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INFORMATION SYSTEMS DEVELOPMENT PLAN FOR DAVAO CENTRAL CONVENIENCE STORE CABALUNA

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ABSTRACT
Discrepancies and inaccuracies are common problems in a manual system. It undermines the potential of the business to align with modernizing standards of the retail industry. Implementing an optimized information system reverses those errors into positive effects for the company. This paper conceptualized the issues which is the intent to resolve. Adapting to the Point-of-Sale system comprehends the business position and creates decisions out of the information. It automates major processes boosting productivity. Utilizing technology facilitates managing the volume of information. It offers security measures and flexibility in handling everyday transactions.

Keywords: point-of-sale, transaction processing system, biometric system, automation, business process.

INTRODUCTION

Background of the Business

Davao Central Convenience Store Cabaluna Branch entered the business market of Panabo City in the year 2011. There are 82 DCCS establishments in the Philippines. The main branch was established in 1998 by Cyril Yap, the owner and the vice president of operations. When Panabo grew in population and commerce, they ventured outside Davao and leveraged in the fresh vicinity. They have five branches in Panabo, partnering with their sister company called the Davao Central Warehouse Club.

Located adjacent to Panabo City Parks & Plaza, a focal area of commercialism has proved to be an advantage of the business. BPO companies, hospitals, and funeral homes within the area emerged the importance of convenience stores. Night activities have become popular, creating opportunities for more revenue. Groceries, perishables, and liquors are some of the best-selling items day and night. The changing lifestyle of Panaboans gauged the increase of demand for 24/7 businesses.

On the other hand, operating the convenience store overnight also entails extensive electricity use. The high operational cost did not cripple their processes as they have maintained the same profit margin over the years. It is the reasonable prices that fortified their market presence. Their clear trajectory of providing affordable and convenience to people had led them to breakthrough economic and social changes despite the cutthroat competition.

Current Routine and Business Process

Routines

The daily routines of the business include cleaning the store before opening at morning shift and checking the inventory of the products, determining the lacking products or out of stock. Before implementing the covid regulations, a total of 3 shifts were circulating to handle the execution of the business process. The pandemic curfew compelled them to reduce the shifting into two (2). Reserved personnel is handling the cash register while the other person is preparing for lunch. The convenience store is open for 24 hours, but the store opens at 6:30 AM and closes by 8 PM during this pandemic.

Business Process

The retail business focuses on managing sales, inventory monitoring, receiving delivery supplies, and sales remittance. Checking up on the inventory is strictly observed, recording the shelf life and the number of goods. These impact the time of purchasing and the number of products bought from wholesale retailers across the country. Once the delivery has arrived, the manager would compare the official receipt to the delivered items. There are instances of inaccurate deliveries and expired goods which they will ask for a refund. The acquired stocks are displayed strategically according to different sections of the store. In selling the products, customers would have to pick their items themselves and check out assisted by a cashier. The sales accumulated for the week are remitted directly to Davao Central Warehouse Club, then they transmit the data through email.

Table 1: Event table of Central Convenience Store

Time	Task
5:45 AM – 6:00 AM	• Log-in DTR • Preparing and checking the stocks • Cleaning the premises
6:00 AM – 10:30 AM	• Opening the store • Working • Log-in DTR for second shift
11:00 AM – 12:00 PM	• Lunch Break for the first shift
12:00 PM – 3:00 PM	• Log-out DTR for first shift • Cleaning
3:00 PM – 3:30 PM	• Break time
3:30 PM – 6:30 PM	• Resume of work
6:30 PM – 7:00 PM	• Dinner break for the second shift
7:00 PM – 8:00 PM	• Resume of work • Closing the store

PROBLEMS FOUND

Inadequate Sales. There are circumstances where the income yields lower than the expected sales. The employees are suspecting shoplifters that evaded apprehension. The security guards sometimes overlook the CCTV cameras because they are short in the workforce, assisting customers themselves. The employees are expected to top-up the short amount at the end of the week with their salary.

Inventory deficiencies. The fluctuating preferences of customers from time to time have posed an issue in supplying specific goods. Some shelves are full of products despite its waning sales accumulating expired products. Also, other products could turn insufficient from the unprecedented surge of buyers.

Lack of IT infrastructure. The use of manual record books in accounting inventory and sales has proved inefficiency and inconvenience. Calculating all transactions from papers every Friday night divides their

attention from accommodating customers. The monthly data are compiled in the computer to transmit through email, which is sometimes interrupted by weak internet connectivity.

Goals and Objectives

The general objective of this proposal aims to develop an Information System that transforms the existing issues into established business processes. It is focusing on integrating information technology structured to improve value creation.

Specific Objectives

1. To mitigate the frequency of shoplifting that results in imbalance sales and provides sufficient information on supplies.
2. To optimize the existing POS system for automatic inventory check-up and seamless data transmission.
3. To maintain the competition in the market and offers specialized services.

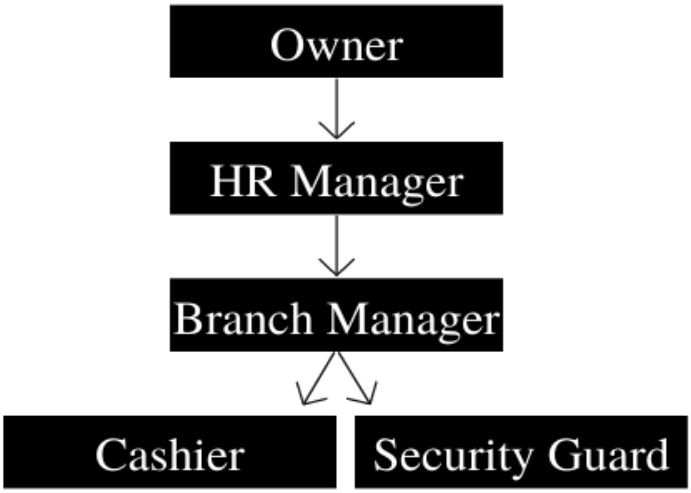

Figure 1. Organizational Structure of DCCSI Cabaluna

ORGANIZATIONAL STRUCTURE

Stakeholders

The people within the business play the most significant role in determining the future of the business. The organization must share the same goals that would create more value. The following are DCCSI stakeholders:

Investors. DCCSI strengthened their relationship with Davao Central Convenience Club as they have continuously provided for the business needs. They have witnessed the constant growth of the business and the opportunities that come with it.

Employees. The employees execute the operation of business processes. The business includes the branch manager who monitors sales and inventory, cashiers for the minor business transactions, and; security officers who guard the whole establishment against delinquents.

Suppliers. Retail businesses like DCCSI replenish their stock inventory through wholesale merchandisers. Their obligation lies in delivering products securely and checking the accuracy of product details such as the brand names and expiration dates.

Customers. As much as the stakeholders mentioned above are essential, the business would not prosper without generating income. Customers impact the business by analyzing their preferences in products and services, allowing them to create service experience business transactions.

Existing Technologies

DCCSI Cabaluna integrated Electronic Cash Register (ECR) and Point of Sale (POS) System to handle basic business transactions like selling goods. It registers the product sold into the computer to yield calculations on the inventory information.

The barcode system also picks up the pace through scanning the product barcode and decoding its corresponding price.

PROPOSED INFORMATION SYSTEMS

Related Literature

Retailing remained one of the top contributors to the Philippines ' GDP. After implementing the Trade Liberalization Act in March of 2000, which allows foreign investors to own retail enterprises, the increased competition in retail demands higher standard services [1]. The Retail Management System (RMS), a platform that offers various components in managing business processes, has been widely integrated to equal the fast-paced economy. Retailers classify their target consumer groups, determine the service outputs they need, and align their products to deliver value to each group.

Point of Sale (POS) aides business owners from manual labour that is taxing, inconvenient, and time-consuming [2]. It serves as the eyes and ears of the business to discern potential damages and makes a good decision. It analyzes inventory data about the products' status and helps segregate specific items. Allowing total manual labour threatens to yield inaccurate sale figures and inventory counts, which causes detrimental effects on the business. Optimizing the POS system upgrades the level of accuracy and mitigates human error. The system expects to automatically accumulate real deals and automatically exchange data, which can create various reports. It is valuable for daily news from past information and weekly/monthly reports [3]. It also updates real-time information about weather forecasts, festivals, and holidays, interpreting future high-selling products [4].

Analyzing customers' shopping behaviour and purchases is as important as the consciousness of outside factors. The Efficient Consumer Response (ECR) concept originated from the inefficiencies of the retail industry in 1992 [5]. In contrast with the traditional "push system," which demands suppliers to process and deliver goods ahead of time, based on the forecasted reports, and "pull system," which delays the delivery of products until business owners purchase an order, ERC is a hybrid of products the two systems. Creating an interdependent relationship between suppliers and clients lessens product waste while increasing profit margin [6].

Knowing the underlying factors that affect the general processes of the business evokes quick interventions to prevent the worst. Mobile POS and advanced inventory management systems provide improved services that fulfil the experience of the customers. A research study by Sanjay Ahuja and Alan Rolli named "Exploring the Convergence of Mobile Computing with Cloud Computing" in 2012 fortifies the possibilities of technology in the future and how information circulates from person to person with permitted access [7]. Enterprises can now streamline their business process by utilizing mPOS, automating their day-to-day transactions to increase efficiency and productivity since individuals today have access to mobile technology [8].

Cloud services also benefit from centralizing the data from employees. Managers can easily track and manage employee attendance with an online portal [9]. Applying a biometric system for personal authentication proves to cut the tedious manual process pushing for more productive activities [10], [11]. It is easier to communicate with a co company with an online platform accessed only by authorized personnel.

Related System

Implementing a system that fits the business needs and stimulates the collaborated process to elicit proper feedback is considered based on various factors. The researchers' assessment of the current DCCS system failed to connect each activity to function as a whole. Transaction Processing System (TPS) bridges the connection gap and facilitates manual issues. According to the study by Mohammad Bin Amin, MD. Alauddin and Dr Mir Mohammad Azad titled "Business Transaction Processing System," TPS maximizes the workforce through coalescing two or more business operations into one [12]. This system helps medium-sized businesses

to attain full authority and mastery in operations. Using one platform to achieve multi-processing activities is actualized by an appropriate computer network.

TPS collects, stores and retrieves data from every transaction in the database system [13]. They manage the data that are unattended for a long time and impact decision-making. This information sets to trigger feedbacks about customers and suppliers [14]. Integrating a TPS to its optimum purpose would eliminate errors and discrepancies and automate the whole process improving productivity [12].

DCCS Optimization and Enhancement System

This system is crafted explicitly for DCCS Cabaluna under the objectives and visioned improvements of business processes. The components of this system target their task while completing the whole process. It works based on another process's product or outcome, significantly decreasing the time spent on manual work. Optimizing the on-hand resources transforms the business that conforms with the changing society gearing from the competitive industry.

Functionality

- Like the traditional POS system, it accommodates various business processes such as collecting data, inventory analysis, data transmission, tracking sales, and creating receipts.
- Merchant QR Code provides a quick and modern way of purchasing using electronic wallets. A paperless receipt sends through email or SMS.
- Fingerprint scanning automates the attendance process. It records the exact time of an employee's logins and outs, ensuring adherence to work ethics.
- Smart CCTV connects through mobile devices making other personnel aware of delinquents.
- Integrating a hybrid database promotes flexibility in the business processes, especially as a contingency database during downtime.

Economic Feasibility

Table 2. Biometric System

Cost Description	Cost
Operational Cost	₱3,000.00
Development Cost	₱15,000.00
Maintenance Cost	₱5,000.00

Valuing integrity in a business is crucial. Developing a biometric system that promotes accuracy in employees' attendance encourages them to adhere to work ethics. It is feasible because it positively affects employees' performance [10].

Table 3. Smart CCTV

Cost Description	Cost
Operational Cost	₱600.00
Development Cost	₱18,000.00
Maintenance Cost	₱3,000.00

Investing in security that allows multiple personnel to monitor the establishment minimizes the tendency of shoplifting.

Table 4. Hybrid Database

Cost Description	Cost
Operational Cost	₱2,000.00
Development Cost	₱5,000.00
Maintenance Cost	₱5,000.00

This system integrates the cloud and in-memory storage, allowing flexible database performance. It connects easily to co company that needs real-time information.

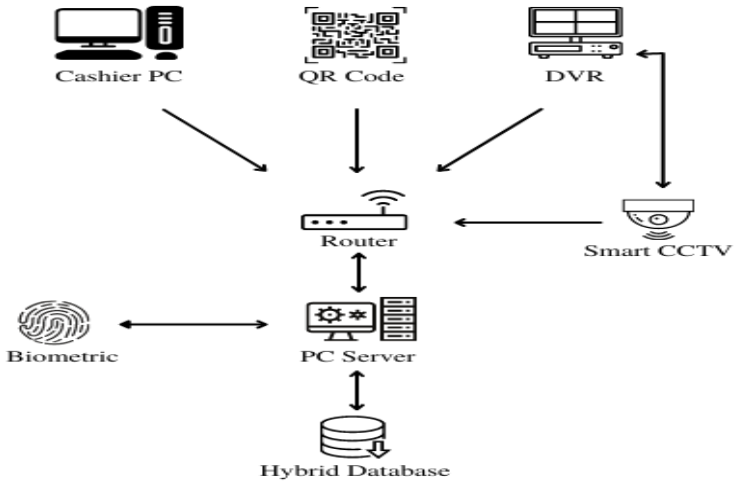

Figure 2. System Architecture of DCCSI Cabaluna

System Architecture

1. The cashier PC serves as the conventional POS system. It has a corresponding POS software installed to monitor the transactions that occurred, simultaneously checking the inventory activities.
2. The QR Code is essential to cater to digital payments. An android or apple device works the same. It also requires an application to scan the code, automatically transferring it to the business's bank accounts.
3. As a solution for shoplifting problems of the establishment, a smart CCTV which connects to LAN network can be monitored through mobile devices, allowing more employees to check up for suspicious entity.
4. The DVR or Digital Video Recorder is a piece of equipment to record surveillance videos. It can be uploaded automatically on cloud storage.
5. The Biometric finger scanner connects with the PC server to locate the stored employees' information and save their attendance activities.
6. Router serves as the network allocator to suffice the needed connection of all devices.
7. The PC server is where all the data is accumulated and analyzed. It has the software to control its features and set it aligned with the business objectives.
8. This system implements a hybrid database which is a combination of in-memory database and cloud storage. It automatically segregates the data depending on their required storage performance.

PROPOSED IT INFRASTRUCTURE

Proposed Computer Hardware

The desktop computer is an essential requirement to implement a POS system. All components are known for the efficient performance that POS software requires.

Table 5. Proposed Computer Hardware

Computer Hardware	Specification	Unit Cost
Processor	Intel Core i5-3450	₱2,891.00
Memory	HyperX Fury DDR4 2666MHz 8GB Black	₱2,788.00
PC Case	Aerocool GT Black USB 2.0 with VX-500w Power Supply	₱2,350.00
Barcode Scanner	Eyoyo Wired 1D QR 2D barcode scanner, handheld Extra Long USB Wired Bar Codes Reader CCD PDF417 Data Matrix Bar Code Image Automatic	₱1,084.00
Thermal Printer	Goojprt PT-210 Portable Thermal Printer Handheld 58mm Receipt Printer for Mini Printer	₱1,090.00
Fingerprint Scanner	Zkteco Iface 702 Biometric Face Fingerprint Time Attendance	₱10,300.00

Desktop Computer
The computer includes an Intel i5 processor, which significantly increases the processing rate with 8GB RAM to withstand the amount of data. In choosing the proper storage for the business, a solid-state drive (SSD), a storage device that uses flash memory to access data faster than HDD, weighs more in retail since it processes information quicker.
Thermal Printer
The printer performs in two ways- printing receipts and barcode labels. It supports UPC and EAN codes.
Fingerprint Scanner
The scanner detects the fingerprint to verify the user, saved to the corresponding biometric software.

Proposed Operating System Platform

Table 6. Proposed Operating System

Operating System	Specification	Unit Cost
Windows 10	Windows 10 1 gigahertz (GHz) or faster processor or System on a Chip (SoC)	₱10,000.00

Windows platforms are standard Operating System that offers a variety of features. People are well-versed in using Windows, making it easier for the person in charge to navigate.
Windows 10 is the latest version of Windows, which provides more functionalities than previous versions. It can be upgradable to Windows 10 Pro; an OS dedicated only for business functions.

Proposed Enterprise Software Application
Retail businesses execute various processes simultaneously. Monitoring can be challenging if the business only consists of few employees. The application unites these processes into one that can easily be comprehended. Customizing the settings according to the business needs is helpful to maximize the use of the software. These provide an interface to control and monitor the connected devices.

Table 7. Proposed Enterprise Software Application

Software Application	Specification	Unit Cost
POS System Software	order management, order brokering, customer engagement, high security, comprehensive reports, open architecture, online access	₱8,000.00
Overseas_ZKBio Access IVS_3.2.1_R_2021-05-20_x64	IFace series integrated 630MHz high-speed ROR Multi-Bio processor, CRT-Iface702 adopts the latest ZEM600 platform with ROR Face 7.0 algorithm	FREE
iVMS-4200	H.264, H.264+, H.265, and H.265 video encoding formats, E-map function, Remote configuration for added devices	FREE

POS System Software
The POS system software is essential to operate the sales and inventory management fully. It displays the inventory status and tracks sales which are analyzed to know the market trend. It is also responsible for creating receipts and calculating value-added taxes.

Biometric Software

The biometric software serves as the platform to manage the attendance system. It locates the owner of the fingerprint by recognizing the stored information inside the database.

DVR Software

In light of shoplifting occurrence reducing the business sales, a comprehensive Digital Video Recorder serves as a black box to store the surveillance videos.

Proposed Data Management

Data is vital for the business. It holds information that helps discern what is best to do. However, it can also be bombarding if not organized properly. It could go to waste without benefitting from it.

Table 8. Proposed Data Management

Database Software	Specification	Unit Cost
Microsoft SQL Server	Create database, maintain database, analyze data, generate reports	FREE
Google Drive	100GB Cloud Storage	₱95.02/mo.

This database system is responsible for storing, retrieving and processing data in a simple layout. The functions are straightforward, allowing non-expert users to acquire proficiency in using. Also, the display is closely akin to Microsoft Excel, which is not intimidating to use.

On the other hand, cloud-based management is a tool for a contingency system for security purposes. It supports collaborative functions which can easily manipulate by their co company. The surveillance videos from DVR can set to upload to the cloud immediately for safe-keeping.

Proposed Network and Telecommunications

Since devices require connection, the researchers include an internet subscription and a router to allocate the data needed for each device and connect devices to work together.

Table 9. Proposed Network and Telecommunications

Network and Telecommunications	Specification	Unit Cost
Router	Tp-link 450Mbps Wireless N Router TL-WR940N	₱1,250.00
Cable	50M CAT5e Ethernet UTP LAN Cable	₱286.00
Internet	100Mbps Plan	₱2,812.00

Proposed Internet Platform

Connecting a business to the internet where potential buyers are everywhere gives the business a vantage in reaching wider audiences. Social media platforms now have become a market for products and services that needs to maximize. They offer functionalities for business owners who make transactions online convenient and easy.

Since the business is a convenience store, it is feasible to offer delivery service within the area. Facebook Marketplace is the best platform to consider. People of all ages connect to social media and have become more open to online transactions. Refreshments and non-perishable items can offer for delivery.

Table 10. Proposed Internet Platforms

Internet Platform	Specification	Unit Cost
Facebook Marketplace		FREE

Proposed IT Manpower

Maintaining the IT infrastructure to ensure the system is achieving its purpose for the business is significant. They need an expert to suggest recommendations and raise awareness about the implemented technology. Knowing about issues first-hand prevents decrementing the efficacy of the system to the whole business process.

Table 11. Proposed IT Manpower

IT Manpower	Job Description	Proposed Salary
Software Developer	Software developers propose, design, engineer and develop software applications for computers.	₱200.66/hour per project
IT Helpdesk	Provides technical support and assistance in technical aspects.	₱25,000.00/month

CONCLUSION AND RECOMMENDATION

Conclusion

Based on the extensive research and considered factors, the DCCS Optimization and Enhancement System is vital in advancing the services and the business processes. It is focally directing to transform the conventional ways of the business stagnating their growth. It is the starting point of embracing modern possibilities to implement in the future. The system highlights the importance of customer experiences while ensuring an accurate return on investment.

Moreover, the issues facing the business are leaning to negligence resulting from less human resources. Because of this, the researchers include a smart surveillance camera in the system, aiding their security which helps identify shoplifters.

Recommendation

The following are the recommendations of the researchers for DCCSI:

1. The mobile Point-of-Sale system is highly recommended for future use. The researchers dismissed the idea for now because the system has not yet been established in the country.
2. The researchers suggest implementing Electronic Article Surveillance (EAF) in their gates if they are planning to expand the business.
3. Using marketing tools in social media amplifies their business presence.
4. The shelving must be according to the psychological factors of customers.

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