Buying and Merchandising Operations Research

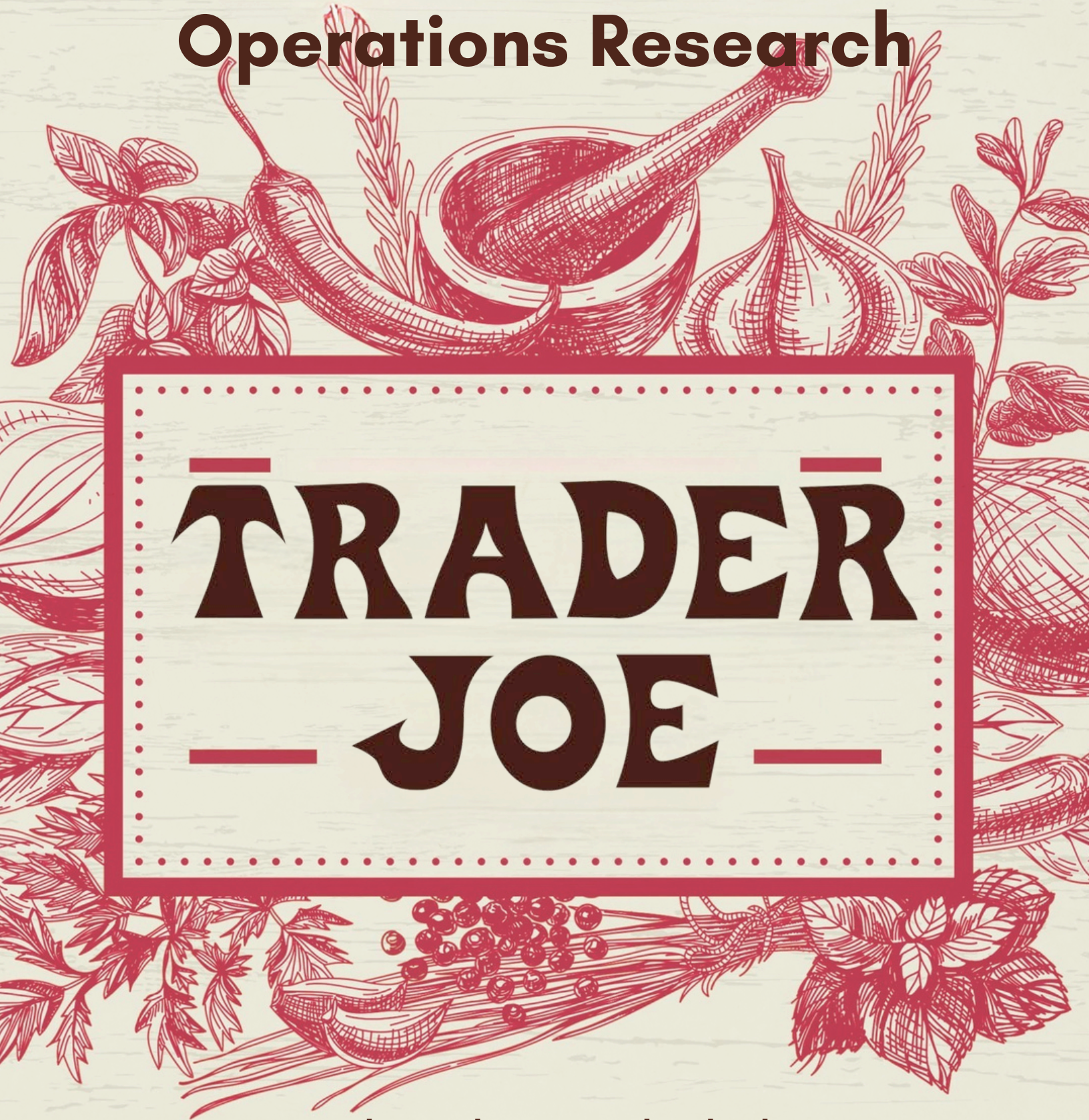

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Table of Contents

I. Executive Summary

Introduction

T**rader Joe's** is a grocery retailer known for it's l**ow prices**, **unique products**, and **customer service**. They have **500+ stores** in the US and in 2023 had **$16.5 billion in revenue**. Additionally, Trader Joe's is rapidly increasing in customers with a **8.7% year-over-year** increase in **foot traffic**. This study focuses on the **Kirkland, Washington** location which has the **second highest volume of sales** in the state. The high sales provides unique challenges in the already small grocery retailer, which averages 10k sq compared to most at 60k sq.

Problem

Compared to their peers within grocery retailers, Trader Joe's has opted to use a **human-based operationa**l method. And are worried that the integration of technology and AI will take away from the customer service they are known for or drive up costs. However, the volume of sales from the Kirkland Trader Joe's means a bit of over/under ordering hurts the location's sales dramatically. The minimal use of technology means that they rely on **employee's experience and memory,** leading to a **huge lose in potential revenue**.

Research Methods

Our research methods combined both quantitative and qualitative data that all built upon each other to give a complete picture of the locations operations. And the secondary sources gave more insights into the store and solutions that stuck with the brand by keeping the great customer service and kept prices low.

PRIMARY RESEARCH			SECONDARY RESEARCH
Method	**Description**	**Date**	**Method**
Observational Study	Audited the store in-person.	Nov. 25, 2024	Preliminary Online Research
Interviews	Interviewed 4 employees and 2 managers.	Dec. 17-18, 2024	Competitor Case Study
Ex Post Facto Study	Data on the store provided by Store Manager	Dec. 18, 2024	Solutions Research

Findings

The following is a summary of the themes and topics brought up by the various methods used in the research study in the form of a **SWOT Analysis**.

STRENGHTS:

- Good Customer leads to a high customer loyalty
- Experienced employees with strong product knowledge
- Popular product selection

WEAKNESSES:

- Heavy reliance on employee knowledge
- Outdated ordering systems
- Ineffecient storage of product
- Ineffective displays
- Limited data collection

OPPORTUNITIES:

- AI integration into operations
- Increased data collection
- Optimized displays
- Streamlined ordering and stocking processes

THREATS:

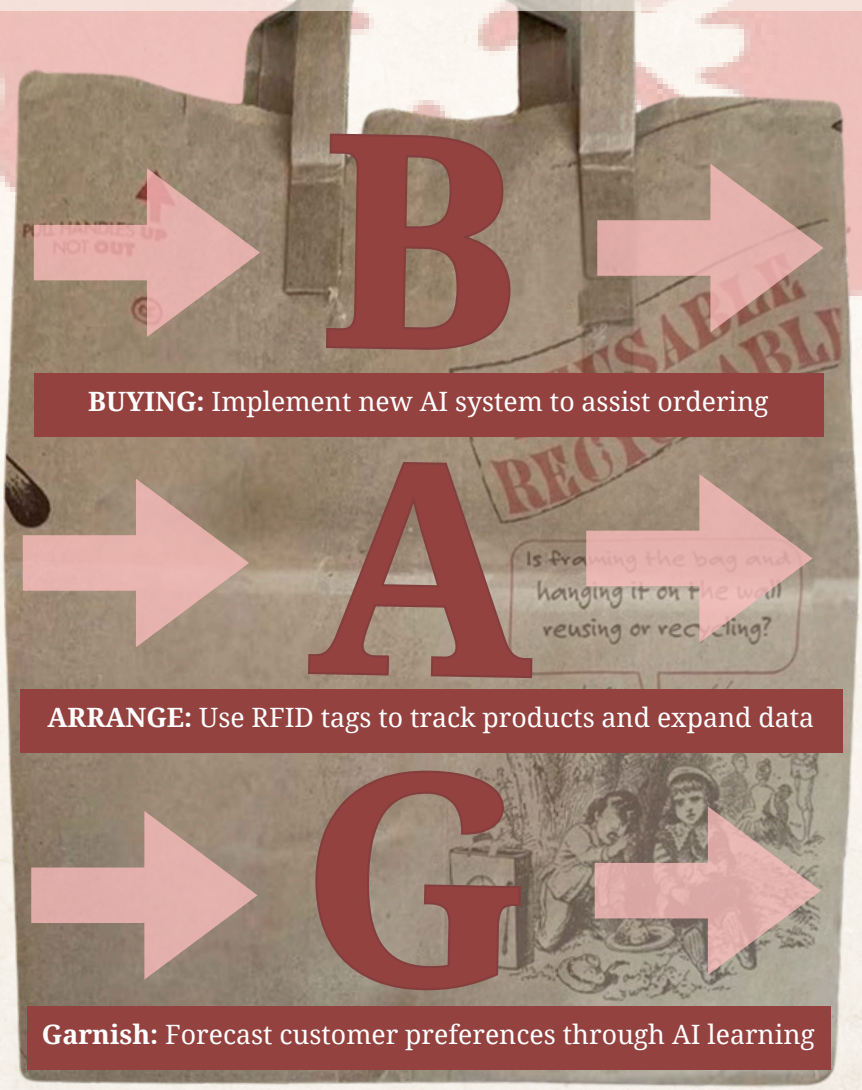
- Dependence on key employees
- Competitor AI use
- Limited storage/shelf space

Proposed Strategic Plan: operation B.A.G

Operation B.A.G. aims to keep to Trader Joe's mission statement, while implementing AI to enhance store operations. Freeing up employees through efficient use of AI in stocking and ordering and predicting customer preferences for displays will allow for more satisfied customers at a lower cost and make the location future-proof.

Conclusion

Results



Outdated AI programs

Increase employee efficiency

Lack of data points

Maximize store space

Inaccurate assumptions

Increased new item sales

Implementation

Operation B.A.G. will be implemented over the course of 3 months during the slower months of May-July. This includes training the AI model (LEAFIO AI) on the data from the store's past sales. The model takes data on items purchased together, shelf size, volume purchased, and product size to give shelf layout, different displays, inventory, and buying recommendations. To get information on how long it takes an item to be purchased and frequency of stocking RFID scanners will be installed.

Timeline:

Measuring dimensions of the shelves for the new AI system (May 2, 2025)

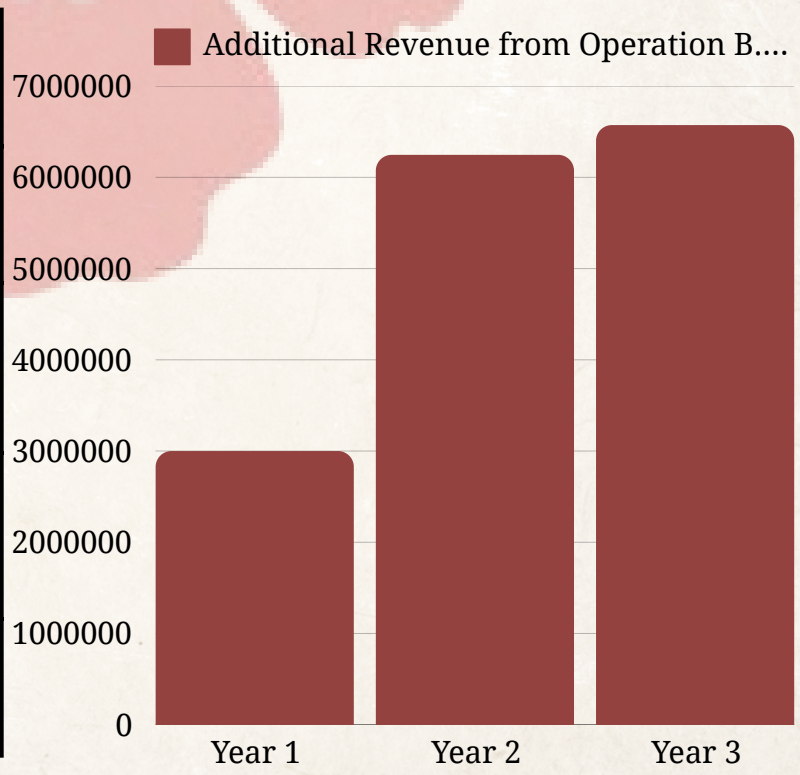
Initial store manger and employee training for the new system (May 7-28, 2025)

Installation of various equipment and computerized system (May 5-7, 2025)

New system is fully implemented within this week (May 27-June 3, 2025)

Budget

Totals and ROI for Operation B.A.G.	
Current Yearly Revenue	$76,024,000
Costs of Operation B.A.G.	$414,500
Profit from Operation B.A.G.	$3,573,128
ROI	**762%**



II. INTRODUCTION

A. Description of the Business or Organization

"We are committed to providing our customers outstanding value in the form of the best quality products at everyday prices."
- Trader Joe's Mission Statement

Headquartered in Monrovia, California, Trader Joe's is an American grocery store chain with 597 locations across the nation. Beginning as a grocery store in 1967, it serves cheap commodities, with Trader Joe experiencing an 8.7% year-over-year increase in foot traffic, surpassing the grocery sector's average growth of 3.0% (Store Brands). In 2023, they achieved an estimated revenue of $16.5 billion, continuing its good market trajectory and topping the American Customer Satisfaction index with a score of 84, outperforming peers such as Costco and Publix (progressive grocer).

This investigation will focus on the chain store located in Washington state, specifically the one in Totem Lake Village, Kirkland. The research was conducted and analyzed using qualitative data collected through interviews with the managers and employees from the Totem Lake chain store. Totem Lake store is located in a major metropolitan area and has the second highest sales in the state following one located in Bellingham according to the owner of this Trader Joe's, Timothee Weiss. As once the manager of the Shoreline Trader Joe's and current manager of the Totem Lake Trader Joe's, Weiss has taken on more than 3 stores in Washington over 20 years, overseeing the operations including team management, customer experience, inventory control, store presentation, sales and budgeting, and safety compliance.

B. Description of the Target Market

	Primary Market: Employees	Secondary Market: Customers
Demographics	Ages 22-32 and ages 40-60 together make up 66% of employees. The employees generally have low to middle income, earning $50k, 20k higher than national due to the location, as an average salary, or 24 dollars/hour.	Small families aged between 25-44, married, college-educated, with a middle or upper level income ($125k in Kirkland) is Trader Joe's primary customer target market.
Psycographics	This area of Kirkland is rich in terms of socioeconomic status. Employees can afford to have a lifestyle directed towards healthy fulfillment. Given the expensive cost of living, employees at this location of Trader Joe's work part-time alongside further education or a secondary job. However, the average employee at this location has worked there for 5 years and have extensive knowledge on products and operations.	Customers show an interest in healthy and organic food, which Trader Joe's provides on a daily basis. Additionally, Trader Joe's grocery stores have shown a particular appeal towards single individuals and small families (1-3 people), "between January and August 2024, 26.5% of residents in Trader Joe's captured market lived in one-person households - compared to a statewide average of 22.9%." (Carmel)

C. Overview of the business or organization's current artificial intelligence strategies and usage

"That small, more intimate setting really does set us apart from everyone else selling food."
- Tara Miller (VP of Marketing at Trader Joe's)

Using Microsoft's Azure OpenAI service, the company began using it to improve "customer experiences, streamline operations, and foster innovation" (Doering). However, overall Trader Joe's uses minimal technology in all their operations. This is part of the company's mission to of 'WOW customer service', which they believe is created by the employees. As the captain (store manager) Tim Weisman tells his employees, "you, the crew (employees) are the brand". There is a widespread belief within Trader Joe's that investing in AI is unnecessary as they would rather invest money on having a bigger team of employees (~200 at the Kirkland location).

III. Research Methods

A. Description and rationale of research methodologies selected to conduct the research study

Our primary research methodology used to conduct the research within this paper was a mixed methods research—an approach that combines both qualitative and quantitative data as our goal was to be able to include actual company numbers from our chosen store as well as surveying workers to have individual input when coming up with our solution.

PRIMARY RESEARCH		
Method	**Description**	**Rational**
1. **Observational Study**	Audited the store by shadowing a variety of employees for one day (10am to 9pm).	To have a better general understanding of the location.
2. Interviews	Interviewed 4 employees and 2 managers through a semi-structured interview. Questions based on the audit were formed on AI usage and its potential application as well as the storage/stock issue within the store. (listed in appendix)	After the audit this method was used in order to get insight into the employees though process. This was also used to fill gaps of past history, closing and opening experience which could be covered by the audit due to the timing.
3. Ex Post Facto Study	Provided directly by the store manager of the Kirkland location. The data included were the employee schedules, incoming shipments, average wages, and present store stock.	We wanted to get more objective, number-based data. The data was also used to inform finances.
SECONDARY RESEARCH		
1. Competitor Case Study	Analyzed digital case studies of other grocery retailer's implementation of AI	Gather potential solutions that solve issues identified by previous data.
2. Solutions Research	Looked thoroughly through solutions identified to learn cost and impact.	To understand the impact of solutions on business.

B. Process used to conduct the selected research methods

Preliminary Research (10/8 - 11/5)

Found reliable statistics on how Trader Joe's compared to similar grocery stores in terms of customer experience, product types, etc.
Analyzed online data of Trader Joe's about perceptions, AI use, company policy/mission
Noted reoccurring themes

Observational Study (11/25)

Contacted store to schedule a time to shadow
We were assigned to shadow a different employees each hour
Occurred on Nov. 25, 2024 (busiest week of the store) from an 2 hours after opening (10am) till store closed (9pm).

Interview with Employees (12/17 and 12/18)

Obtained permission to interview 4 employees for 20 min each and 2 managers 15 min each
Interviews were conducted during store hours on Dec. 17 and 18, 2024 as employees while they were stocking product
Open-ended questions pertaining to AI usage, stocking, and ordering were prepared based on prior research (can be found in the appendix)
Follow-up questions were then asked to clarify and expand on responses

Data from Store Manager (12/18)

Collected data through a chat after interviewing employees on Dec. 18, 2024
Manager used store management data from 'Dayforce' as reference for the location's data
Estimations of time loss, etc. where done on the spot to the store manager's best knowledge
Calculations with the data were done on the spot to verify the validity of the conclusions

Competitor Case Study (12/20 - 12/29)

Used competitors similar to Trader Joe's Kirkland location through prior research
Using problems found in the store, used case studies on competitors succeeding in the issues
Success of the solutions used in each case study was then noted.

Solutions Research (12/30 - 1/5)

Analyzed each solution identified through industry research
Used location-specific research to evaluate effectiveness and feasibility of implementation
Looked at Trader Joe's current tech use AI that would integrate smoother

IV. FINDINGS AND CONCLUSIONS OF THE STUDY

A. Findings of the study

Through our research we identified that this location excels at customer service and using employees as a method of promotion. While the location itself has no control over the variety of products sold, the product selection is well liked among customers. All the primary studies were interconnected and built upon each other from this we this we found 3 main themes repeated throughout the primary research. The estimations below are based on data provided by the store manager and calculations verified by him and others.

PRIMARY RESEARCH FINDINGS

1. Ordering product is informed by personal knowledge

During our interview with the grocery section order writer, he mentioned that while the section's product is ordered well it is mainly attributed to being "just experience". The reliance on 'experience' is partially due to the average employee working at Trader Joe's for 5 years. The employees rely on the their knowledge of product sale trends, package sizes, and estimations of the amount of product based on shelf size and backstock. While order writers have access to a program on the order writing system that gives a suggested amount, this is amount is inaccurate. The system has been called "out of touch" due to the inaccurate suggestions. Due to the small store size and small back area, bad ordering has lead to shortages of many products and some products taking away limited space in the back and on the shelf. This issue was brought up by both of the managers interviewed. They further mentioned that when employees who wrote the order more often were gone, either on vacation or absent, the orders would become significantly worse, leading to a lose of potential sales.

Estimated Yearly Loses: $2,719,600 | Average Estimated Weekly Loses: 52,300

2. Ineffective tracking of product and backstock

All of the employees and managers who were interviewed mentioned that in that especially in the morning the storage areas, especially the fridge (containing meat, dairy, refrigerated produce, ready-to-eat food, fruit, and eggs), were very full. The picture on the right is a picture taken mid-day on 12/17. Employees complained that it was hard to get any product out to put on the shelf and that "it took too much time". Through the observational study we estimate that it took 5-10 minutes per employee to get/put away product from that fridge. This leads to 18 minutes for every hour worked. Using data from the store manager, accounting for busyness of the store and how crowded the fridge was throughout the week, we estimated that the store loses $6102 every week due to an unorganized and crowded fridge. The location's other multiple storage areas in the back are crowded to a lesser degree, but still leads to huge loses for the store.

Estimated Yearly Loses: $525,304 | Average Estimated Weekly Loses: $10,102

3. Displays fail to increase sales of products

Our original observation of the store showed us minimal sales from the displays. Additionally, many products on display were products with already high sales and products that had high awareness among customers. The store manager mentioned that when choosing products to display they "predict what might be popular or choose seasonal items". Although, the store manager did say that "items displayed through samples are usually new products". The store also does display products on the shelf "decently well" according to employees. However, Trader Joe's Kirkland has 4 other ways of displaying products: through rounder displays at the end of the shelves, samples, next to the checkout, and pop-up displays on the store floors. One manger also noted that displays tend to stay for 2-3 weeks, especially in the non-holiday season when there are less seasonal products. For example, the store had a soup display for almost 4 months from October of 2024 to January of 2025. The displays require a large amount of product that the store has to invest in. Because of this in order to remove a display, the items have to sell well. For example, the store ordered stuffing mixes for a thanksgiving display, but there the average customer doesn't incorporate stuffing into their thanksgiving meal. This had led to the store still having excess of over 100 boxes of stuffing that they are unable to sell. As another manager further noted, "when the display product doesn't sell well we try to demote it to a smaller display, but it does take a very long time to get rid of a failed display".

Estimated Yearly Loses: $355,160 | Average Estimated Weekly Loses: $ 6,830

SECONDARY RESEARCH FINDINGS

1. Competitors use an AI dependent model

Whole Food's is one of Trader Joe's biggest competitors. While Trader Joe's invests a huge portion of it's money for a human-reliant operation system Whole Food's is a company leading the AI trend in grocery. Whole Food's monitors sale trends, purchase patterns, weather, and local trends. With a huge resource of data within their store and through Amazon, their AI forecasting is extremely accurate. Thereby reducing waste and knowing what items to purchase, promote, and discount. This allows Whole Foods to increase profitability and customer satisfaction with the products sold. While Whole Food's uses more AI than most other grocery retailers, most big grocery retailers use AI in similar ways. Out of all big grocery retailers (Walmart, Costco, Kroger, Safeway, Fred Meyer, H-E-B, Whole Foods, etc.), Trader Joe's uses the least amount of AI in all their operations, saying that it is "part of their brand".

B. Conclusions of the study

Our research shows that the lack of AI in the Kirkland location of Trader Joe's is leading to a lose of $3.6 million in yearly additional revenue. Therefore the study concludes that Trader Joe's Kirkland should implement AI in 3 ways. As customers and employees agree, the AI added should not take away from the brand of a human-driven company or the customer experience.

1. Outdated AI that isn't accurate

It is evident that the current perpetual inventory system, a method of tracking inventory continuously, requires human estimate through physical checks, resulting in data discrepancies. Manually counting stock can result in human errors, such as incorrect recording and miscounting. A new AI system could use the past sales records to more accurately predict sales trends. Using a system that can adequately interpret existing data can make the ordering process easier and decrease the overdependence on employee knowledge, minimizing human error.

2. Need to collect more data points

Currently the only data points that Trader Joe's Kirkland collects is the amount of product sold, ordered, and received. In order to make up for extensive employee knowledge more data points need to be taken, similar to what other grocery retailers such as Whole Foods has done. By utilizing data such as package sizes into s ordering models section leaders and orders will have recommendations on how much product the shelves can fit, creating more space efficient stocking. By being more efficient with shelf space the back area will be less crowded.

3. Use data and research while choosing displays

The displays, as shown through the research, primarily are chosen based on assumptions from the employees or recommendations from corporate on new items. This method isn't personalized toward the location, and creates excess product. The point of displays is to introduce customers to new products they may enjoy. The current system of guessing what customers like forgets that the demographics and psychographics of the employees and customers are different. Which has led to a disconnect in the displays leaving excess product that takes expensive room in the storage. By using data on what types of products customers enjoy and the combinations of products the displays could be more effective, removing bias from choosing displays.

4. Trader Joe's is an human-based company

A big theme that ran through all the interviews, observations, and secondary research was that customers loved the human interaction of Trader Joe's. With many saying that the Kirkland location had "the best customer service in the region". Therefore, freeing the employees up and maximizing their time on the store floor is a priority. A more efficient stocking and ordering would allow employees more time with customers.

V. PROPOSED STRATEGIC PLAN

A. Objectives and rationale of the proposed strategic plan

Project **B.A.G** will help Trader Joe's resolve issues and achieve the goals outlined below through incorporation and AI and technology in the work setting, while keeping the brand values that draws customers in, increasing the revenue by around 4.7%. The objectives below are derived from the conclusions outlined in Section IV and are personalized for Trader Joe's store in Totem Lake.

BAG

BUYING: Implement AI assisted ordering

Benefit

Short Term:
Less reliance on manual counting
Decreased backstock
Less shortages

Long Term:
Zero to no loss of products
Less dependency on few employees

Goal

Making the data discrepancy in perpetual inventory system 0 through implementing secondary computerized system that creates a purchase recommendation after accounting for item loss or surplus.

ARRANGE: Use RFID tags to track products

Benefit

Short Term:
Improved backstock organization
Reduce product search time

Long Term:
Accurate shelfing at various times
Reduce "lost product"

Goal

Creating a system built into the stocking process that tracks all the products and facilitates backstock organization process through incorporating RFID-based tracking machine.

Garnish: Forecast customer preferences

Benefit

Short Term:
Increase of sales
Less backstock
Reduce product waste

Long Term:
Increased awareness of products
Increased variety of displays
Increased customer retention rate

Goal

Increasing customer satisfaction level by implementing an AI-powered technology that provides need-based recommendations that analyzes customer dataset to effectively utilize display section, showcasing right items at the right time for right customers.

B. Proposed activities and timelines

Overview

Operation B.A.G will give Trader Joe's Totem Lake opportunities to enhance business operation, increase cash flow, and improve customer experiences. The strategy will be implemented on May 2nd, 2025, so that it leads up to the summer, which is a slow season with fewer customers visiting the store. The first 3 weeks of this operation will include training the store manager and employees to inform them of structural changes in their job duties with the adoption of AI technology. Beginning May 28th, 2025, the operation will blend various training, maintenance, and evaluation strategies for the next three 3 years to continuously monitor the effect of the AI incorporation in the store.

RFID Reader Installation

There will be adoption of RFID-based tracking readers to facilitate back stocking process. The RFID tags are already located in the box's stickers, and contain all the product information, amount of product per box, etc. The RFID tag readers will be installed at the door from the back store to the store front. After RFID infrastructure is installed, this reader will be integrated with the existing inventory and POS software, tracking items by items and helping employees better organize the storage and find the items they need to find.

AI Machine Learning (LEAFIO) Integration

The AI-powered Technology Platform, LEAFIO, will be integrated into the existing technology (POS, RFID tags, ordering system, item lookup) at the store. With the integration and new data point that the RFID system provides, the LEAFIO platform will have access to store/shelf/backroom dimensions, items bought together, and the times popularity of items throughout the day. The AI will use then machine learning to predict customer preferences, seasonal trends, the optimal time for showcasing certain products, and pairings that can be used in the displays.

Employee Training

To ensure all employees and managers adapt to the new system after the initial AI implementation, there will be a training period from May 7th to the 23rd in 2025. Training will consist of how to use the new system as well as understanding how to find products and organize storage accordingly with the assistance of the RFID system. Additional training will be provided in the events of an issue that can be solved without the aid of a maintenance worker. In the instance the system stops workers, workers will be expected to track stock manually during that time. Finally, after the initial training, annual trainings will occur to keep workers up to date with the system when updates are implemented.

Proposed Timeline: AI Implementation:

Measuring dimensions of the shelves for the new AI system (May 2, 2025)

Initial store manger and employee training for the new system (May 7-28, 2025)

Installation of various equipment and computerized system (May 5-7, 2025)

New system is fully implemented within this week (May 27-June 3, 2025)

Proposed Timeline: Post AI Implementation:

Employees receive the summer to familiarize themselves with the system (June 3-September 9, 2025)

First year check in with employees on the AI system. New training for updates implemented. (June 2-23, 2025)

Maintenance, updates, and check ins as needed. Data will be collected and measured to ensure success of plan. (September 9, 2025 - June 2, 2026)

Annual trainings, updates, and assessments persist to ensure long term success. (June 23, 2025 - onward)

C. Proposed metrics or key performance indicators to measure plan effectiveness

Metric	Year 1	Year 3	Description
Overstock	Reduce by 15% from current	Reduce by 20% from current	The AI should give order recommendations that reduces excess product. It will also will maximize space on shelves. Tracking amount of unsold product in back storage by the end of the day will give an idea of the amount of overstock caused by space-efficient shelving and ordering.
Time Spent Inventory Searching	20 minutes to 10 minute	Reduce to 5 minutes	The AI implemented will recommend potential shelving options and the RFID tag reader will help in prediciting items that need to be stocked. With the addition of a less crowded back storage, employees should be able to quickly get product to the store floor, which will be periodically tracked.
Customer Retention Rate	75% to 85%	75% to 87%	Through AI that allows employees to interact with customers more, satisfaction will increase. Given that the store expects 1,200 ending customers, with 350 new customers acquired and 1,000 starting customers, the resulting CRR is 85%, indicating strong customer retention during the period. This will be tracked through repeat credit cards.
Display Sales	25% increase from current	35% increase from current	Through the implementation of AI-powered technology platform, we expect the display section to have products that the customers find appealing, resulting in increase of sales of the display products.
Lost Product	Reduce from 3% to 0.5%	Reduce to 0.2%	Through the implementation of secondary computerized system, we expect the lost products to be more frequently detected before the data is stored in the perpetual inventory system, reducing the proportion of lost product from 3 percent to 0.3 percent within three fiscal years.

VI. PROPOSED BUDGET

To carry out operation B.A.G., we've devised a budget to account for the need of one time purchases with the initial implementation of AI usage for the store, as well as reoccurring costs that will come along afterwards. Below is a table listing out the costs for each type of purchase along with the frequency for reoccurring costs, showing the totals for each monetary column in the last row. Please note that the cell highlighted in orange was the total value after already multiplying the reoccurring cost with the respective frequency value before summing them all up. Staff training is included in both one time and recurring costs for there will be an initial training after the new system is set, and then yearly ones after that for potential updates to the system.

Item	One Time Expense	Recurring Cost	Frequency	Total First Year Cost
AI Development	$50,000			$50,000
Hardware	$20,000			$20,000
Cloud Services		$6,000	Monthly	$72,000
Software Subscription		$12,000	Monthly	$144,000
Hardware Maintenance		$5,000	Quarterly	$20,000
Integration	$15,000			$15,000
AI Updates		$10,000	Annually	$10,000
Additional Electricity Costs		$6,000	Monthly	$72,000
Staff Training	$16,800	$8,400	Annually	$25,200
Total Initial / Recurring Annual Costs	$101,800	$326,400		$428,200

- Figure 6.1 (to the right) displays the percentages and distributions of the costs associated with operation B.A.G.
- Certain costs are not portrayed if negligible enough

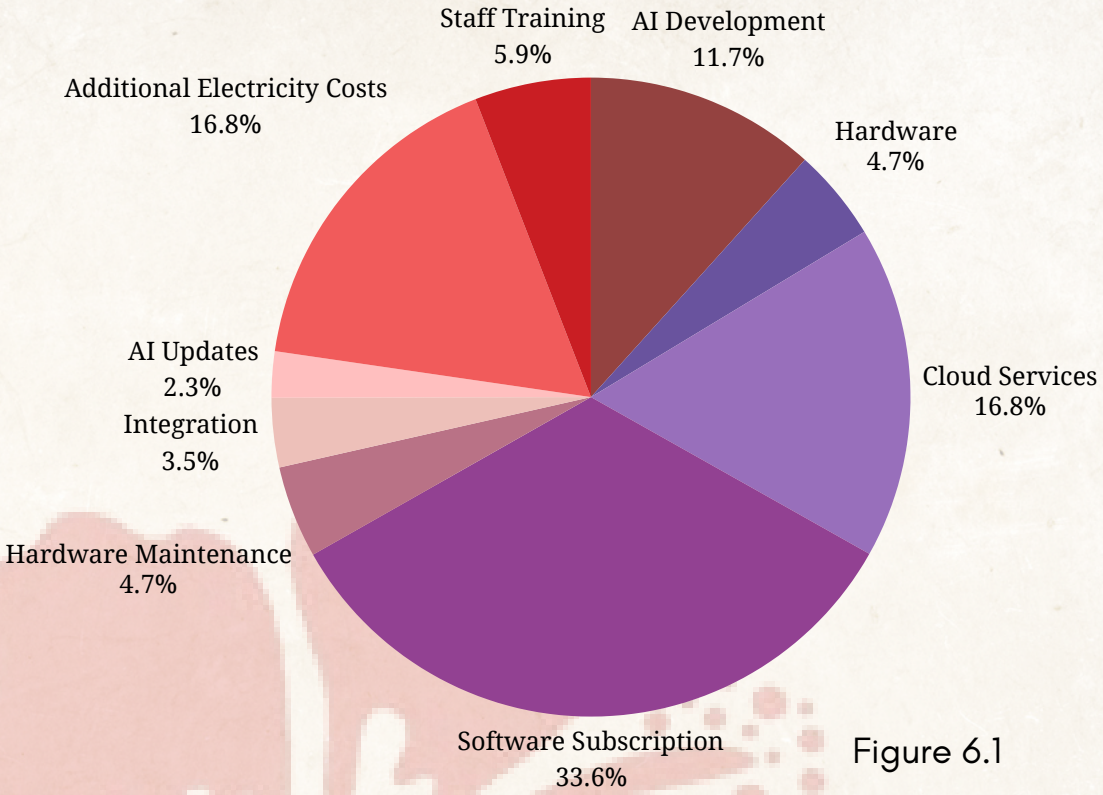


Figure 6.1

Return on Investment

As shown in section IV findings of the study, there is a total rudimentary estimated annual lose of **$3,600,064** from stock related issues, including but not limited to a problem with ordering shipment, ineffective tracking of product and backstock, and displays not meeting sales. With operation B.A.G., there is an estimated **4.7% increase** in revenue with the use of AI to perform the tracking and management of stock, making this a worthwhile investment.

First Year ROI Statement

Totals and ROI for Operation B.A.G.	
Current Yearly Revenue	$76,024,000
Costs of Operation B.A.G.	$414,500
Profit from Operation B.A.G.	$3,573,128
ROI	762%

VII. BIBLIOGRAPHY

"ACSI: TRADER JOE'S TOPS IN CUSTOMER SATISFACTION." *SpotsnDots*, 3 Mar. 2021, www.spotsndots.com/acsi-trader-joe-s-tops-in-customer-satisfaction/article_12d84260-7c04-11eb-87d6-3bcd099f3af3.html#:~:text=The%20celebrated%20grocery%20store%20topped%20the%20supermarket%20industry,Index%20%28ACSI%29%20retail%20and%20consumer%20shipping%20report%202020-2021. Accessed 13 Jan. 2025.

"AI Pricing: How Much Does Artificial Intelligence Cost?" *WebFX*, www.webfx.com/martech/pricing/ai/#:~:text=In%202025%2C%20companies%20can%20pay,mostly%20work%20for%20entrepreneurial%20operations. Accessed 13 Jan. 2025.

Alkhaldi, Nadejda. "How to Deploy AI in Your Grocery Store." *Itrex*, 27 May 2024, itrexgroup.com/blog/supermarkets-of-the-future-deploying-ai-in-grocery-store/?utm_source=chatgpt.com. Accessed 13 Jan. 2025.

Buehler, T. Leigh. "Artificial Intelligence in Retail and Improving Efficiency." *American Public University*, 4 Mar. 2024, www.apu.apus.edu/area-of-study/business-and-management/resources/artificial-intelligence-in-retail-and-improving-efficiency/#:~:text=One%20of%20the%20key%20advantages,preferences%20%E2%80%93%20to%20create%20individualized%20recommendations. Accessed 13 Jan. 2025.

Carmel, Ezra. "Trader Joe's: Continuing to Thrive in 2024." *Placer.ai*, 2 Oct. 2024, www.placer.ai/blog/trader-joes-continuing-to-thrive-in-2024. Accessed 23 Dec. 2024.

Cummings, Ashley R. "AI in Retail: Use Cases and Examples." *Shopify*, 9 July 2024, www.shopify.com/retail/ai-in-retail?utm_source=chatgpt.com. Accessed 13 Jan. 2025.

Felinah, Destiny. "How Many Trader Joe's Stores Are in Washington? Using Generative AI for Site Analysis." *xMap*, 16 Nov. 2024, www.xmap.ai/blog/how-many-trader-joes-stores-are-in-washington-using-generative-ai-for-site-analysis. Accessed 23 Dec. 2024.

"How AI Is Helping Grocery Inventory and Supply Chain Management." *CLA Connect*, 12 Dec. 2023, www.claconnect.com/en/resources/articles/2023/how-ai-is-helping-grocery-inventory-and-supply-chain-management#:~:text=In%20the%20grocery%20and%20retail%20industry%2C%20AI%20can%20be%20used,transportation%20routes%20to%20reduce%20emissions. Accessed 13 Jan. 2025.

BIBLIOGRAPHY CONTINUED

Larson, Vlad. "Emerging Supermarket Technology Trends with AI in 2025." *Leafio*, 10 Nov. 2024, www.leafio.ai/blog/supermarket-technology-trends-with-ai-review/#:~:text=Automation%20in%20grocery%20stores%20transforms,%2C%20chatbots%2C%20and%20virtual%20assistants. Accessed 13 Jan. 2025.

"Picking Your Target Market: Lessons from Trader Joe's." *Creative Demand*, www.creativedemand.org/blog/picking-your-target-market-lessons-from-trader-joe-s. Accessed 23 Dec. 2024.

"Picking Your Target Market: Lessons from Trader Joe's." *Creative Demand*, www.creativedemand.org/blog/picking-your-target-market-lessons-from-trader-joe-s. Accessed 13 Jan. 2025.

Reilly, Jon. "Cost of AI in 2024: Estimating Development and Deployment Expenses." *Akkio*, 2 May 2024, www.akkio.com/post/cost-of-ai#:~:text=On%2Dpremises%20hardware%20can%20be,the%20vast%20majority%20of%20businesses. Accessed 13 Jan. 2025.

Ricadela, Aaron. "Transforming Supermarkets and Grocery Stores with AI." *Oracle*, 5 Sept. 2023, www.oracle.com/in/retail/grocery/grocery-ai/. Accessed 13 Jan. 2025.

Sleter, Greg. "Trader Joe's Sees Growth in Store Visits, Report Says." *Store Brands*, 2 Oct. 2024, storebrands.com/trader-joes-sees-growth-store-visits-report-says#:~:text=The%20specialty%20grocer%27s%20monthly%20foot%20traffic%20has%20outpaced,visits%2C%20according%20to%20a%20new%20report%20from%20Placer.ai. Accessed 13 Jan. 2025.

"Trader JOE's Demographics and Statistics in the US." *Zippia*, www.zippia.com/trader-joe-s-jobs/demographics/. Accessed 13 Jan. 2025.

"Trader Joe's Marketing Plan." *Squarespace*, static1.squarespace.com/static/5a42a53be5dd5b06864538e4/t/5a4445ef8165f5bbbf7d8d83/1514423794358/Trader+Joe%27s+Marketing+Plan.pdf. Accessed 23 Dec. 2024.

VIII. APPENDIX

Appendix A: Manager / Employee Interview:

What do you think about the current Artificial Intelligence (AI) usage in the store?

Tell us about your perspective on the present storage / stocking issue within this store?

What opinions do you have about our idea of implementing AI to assist with that issue?

Do you foresee any flaws or shortcomings that may arise from unintended consequences from our plan?

Appendix B: Grocery Section Lead Responses

1. We asked the order writer for the grocery section: here's the rough quote "There's generated recommendations on our ordering tablets... it's a little unreliable: yesterday it told me to order 1 box of the peppermint baking chips, but since I was going to move them to a different section of the shelves with the flyer items we needed more since the height of the shelves allowed for more product. And also with the tomato soup we were doing that soup display on the rounders, so now it thinks we need 50 boxes of soup. It's really out of touch. But the process is just looking at each item we currently have by scanning the shelves, then check the backstock. Using that I figure out how much to order. As long as I get everything back in 48hrs we're good. [our store sells every product within 48hrs of delivery] But it's a lot of gained knowledge."

[I asked a follow up about the fitting in shelves part]

"I mean I've been working here over 20 years. And you get the feel for the boxes how much product and everything. Plus they say grocery is the harder section cause it's larger. I mean I still make mistakes. Like those cake mix boxes fit so awkwardly there, I'd never do that again. But you can't perfectly know the dimensions of everything, and even if you did the feel for it is more important. That's something these [tablets/ordering program] don't give. So it's really just experience. You'll get the hang of it"

Appendix C: Improper Storage Calculations

The box [the refrigerator used to store meat, dairy (milk, yogurt), wet produce (carrots, salads), and cold fresh-ready-to-eat food, fruit and eggs] is always so full. At the beginning of the day it can look like this. Employees than have to waste ~5-10 minutes while stocking product each time they are putting product in the box, taking it out, and finding products to put up. This totals to around 18 min wasted per 1hour of working product. Employees at this location are paid from $17-$27 (average employee according to a rough estimate by an employee of 5 years was $21) an hour and on Sundays $27-$37. This means that the location is losing $5-$11 per person an hour. While it doesn't seem like a lot around 5-10 employees are working on stocking products that are stored in that freezer at any given time. At worst they are losing $110 an hour, every hour. Employee working times are typically from 5am-11pm (18hours). Factoring in roughly how busy the store is at certain times, per week the store is losing $6102 on bad storage just in the box. Considering the issue of bad storage, while not as bad, especially in the freezer. Additionally, many other storage areas in the back area of the store have no organization pattern. Considering the "snack den" as employees call it due to the mountain of boxes that surroundes employees when looking for a certain box, takes longer than it needs to for employees to find certain products. This problem is worse in the dry produce and frozen storage. While both have a general layout because of no official or written layout items are placed back haphazardly. Additionally due to a lack of space moving huge u-boats, flat carts, and luges can make moving though the dry produce around the same amount of time as the item in the 'box' takes.