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Information Systems Technology Plan for Lao Homeland Hardware in Carmen

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ABSTRACT

The affordability and user-friendliness of common commodities and products continue to be among the top producers and consumers purchasing goods for their tiny retail establishments in quantity. The daily process encompasses the store's continuous operations, including exchanges between clients and large-volume products asking for additional reductions, and the cost could not be identical to what is on the shelves. Additionally, workers are crucial to the operation of the store. They are all-around employees who are dedicated to their jobs. The inventory process is not as good as we can see; all of the products are misplaced sometimes, so we highlighted that part and made a solution for it.

KEYWORD: Inventory Management System, Automated Reports, sales recording, payment options.

1. INTRODUCTION

1.1 Background of the Company

Lao Homeland Hardware was established on August 8, 2004, but the business does not celebrate an official anniversary. It is located along the highway in Magsaysay, Carmen, Davao del Norte. The store was founded by Mrs. Armila Oktubre and Mr. Orly Oktubre, who named it Lao Homeland Warehouse in honor of their son, Lloyd Anthony Oktubre, Lao being derived from his initials. However, the business ownership has since been transferred to Lloyd, Armela, and Orly, who continue to manage the store. The Lao Hardware provides their customer with deliveries of materials, ensuring the quality and quantity of the materials are being transferred to customers. Also, the owner sells sand and gravel, and they gather these materials for the nearby river.

1.2 Current Routines and Business Process

1.2.1 Current Routines

The daily routines of the business start with prayer, followed by opening the store and cleaning, which will start in the morning at 6:00 AM and end at 6:15 AM. After the 15 minutes of the first routine, they do their next routines, which are arranging, restocking, and tracking the products that start at 6:15 AM and end at 6:30 AM. The main working hours span from 6:30 AM to 11:30 AM, comprising 5 hours of operational activities in which all of the staff are assigned to check the inventory and stocks. A one-hour lunch break follows this, but they still entertain some customers even if it's their lunchtime. Work resumes from 1:00 PM to 4:30 PM for 3 hours. They will strictly check the amount and number of the ordered products, which are arranged according to their type. The last 30 minutes before the work ends are dedicated to closing prayer and cleaning the area. Employees officially log out at 5:00 PM. Moreover, on a weekly basis, the owners go to the product supplier at least twice to buy stocks for replenishment. Moreover, the company also monitors parcels delivered to them at least twice a month. The authorized staff in the storage area is knowledgeable about monitoring what goes in and out.

Table 1. Event Tables of Lao Homeland

Start time	End time	TASK	Duration
6:00 am	6:15 am	Morning prayer, opening the store,	15 minutes
		and cleaning	
6:15 am	6:30 am	Arranging, restocking and tracking the products	15 minutes
6:30 am	11:30 am	Working Hours	5 hours
11:30 am	12:30 pm	Lunch Break	1 hour
1:00 pm	4:30 pm	Working Hours	3 hours
4:30 pm	5:00 pm	Closing Time	30 minutes

1.2.2 Business Process

Lao Homeland Hardware will conduct an inventory check regarding the status of the goods and whether it is just enough for the day's transaction. Nonetheless, if someone wants to be their new supplier, they must first submit a business proposal to Armila Oktubre. Every delivery of the products is strictly checked before it is stocked in the hardware. Also, every supplier has its representatives to market their products. On selling their products, their customers will buy from their store and go out after paying. On their business side, Lao Homeland Hardware will purchase supplies, store them in their hardware, and then display them in the store.

1.3 Problem Found

1. **Manual Sales Recording:** All of the process is done manually, and inventory is recorded using paper logs or spreadsheets. This method is slow and prone to human error, such as incorrect inputs.
2. **Limited Payment Option:** Lao Homeland Hardware lacks cashless transactions; they are using the traditional manual cash transaction, and many customers prefer paying online for a smoother and faster process.
 - **Lack of IT Infrastructures:** There are no available computing machines or systems; they only available are notebooks, ballpen, and calculators.

1.4 Goals and Objects

1.4.1 General Objects

The researcher's objective is to propose and implement a computerized Point of Sale (POS) and Inventory Management System (IMS) supported by a reliable IT infrastructure by automating sales transactions and expanding payment options.

1.4.2 Specific Objectives

1. To replace the existing manual payment and inventory methods with an automated system.
2. To ensure real-time monitoring and updating of inventory levels.
3. To generate automated reports for sales and inventory.
4. To automate the sales recording process by implementing a computer POS system.

1.5 Organizational Structure

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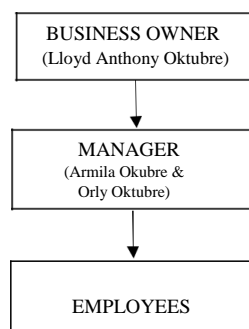


Figure 1: Organizational Structure of Lao Homeland

1.6 Stakeholders

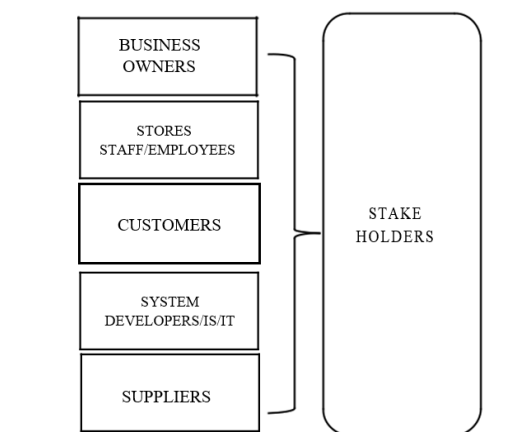


Figure 2: Stakeholders of Lao Homeland

2. Proposed Information Systems

2.1.1 Related Literature

The integration of Point of Sale (POS) systems with Inventory Management (IM) has been pivotal in enhancing operational efficiency for small and medium enterprises (SMEs). A study by Yinyeh and Alhanssan emphasizes the importance of implementing inventory control solutions to streamline business processes and reduce manual errors [1].

Furthermore, the adoption of mobile-based POS systems has shown significant improvements in transaction speed and inventory tracking. Research indicates that mobile POS systems offer user-friendly interfaces and real-time data processing, which are essential for modern retail operations [2].

In Malate, Manila, Point of Sale (POS) systems are regarded by the majority of retailers as the core of their operations. It is what holds everything together and enables a business's services to run smoothly. It's critical to understand that a point-of-sale system is not a single entity. Every business uses a different combination of hardware and software components in its point-of-sale (POS) systems. The purpose of this paper is to demonstrate a cost-effective POS system [3].

Due to its consumer and price-friendly products, general commodities are still among the leading producers in customers buying products in bulk for their small retail stores that are located in Panabo City. The daily operation includes non-stop activities of the store, such as transactions of large-volume products, customers requesting more discounts, and the price may not be the same as what the shelves are displaying. Employees also play an essential role in running the store. This factor is why their daily time record is monitored well to save administrative costs. The business employs the use of a Point of Sale system or POS system, wherein every transaction takes less time to finish in an organized way. However, using credit cards is not part of their payment method. It processes transactions as to how and when a product was purchased and paid [4].

This study looked at how POS businesses in Anambra State helped lower the unemployment rate. The study's goals were to ascertain how much the POS industry contributes to the reduction of unemployment in Anambra state and to investigate the degree to which POS availability and usage have generated revenue for POS business center owners. Data was gathered from point-of-sale business owners using structured questionnaires. There were 3045 people in the study's population, and the researcher chose 100 respondents from Nnewi, Awka, and Onitsha for a total sample size of

- Two hundred and forty-seven copies of the questionnaires were returned. Techniques for purposeful sampling were used. The study employed a survey research design due to the nature of the task. The study included both primary and secondary sources of data, and the questionnaire used for data collection was analyzed using analysis of variance. According to the study's analyses, point-of-sale locations significantly lower unemployment in Nigeria. The proprietors of POS business centers in the state of Anambra have made money from the availability and use of POS. According to the study, the government, through the CBN, should pass legislation protecting POS customers' interests so that funds cannot be taken out of their accounts without authorization. The government and deposit money banks should also promote the use of POS to help reduce unemployment in Anambra state. [5].

This study looked into how Nigerian small companies performed in relation to point-of-sale systems. Research indicates that despite the availability of POS terminals, electronic fund transfers, and check payment methods, the majority of retailers continue to accept cash payments above the point of sale. The study intends to find out why merchants accept cash over electronic payment while they have the POS terminals by banks without being solicited for by the merchants. The study employed a descriptive research design, using questionnaires to gather information from a few chosen supermarkets. The data was then analyzed using simple percentages and displayed in tables. The study indicated that most supermarkets accept cash through electronic transfers and that most customers prefer to pay with cash over the counter rather than utilizing the supermarket's electronic payment technology, such as POS. According to the study, policies should be created to incentivize supermarket patrons to use point-of-sale (POS) as a payment method for their business dealings [6].

2.1.2 Related Systems

Sabah Al-Fedaghi and Nourah Al-Huwais (2018) proposed a conceptual modeling framework for inventory management systems using the "Thinking Machine" (TM) approach. This model emphasizes five operations: creation, processing, receiving, releasing, and transferring. By applying TM to an actual inventory system, the study demonstrated its viability in providing a high-level representation of inventory processes, facilitating better design and analysis of inventory systems. [7].

According to Business News Daily, integrating inventory management features into POS systems allows businesses to automate inventory tracking, generate detailed reports, and manage inventory across multiple locations. Such systems help reduce manual errors, improve customer satisfaction, and optimize stock levels by providing real-time data and analytics [8].

2.2 Proposed Information Systems

2.2.1 Functionality

Computerized Point of Sale (POS) and Inventory Management System with Integrated IT Infrastructure offers:

- 1) It supports cashless payment for faster transactions.
 - 2) It automates and records sales to lessen human errors and speed up transactions.
 - 3) Generates digital and printed receipts instantly for a customer's proof of purchase.
 - 4) Provides real-time monitoring of inventory.
- i. Automatically Connects with barcode scanners and receipt printers to streamline the entire transaction process.
 - ii. Tracks product sales, providing data for sales analysis and inventory adjustments.
 - iii. Minimizes errors from manual stock entry and improves tracking accuracy.

2.2.2 System Architecture

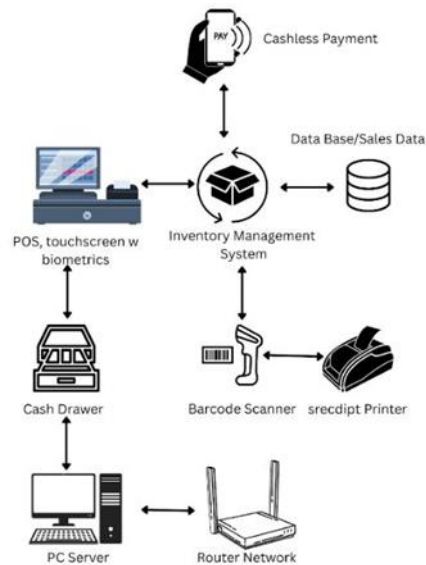


Figure 3: System Architecture of Lao Homeland

POS Terminal Processes sales, collects payments and connects to barcode scanner and cash drawer. Supports biometrics and touchscreen interface.

The Inventory Tracks stock levels,

System updates automatically after each sale, and monitors trends.

Sales Database Stores all transaction data, product details, and sales logs.

Barcode Automatically inputs item

Scanner details to reduce human error and speed up checkout.

Receipt Printer Instantly prints customer receipts and, optionally, digital copies.

Cash Drawer Automatically opens for cash payments.

Admin Generates reports,

PC/Server manages data, and handles user/admin control.

Router/Internet Enables online payment

processing and
communication across
devices.

Cashless Gateway Accepts GCash, Maya, and
other digital payments for
convenience.

2.2.3 Economic Feasibility

Table 2: Cost structure of Lao Homeland

Cost Description	Cost
Operational Cost	₱ 83,519
Maintenance Cost	₱ 8,529
Total Cost	₱ 92,048

3. Proposed IT Infrastructure

3.1 Proposed Computer Hardware

PC/Server: This is the central unit that stores all data, sales records, and inventory history and runs the database application. The first terminal and all peripherals are networked to the PC/server.

POS Terminal: The POS terminal processes the sales transactions, keeps up-to-date pricing, accepts touch screen input, can scan items or log in with a biometric identifier, and prints receipts on command. It is a kit; the terminal connects to the biometric scanner and the receipt printer, with the router for communication.

Barcode Scanner: It scans the product barcode automatically, which retrieves the price and product info. The barcode scanner connects by USB directly to the POS terminal, which helps streamline the checkout process and helps to reduce errors.

Receipt Printer: This connects to both the POS terminal and the PC. The receipt printer prints each item that is sold and keeps a record of each customer transaction.

Cash Drawer: The cash drawer opens with each cash payment and stores the cash securely. The POS terminal or receipt printer opens the cash drawer.

Router: This connects all of the POS devices to the network. It enables the devices to communicate locally with each other, as well as connect to the internet, allowing for remote data backup and cloud reporting.

Table 3: Proposed Computer Hardware of Lao Homeland

Computer Hardware	Specification	Unit Cost	Quantity	Total Cost
	Processor: AMD Ryzen 5 -			

Desktop Computer Set	5600G with Radeon Motherboard: ASROCK B450M-HDV R4.0 MATX Memory: Kingston KVR32N22S8/1 6 16GB DDR4 DIMM Storage: 1TB NVMe SSD (Kingston NV2) Power supply: Corsair CV550 550W 80+ Bronze PC case: Bosston EK- 03B Coated Micro-ATX	P31,185	1	P31,185
POS Terminal	Touchscreen Monitor: 15-17, capacitive, HD (1920x1080) Terminal(CPU): Intel Celeron/i3/i5, 4- 8GB RAM, 120GB SSD,	P30,421	1	P30,421

	Windows/Linux Digital Persona 4500 or similar			
Barcode Scanner	Netum C750 Scan Type: 1D & 2D (paper & screen) Connectivity: Bluetooth, 2.4GHz wireless, USB Storage Mode: Holds 100,00+ codes offline Modes: Manual, auto-sensing, continuous scanning OS Compatibility: Windows, macOS, Android, iOS Sensor: CMOS, fast motion scanning	P4,330	1	P4,330
Receipt Printer	Xprinter XP- Q200 Print Method: Direct thermal Print Speed: 200 mm/s Resolution: 203 dpi	P4,200	1	P4,200

	Paper Width: 79.5± 0.5mm(80mm) Interfaces: USB, Serial(RS232), Ethernet(LAN) Auto Cutter: Yes(partial cut) Supported OS: Windows,			
Cash Drawer	Dimensions: 33.4cm(W) x 37.9cm(L)x 7.9cm(H) Tray Configuration: 4 bills, 5 coins	₱1,499	1	₱1,499
	Connections: USB (via included adaptor) Features: Auto- open with Qashier Smart Terminal[14]			
Router	Wi-Fi Speed: Up to 300 Mbps (2.4 GHz) Antennas: 2x fixed antennas Modes: Router, Access Point, Range Extender, WISP Features:	₱1,290	1	₱1,290

Parental Controls, Network, support, optimization	Guest IPv6 IPTV			
Total Cost : ₱ 72,925				

3.2 Proposed Operating System Platforms

For the operating system of the POS system and server computers, the researchers recommend Windows 10 Pro due to its improved security features, compatibility with modern business applications, and better long-term support compared to older OS versions.

Windows 10 Pro allows efficient device management, user account control, and secure login features, including biometric login, which fits perfectly with the requirements of Lao Homeland Hardware's POS setup. Although it requires slightly higher hardware specifications compared to Windows 7, the proposed computer hardware is capable of running smoothly.

Moreover, Windows 10 ensures future compatibility with software updates, drivers, and external devices such as barcode scanners, biometric devices, and receipt printers, making it a scalable and future-proof option. This will help reduce system crashes and increase reliability in daily store operations.

Table 4: Proposed Operating System Platforms of Lao Homeland

Network & Telecommunication	Specification	Unit Cost	Qty.
Windows 10 Pro	Compatible with proposed hardware: supports biometric login and security features.	Free (licensed with device)	2
Total Cost: ₱ 0			

The POS software to be installed is compatible with Windows 10 and is selected to support barcode scanning, receipt printing, inventory alerts, and biometric login, ensuring it operates efficiently within the chosen OS platform.

3.3 Proposed Enterprise Software Applications

The researchers suggest developing integrated enterprise software solutions to improve operational efficiencies and track inventory accurately. These software applications will support better integration of sales transaction functions and warehouse operations, providing the data needed in real time and making decision-making easier.

FTx POS and Warehouse Management System offers a wide openly solution that combines point of sale functionalities with a fully operated system warehouse management; it supports real data tracking, automated order processing, and easy-to-use warehouse operations through features like barcode scanning and electronic data interchange (EDI) support that is suitable for business process aiming to streamline their retail and warehouse process.

Table 5: Enterprise Software of Lao Hardware

Enterprise Software	Specification	Unit Cost	Qty.
FTx POS & Warehouse Management	Integrated POS and warehouse management system with real-time inventory tracking, barcode scanning, EDI support, and automated order processing. Compatible with various	₱1,500	1
	devices and scalable for business growth.		
Microsoft Office 2016 Professional	Includes Word, Excel, and power point for documentation, reporting and data analysis. Compatible with Windows and macOS platforms[7].	₱1,455	1
Total Costs: ₱2,995			

3.4 Proposed Data Management

The suggested data handling of the Researchers includes those who create databases; normalization is identified by the design process. Creating the conceptual (logical) design of databases was an abstract model from a commercial standpoint and a physical layout that determines how data is organized on a storage device with immediate access. Create procedure determines the connections between data components, redundant database components, and the majority of effective methods for assembling data pieces to satisfy business demands and application requirements for programmers—normalization and simplifying complicated data groups to reduce redundant data components and an uncomfortable many-to-many dynamic. Data management is typically the first step toward the near future for the firm to succeed.

3.5 Proposed Network and Telecommunication

Telecommunication in business is Global knowledge sharing is crucial. It permits the company to speak with the vendors as well as with their esteemed clients. By way of telecommunication and networking, a company can undoubtedly have the opportunity to communicate with other companies. So, to support our POS system, the researchers propose implementing the PLDT fiber unli plan 2099.

Table 6: Network & Telecommunication

Network & Telecommunication	Specification	Unit Cost	Qty.
PLDT Fiber Unli Plan 2099	Up to 700 Mbps (speed boost for 6 months:500 Mbps regular) – Unlimited data – Free installations & activation – Landline with unlimited calls to Smart/TNT numbers.	₱2,099 /month	1
Total Costs: ₱ 2, 099/ month			

3.6 Proposed Internet Platform

E-commerce

The online platform is now a component of the daily lives of humans. It is typical for business owners to offer a platform that gives clients access to the precise details they require. Internet-based platforms take advantage of e-commerce advantages and ease.

Marketplace for E-Commerce

One definition of online marketing is an online/internet platform that enables the vendor and buyer to exchange products and supplies without the requirement for face-to-face communication. Transactions with customers are handled by the marketplace manager, after which they are supplied and completed by the collaborating merchants or distributors.

Table 7: Proposed Internet Platforms for Lao Homeland

Enterprise Software	Specification	Unit Cost	Qty.
E-commerce	Selling via platforms such as Shopee and Lazada	Free	2

Total Costs: ₱ 0

3.7 Proposed IT Manpower

Table 8: IT Manpower of Lao Homeland

IT Manpower	Specification	Unit Cost
Software Developer	Design, develop, and maintain the POS and Inventory system software, including a database integration and barcode functionality.	₱ 5,000
IT Support Specialist	Handles technical issues, sets up hardware, installs software, maintains system stability, and provides troubleshooting support.	₱ 500
Total Costs: ₱ 5,500		

4. Conclusion and Recommendations

4.1 Conclusion

In light of the findings, the research concludes that Lao Homeland should require an improved system. The system will greatly enhance the business procedure. This involves appropriate and fast transaction processes using cashless payment and automated daily time records, automated inventory checking management, and finally, improved workflow as suggested by the design of the system architecture. This will be the improved business process of Lao Homeland Hardware.

4.2 Recommendation

The suggestions listed below are suggestions that researchers recommended the Lao Homeland think about:

- 1) To enhance their computer system's running system to more recent interactions of Windows that allow the system to get updates continuously.
 - 2) Analyze and monitor system reports.
 - 3) To improve the hardware elements of their computers to process information more quickly and exchange.
- To have a strong PC server because they don't have one.
 - To adhere to the suggested framework for the enhancement of the Lao Homeland, like an Automated Inventory Management System for recording and tracking their daily stocks.
 - Adopt Computerized POS and Inventory Management System.
 - Implement IT Infrastructure that supports scalability.
 - Provide Multiple Payment Options.
 - Plan for future space expansion.
 - Good Network connectivity for every transaction process.

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