

OPTIMIZING INVENTORY MANAGEMENT AND WASTE REDUCTION IN BNS'S OPERATIONS: A CASE STUDY ON CHATIME BANGLADESH

BNS Group | Chatime Bangladesh

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Internship/Project Report Approval Form

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13/12/2025

13th December 2025

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Subject: Submission of Internship Research Paper on “An Evaluation of Inventory Management and Waste Reduction Practices at Chatime Gulshan”

Dear Madam,

I am pleased to submit my internship research paper in partial fulfillment of the requirements for the completion of my undergraduate internship program for the Fall 2025 semester.

This report is based on my internship experience at BNS Food & Beverage Ltd focusing on the operational and supply chain challenges related to inventory control, waste generation, and perishable product management at the Chatime Gulshan outlet. The study integrates both quantitative and qualitative analyses to identify key issues and propose practical recommendations for improving inventory efficiency and reducing material waste.

I sincerely hope that this report meets the academic requirements and expectations of the internship program. I would be grateful for any feedback or suggestions you may have to further improve the quality of this work.

Yours sincerely,

Rafi Alam Adith

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Bachelor of Business Administration; Concentration: Supply Chain Management

ULAB School of Business (USB)

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PART A

Chapter 1: Internship Preparation

1.1 Motivation and Expected Learning

From the start of my undergraduate life in Supply Chain Management, I was intrigued by the smooth flow of goods on a daily basis, that is, how raw materials turn into finished goods. I had to observe that process firsthand, not in a textbook or case study, but in an actual organization where every decision can make a difference to cost, quality, and customer satisfaction.

What motivated me to work in BNS Food and Beverage Ltd. which is the franchisee of Chatime Bangladesh was my willingness to be involved in the supply chain management in one of the most developed consumer industries; the food and beverage industry. Chatime is a global food and beverage company with stores across more than 30 countries so, it belongs to a hybrid supply chain - the mixture of imported goods (e.g. tapioca pearls, syrups, flavor bases, etc.) (Taiwan) and local products (e.g. dairy, packaging materials). This special arrangement enabled me to research on the relationship between sourcing globally and local operations.

I have also viewed the internship as an opportunity to learn about the sustainability and waste reduction issues of F&B operations, how incorrect forecasts, reordering practices or mismanagement can result in a waste of materials and profitability. My learning objectives were to apply the concepts that I have learned in the classroom like the EOQ models, lead time analysis, forecasting accuracy, and lean inventory management in an actual outlet setting. However, the biggest desire was to see how theory becomes practice. The combination of data, people, and processes design to make the brand such as Chatime operate smoothly on a daily basis.

1.2 Internship Search Process

I began searching for an internship during the last semester of my undergraduate studies. First, I

was researching opportunities in logistics companies and FMCG firms; however, the majority of jobs were more marketing-focused. I needed something that was directly related to operations and supply chain. To expand my search, I checked Facebook, LinkedIn, ATB Jobs, BDJobs and Shomvob and I was really checking the ULAB Career Services Facebook Page and Vacancy Groups in case of any new relevant internship opportunity.

My search revealed that BNS Food and Beverage Ltd. was on the move to increase its franchise business activities with Chatime and that it had recently opened another store in Gulshan. This immediately piqued my interest, a new outlet would imply new operations data, new systems, and an opportunity to see the supply chain structure on the ground level.

I made contacts in the professional environment, applied my resume, and made it clear that I was interested in the field of inventory management, waste analysis, and process optimization in particular. Within days, the HR team of the company contacted me to have an interview with me.

This experience helped me to understand how I can match academic capabilities to what is truly desired of organizations, i.e. not only theoretical knowledge but the skills to think critically and make a practical contribution to the current business challenge.

1.3 Interview Experience

The interview process at BNS Food and Beverage Ltd. was a fun learning experience. The initial stage with the HR department was aimed at my personal objectives, teamwork capacity, and adaptation to a rapid-paced setting. There were around 12 people with me applying for the internship. Most of the students were from North South University and BUP along with some students from other reputable universities. The interview began around 12pm and ended around 3pm. The interviewer pointed out that operations of Chatime require discipline, flexibility, and tight integration of various departments, among them are supply chain, operations and procurement.

The second step was performed by the Chief Operations Manager who went to more technical and situational questions. I was questioned on what I would do to predict high-traffic days demand. Based on my work on the course, I talked about safety stock computations, ABC inventory classification, and analysis of lead time. I also exchanged thoughts regarding waste reduction by tracking data more efficiently and POS analytics.

The discussion was an open ended discussion and everyone gave their inputs one after another. My skill to apply ideas such as Just-in-Time (JIT) and Lean Management to a real-life situation such as that of Chatime was valued by the interviewer, such as the possibility of enhancing freshness but at the expense of delivery frequency by cutting down order batch size. It was more of a group discussion than a test, and it provided me with a preliminary feeling of the critical and practical balance that the internship would require. A few days later I was called by the HR department for BNS letting me know that I have been selected for the job opportunity and would have to go through their 10 days training period about the operations of Chatime Bangladesh.

1.4 Brief Overview About the Organization – BNS Food & Beverage Ltd. and Chatime Bangladesh

BNS Food and Beverage Ltd. belongs to the BNS Group, a diversified operational mixture based in Bangladesh, with its businesses within the retail, real estate, fashion, and hospitality fields. BNS joined the F&B industry with the purchase of the rights to the franchise of Chatime in Bangladesh in 2017. It is a Taiwanese-owned company La Kaffa International Co. Ltd. They owns one of the largest chains of bubble tea shops in the world. The company offers fast paced services and holds firmly to the quality standards of the drinks they produce.

Chatime Bangladesh has spread very fast since its inception to various high-foot traffic places such as Gulshan, Banani, Dhanmondi and Uttara as a premium beverage product catering to both the locals and expatriates. In addition to Chatime, BNS owns another brand, Layered, which uses artisanal baking to have a range of beverages provided by Chatime in addition to quality desserts, with an emphasis on imported ingredients and elaborate taste combinations.

These brands have collectively revolutionized the way the contemporary cafe culture is conducted in Dhaka, with regard to quality, atmosphere and consistency. The company has established a robust back-end network of suppliers, cold chain logistics, and inventory systems all which become the cornerstones of my research interest. The BNS Food & Beverage is run under Mohammed Shafkat Bulu, one of the BNS Group directors and Managing Director of BNS Food & Beverages, and his qualified team of 20 others.



1.4.1 Mission and Vision

- **Mission:** To deliver world-class food and beverage experiences to consumers of Bangladesh through international quality assurance, operational excellence, and customer satisfaction.
- **Vision:** To be the most trusted F&B brand in Bangladesh by innovating continuously and building a sustainable supply chain that ensures freshness, quality, and ethical sourcing. Their vision is to energize the food industry in Bangladesh by bringing in new and innovative concepts from around the world. We want to ensure that the food industry leads the national growth in Bangladesh.

1.4.2 Teamwork and Organizational Values

BNS Food and Beverage is highly focused on teamwork, innovation and integrity. Each outlet is a well synchronized team with managers, baristas, and supply chain employees who depend on each

other to ensure consistency in the services provided. I found out that it was not only a value but a necessity to work in a team. Delays in deliveries or unexpectedly high order volumes caused teams to be reconfigured in a fast manner by redistributing the responsibilities and prioritizing customer requirements. The central ideology is that the cooperation of the employees will result in increased production and a happier client.

The management promoted the expression of ideas among the interns. In a few instances, I would provide recommendations regarding the reorder intervals and the waste recordings, along with other operations in ways that outlet supervisors would respond favorably. This openness culture made me build confidence in my abilities in analysis and communication. It had sufficient room to demonstrate new concepts and application of alternative operation processes to deliver efficiency.

1.4.3 Chatime Bangladesh: A Specialized Beverage Venture

Chatime Bangladesh represents a fusion of global quality and local adaptation. Every beverage is made using imported tea leaves and authentic tapioca pearls, ensuring consistency with the brand's international standards. However, maintaining this quality in Bangladesh's humid climate and dynamic demand patterns is challenging making efficient supply chain management critical.

The Gulshan outlet, where I was placed, targets premium customers and foreigners living in Dhaka. As it was a newly launched outlet, I had the rare opportunity to observe operational setup from day one from inventory layout design to vendor selection and the first wave of customer service training. Being involved from the start gave me holistic exposure to how a supply chain functions when scaled from paper to practice. I was taught their basic SOP for making drinks and maintaining quality. They trained me thoroughly of food hygiene and safety measures.

Chapter 2: About the Internship

2.1 Job Position and Responsibility

The name of my post was Supply Chain and Operations Intern, under the supervision of the Outlet Manager and the Supply Chain Department at BNS Food and Beverage. The design of the internship enabled me to be involved in several levels of operations, coordination of the suppliers to outlet level management of inventory.

I had the following responsibilities:

- Helping with daily inventory audits and resolving the differences between the physical inventory count and system data.
- Following the reorder schedules and monitoring the delivery lead times by suppliers.
- Record and analyze the amount of waste generated, particularly of perishable products such as milk, tapioca pearls, and fruit syrups.
- Monitoring storage conditions and presence of FIFO (First-In, First-Out) principles.
- Assistance of procurement records and communication between the outlet and central warehouse.
- Gathering quantitative and qualitative information on my research project which examined the effects of reorder frequency and stock accuracy to beverage waste.

Each assignment helped me have a better insight into the effect of operations and supply chain decisions on the organization - both in terms of cost and customer satisfaction.

2.2 My Takeaway from This Position

The internship was more than a business education experiment, it was a wake-up call about how theory works in dynamic and uncertain business worlds. I also understood that inventory management is a complex and realistic situation far from what we learned in class. Whereas calculations such as EOQ and safety stock give me a structure, the reality on the ground requires us to be more intuitive, collaborative, and make decisions on the spur of the moment.

I got to know that the slightest miscalculation, like placing an order too soon, reading a demand pattern wrongly, or communicating improperly with suppliers, can result in either stockout or wastage. Such little inefficiencies add up in the long run, impacting profitability.

The significance of interdepartmental communication was also another big lesson. I observed the importance of a close liaison between the procurement and outlet managers to ensure continuity in the operations. It also sharpened my data-handling and Excel skills, enhanced my skills in communication with people in non-technical teams, and allowed me to see the practical component of supply chain sustainability.

2.3 Relating Educational Learning to Internship Roles

My internship practically showed me the essence of my educational preparation in Supply Chain Management. All the notions that I had studied, such as forecasting models and minimizing waste using lean, had their application in the world of decision-making.

For instance:

- The concepts of Operations Management led me to the management of the bottlenecks in the flow of the inventory.
- The courses in Procurement and Sourcing have assisted me in appreciating the dynamics of supplier evaluation and negotiation.
- The data cleaning, calculation of waste ratio, and analysis of reorder frequency were carried out on the basis of Business Analytics.
- Economics also helped me to look at waste not only as a waste of material, but also as an inefficiency that influences the opportunity cost and supply-demand equilibrium.

Such combination of theory of classroom with field experience proved right to me that applied knowledge is the true gauge of learning.

Chapter 3: Self-Reflection

3.1 Likes and Dislikes about My Workplace

My experience in the Chatime Gulshan outlet provided me with a first-hand ground-level experience of what a high-end F&B franchise would like. The thing that I liked best was the energy of the workplace. Since the Gulshan outlet deals with a premium customer base, which includes expatriates, corporate leaders, embassy members and affluent families, the tempo was not hectic but easy to predict, making it possible to observe and learn without having to deal with the situation all the time.

The organizational culture was unexpectedly friendly. Outlet Manager, senior baristas and staff in the operations treated me as one of the team members and not an intern who performs side jobs. They involved me in meetings on the purchase of stocks, reconciliation of wastes, and dealing with customers daily. As one example, I used to go to morning briefings on a regular basis, whereby we used to discuss the day ahead in terms of expected demand due to weather, past week trends, and current promotions. I also found it interesting that the management was easily approachable on feedback. When I realized discrepancies exist between physical tapioca stock and POS records over a period of a week, I proposed to introduce a mid-shift stock check, particularly on a busy Friday. The team was fine with this idea and even provided it an opportunity to test which made me feel important and self-confident. Their research and development is done in their kitchen which is in the head office in Banani. The R&D is conducted by the GM of the company and in a couple of cases I was invited to participate in the sessions and contribute to the innovative efforts of their menu as I displayed interest in creating newer flavour combinations that complement each other. The GM himself taught me about the recipes of the drinks and the manner the various combinations work during some of our R&D sessions.

But there were aspects that I did not like either. The most significant weakness was the paperwork of the inventory management. Although it was a well known brand, a lot of critical records like the daily milk consumption, boba wastage and syrup counts were being recorded on paper or spreadsheets which were prone to errors. This caused me to repeatedly verify information across various sources which could be confusing and could be subject to inconsistency.

The other related issue that I found difficult was the tight delivery schedule. Due to the high level of imported ingredients, most of them of the La Kaffa Taiwan brand, delays were frequent. In some cases, the outlet had to use emergency transfers between other branches, which interfered with business and overstrained staff. It taught me the importance of being resilient but it also demonstrated to me the trickle-down effects of supply chain inefficiencies that come down to the frontline operations.

3.2 How I Could Do Better and How They Could Utilize Me Better

There are many areas where I believe I could have done better. Since I worked with vast quantities of raw data, waste logs, reorder intervals, and so on, I assume I could have been more proactive to develop improved visual dashboards. An outdated Power BI or Excel dashboard that indicates daily waste trends, boba swelling ratios, and reorder point variations would have given the outlet some insights. I also found out that I was not always assertive when communicating with senior management. I had some moments when I would recognize the problems such as mango smoothie forecasting errors or overproduction of boba during off periods but I had not gone to the Operations Manager. I would have been able to make decisions quicker with greater confidence.

On behalf of the organization, I feel they could have made more out of me by engaging me in back-end supply chain operations and not just the outlet operations. They could have given me more chances to work in their central warehouse where the imports received in Taiwan are handled.

They could have provided me with historic procurement documents in order to find out long-term trends but as one of the outlets that I was assigned to was brand new there was not much information to work with.

An opportunity to sit in a procurement meeting or two to see how the suppliers are being negotiated would have been an a good learning experience for me. Such experiences would have provided me with a wider perspective of the entire supply chain other than that of the outlets.

3.3 How They Can Improve the Experience for Future Interns

In my opinion, the interns in the future would enjoy a better organized onboarding program. I had to learn a lot when I first joined by shadowing staff, and that was effective, but inconsistent. A brief orientation session telling the complete supply chain flow (imports - warehouse - outlets Taiwan) would be very beneficial for newer interns. Rules on inventory and shelf-life along with food-handling practices and procedures should be a stable. The other way that would make the experience better would be to give interns a mentorship partner in the supply chain department. My experience was more outlet-oriented, which was very good to learn the frontline operations, however interns should gain experience in the corporate backend.

Finally, interns should be allowed to spend 1-2 days in different outlets and this would provide them with a more holistic view of how demand patterns change across different locations and how supply chain strategies have to change in response. This initiative was taken recently and I was one for the first few interns they hired in this session who got the chance to take part in working with the supply chain department as well as work in different outlets of the company.

Chapter 4: Personal Development Plan

4.1 Short-Term Goals (1–2 Years)

My main objective in the coming one year or two is to close the gap between academic knowledge and industry demands. My strengths to develop are:

- Data analytics (Excel automation, power BI, basic Python)
- Six sigma and Lean.
- The tools of forecasting and demand planning.

I also intend to serve in a position that would enable me to utilize supply chain optimization methods in practice in F&B, FMCG, or retail. One of the short-term goals is to help firms minimize waste and enhance inventory turnover with the help of data driven decision making. I would like to gain better leadership skills, especially in the areas of team co-ordination and communication that I have witnessed first hand during peak time periods in Chatime.

4.2 Long-Term Goals (3–5 Years)

My future career path in five years is to become a Supply Chain Analyst or Operations Manager, preferably in a contemporary F&B or FMCG company with the emphasis on efficiency and innovation. I aspire to specialize in:

- Inventory optimization
- Demand forecasting systems
- Sustainable supply chain practices.
- Cold chain logistics

Finally, I would like to work on the projects that present the technology-based solutions, e.g., AI forecasting models or automated inventory systems, to minimize operational wastes in businesses of Bangladesh. Another aspiration of mine is to become a graduate student of Supply Chain Analytics or Operations Research in the future to equip myself further with analytical skills.

4.3 Skills I Am Willing to Learn in the Future

What I have observed at Chatime influences the abilities I wish to develop. I have observed how minor inefficiencies such as the wrong calculation of ingredients expansion ratio or incorrect prediction of weekend traffic can lead to bigger operation problems. To help solve such problems, I would like to become knowledgeable in the following areas:

- High-level data analysis in Python, R and SQL.
- ERP: SAP, Oracle NetSuite.
- Bid and supplier bargaining.
- Simulation and modelling of inventory.
- Supply chain design sustainability.
- IoT sensors (digital supply chain), automated stock counters (digital supply chain).
- Conflict management and leadership.

Part B

Executive Summary

The current research paper is a study on the inventory management and waste generation practices at the Chatime Gulshan outlet which is run by the BNS Food and Beverage Ltd. with special reference to the perishable food materials including tapioca pearls, fresh milk, syrups and toppings. Being a new high-end outlet that has a high-end customer base and expatriate clientele, Chatime Gulshan is beset by operational challenges that are peculiar to it in terms of uncertainty in demand, variability of lead-time with suppliers and the perishability of some of its major raw materials. The purpose of the study will be to assess the effectiveness of the inventory reordering system used by the outlet, find out the causes of inventory misalignment and waste, and recommend data-driven changes that will enhance the performance of the operations.

It was a mixed-method research design. A 60-day physical stock, POS inventory, waste logs and procurements were used in collecting quantitative data. The qualitative data were collected by conducting surveys of staff and semi-structured interviews with managers and operational employees and making observations related to the process of stock handling, preparation habits, and FIFO/FEFO systems. Descriptive statistics, mismatch analysis, correlation analysis and a perishable-aware Economic order quantity (EDOQ) model with outlet-level demand and spoilage risk was used in analyzing inventory performance.

The results indicate that differences between the system-recorded stock level and the physical stock level are constant with an average of 16.25 percent variation in major SKUs. These discrepancies were discovered to be contributive to emergency orders, ineffective reorder frequency, and even stockouts. The waste analysis revealed that every month about 34.85 kg of inventory is wasted, while tapioca pearls.

Chapter 1: Introduction

1.1 Background of The Study

One of the most important aspects of supply chain management in the food and beverage (F&B) sector is inventory management. Specifically, companies that sell perishable goods encounter a distinct range of problems: excessive inventory can result in spoilage, whereas a shortage in supplies may make a company run out of essential ingredients and cause client dissatisfaction. In the case of the beverage brands such as Chatime, this issue is particularly significant. Chatime stores are based on imported and locally sourced products, such as flavored syrups and tapioca pearls can be imported, but ingredient such as milk, sugar or toppings are usually produced locally. This generates a hybrid supply chain where there is an increase in the variability of lead-time, risk of transportation, and decay of inventory. Recent quantitative research on perishable food supply chains indicates that incorporating product decay into EOQ-like inventory models is crucial for balancing holding, ordering, and waste costs (Patriarca et al,2020)(Muriana,2020)(Lipnik & Čepar, 2025).

In addition, food and beverage companies need to control their inventory to a high degree of shelf-life and freshness. The perishable supply chain literature has indicated that in order to design the most appropriate inventory policies we should also factor in the ordering and holding costs in addition to the deterioration costs -the value lost when items become obsolete.

In the most extreme situations, the poor inventory decisions can lead not only to financial loss but also to reputational loss. Recent research on the EOQ and lot-sizing models for deteriorating items enhances the traditional methods for fast-moving food products (Muriana,2020)(Singh & Ambedkar,2023).

The perishable inventory models are also well researched in the domain of academics. Steven Nahmias has long proposed an inventory theory that explicitly considers the decay of products as a major contributor to this field. Beyond that, researchers have put forward modified models (e.g. perishable-EOQ) incorporating the spoilage rates and the stochastic lead times to more effectively model the F&B operations. As a matter of fact, these theoretical problems are converted into highly concrete operational problems. F&B companies are prone to challenges of:

- Unstable demand - consumer trends shift, particularly on the fashionable and seasonal products and hence hard to predict.
- Storage factors- to keep perishables in optimal conditions, it is necessary to keep storage in the fridge and to be able to organize the rotation cycle. FIFO
- Variable lead-time - in case of imported goods, variation in the supply may compel the outlets to carry the buffer stock in inventory although excessive dependence on the buffer will lead to an overabundance that may cause wastage.
- Waste and cost - the expense of spoilage is not only financial, but also environmental, and the contemporary F&B operations are being put under the strain of becoming more sustainable.(Tayana Solutions)

Research conducted in developing and emerging markets shows that deficiencies in infrastructure, inadequate cold chains, and environments lacking reliable data considerably worsen shrinkage and food loss at the retail stage (Richards & Hamilton,2022)(Olabode et al,2025). Such hardships are exaggerated in the Bangladesh situation. Local retail chains studies of perishable food distribution depict that the quality of stock, the control over shrinkage as well as the coordination of the supply are key bottlenecks. (Scribd)

It is against this background that the Gulshan branch of Chatime Bangladesh serves as an interesting microcosm of these greater challenges. Being a high-end bubble-tea shop it needs regular access to perishable goods such as milk, fruit syrups and tapioca pearls but must also minimize wastage to remain competitive and viable. The frequency of reordering and the accuracy of inventory information determine this balance. Comparable case studies at the outlet level involving bakeries, beverage distributors, and grocery chains have employed inventory modeling to formulate waste reduction strategies while upholding service standards (Winkler et al,2023).

Thus, in my research, the practical and theoretical issues are intertwined: not only do I wish to find out how ordering decisions at Chatime Gulshan are contributing to the wastage of ingredients, but also to develop a data-driven inventory policy, which complies with the perishable inventory theory.

The results may assist Chatime to lower the cost, enhance freshness, and emulate best practices that could be applicable in the other stores.

1.2 Objective of the Study

Previous research indicates that the frequency of reordering, the selection of safety stock, and the targets for service levels collectively influence spoilage rates in retail environments dealing with perishable goods (Lipnik & Čepar, 2025)(Singh & Ambedkar,2023). The main goal of this research was to directly investigate how the reorder rate of the Chatime Gulshan affects the wastage of ingredients and particularly of perishable goods such as tapioca pearls, milk, and syrups. With order analysis (reorder intervals, order sizes, and related spoilage), I would like to learn whether ordering more frequently has any benefit or rather a different pattern would be more effective. Meanwhile, I will measure the difference between the inventory maintained in records and the physical stock and count daily within a 60-day period to determine the mismatch rates of important SKUs and how these inaccuracies lead to spoilage. Recent advancements in the EOQ model for perishable or deteriorating products, which take into account inflation and demand that correlates with inventory levels, demonstrate that even fundamental models can result in considerable decreases in waste and expenses in real-world applications (Zhang et al,2022).

I will construct and test an inventory optimization model (an adapted EOQ) that specifically considers the effects of item deterioration and variation in the lead-time. I will be able to use this model to simulate reorder choices and experiment with various strategies to strike a balance between unproductive waste and resilience to the unpredictability of supply. Based on my data and my model understanding, I will subsequently implement recommendations on what can be done to improve the situation by no less than 10 percent. For example, hybrid ordering policies, mid-shift inventory audits, better forecasting, and digitized tracking, etc., without causing a rise in the number of stockouts.

1.3 Problem Statement/Research Questions

1. How do reorder frequency and inventory accuracy influence perishable ingredient waste at Chatime's Gulshan outlet?
2. To what extent does inventory inaccuracy (system vs. physical stock) contribute to spoilage, and how can an efficient reorder policy reduce this waste while maintaining product availability?

Chapter 2:

Literature review

Inventory management in food and beverage (F&B) industry has become a necessity since the products are very perishable and change rapidly. It has been found that proper stock counts and systematic re-ordering systems are required to prevent wastage, shortages and emergency orders . In the past, traditional inventory planning typically makes use of Economic order Quantity (EOQ) model which determines the most cost efficient level of the order size by balancing between ordering and holding costs. The recent studies in the field of perishable inventory management emphasize the increasing importance of the systems that must take into consideration the effects of spoilage, shelf-life limitations, and uncertainty in the supply. Recent research indicates that when the standard formulae of inventory are used including the traditional EOQ formula, they tend not to work with perishable products whose shelf life is shorter (Inventory Management of Perishable Products, 2022). Since Chatime deals with such ingredients as tapioca pearls, milk and toppings, which quickly spoil, the findings are applicable immediately.

Cold chain research also reveals that perishable ingredients react differently at different temperatures, handling and delays during transportation. In their 2024 model on temperature-sensitive items, the researchers concluded that the rate of deterioration rises dramatically when the conditions of the storing environment change, implying that the outlets need to adjust the quantity of their orders to the risk of spoilage instead of demand. This goes to justify why Chatime needs to streamline its reorder points and cannot be able to base its ordering on weekly experience. Interferences in supply are also significant factors that should be considered in the management of perishable inventories. It has been found that transport delays and unreliable performances of suppliers can cause outlets to ration, place emergency orders, and lower the final product freshness (Li et al., 2022). This is in agreement with the survey findings conducted by Chatime Gulshan, where employees noted that it is very hard to keep fresh inventory due to the delays by suppliers.

Inventory control in conjunction with waste-minimizing strategies is suggested in more recent work. In one study that combines pricing, inventory levels, and product age to minimize overall waste, policies that are data-driven are more effective than those that rely on intuition to make an order,

particularly when the product has a short shelf life (Dynamic Inventory Control, 2025). The pearls and milk sold by Chatime spoil easily; thus, the structured reorder rules would allow eliminating the unwarranted waste.

Lastly, new EOQ studies in uncertain supply chains conclude that new EOQ models such as spoilage, non-deterministic demand and uncertainty of lead-time present a better cost reduction than the conventional inventory management. These expandable models enable the outlets to align the order quantities with the realities of operation to reduce stockouts and waste (Alnahhal et al., 2024). In the case of Chatime, this justifies the use of a perishable-conscious EOQ or dynamic reorder system instead of using a manual judgment. The fluctuation in supplier lead-time only makes inventory decisions more complicated. Unpredictable deliveries may destabilize the production and requirements will have to make an emergency order, thus it is advisable to keep the right amount of safety stock to deal with the uncertainty.

All in all, the literature concentrates on the significance of precise record keeping, organized order systems, effective rotation of goods, and effective communication. All these ideas are relevant to the purpose of this study that will help to enhance inventory management and minimize wastages at Chatime Gulshan.

Chapter 3: Methodology

3.1 Type of Research

The research is based on a mixed-method approach and uses both quantitative and qualitative methods of research. The quantitative part works with quantitative data based on the inventory records, wastage records, orders and daily sales at Chatime Gulshan within 60 days. In the meantime, the qualitative part of it is based on the data collected through interviews with the staff, observation, and structured questionnaires provided to the employees of the outlets that work with inventory handling and the preparation of the beverages and pastry good from Layered.

The study is descriptive in nature because it plans to explain the current inventory practices, waste trends, and operational challenges without controlling any variables.

3.2 Research Design

Modern studies in food retail are increasingly considering inventory accuracy as a central factor that connects ordering strategies to waste levels and profit results (Olabode et al,2025). The research design examines three key components which helps to better understand perishable inventory management,

Independent Variable: Reorder Frequency

- Number of orders placed per month
- Average order quantity
- Lead-time duration and variability

Mediating Variable: Inventory Accuracy

- Physical stock vs. system-recorded stock

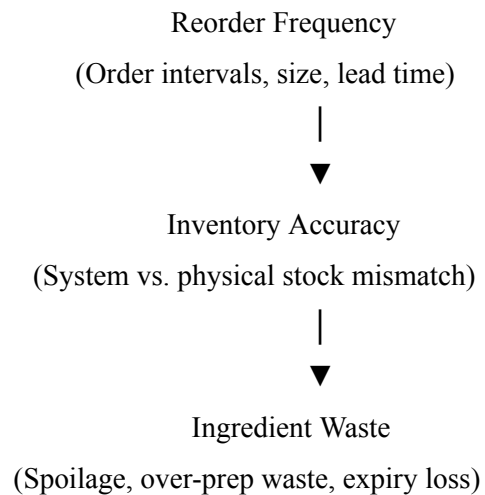
- Daily mismatch percentage
- Frequency of stock discrepancies per SKU
- Causes of mismatch (operational practices, data-entry, rush-hour pressure)

Dependent Variable: Ingredient Waste

- Daily waste logs
- Percentage of spoilage relative to stock on hand
- Cost of waste (BDT per month)
- SKU-specific deterioration

3.3 Research Model

The model investigates how reorder frequency and stock accuracy interact to influence waste levels at the Chatime Gulshan outlet



3.4 Data Collection and Analysis

In this research, both primary and secondary data were used to assess the effect of reorder frequency and inventory accuracy on ingredient wastage at Chatime Gulshan. Primary data were collected in the 60 days with the help of daily physical inventory counts, waste and production records, POS inventory records, staff surveys, semi-structured interviews, and physical observations of the preparation practices and FIFO/FEFO practices. The secondary information was acquired through the internal procurement reports of BNS Food & Beverage Ltd., records of suppliers deliveries and import reports as well as SOPs of stock handling. Mixed-method approaches that combine operational data with staff interviews are recommended for studying food waste in retail and food-service settings (Lipnik & Čepar, 2025).

A purposive sampling method was employed to target individuals and SKUs that are directly involved in inventory decision-making. The ultimate sample consisted of 60 days of quantitative data, 4 main perishable SKUs, 4 managerial/ operational key informants and 10-15 staff survey respondents. Comparable analytical procedures, such as correlation analysis, EOQ-style modeling, and cost-of-waste assessment, are utilized in recent case studies involving breweries, bakeries, and supermarkets (Lipnik & Čepar, 2025)(Winkler et al,2023).

Quantitative analysis was used to include the descriptive statistics, calculation of mismatch, correlation analysis between the reorder interval and waste, trend analysis of the daily pattern of waste, modelling of the perishable EOQ to ascertain the best ordering quantities, and cost estimation of monthly spoilage. The qualitative analysis involved thematic modelling of interviews, operational bottlenecks and behavioural analysis that includes over-prepping and uneven stock turnover. Both methods had cross-validated findings to make them reliable. All the data was gathered in an ethical manner including participant consent and confidentiality.

3.5 Expected Outcomes

Innovative frameworks for preventing food waste highlight that enhancing inventory management and increasing awareness of stock levels are some of the most effective strategies retailers can implement to reduce waste (Olabode et al,2025). The research is supposed to show the effect of reorder frequency and inventory accuracy on perishable ingredient waste. The research may probably indicate that inconsistent or unplanned reorders can be measured as contributing towards overstocking, emergency buying and unnecessary spoiling. The research will also aim at measuring the extent of discrepancy between the physical and system-recorded inventory of major SKUs, showing how these inaccuracies corrupt the forecasting and ordering processes. The research ought to detect the operational behaviors through interviews, surveys and observations, which are some of the factors that create waste in everyday life, like over-preparation, delayed stock logging and inconsistent FIFO/FEFO practices. Moreover, the analysis of a perishable-adapted EOQ model should provide an optimized reorder quantity and reorder point that will be specific to the operations of the outlet level and provide a more systematic approach to making inventory decisions. In the end, the study will provide a set of practical, data-driven recommendations that can help reduce ingredient waste by approximately 15-25 percent, increase the dependability of the stock, stabilize the ordering cycles, and optimize the overall operational efficiency and contribute to more sustainable supply chain practices at Chatime Bangladesh.

Chapter 4: Findings and Discussion

4.1 Mismatch Analysis

Recent research regarding inventory in supermarkets and beverage stock indicates that even slight inaccuracies in stock records can hide significant operational losses and distort forecasting systems (Richards & Hamilton, 2022). To find the amount of wastage happening in Chatime, a mismatch analysis was done to find the difference between the actual stock that the outlet holds in its inventory and the amount of stock that is recorded in their POS system. The main perishable items that Chatime uses are Tapioca pearls, Flavouring syrups, UHT milk and toppings. Out of the items here 3 of them are imported directly from Taiwan and one is purchased locally. These are the most procured and wasted items that Chatime uses. The data collected from the observation was used to find the mean of the physical and virtual stock of each item.

The formula used:

$$\text{Mismatch\%} = \{(\text{Physical Stock} - \text{System Stock}) / \text{Physical stock}\} \times 100$$

The results from the observation:

Item	Mean of Physical (kg)	Mean of System (kg)	Mean of Mismatch (%)
Tapioca Pearl	7.0	8.0	14.3%
UHT Milk	6.2	8.0	29.0%
Syrup	3.7	4.0	8.11%
Toppings	2.2	2.0	13.6%

Item	Mean of Physical (kg)	Mean of System (kg)	Mean of Mismatch (%)
		Total Variance	16.25%

The physical stock and the system stock show a variance of 16.25% which is a noticeable difference. This affects the company's ability to keep an accurate record of their inventory. The pearls and toppings are prepared before serving and have a short shelf life before they need to be discarded so a difference this huge causes significant problems. UHT milk showed the highest mismatch percentage (29.0%) as it is an item that is purchased locally on a regular basis so its inventory was not logged consistently. Another reason for milk to have such high mismatch is employee awareness while working.

4.2 Waste and Cost Analysis

Evidence from food and beverage companies suggests that converting physical waste into financial losses is essential for encouraging management to take action on process enhancements (Lipnik & Čepar, 2025). The waste and cost analysis was done to show the average amount of resources the outlet is losing and how much money is it costing them. The company records their wastage records

Items	Mean of Daily Waste (kg)	Monthly Waste (kg)	Unit Cost (BDT/kg)	Monthly Waste Cost (kg)
Tapioca Pearl	0.34 kg per day	10.2 kg	2200	22,440
UHT Milk	0.61 L per day	18.3 kg	120	2196
Syrup	0.14 L per day	4.2 kg	1500	6300
Toppings	0.07 kg per day	2.1 kg	750	1575
Total		34.8 kg		32511

in logbooks, which is an inefficient way to track wastage. The logbook could not provide accurate information as there were several days of incomplete data. This is a major reason why wastage is occurring in such huge quantities, as there is no proper tracking or monitoring of wastage. The Gulshan outlet has a total monthly wastage of 34.8 kg of ingredients. This is costing the company approximately 32511 BDT per month. Tapioca pearls, syrups and toppings all have a high unit cost as they are all imported from Taiwan. The highest amount of wastage occurs in UHT as its purchasing information is not properly noted down. Lack of skills from employees also play a big part in the wastage of the core resources.

4.3 Correlation Between Reorder Interval and Waste

Correlation focused analyses of ordering patterns and waste have been utilized in various outlet level research studies to validate the need for revising reorder rules and safety stock levels (Winkler et al,2023).

A Pearson correlation test stated that:

$$r = 0.38$$

The Pearson's correlation coefficient $r=0.38$ shows a moderate, positive association. As the length of the reorder intervals increases, the amount of waste also increases. When the system stock mismatch happens, the employees tend to cook bigger batches to save time but with a small shelf life it expires faster. As the reorder happens depending on the data from the system stock, waste is increased due to longer reorder intervals.

4.4 EOQ and Optimal Reorder Point

To find an optimal order size that would help decreasing waste, EOQ was used. Recent EOQ models for items with a limited lifespan indicate that directly accounting for shelf life, uncertainties in lead time, and preservation measures can significantly enhance reorder point decisions for perishable stock keeping units (SKUs) (Singh & Ambedkar,2023)(Zhang et al,2022). The finding showed that there was an approximate demand of around 5kgs of tapioca pearls per day as it was one of the core components of the products sold in Chatime. The holding and inventory storage costs shows 3.4 BDT for each kilogram.

The calculation showed that the EOQ for the Gulshan outlet is 29.7kg per order. This shows the optimal order size that the business should choose to reduce losses but as there isn't much storage

space and that time would slowly deteriorate the freshness and quality of the ingredients the company needs to consider all the tradeoffs before deciding. In order for the company to order 30kg each time for the outlet they would need to follow a cycle time of 6 days. I have used the formula $R = D \cdot L + Z \cdot \sigma L \cdot \sqrt{D}$ to find the reorder point which will help to understand at what point should the company choose to stock resources. This would help to mitigate problems such as stockouts and wastage by overstocking. The lead time demand showed to be 10kg and calculating the safety stock showed approximately 1.84 kg. Reorder point calculation resulted in 11.84 kg meaning it can be rounded off to 12 kg. The calculation shows that the company should reorder tapioca pearls when the current stock falls to 12 kg to prevent running out while waiting for the next shipment

4.5 Qualitative findings

To support the data findings from the quantitative research that was done, a survey was done to support the findings. The responses in the survey indicate that there are a number of issues regarding the management of inventory, generation of waste and operational issues at Chatime Gulshan. The majority of employees, including the baristas, and managers also reported that they personally correct the stock in the POS and that the system is normally mismatched with the physical stock. They say that the real reason is that it is difficult to update the inventory during rush hours, when the service demand is more important than logging. This is the reason why mismatches still occur even when staff members feel that they are doing it properly. The quantitative results of the current study are also supported by the fact that employees also confirm that the consequences of incorrect logging are often a lack of stocks and emergencies.

Concerning stock-handling methods, the majority of the personnel assert to be adhering to FIFO/FEFO, yet many do not know whether their colleagues are always doing so. The training of FIFO/FEFO is not balanced, with some staff feeling confident about the training and others remain neutral, which shows that there is not a consistency in the way FIFO/FEFO training is offered or applied. Notably, it is agreeable with almost all that improper rotation is a major contributor to

wastes, which is consistent with the study finding that milk and pearls go spoiled very easily unless they are handled with care.

The survey also gives an understanding of wastage causes. Employees are conflicted about whether over-preparation is the leading source or it is the expiry, but they unanimously agree that the stricter monitoring might decrease the wastes produced on a daily basis. The supplier delays are also reported by many, who claim that inconsistent delivery time negatively affects the stock freshness and compels the outlet to emergency order. The vast majority of the staff endorses an organized, fixed reorder routine, as opposed to experience-driven decision-making, which indicates the willingness to have a more data-oriented system.

Also, its operational issues were brought to the spotlight. The employees are divided on whether there is sufficient storage room or whether the orders they do are in line with the actual demand. Nevertheless, it is widely agreed that extra training on inventory control and implementation of mid-shift stock checks would greatly improve the accuracy of stock. Lastly, employees generally admit that the level of inventory inaccuracies and the present level of waste is not as low as it can be, and that they feel that better communication between employees and the management would answer the issue.

Chapter 5: Recommendations

The results of the data analysis and staff survey indicate that Chatime Gulshan can enhance its inventory control through certain practical modifications. To begin with, the outlet must shift to a more organised and data-driven ordering process as opposed to mostly using experience or guesswork. Basic instruments such as fixed reorder points and periodic mid-shift stock counts would assist in avoiding the incidences of a stock mismatch that are being used to initiate shortages and emergency orders. Employees also stated that it is hard to update stock when the stock is busy thus a quicker and simpler system of logging would make the stock records more precise.

Another significant area is the waste reduction. There is a lot of waste on the case of too much preparation of the pearls or the expiry of other ingredients such as milk. Replacing larger cook batches with the actual demand patterns and improving the labeling of FIFO/FEFO would aid in maintaining the products fresh and minimize the unwarranted wastage. Although the majority of the staff attempt to operate by the FIFO system, the survey reveals that this is not always the same within the shifts, therefore, short-term refreshing training can help streamline the process to all staff members.

The outlet would also need to collaborate with the suppliers and the procurement team to manage the delays in deliveries. The outlet would be less susceptible to missing deliveries and sudden demand spurts, holding small yet well-calculated safety stock of pearls and milk, would be a good idea.

Finally, it is evident in the survey that improved communication and cooperation between management and staff would help enhance the general efficiency. Even basic changes such as a

weekly check-in, better allocation of tasks, and faster communication of any problems with stocks can make the inventory control more predictable. The combination of these changes can minimize waste, enhance accuracy, and simplify day-to-day activities of the whole team.

Chapter 6: Conclusion

This paper aimed at exploring the connection between reorder nature, inventory accuracy and waste production at Chatime Gulshan, which is a retailer of beverages, and highly relies on perishable goods. Based on 60 days of operational data, the calculation of EOQ and reorder point, along with a survey of employees of various positions, the study has identified multiple interrelated issues that are mostly evoked by inconsistency in the stock logs, experience-based ordering, and inconsistency in supplier lead time. The mathematical modeling revealed that an inappropriate ordering frequency and a lack of safety inventory have a major effect on waste rates whereas the survey data indicated that the actual challenges included updating stock when there is a rush, non-adherence to FIFO/FEFO, and lack of inventory training.

The findings all suggest that the problem of waste and stock mismatch is not brought about by only one factor but rather a combination of behavioral, procedural and logistical factors. The most sensitive items turned out to be pearls and milk, and both the process of preparation and expiry all resulted in waste. Employees admitted that by increasing control, training similarity and communication, the control of operations will increase. The EOQ and the reorder point models have shown what the structured ordering can potentially bring to the table, however, the models need to be adjusted to the real-world limitations such as the limited storage capacities and the short shelf-life.

Altogether, the study finds that effective measures to enhance inventory accuracy are the transition to a data-driven decision-making process, more frequent stock checks, and more operational guidelines. Structured reorder policies and the adoption of simplified stock-tracking approaches, enforcement of FIFO/FEFO by labeling and training as well as building a superior coordination with suppliers will reduce waste, lower costs, and enhance overall supply chain performance. Focusing on mathematical and human considerations, Chatime Gulshan will be able to construct a more productive, predictable and resolute inventory management system.

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Survey Questionnaires

Survey on Inventory Management and Waste Reduction

Optimizing Inventory Management and Waste Reduction in BNS Groups

1. What is your position at Chatime?

A. Manager

B. Team Member

C. Barrista

D. Supply Chain Management

2. How long have you worked at Chatime Bangladesh?

A. Less than 3 months

B. 3-6 months

C. 6-12 months

D. MORE than a year

3. I update stock usage in the system/POS properly during my shift.

A. Strongly Agree

B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

4.	The POS/system stock levels usually match the physical stock at the outlet.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

5.	It is difficult to update stock during rush hours.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

6.	Inaccurate stock logging contributes to stock shortages.
----	--

A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

7.	I find the current stock-counting procedures easy to follow.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

8.	I always follow FIFO/FEFO when handling ingredients.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

9.	Other staff also follow FIFO/FEFO consistently.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

10.	Other staff also follow FIFO/FEFO consistently.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

11.	Improper FIFO/FEFO practices increase the amount of waste.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree

E.	Strongly Disagree
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Waste Generation and Stock Availability

12.	Tapioca pearls are often over-prepared during peak hours.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

13.	Over-preparation is a major cause of waste at the outlet.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree
14.	Over-preparation is a major cause of waste at the outlet.
A.	Strongly Agree

B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

15. Daily waste could be reduced through stricter monitoring.	
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

16. Supplier delays affect our ability to maintain fresh stock.	
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

17. Inventory mismatch contributes to emergency orders.	
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A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

18. Having a more structured reorder schedule would reduce stockouts and waste.	
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

Operational Efficiency

19. The outlet has sufficient storage space for current order quantities.	
A.	Strongly Agree
B.	Agree
C.	Neutral

D.	Disagree
E.	Strongly Disagree

20.	The current order sizes are appropriate for daily demand.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

21.	More training on inventory management would improve efficiency.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

22.	Introducing mid-shift stock checks would improve accuracy.
A.	Strongly Agree
B.	Agree

C.	Neutral
D.	Disagree
E.	Strongly Disagree

23.	Inventory inaccuracy is a significant problem at the outlet.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

24.	Waste levels are higher than they should be.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

25.	A fixed ordering policy would be more effective than experience-based ordering.
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A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

26.	Better communication between staff and management would improve inventory control.
A.	Strongly Agree
B.	Agree
C.	Neutral
D.	Disagree
E.	Strongly Disagree

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OPTIMIZING INVENTORY MANAGEMENT AND WASTE REDUCTION IN BUS OPERATIONS: A CASE STUDY ON CUSTOME BUSNG ARISE

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