

# LIS 615 Final Report

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## Executive Summary

The inventory management system in Babcock Dairy Shop in Wisconsin-Madison between changing seasons and holidays can be tricky. As weather quickly changes in Wisconsin-Madison, the demand for ice cream, one of the core products, fluctuates, which causes shortages or surpluses in the inventory, an information system. This can correlate to decreased revenue due to both missing out on potential sales or needing to discard surplus products. To manage the system, two parties are heavily involved: the employees who conduct the interaction, which moves the inventory level, and the manager who sees this change in inventory and decides on the next batch of products to order. The stock supply can be quantified by looking at POS systems that help manage items, orders, packages, and the shipping process. Matching the previous year's calendar dates and inventory level with the years after the implementation will accurately quantify the difference. Although other factors like customers and weather influence the inventory levels via buying the product, they do not contribute to the management. Our group chose this information system to analyze as tracking the inventory level is a moderately complex activity with around ten steps that can be curated to harness the strength of our members.

Our group chose this information system to analyze as tracking the inventory level is a moderately complex activity with around ten steps that can be curated to harness the strength of our members. This specific information system has a Madison-centric focus, making the project feasible as our group can reach the interviewees (who are retail workers and managers) and follow up with the impact our project creates.

The main activity for the project is turning the current paper system into a small business electronic information management system. To do this, our team will need to pick out the management system to use, configure a way to apply the current paper system to the online system and utilize the inventory prediction features on the system. However, we will not create a new management method or inventory method as it is already stable and can be implemented – this includes how the ice cream is pulled and tracked and the method of storage that the store currently uses.

The project will produce (1) information system management online, which will be able to ensure the most efficient and optimized level of inventory management. The main features of inventory management will be real-time tracking and inventory management prediction. This will take around a month, from December 13th to January 10th, for optimal management turnover. The estimated budget will be an initial cost of \$350-400 and \$75 per month.

The project's success can be gauged by seeing the inventory level after implementing a new POS system. This new system of inventory management (systems management) will create increased revenue by not missing any opportunity costs. The stock supply can be quantified by looking at POS systems which help to manage items, order, packages, and the shipping process. By matching the previous year's calendar dates and inventory level with the years after the implementation will accurately quantify the difference. This will create trust with the customer, knowing that this store will always have appropriate items in stock at the correct time. There will also increase the value of the organization which would be valuable for workers.

The key stakeholders for this project would be employees, managers/supervisors, customers, suppliers, the team implementing the project(team spice), and the UW-Madison Agriculture Department which owns the dairy store.

Some risks that arise are stock levels being too low or high, project deadlines, and employment shortages that may occur.

## Observation

The information system to track the inventory level is a moderately complex activity with around ten steps that can be curated to harness the strength of our members. This specific information system has a Madison-centric focus, making the project feasible as our group can reach the interviewees (who are retail workers and managers) and follow up with the impact our project creates. The achievability of this project is aided by one of the group members working at the retail store, ensuring fast communication between the store and the group.

The activity our group observed is the sandwich-selling process to create a sandwich that the customer wants, and sell it at the correct price. For the employees, this process is split into two parts: making sandwiches and paying for the item(s). The former has the customer specify the choices they want, from bread, cheese, meat, and toppings. After this, the latter process is kicked into motion as the customer picks any other side products they want and proceeds to check out using a card, the only accepted payment method in Babcock Dairy. The managers are responsible for ordering and keeping track of the inventory levels, also the human management aspect of the business. They take note of the amount of items being sold, and decide when to order some more. They also decide on the layout of the organization, including tasks that employees should do. Finally, they manage the schedule of the employees, attempting to create the most optimal working schedule for all parties involved. For the employees to create and serve the sandwich, the manager's role is required to make sure everything is in place.

## Key Insight

The team gathered a few insights while observing the business. First, the managers utilize a pen-and-paper method and estimation for the number of new stocks to be ordered. Oftentimes employees ask for certain items from other employees near the inventory, and they have to go and check. The pen-and-paper method means that there is no real-time understanding of items in stock. Next, when employees ask, managers answer with general verbal instructions. This can be when communicating with the employees regarding item placement, schedule, orders, etc. These instructions are not written down for further prosperity, only handed down by word of mouth. This leads to our next insight that each employee's product differs. Some employees have a bigger scoop for ice cream, and put more materials in a sandwich. Also, the most questions asked was "Is item X there?", and the most frequent answer was "no". This meant that the most important items (such as bread, bacon, etc) were out of stock in the rush hours before the store closed. These problems all seem to result in a slow-updating inventory management system and no guides for employees to follow.

## Primary Problem

The primary problem identified is the food wastage caused by lack of proper inventory management system. A poor inventory management system leads to surplus food due to over-ordering as the managers fail to either notice it already being in the inventory or overestimate the amount needed. This means increased storage space for unnecessary products and the need to check expiration dates for a needless amount of inventory when needed to edit inventory. Getting out of stock means risking sales during stock out and poor business performance, causing financial loss and opportunity cost. This, in turn, can also transition to losing customer faith and loyalty as customers are less likely to trust that their order will be available at the store.

## Problem Summary

Inventory Surplus	Warehouse Cost	Shelf life Expiration
Inventory Shortage	Loss in sales	Loss in customer trust

Poor inventory management is one of the biggest reasons why small businesses fail. Currently, the Babcock dairy store implements their inventory management with pen and paper, which causes the problems mentioned previously, hence it is not an effective method for inventory management for the business. Chances human errors are prevalent because editing and data entry by handwriting is required, furthering the opportunity to misread information. Ordering more items than required can lead to waste and be costly in many ways: needing to throw away the surplus food and losing trust of employees who also can constantly see that the managers have failed to meet the inventory requirement. Other than having too much or too little, poor inventory management can be ineffective in many ways, as it doesn't have real-time updates on the availability of products. This can result in poor communication between managers and employees with different frames of understanding as managers look through the inventory through the system while employees can observe it from the storage themselves.

## Solution Suggestions

Traditional pen-and-paper methods of inventory management systems can be detrimental to the business. Hence this report outlines four possible solutions:

1. Restock alert to supplier
2. Cloud-based software system
3. Search bar products for inventory management systems
4. Implementation of the kiosk system

**Restock alert to a supplier:** Alert the supplier of the items that are in low stock so that items can be restocked before it gets out of stock which will help in retaining customers and no sales loss.

**Cloud-based software system:** Web-based inventory system with data entry using computer systems that automatically updates on availability and forecasts future stocks based on previous data.

**Search bar products for inventory management systems:** This solution proposes the introduction of the search bar to the existing inventory management system (that is, for the ice cream only). Introducing a search bar within the existing inventory system will allow the employee to easily search for the item and its availability rather than going through the whole list of all the items.

**Implementation of the kiosk system:** To keep track of the exact amount of items being ordered and toppings customers added for accurate stock management, a kiosk system with menus that customers can order from.

## Primary solution

### Cloud-based software system

This solution proposes a cloud-based inventory system that provides a real-time update on the availability of items, forecasting how much stock is needed or required. This real-time update on the availability of stock can help management to understand how much stock they need to order so that there is neither a surplus amount of stock nor a shortage of stock. This cloud-based inventory management system can help employees to understand when they actually need to place an order, as it provides insight into the real-time availability of the stocks. This can also help management to determine which products are really being used and which products are not so that they can

eliminate such products which are causing financial loss to the business. Understanding the availability of products can prevent stockouts and overstocking and can also help in customer satisfaction since the business has what the customer needs and it meets the customer's requirements.

#### Benefits of the solution

Real-time updates	Reduction in errors	Safe data storage
Efficiency in communication	Data and analytics overview	Customer trust

## Business Value

When our system is complete, it can greatly improve employees' productivity. So, there is no doubt that it can help stores save labor costs. In addition, due to the advanced nature of the system, the error rate of orders will be reduced, and the waiting time of customers will also be reduced. This will make customers more satisfied with the store's service, leading to a higher likelihood of buying again or inviting friends over for ice cream. This will obviously boost the ice cream shop's revenue. Finally, stores are less likely to waste inventory because of the inventory system, reducing the store's material costs. Hence there will be both increases in financial trust, customer loyalty, and employee respect.

## Time & Budget

The start of this project will be on December 13th, when the school semester has ended so the ice cream shop has fewer hours and fewer customers, ensuring a smooth transition to the new system.

#### Project Schedule

Dec 13th	Configuring the settings	Jan 3rd	Education employees about the systems
Dec 20th	Configure layout & entry template	Jan 6th	Creating Entries
Dec 27th	Entering in previous years data	Jan 10th	Implement system
Dec 30th	Generating predictions	Jan 22nd	End Project

The total cost mainly consists of two parts: setup cost(one time) and recurring cost every month. For setting up, it needs at least 15+ hours to enter everything in and create a scheme that currently echoes the paper method. This will require the three managers working who earns 20 dollars per hour and the 15 hours, which total to a minimum of 350 dollars for the set-up fee. For recurring costs every month, the average cost of a small business management system (CRM) is around \$12 per month for every user with the more advanced packages for larger systems going from \$50-\$150 dollars per month. For our business with only two main features, \$60 per month will be the optimal point. HubSpot Sales Hub ensures account management and inventory prediction with around \$75 + tax per month. In total, it will cost around 350-400 dollars to set up, based on the number of things that need to be entered, and 75 dollars recurring every month.

However, with a new system, the time for inventory management may decrease as the normal time used to write with pen paper and decipher the meaning is cut. Also, the time at which managers discuss which items should be ordered are reduced as well.

## Key Stakeholders

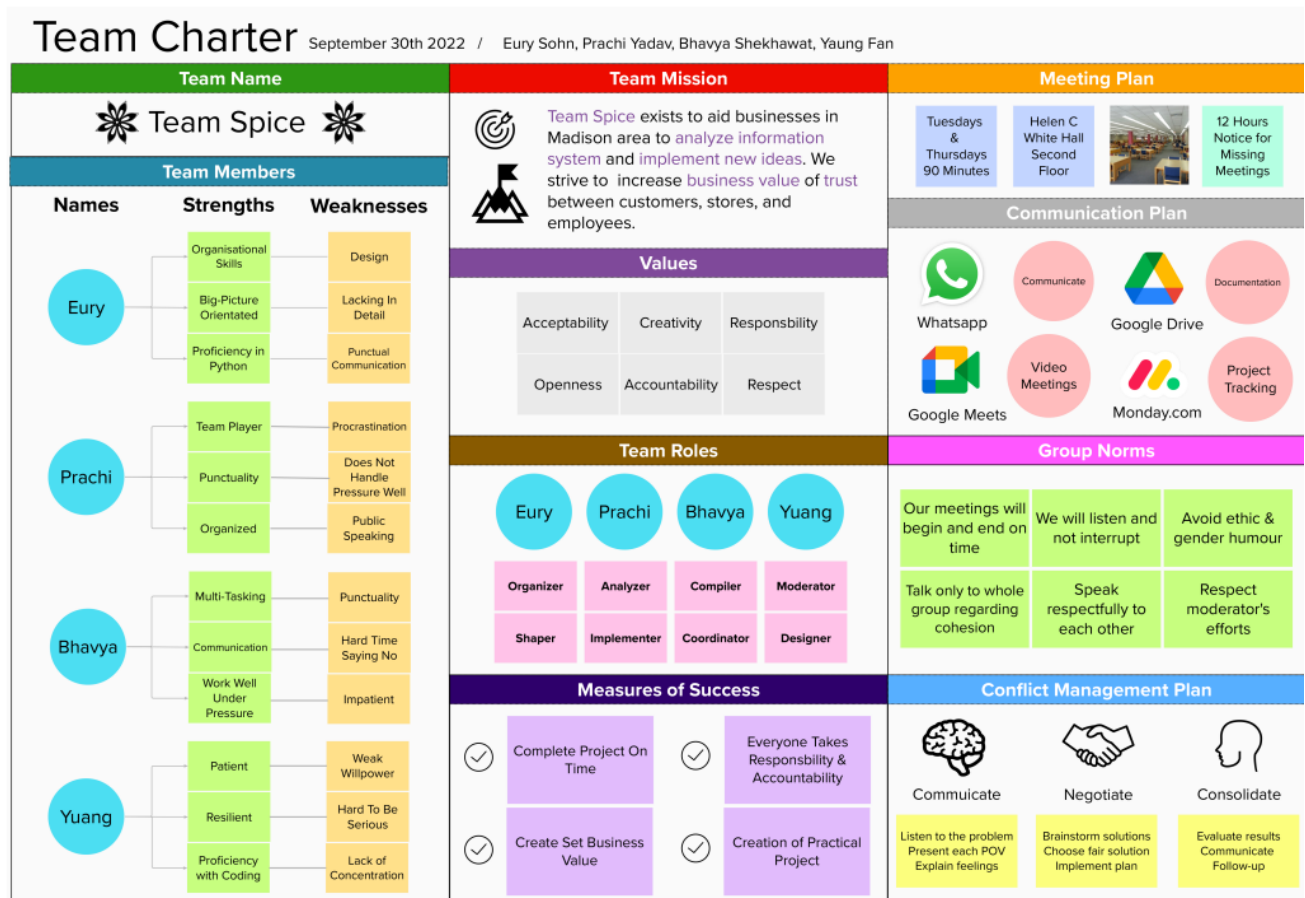
Stakeholder	How we plan to engage them
Employees	We will observe their daily routine and see how the existing inventory system is used and what are its pain points.
Managers/ Supervisors	We plan to conduct interviews with them to get better insights and the internal workings of the system. Aids in gathering information
Customer	Customers will be engaged when system prototypes are released for beta testing. This will help us figure out what works and what doesn't.
Suppliers	Involvement in requirement gathering and prototype testing to warn of change inventory ordering
Team Spice	Team Spice are the core members of the project who will be involved from the first stage of the project till the end stage.
UW-Madison Agriculture Department	As the owners of the store, their inputs will be valuable to the project and will set the project's scope. They will be regularly notified of the progress updates and be involved in all scope-related discussions.

## Project Risks

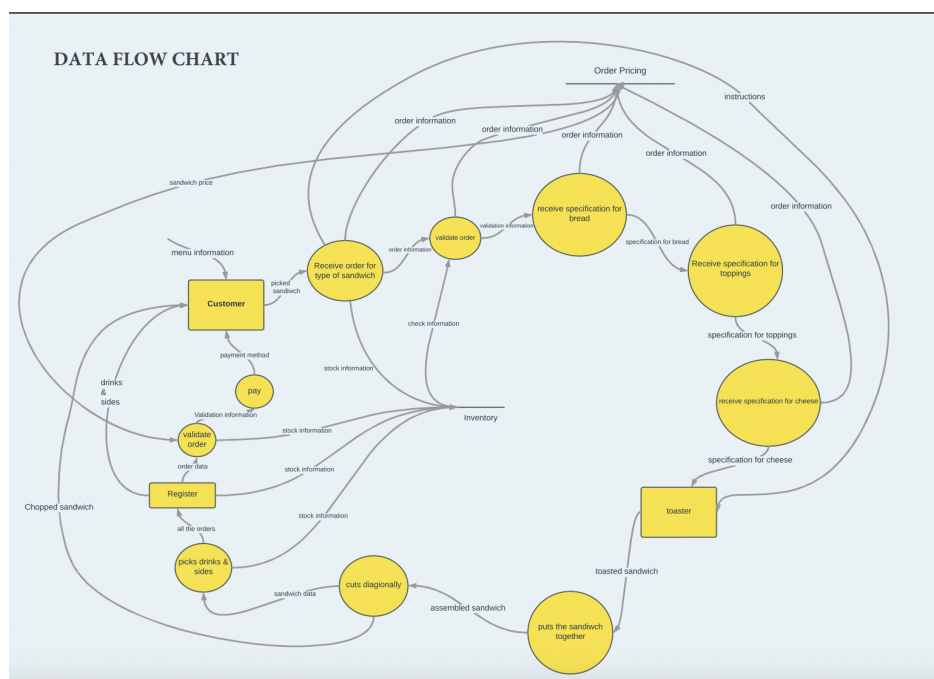
Sr No	Risk Name	Handling Process
1	Inaccurate forecasting of stocks	This will mean there's a problem with the software and it will require troubleshooting and bug analysis
2	Management system crashed or is hacked	The support team will engage crisis management protocols to first restore the system and then do root cause analysis of the issue
3	Items exceeding shelf life	Using first out principle when using items and marking dates on products as well as keep digital track of the expiration date
4	Delayed delivery of products even after timely alert	Have a backup supplier in place and place order items ahead of time
5	Project deadline is not met	Have a remote working strategy in place or have additional backup resources in place
7	Items delivery to incorrect location	Timely check ins with the shipment people to know immediately about error and then redirect to correct location
8	Staff Shortage	Will create a backup resource hiring process in place. Improvements on work benefits and environment to retain healthy workforce
9	Project Funding unclarity	Maintain emergency funds or have backup sponsors in place

## Appendix

### Team Charter:



### Process and Data Flow models:



FLOW CHART





## A7: Project Charter LIS615

**Date:** October 30<sup>th</sup>, 2022

**Team Name:** Team Spice

**Project Members:** Eury Sohn, Prachi Yadav, Bhavya Shekhawat, Yuang Fang

### Purpose of the Project

The inventory management system in Babcock Dairy Shop in Wisconsin-Madison between changing seasons and holidays can be tricky. As weather quickly changes in Wisconsin-Madison, the demand for ice cream, one of the core products, fluctuates, which causes shortages or surpluses in the inventory in the paper sense. We are planning to increase revenue and responsibility of the store by making sure the inventory is always in stock via turning the paper inventory system to prediction-based computer information management system.

### Project Scope

The main activity for the project is turning the current paper system into a small business electronic information management system. To do this, our team will need to pick out the management system to use, configure a way to apply the current paper system to the online system and utilize the inventory prediction features on the system. However, we will not create a new *management method* or *inventory method* as it is already stable and is able to be implemented – this includes the way that the ice cream is pulled and tracked, the method of storage that the store currently uses.

### Deliverables

The project will produce (1) information system management online which will be able to ensure the most efficient and optimized level of inventory management. The main features of the inventory management will be real time tracking and inventory management prediction.

### Costs

The average cost of a small business management system (CRM) is around \$12 per user with the more advance packages for larger systems going from \$50-\$150 dollars. For business around this size with only two main features, \$60 per month will be optimal point. HubSpot Sales Hub ensures account management and inventory prediction with around \$75 + tax. This will be the reoccurring fee every month, for the set up, it needs at least 15+ hours to enter everything in and create a scheme that currently echoes the paper method. This will require the three managers working who earns 20 dollars per hour and the 15 hours, which total to minimum of 350 dollars for the set-up fee. In total, it will cost around 350-400 dollars to set up, based on the amount of things that needs to be entered, and 75 dollars reoccurring every month.

### Project Schedule

The start of this project will be on December 13th, where the school semester has ended so the ice cream shop has less hours and less customers, ensuring there is enough time to figure out a new system.

- |  |               |
|--|---------------|
| 1. Configuring the settings of the new system        | 13th December |
| 2. Entering in the currently paper methods to online | 20th December |
| 3. Entering in previous years data to create data    | 27th December |
| 4. Generating predictions for a week and fine-tuning | 30th December |
| 5. Education employees about the systems             | 3rd January   |
| 6. Creating entries and directories for finalization | 6th January   |
| 7. Implement system                                  | 10th January  |

The implementation and education of the employee needs to occur near the starting of school to ensure that the most employees are working, and that the system is different to the inventory level of the holidays.

### **Measures of Success**

The project success can be gauged by seeing the inventory level after implementation of a new POS system. This new system of inventory management (systems management) will create increase revenue from not missing any opportunity costs. The stock supply can be quantified by looking at POS systems which help to manage items, order, packages, and the shipping process. By matching the previous year's calendar dates and inventory level with the years after the implementation will accurately quantify the difference.

This will create is trust with the customer, knowing that this store will always have appropriate items in stock in the correct time. There will also increase a value of organization with would be valuable for workers.

### **Stakeholders**

Name	Engaged/ Affected	Expected Benefit	Assumptions	Power	Interest
Employees	Affected	Improved work efficiency and reduce work intensity	Improvements in the system allow the system to do more work, and reduce employee work and memory load	Low	High
Managers/ Supervisors	Affected	Improved Inventory level, improved delivery efficiency and user satisfaction, Reduced memory load	The improvement and automation of the system can keep track of the inventory levels of the store and alert the supplier accordingly	High	High
Customer	Affected	Reduce waiting time and reduce the situation of getting	Improvements in the system will make sure that popularly used	Low	High

		the wrong product and get higher value for money	items are always in stock		
Suppliers	Affected	Receive supply orders timely and in a more organized way	The improved system will track low stock items timely and correctly and notify the supplier	Low	Low
Team Spice	Engaged	Will gain experience and expertise in improving an Inventory system and enjoy the profits after implementing the system in the dairy	The improved system is efficient and cost effective enough for clients to buy and implement them in their store. The improved system will generate profits for the client	High	High
UW-Madison Agriculture Department (Owners)	Engaged	Will enjoy the profits reaped by the new improved inventory system. Will gain more loyal and satisfied customer base	The improved system will be cost effective, efficient and reap profits in the future	High	High

### **Communication Plan**

Our team meets regularly offline at HC Helen Library and Online via Zoom. With our key stakeholders, we regularly communicate offline during Babcock office hours at Babcock Dairy and via Zoom for online meetings. Each exchange is about 60-90 minutes long.

#### **Communication Goal:**

- Continually update stakeholders on the needs, timetable, budget, and status of the project.
- Give detailed explanations of any decisions made or need to be made.
- Create chances for stakeholder feedback.
- Share the breakdowns with the interested parties.

#### **Frequency:**

Weekly project progress updates delivered via one online and one offline meeting among team members. Stakeholders are encouraged to participate in weekly online meetings but are

scheduled to meet offline once a month to review progress, discuss future steps, and revise timelines.

**Weekly emails:** Weekly emails to be sent every Monday with the following agenda:

- Any updates on the budget.
- Timeline specifics
- Any breakdowns/roadblocks
- Next steps

**Offline Meeting/Online Meetings:** Occurs every Tuesdays and Thursdays which last 60-90 mins.

**Meeting Agenda:**

- Timeline & budget
- Progress Update
- Any changes in timeline
- Questions & deliverables
- Obstacles encountered

## Risk Register

Risk ID	Risk Name	Date Identified	Condition	Consequence	Probability	Impact	Severity	Response Strategy	Response Details
1	Inaccurate forecasting of stocks	11/01/2022	Not taking in account for special occasions such as game days, holidays, or sudden weather change	Customers not getting their desired order, reliability and possible revenue loss	3	3	9	Mitigate	Do more research, record more accurate data, make predictions more accurate, and take account previous years data
2	Management system crashed or is hacked	11/01/2022	Outdated Software/Net connectivity issue/Physical damage to servers/Security	Unable to track orders and place a new one, security lowered causing extra time and monetary efforts to fix	3	4	12	Contingency Plan	Have secure backups, emergency operation plan without a information system and

			Vulnerability						improve the robustness of the system
3	Items exceeding shelf life	11/02/2022	Items not getting used on First IN first OUT basis	Food wastage leading to monetary loss	2.5	3	7.5	Avoid	Greater emphasis and education on staff following the first in first out principle when using items and marking dates on products
4	Delayed delivery of products even after timely alert	11/02/2022	Supplier unable to deliver the products on time due to unexpected circumstances	Items out of stock impacting proper customer service and reliability	3	3.5	10.5	Mitigate	Always have a backup supplier in place and place order items ahead of time
5	Project deadline is not met	11/03/2022	Skilled labour wasn't hired because of various reasons or covid hits again slowing down the process	Client expectations not met and increase in project cost	2.5	3.5	20	Mitigate	Upskill employees and have a remote working strategy in place
6	Client doesn't find the information system profitable	11/03/2022	The technology and price of the information system don't meet market value	The scope is the whole entire project failure, fatal and need long time frame to recover	3	4.5	22	Avoid	Investigate market needs and improve the system to meet user pain points

enough

7	Items delivery to incorrect location	11/04/2022	Address not getting updated correctly in the system	Order delivery is delayed, dissatisfaction from customer leading to decrease in reliability and loyalty	2.5	2.5	5	Avoid	Send reminders to customer to have their address updated and develop a comprehensive return process policy
8	Staff Shortage	11/04/2022	Mass staff on leave due to holidays or school occasions	understaffing leading to increased wait time for the customers, decrease in satisfaction	2.5	3	7	Contingency Plan	Hire short-term part-time staff (such as school students)
9	Project Funding uncertainty	11/05/2022	Inflation and Recession causes price of labour and technology to increase; needing extra funds	Client may refuse to pay for the increase and the deal may fall through, monetary loss	3.5	5	22	Contingency Plan	Have additional sponsors in place to ease funding requirements, reevaluating the budget
10	Trainings for the new information system is time consuming	11/05/2022	Additional skills required to operate the new information system	Extra time is spent to train existing employees and effort to hire skilled employees in future; decrease in service quality	3.5	2	7	Accept	Improve the usability of the system and provide complete and effective tutorials and manuals
11	Team members are	11/06/2022	Recession and Inflation may lead	Team Members don't feel motivated to	3.5	3.5	12.25	Mitigate	Create realistic timelines so that

not compensated appropriately

to budget cuts or lack of understanding current labour prices

complete the project and delaying the timelines; may need extra time

employees can have decent work life balance even if paid less due to economic issues

12	Misinformation in the inventory system	11/06/2022	Miscommunication between staff and employee or pure human error.	Incorrect ordering by either overshooting or missing inventory needed, throwing away items or missing items-monetary loss	4	4	19	Mitigate	Ensure clear line of communication between employee and staff, ensuring feedback loop where employee can double check
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