Repor

❖ **Legal Practice:**

1. Vehicle Documents updated properly
2. No Police case issued for Vehicle Document Failure
3. Driver Duty Scheduling strongly followed 8 hours policy
4. Driver and helper leave maintain as Per KFG practices

- **Product safety, Vehicle Safety and Cost Optimization:**

1. Ensure the proper delivery of product by maintaining timeline without damages of product by taking necessary steep of Product safety, Timely Delivery & Communication with the stake-holders (Producer, Customer- Primary, Customer-Secondary etc.)

2. Ensure vehicle runs without any crash/ damages of vehicle

3. Increase the efficiency of the existing process either new ideas generated for save the cost of KFG or Increase the profitability or any development works like SOP, Guidelines, Flow-chart etc.

- **Transport Unit Management**

1. Training for Drivers/ Stake-holders on skill development and awareness Build up by Training Status:This is an assessment conducted by any external parties to evaluate how effectively training plan is implemented (conduction of training as per calendar, Trainer performance, Presentation style, evaluation of Trainees, record maintaining of individual performance in ERP, hard copy preservation, etc.)

2. Implementation of Total Vehicle Servicing (TVS) Module (Ensure the presence of tools, Knowledge of Drivers to Perform, Practically maintaining & record keeping in Register Book/ File)

3. Physically conduct the assessment of vehicle operation status, Driver rest facilities and compliance management.

5.3 Internship Experience Reflections on Learning & Growth:

Transportation as a part of logistics and supply chain management and a key element of business activities of a industry. Effective transportation able to keep the supply chain moving and keeping inventory lean and it also able to impact warehouse efficiency, lead time reduce and cost minimize.

5.4 Personal and Professional Growth:

In my study I have learn so many thing about transportation on supply chain management both personal and professionally developed my theoritical and technical knowledge such as-

Self Improvement:

Here at Kazi Farms Transport key target to create and maintain a transportation system which ensures product safety, time bound and cost effectiveness. Our customers will view the Transportation Department as a reliable service provider in terms of quality, safety and

excellent cooperation. At kazi farms 481 unit vehicles moving different location in Bangladesh I am the active member of a large fleet. It's help to learn to fleet management, manpower utilization, manpower development, cost optimization to achieve the company goal.

Professional Experience:

Fleet Management: We execute our fleet very efficiently basically we transport very sencitive product like- Dry cake , dry fish ,Branded eggs, Ice cream & Frozen food all the produtcs are very careful transportation with proper maintain biosecurity. Here this transportation seamless running by taking some major steeps by efficient manpower recruitment, proper training and better work environment. We experience how a large company like ice cream & frozen food industry as a Kazi Farms growing continuously by maintaining proper supply chain process.

Development of self confidence:

Kazi Farms is a market leader of poultry sector here we learn how maintain a large fleet of transportation which maintained whole supply chain processes. Kazi Farms most of the products are very much sensitive this product we transport to whole country within our time limit, safety of product with a cost efficient way that developed my confident level to work with challenge.

Leadership development:

Total 117 employee work under my supervision and here separately distributed their individual task. Every one job responsibly, accountability & performance evaluated within a structure. Guided my team to achieve a certain goal through correct direction and motivation. Here learn how encourage others to take the actions need to succeed. To learn the ability of an individual or a group of stuff to influence and guide to the members of an organization.

Improved Time Management:

Time management include the ability to set goals, organize, focus, prioritize and delegate. At Kazi Farms transport very much active on time management every work procedure done by proper time schedule it is help to achieve organization goal. Here my work station I have gather knowledge how time should be manage according to achieve organization objective.

Developed Communication Skill:

In my study I learn how to communicate with the different stakeholder firstly listen or understand well what message to be communicate that is lead to good communicator. It

lesson to me be present and available with the message. How a take notes help to success to a communication and create a positive organization culture.

Improve job performances:

I have learn how to create an effective plan ahead prioritize work on my own time management. It help to learn try to best new ways of better working use of necessary tools to simplify and automate. The study help to set the right expectation, trim out to-do list and create milestones and goals.

Increased duties and responsibilities:

In my study I have learn the first step to talking on more at work progress. Take proper initiative to what would be done within time frame. Learn new skill and get the timing right for better performance and ready to take on greater responsibilities. This study help to owning action, gain confidence and accountability.

Skill development:

I have learn how a training is more effective for an individual skill development. In my job place enough opportunity to attend lots of training almost every month one or two training conducted for skill development to the employee for contribute to company. Corporate culture practice on organization also develop employee skills. Proper feedback in necessary for the work place it creates more positive and productive relationship between organization employees and it how to reach goals and drive business value.

5.5 Ethics in a workplace to improve upon

The study learn about the defferent ways of ethics within a workplace that improve upon professionalism such as-

- Clear goal and Objective: Clear goal and obective ensure excellent customer service with a taking necessary steeps in achieving the main goal.
- Discipline : Discipline not only complete the task within a time frame but also execute all the task very well. It is extremely important to ensure all the assignment and projects are delivered and execute with a timely manner.
- Proper Mentoring: In a organization a mentor influence, guidance, or direction to his subordinates and also influences the personal and professional growth of a mentee.

- Create the right Work Environmental: Workplaces there is trust, cooperation,encourage, risk-taking support, equity and positive work environment.
- Professionalism: Showing respect, helping and supporting for all team members remaining flexible, open to change and communicating to resolve problems.

5.6 Good Leader or A Team Player:

The study learned about a good team leader or a team player possesses a combination of qualities, such as

- Cooperation and Communication skills: These skills are help me able to exchange ideas, information, feedback and work together for a common goal.
- Strong ethics: The study help me to maintain the ethical issues such as being punctual, showing accountability, taking initiative and maintaining a positive attitude.
- Technical expertise: I have learn the ability for the role and the depth of knowledge in my chosen field.
- Responsible: As a team leader responsibities are the functions that help to perform to succeed in my position.
- Build trust within the team: Building trust among the team is a key component that success at work. High trust in the organization get satisfection and have a less tress.

5.7 Worksite new skill development New skills development at my worksite such as-

- Time Management: Time management is the key learning point of me it help me to proper planning, prioritizing, goal setting, evaluating urgent task and improving workflows.
- Problem solving: This skills help me to determine the source problem and how is the best solution on it and grow ability to plan, prioritize and execute strategies.
- Planning and Organising: This skills give me the ability to work done in a more structure way and also help me to more control over the task with the time line that consistent in set the goal.
- Self-Management: The study learn about how to developed self-management skills that include a personal goal setting and focused me to long term objective.

- Confidence: Confidence help me to speak concisely and with clarity and effective commuunicate get confidence that important for career advancement.
- Interpersonal skills: In my worksite give me opportunity to develop my interpersonal skills that enhance my self-confidence to problem solving.

5.8 Internship Experience and expect from supervisor:

According to my study I expect my supervisor to cooperative and provide clear direction on what expected of me. A good supervisor evaluate me and provide clear meaningful feedback regularly and direct with his subordinate about company challenges and its objectives. I also expect my supervisor to be open and honest with me and help to know if anything I could improve upon and help to do my work differently.

5.9 Internship Experienc shaped career interest and goals:

In my study I have grown my professional and technical development by increasing my strategizing, troubleshooting and networking skills. I like to taking challenges and pushing the limits to innovative methods of solving problems. The creation and implementation of the plan that will be able to replicate to some level at any other career.

5.10 Action and Activities:



Fig 1: Vehicle at customer point for product delivery

Here at Kazi food industries ltd we operate our transport department with a vision that reflects our customers will view the Transportation Department as a reliable service provider in terms of quality, safety and excellent cooperation. Kazi food industries vehicle branding also create a brand image.

Major Objectives of Kazi Farms Transport Division:

- Customer satisfaction
- Product Safety
- Timely Delivery
- Vehicle/Road/Human safety
- Employee Skill development
- Cost Optimization
- ERP integration in every phases of operational work

Discuss about our action and activities as follows:

i) **8 hours duty policy implementation:**

In a transport management driver & helper per day 8 hours duty maintain its very difficult and now present government of Bangladesh realizing it to reduce road accident and government take some steep on it. Kazi farms 8 hours duty policy continuation of this transport operation by implementing transit system. Basically Kazi Food company their production icc factory Ashulia sales centre and dealer points are located different parts of the Bangladesh for product safety and road crash minimize setup 12 depot and every and different Kazi Food unit arrange enough rest facilities for driver & helper rest. This policy continuously help to achieve our company goal by product safety and road crash minimizing.

Employee Skill development:

Road safety and product safety where create a effective training schedule which ensure every driver & helper gets a training per month and we also for better training send them to Nitol Motors and BRAC training centre. After training their performance are evaluated through exam test.



Fig: Skill development Training for drivers & helpers

iii) Improving road safety in the private sector

Here at Kazi Farms Group which is the largest food industry in the country. Our core business is producing ice-cream & Frozen food transporting them to locations all over Bangladesh by Refrigeration van . These involve many Refrigeration van traveling the length of Bangladesh every day. We have taken a number of initiatives for transport safety which I would like to share.

The first things of safety is having properly trained drivers. We ensure all our drivers have to have a valid driving license. Unfortunately, it's not enough to get a copy of each driver's license; due to the proliferation of false licenses, we verify all drivers' licenses with BRTA. Also, the date of expiry of all driver's licenses is stored in the HR module of our Kazi Farms company Enterprise Resource Planning (ERP) software. So each month, the drivers whose licenses are expiring can be identified and sent to renew them.

The second element of safety is controlling driving time. Bangladesh law prohibits drivers from driving more than 8 hours a day. This is a common-sense law, as after 8 hours of driving anyone will become too tired to safely control a vehicle. Since our organization requires very long trips transporting ice cream & Frozen ctg ,Rangpur,Khulna,Barisal, Sylhet Noakhali,comilla,Bogura, mymnesing from Ashulia , we have established transport offices in depot points that drivers can be changed before they become too tired.

The third element of safety is monitoring vehicles while driving. This is accomplished by fitting each vehicle with Global Positioning System (GPS) tracking systems. This enables a vehicle control center in Dhaka, which is staffed 24 hours in 3 shifts, to check the current location and speed of each truck continuously. The GPS sensors in the truck can trigger an alarm whenever the driver goes too fast. However, the driver can possibly ignore the alarm if they are in a hurry.

All the above increase safety, but they do cost money. Licensed drivers demand higher salaries than unlicensed drivers.GPS systems and trip monitoring staff also cost money. However, for a business like Kazi food which is transporting even a small improvement in driving brings less ice cream damage and saves money. Controlling and monitoring transport with GPS also helps prevent corruption and theft of fuel. We have measured each of our vehicle trips and establishing a standard "kilometers per litre" for each trip; our company ERP software records the actual fuel consumed by each trip and each driver. The standard function of ERP software is to provide reports of standard costs versus actual costs for different operations such as manufacturing and transport.



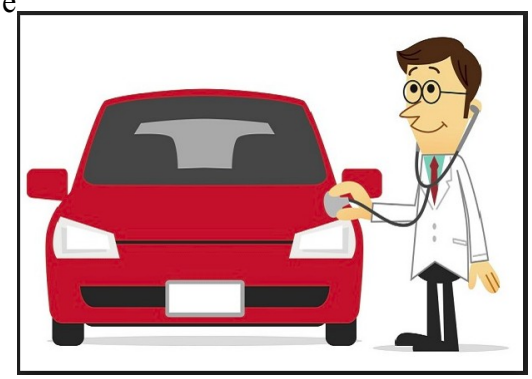


More relevant to the rest of the country is the fact that these practices also save lives. My hope is that other Bangladeshi companies will also adopt practices similar to the above to improve road safety and reduce accidents. The fact is that as Bangladesh grows and the private sector is also going to become an increasing fraction of all economic activity.

Fig: NITA class room *Fig: NITA Driving Track*

Efficient service system:

Kazi farms establish a effective service system for uninterrupted customer service. Service team 24 hours ready for their service that help to ensure product reach to customers end within the time frame.



Major Role of Service Center:

1) Ensure periodic maintenance
2) Trouble shooting of any technical failures
3) On-site support if a vehicle is stopped at road

4) Arrange spare parts (advance and on demand)

5) Ensure proper working tools

6) Work safety and workshop cleanliness

7) Skill development of mechanics

8) Awareness build up on vehicle maintenance to Driver

This strategy is now paying dividend to KFG as an excellent supply chain network has already formed at Bangladeshi market.



Fig: Training workshop for service team

5.11 Key Learning on Internship:

Key learning of the study is to developed my knowledge about effective Transport Fleet Management. Kazi Farms has a large transportation system total 481 vehicles which ensure product safety, time bound and cost effective operation process with customer satisfaction. This tranportatiom of supply chain is the life line and progress of Kazi Farms industries. Customer satisfaction and operational excellence is achieved through an environment that

- fosters an atmosphere of cooperation, dedication, honesty, creativity and trust;
- ensures our employees have opportunities for professional development by embracing new concepts and technologies;
- Strives to assure integrity and accountability in every actions and stages.

5.12 Internship learning and value add :

This study has provided me with a wonderful opportunity to acquire practical knowledge, cooperation & communication skills and also technical skills. I am confident to improve myself in future. I have explored a few reasons that is important for professional growth in future.

Real life exposure: An internship enable me to gain first-hand exposure to real-world work. That knowledge of experience of trying something new is extremely beneficial.

Building a professional network: Networking is one of crucial of succeeding. Technology is one of the easiest sources of research, there are different apps that connect me professionally, such as Linkedin, Facebook Group, Clubhouse. Most people use Linkedin to connect professionally.

Improve time management and communication skills: Time is the magic ingredient of success. It help to prioritize work and it also helps to my goal faster. Proper time management boosts my confidence and help to improve career opportunities. It help me to define and prioritize my tasks and break my task into smaller tasks.

Delivery Limitation

- Vehicle prechecking before ice cream & Frozen food loading & unloading.
- Vehicle stranded temperature system check.
- Overall vehicle general check to avoid on road vehicle uneven break down.
- Temperature system must be ensuring – 40 temperature in vehicle at ice cream & Frozen food product delivery purpose .

2. Giving instruct driver to ice cream & Frozen food delivery with safety condition:

- Counseling drivers & helpers in schedule basis.
- In traffic jam, must be check Refrigerator van temperature.
- Vehicle speed limit **(45 km/hours)** maintain as per road condition and our company ice cream & Frozen food carrying policy.
- Collect receiving Challan from party after Ice cream & Frozen food delivery.

- Any unexpected issue like-traffic jam, vehicle problem,road problem then inform immediately transport & Call center person.

4. Special attention:(Operation in-charge & Call center)

In the time of traffic jam & waiting for ferry on ferry ghat crossing driver & helper name & mobile number with vehicle number share to call center due to ensure & monitoring vehicle air circulation system.(Like- all fan starting position and ventilation system are also open) **Call Center Mobile Number-01713-239229.**

5. Support need for sales department:

- Avoid to unexpected long distance vehicle's movement for ice cream & Frozen food temperature issues..
- In current conditions by completing the ice cream & Frozen food delivery at overnight as much as possible to unexpected temperature loss can be prevented.

Chapter – 06

Findings

6.1 Findings

Kazi Farms Group, a leading poultry enterprise in Bangladesh, has diversified into various sectors, including frozen food products under its subsidiary, Kazi Food Industries Limited. This subsidiary markets brands such as Bellissimo and ZaNZee ice creams, as well as Kazi Farms Kitchen frozen food products across Bangladesh. Wikipedia

To maintain the quality and safety of its frozen food products, Kazi Farms Group relies on an efficient cold chain infrastructure. This system ensures that products are stored, handled, and transported within optimal temperature ranges, preserving their quality from production to the consumer.

In Bangladesh, the company has been focusing on enhancing its processing capabilities to drive future growth. For instance, Kazi Food Industries Limited has been exploring partnerships with e-commerce platforms like Daraz to expand its distribution network. However, the integration of frozen meats into such platforms is contingent upon the establishment of a reliable cold chain to ensure product quality during delivery. Asian Agribiz

Internationally, Kazi Farms Group has extended its cold chain operations through Kazi Food Logistics Ltd., particularly in East Africa. This subsidiary offers services including cold storage, refrigerated transportation, and cold room installations, catering to sectors such as food and pharmaceuticals. Their facilities comply with international food safety standards, ensuring the integrity of perishable goods throughout the supply chain. Kazi Food Logistics

In November 2023, the ARCH Cold Chain Solution East Africa Fund (CCSEAF) announced an investment in Kazi Food Logistics Ltd. This strategic partnership aims to strengthen the cold chain network in Uganda, addressing food loss and enhancing food security across East Africa. The investment underscores a commitment to developing state-of-the-art cold storage facilities and logistics platforms in the region. Cold Solutions East Africa

Through these initiatives, Kazi Farms Group demonstrates its commitment to maintaining robust cold chain systems, ensuring the quality and safety of its products both domestically and internationally.

Chapter – 07

Recommendation And Conclusion

7.1 Recommendation

The efficient logistics and transportation management is to make sure by proper planning & preparation. There are so many elements involved in planning procurement of products, storage and delivery of the product. Proper planning is ideally supposed to bring successful outcome it minimize unexpected circumstances, such as shortages, delay or transport damages.

Strengthen the staff performance that are the people who play important role in the growth of the business. It is important to provide regular training to improve their abilities and agility. Make sure to the staff to understand the SOP, their responsibilities and the technology used by the company.

To improve efficiency of logistics and transportation management in supply chain that is a great way of controlling operating costs. Firstly analyse all the expenses related to transportation and logistics and know what factors are contributing to high expenses. The most effective ways of analyse and save operating cost is to adopt software solution like an ERP system. This automated software system also help to estimate income and expenses that would be able to allocate budget more wisely.

For smoothly transport operation optimize the warehouse management. Storage and arrangement of goods affect the shipping process and it is important to ensure all items are arranged very well

7.2 Conclusion

Transportation is key element of logistics and responsible for the transfer of product one location from to another location along the supply chain management. Kazi Farms Company recognize the key role of transportation has developed appropriate transactions strategy to integrate into the supply chain management with a cost sevings to technology tracking and positioning of distribution centre. At the growing age of KFG, Top management realized without a smooth transportation system it's difficult to achieve business excellence in Bangladeshi market. Internal supply chain will be collapsed by taking the support of 3rd Party logistics or rented fleet, Hence KFG was adamant to establish its own vehicle fleet with a complete service set up. This strategy is now paying dividend to KFG as an excellent supply chain network has already formed at Bangladeshi market. How a effective in house transportation system help to acheive its organization goal Kazi Farms is one of best example ice cream & Frozen food sector by focus on efficient Fleet management and proper planning. Kazi Food able to achieve the Transportation Department as a reliable service provider in terms of quality, safety and excellent cooperation which set a exemplary precedent in the domestic market.

Chapter – 08

References

8.1 References:

1. Vaccine Cold Chain" (PDF). www.who.int. WHO. Retrieved 19 December 2020.

Lou Smyrlis (19 September 2013). "CN's Claude Mongeau preaches 'eco-system of collaboration' at Port Days" Archived 21 September 2013 at the Wayback Machine, Canadian Transportation Logistics, Retrieved 20 September 2013

2. Kohli, Pawanexh. "Fruits and Vegetables Post-Harvest Care: The Basics" (PDF). CrossTree techno-visors. Retrieved 6 April 2009.[dead link]

3. Gyesley, S. W. (1991). "Total Systems Approach to Predict Shelf Life of Packaged Foods". ASTM STP 1113-EB. {{cite journal}}: Cite journal requires |journal= (help)

4. "Cold Chain - PAHO/WHO | Pan American Health Organization".

https://www.who.int/docs/default-source/searo/india/publications/immunization-handbook-107-198-part2.pdf[bare URL]

5. The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction, In brief. Rome: FAO. 2019. p. 12.

"FRIDGE SPACE - Bibliothèque et Archives Canada".

6. Otter, Chris (2020). Diet for a large planet. USA: University of Chicago Press. p. 45. ISBN 978-0-226-69710-9.

7. "Frederick McKinley Jones". Minnesota Science and Technology Hall of Fame. Minnesota High Tech Association / Science Museum of Minnesota. Retrieved 11 February 2010.

8. Smith, Jessie Carney (2012). Black Firsts: 4,000 Ground-Breaking and Pioneering Historical Events. Visible Ink Press. p. 613. ISBN 978-1-57859-424-5. Eight Black American Inventors by Robert C. Hayden Addison-Wesley, 1972; pp. 46- 50.

9. "Air Conditioning and Refrigeration History - part 4 - Greatest Engineering Achievements of the Twentieth Century". www.greatachievements.org. Archived from the original on 3 December 2016. Retrieved 24 April 2018.

10. Kelly, Kate (15 December 2020). "Critical to Vaccines, Cold Storage Is Wall Street's Shiny New Thing". The New York Times. Retrieved 20 December 2020.

11. Pambudi, Nugroho Agung; Sarifudin, Alfan; Gandidi, Indra Mamad; Romadhon, Rahmat (2022). "Vaccine cold chain management and cold storage technology to address the challenges of vaccination programs". Energy Reports. 8: 955–972. Bibcode:2022EnRep...8..955P. doi:10.1016/j.egyr.2021.12.039. ISSN 2352-4847. S2CID 245490703.

12. "Office of Medical History". history.amedd.army.mil. Archived from the original on 16 February 2017. Retrieved 24 April 2018.

13. Fischetti, Mark (19 November 2020). "The COVID Cold Chain: How a Vaccine Will Get to You". www.scientificamerican.com. Scientific American. Archived from the original on 19 December 2020. Retrieved 20 December 2020.

14. Derek Lowe (31 August 2020). "Cold Chain (And Colder Chain) Distribution". Science Translational Medicine. Retrieved 5 September 2020.

15. Riva, Marco; Piergiovanni, Schiraldi, Luciano; Schiraldi, Alberto (January 2001). "Performances of time-temperature indicators in the study of temperature exposure of pac

16. kaged fresh foods". Packaging Technology and Science. 14 (1): 1–39. doi:10.1002/pts.521. S2CID 108566613.

17. Meyers, T (June 2007). "RFID Shelf-life Monitoring Helps Resolve Disputes". RFID Journal. Archived from the original on 30 June 2009.

18. "Cold Chain Temperature Monitoring – Absolute Automation Blog". absoluteautomation.com. 27 May 2016. Archived from the original on 24 April 2018. Retrieved 24 April 2018.