CONOPS Preparation

Team 4

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1 The Current System or Situation

1.1 Background, Objectives, and Scope

Right now the current system uses a traditional check-out system where a store staff person scans each item, collects the payment and bags the groceries.

The objective is to implement a self-service check-out system in all their stores.

In the new system the customer will scan the items and bag them, and they will pay for their groceries by inserting a card or currency or swiping a credit card.

This would make checkout faster since the self checkout system requires less hardware making it easier to install more of these which in return would make the process more efficient.

1.2 Operational Policies and Constraints

You depend on your personal to use your checkout meaning that there are times where the checkouts are idle.

You require two person to operate the checkout (the costumer and the cashier).

The cashier must be present during the entire checkout process.

1.3 Description of the Current System or Situation

The system is operating inside a supermarket, it requires a carrier band, a screen, a printer, scanner gun, scanner panel and a Point-of-Sale.

This Point-of-sale can take cash, credit card (Which are link with different credit card providers system) and also support Apple Pay and Google pay.

The cashier needs to use the carrier band to bring the items near her so she can use either the scan panel or the scan gun to get the pricing of the item and add it to the POS.

The carrier band has a fixed amount of items it can carry at a particular time, the speed depends on the expertise of the cashier, the amount of items of the customer and the current availability from the remove payment providers.

The cost of operation requires to maintain all the hardware and also the cashier salary.

1.4 Modes of operation for the current system or situation

The regular mode of operation would be that the cashier scans and creates a final bill for the customer and the customer paid, but there are some cases that the cashier requires to return a transaction or requires to open the cash drawer.

In this case the cashier would require to call a supervisor that can overwrite this transaction or gain more access to the cash drawer.

1.5 User classes and other involved personnel

In the current system exists there types of user, most of the time the user are going to be:

- **Cashier**: Who can control the carrier band, add items to the bill, create the bill and confirm payment.
- **Costumer**: Who manually add items to the band and pay the bill

If a situation arises there is another that has access to the system which is the supervisor who has access to overwrite instructions created by the cashier.

1.6 Support environment

For this system there are three companies that take care of the different parts of the system, one company maintains the carrier band, the other takes care of the POS and the last one takes care of the payment provider.

2 Justification For and Nature of Proposed Changes

2.1 Justification for changes

The reason to update this system is because the Partial Foods is having too much checkout IDLE on regular days you usually do not need to operate all of the checkouts but there are cases that get saturated and there are too many clients to supply the demand.

From a business perspective also doesn't make sense to all of the cashiers operating the checkout if there is not enough demand.

The new system would require less hardware, not need a cashier to be operated since the users are the ones who would be doing the checkout, since it takes less space we could add more of them and also the lines would be faster.

2.2 Description of desired changes

The capabilities that are going to be added is to enable customers to operate the machine itself, since the users are doing the entire checkout workflow we are going to remove the carrier band.

We are going to add a bagging area and a security scale, we are going to remove the cash registers and we are only going to accept credit/debit cards, smart-cards and NFC/Mobile Payment methods, we are not going to accept cash.

Initially we are going to keep the two systems and gradually will be replacing the previous system with self-checkout machines, in the end we are going to have 4 cash registers with the old system and the rest is going to be replaced with the new system.

We are going to start with 5 people to monitor the self-checkout system and also assist customers with the new system but gradually they are going to be 3 people monitoring.

Two times during the month a company is going to come to do maintenance to the machines, the first time is going to maintain half of the machines and the second time will take care of the rest.

2.3 Priorities among changes

2.3.1 Essential features

- Accept payments (Credit/Debit Card, Magnetic Stripe Cards)
- Support for the bagging area
- Support for the security scale
- Overwrite system

2.3.2 Desirable features

- NFC/Mobile Payment Options
- Vouchers/Coupons/Deposits

2.3.3 Optional Features

- Integration with loyalty System
- Support for Smart-cards

2.4 Changes considered but not included

We consider installing a face-recognition software to speed up the process for the loyalty card system but the development and cost wouldn't make it cost effective.

We consider asking the users their email address so we can send the receipt via email and also collect their emails for marketing campaigns but it would require that we have a reliable internet connection and we would have to aintain the infrastructure.

2.5 Assumptions and constraints

2.5.1 Assumptions

- The costumers knows how to operate the system
- The cashiers know how to use the system
- There is always going to be at least 1 staff member to help the customers use the system
- We will always going to have a reliable connection with the credit card providers
- The customers will not shoplift
- The system will know how to apply discounts and promotions

2.5.2 Constraints

- The maximum weight that the scale supports its 60kg
- The SCO (Self-checkout) system do not support refunds
- The SCO do not accept cash
- The SCO will not work if the scale do not work

3 Concepts for the Proposed System

3.1 Background, objectives, and scope

The new system is a Self-checkout (SCO) system, this enables users to do the checkout process without the need of a cashier.

The reason we are doing this is because there are some days that we are receiving too many clients and there are not enough cashiers so the lines are becoming larger and the clients are getting anxious because it takes them too long to pay.

A lot of the machinew in the old system stays idle most of the time, this new system would optimize this by not needing a cashier to control the checkout process.

The new system would have two types of user:

- **Costumer**: Scans, bag and weight the items, and also pay.
- **Super user**: In case something happens this user can overwrite customer operations and has access to more functionalities.

3.2 Operational policies and constraints

3.2.1 Operational policies

- The super user is able to overwrite costumer actions
- The super user is able to shutdown the system
- The super user is able to the system to sleep

3.2.2 Constraints

- The new system only supports credit/debit cards, NFC/Mobile payments and Magnetic Stripe Cards.
- The scaling system only supports up to 60Kg
- The POS system needs to run on Windows Operating System.

- The POS system requires at least 2 meter of space between systems to enable the best use of space.
- The system requires at least one person to be operated and up to 2 (one customer, one super user) running the system at the same time.

3.3 Description of the proposed system

The system will operate in the store where people do their groceries, near the supermarket exit, they are going to be running alongside the old system.

This system will require a wired connection for electricity to power the scanner, printer, scale and POS system. It will require an internet connection to the supermarket server and also requires an internet connection with the payment providers.

The system requires a scanner, a scale, a printer, a touchable screen, a bagging section and payment interface.

The system needs to be able to read barcodes and QR codes, coupons and also need to support promo codes.

Each SCO system consumes 10 watts with all the hardware running at the same time, 5 watts on idle and 2 watts on sleep mode, the supermarket runs from 6:00AM - 10:00PM (16 Hours).

The cost will depend on how many of the SCO will run at the same time, the cost of the electricity and the cost of the internet services, which these ones are outside the scope of the project.

The operational risk factor would be that if the scale gets broken the SCO is not going to work, and if the system loses internet connection the customers won't be able to pay since the system doesn't support cash payments.

Since the system only handles one customer at the time the system is really fast.

3.4 Modes of operation

3.4.1 Regular

In this mode all the systems are ready to use the scanner, screen is at 100 percent of brightness, the bagging system the payment terminal and the scale are working.

3.4.2 Idle

The machine dims the screen at 50 percent, the bagging system gets shut down, the payment terminal shutdown, the scanner gets shut down.

3.4.3 Sleep

The machine sleeps the operating system and all the hardware systems gets shut down.

3.4.4 Training

All the systems are turn on as regular but the checkout information do not get store and the payments don't get send to the payment provider.

3.4.5 Maintenance

All hardware systems gets shutdown but the mechanical pieces get unlocked.

3.5 User classes and other involved personnel

Costumer: Do the checkout process. These are regular people that purchase in the supermarket. They have different backgrounds.

Super users: Overwrite customers actions. This type of users are trained personal, they are employees Partial Foods employees, they know how to operate the SOC system, they are previous user from the old system.

Maintenance: They do diagnostics on the system and fix possible issues. They are engineers from the development team, they have technical background and also know how the system interacts with the other parts of the company.

Usually customers would interact with super users in case they need help or if an issue happens.

Super users interact with maintenance because they know what is the current state of the system.

Other type of users that do not interact directly with the SOC systems are the payment provider services, they are an attachment to the system but the maintenance do not have jurisdiction with the payment terminal.

3.6 Support environment

The company will provide support for the software itself but the bagging area, the scanner and the SOC hardware will be provided by the manufacturing company.

The payment terminal would be provided by the company bank or other third party service.

Regarding software the maintenance cycle would be each quarter and would be 3 years warranty support, for further support a new support agreement would be required.

Support only support the software itself not the hardware of the system, for hardware maintenance would be the a third party supplier and they offer a 5 year warranty with yearly maintenance cycle.

4 Operational Scenarios

4.1 Checkout Scenario

- The customer approaches the self-checkout system and starts the checkout process.
- The system initializes the cart properly, allowing the user to scan and add items to the checkout list.
- **Items Without a Barcode (eg. fresh produce) or Barcode Cannot Be Scanned**
  - For these items, the user will use a built-in search function in the system.
  - The user will search for their item in the inventory manually.
  - Once they find their item, they will manually input the number of that item that they wish to add to their checkout and add it.
  - Exception
    * If the user cannot find their item through the system, they will indicate this to the system.
    * The system will then alert a trained worker to the issue
- The user scans their item and for every item scanned, the system checks the store's inventory for what item is associated with the scanned barcode.
- The system finds the item and adds the item to the checkout, signaling the user to add that item to the bagging area and to proceed with scanning their other items.
- **Exception - Item Cannot Be Found**
  - The system cannot find an item in the store's inventory with the barcode read in the scanner.
  - It signals the user that the item scanned was not recognized by the scanner as an item. It also informs the user that the item was either not scanned properly or that the item does not belong in the cart.
  - The system will allow the user to rescan the item.
  - Exception
    * If the user rescans multiple times (number of rescans at administrators choice) without success, the system will lock and alert a trained worker to the problem.

        * The system will unlock until the trained worker unlocks the system (See Unlock Scenario).

- The system repeats the process until the user ends their checkout to proceed to payment.
- **User Wishes to Remove an Item from Checkout**
  - The user will indicate to the system that they wish to remove an item from checkout.
  - The system will lock the scanner and then prompt the user to select which item or items that the user wishes to remove.
  - The user will indicate to the system which item and how much of the item they wish to remove, and the system will remove the item from checkout.
  - Note: The system will actively prevent the user from inputting a number greater than the amount of the item present in the checkout as well as one less than 0.
  - Exception
    * If the system receives a number greater than the amount of the item present in the checkout or a number less than 0, the system will lock and alert a trained worker.
    * The system will remain locked until unlocked by a trained worker, system maintenance personnel, or any other authorized personnel (See Unlock Scenario).
  - The system will then resume the normal scan scenario.
- **User Wishes to Cancel Their Checkout**
  - The user will indicate to the system that they wish to cancel their checkout.
  - The system will prompt the user to confirm that they wish to do so.
  - If the user confirms, then the system will prompt an employee to come and collect the items the user had already scanned and not scanned.
- When the user wishes to checkout, they will prompt the system to end the scanning process.
- The system will lock the scanner and prompt the user to choose a payment method of either cash, debit, or credit.
- **Cash**
  - The system will start the hardware to receive the currency. The system will prompt the user to insert the appropriate bills and coins to fulfill the cost of the checkout.

  - The user inserts the currency into the hardware for counting. The system will continue to prompt the user with the remaining cost of the cart until the amount inserted is at least equal to the total cost.
  - User Inserts More Than The Cost
    * The system will indicate to the user that they will receive change from the coin and bill slots on the hardware. The system will indicate to the internal currency register how much must be taken out for change,
    * The system withdraws from the register to give to the user.

- **Debit and Credit**
  - The system will prompt the user to follow the instructions presented on card terminal.
  - The system communicates with the terminal as for how much the user needs to pay to cover the cost.
  - The terminal carries out the transaction, where the user swipes their credit card or inserts their debit card.
  - Exception - Card Declined
    * The system will indicate to the user that their card was declined.
    * The system will then prompt the user to choose their payment method again. This process will repeat until the user cancels their checkout or the user covers the cost.

- Once the transaction is completed, the system will print a receipt for the user of their checkout list and end the checkout process.
- The system will reset itself for another user.

4.2 Unlock Scenario

- This scenario occurs when the system locks during an error during the checkout scenario.
- Once the system alerts a trained worker to the error, the trained worker will approach the system to assist the user.
- Once the worker assesses the problem and decides that it is good to proceed with the checkout scenario, the worker will input a special code that they will be given by system maintenance personnel. This code will automatically unlock the system for continued use by the user or the worker depending on the decision made by the worker.

- This special code will be accessible to system maintenance personnel, administrative personnel, and the trained workers assigned to the system units.

4.3 Shutdown Scenario

- This scenario occurs when it is the end of the day and the store is closing for the night and the system units are not in use.
- A trained worker or administrator who is present at the time of closing will cancel any current checkout processes that are present on the system units.
- The trained worker will indicate to the system that they wish to shutdown the unit.
- The system will prompt the worker to provide their special code to the system.
- The worker provides their special code to the system.
- If the code check outs, the system will shut down.

4.4 Maintenance Scenario

- This scenario occurs when the system requires some hardware or software maintenance.
- System maintenance personnel, or IT, will have access to a key to open the unit to expose its hardware as well as their own code separate from the one provided to trained workers.
- **System Not Yet Ready for Maintenance**
  - IT will prompt the unit to receive their IT code. If code does not work, see Special Code Error Scenario.
  - The system will receive the code and go into a complete lockdown, terminating all processes.
- IT will open the unit and expose the hardware of the system unit, including a port into the system's software for all software maintenance as well as a system reboot button.
- IT will then conduct all required maintenance on the unit.

- Once maintenance is complete, IT will remove all equipment or any other items that do not belong in the unit. They will also remove their own machine from the unit's software port if software maintenance was required.
- IT will press the reboot button in the unit for the system to return to normal operations.
- It will close and lock the unit shut, protecting the hardware again.

4.5 Special Code Error Scenario

- This scenario occurs when a user attempts to provide the system with a special code but the system does not recognize the given code as a special one.
- The system will prompt the user that the code is incorrect and to input the special code.
- This process repeats until a correct special code is provided.
- Multiple Incorrect Attempts
  - After multiple incorrect attempts (the exact number of which is up to administration or system maintenance personnel), the system will completely lock, terminating all current processes, and will require system maintenance.

5 Summary of Impacts

5.1 Operational impacts

5.1.1 Changes in procedure

Customers can opt to use the self checkout system rather than go to a traditional checkout with a cashier and register, allowing them to pay for items at their own convenience as well as reduce lines for the checkout sections.

5.1.2 Use of new data sources

The new self checkout machines will have their own source of logging in items being bought and brought out of the store, allowing for another system of logging inventory other than manual count and the electronic cash registers

5.1.3 Changes in quantity, type, and timing of data to be input into the system

The rate at which objects are logged into the system for being bought from the store is affected by the varying paces of multiple customers making their own purchases through the self checkout system.

5.1.4 Changes in data retention requirements

Allowing for customers to scan their own items and input their cash or credit cards on their own allows the customers to input their own data directly into the stores computer systems.

5.1.5 Changes in operational budget

More funding will have to go towards paying for these self checkout machines to be installed as well as regular maintenance of the machines and repairs in case of breakdowns.

5.1.6 Changes in operational risks

Some customers will not understand the self checkout system or improperly use it costing the time of staff to help them throughout the checkout process.

Issues with the self checkout machines breaking down and having to be repaired, costing both time and money.

5.2 Organizational impacts

5.2.1 Modification of responsibilities

More responsibilities will be focused on maintaining the functionality of the self checkout machines, basic personnel will have to understand the workings of the machines and can teach unwilling customers how to properly use it.

5.2.2 Addition or elimination of job positions

Adds the possible job position of Self Checkout Machine Specialists who regularly maintain and update the self checkout machines.

5.2.3 Training or retraining users

New employees will have to be trained in using and teaching the use of the self checkout system, older employees will also have to learn this as well.

Customers who do not already understand the machine will have to be taught how to work the machine through store employees.

5.2.4 Changes in numbers, skill levels, position identifiers, or locations of personnel

New employees will have to fill positions for being able to regularly keep maintenance on the self checkout machines.

These new employees will have to have separate, more qualified skillsets compared to cashiers or other store staff.

5.3 Impacts during development

5.3.1 Parallel operation of the new and existing systems

The self checkout machines will act similar to that of the already existing cash registers except the use of a cashier will not be required.

Customers are expected to scan their own items, bag them accordingly, and input their money into the machine without requiring the direct involvement of the cashier.

5.3.2 Operational impacts during system testing of the proposed system

Any bugs or malfunctions in the system should be disposed of and fixed accordingly in preparation for the overall unveiling of the self checkout machines in stores for customer use.