# Copyright Page

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and the

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# Title Page

**MOBILE-BASED POINT OF SALE APPLICATION: A TOOL FOR DEVELOPING A PRODUCTIVITY SOLUTION FOR**

**SMALL AND MEDIUM-SIZED BUSINESSES**

A Research

Presented to the Faculty of the

Polytechnic University of the Philippines

Quezon City Branch

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science in Information Technology

By

**Alyana Mae L. Apo**

**Clark Ian N. Woods**

BSIT 3-1

December 2017

# **CERTIFICATION AND APPROVAL**

This thesis entitled: ***MOBILE-BASED APPLICATION: A TOOL FOR DEVELOPING A PRODUCTIVITY SOLUTION FOR SMALL AND MEDIUM-SIZED BUSINESSES*,** prepared and submitted by ALYANA MAE L. APO AND CLARK IAN N. WOODS in partial fulfillment of the requirements for the Degree BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY has been examined and recommended for acceptance and copyright.

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Above all, to our God, Jesus Christ who is the source of courage and strength of the researcher to finish this research.

**A.M.L.A.**

**C.I.N.W.**

# **CERTIFICATION OF ORIGINALITY**

This is to certify that the research work presented in this thesis entitled ***MOBILE-BASED POINT OF SALE APPLICATION: A TOOL FOR DEVELOPING A PRODUCTIVITY SOLUTION FOR SMALL AND MEDIUM-SIZED BUSINESSES*** for the degree Bachelor of Science in Information Technology at the Polytechnic University of the Philippines embodies the result of original and scholarly work carried out by the undersigned. This thesis does not contain words or ideas taken from published sources or written works that have been accepted as basis for the award of a degree from any higher education institution, except where proper referencing and acknowledgement were made.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**ABSTRACT**

Title : *Mobile-based Point of Sale Application: A Tool for Developing*

*A Productivity Solution for Small and Medium-sized Businesses*

Researchers : Alyana Mae L. Apo, Clark Ian N. Woods

Degree : Bachelor of Science in Information Technology

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Acquiring a POS system is a long-term investment in every business. POS systems are utilized to accept payments from the customers in exchange for the goods that they bought. It is a vital tool in processing sales transactions with the customers. Most vendors nowadays prefer using mPOS solutions to manage their transactions and inventory and some integrate mPOS apps to their current management systems for optimal performance. mPOS must function just like the traditional POS systems only that it’s installed in a mobile device such as smartphones or tablets. mPOS applications are measured by its mobility, real-time accessibility, mobile optimization and its ability to accept credit/debit card payments.

The researcher applied the descriptive and quantitative methods in conducting this research and used the Purposive Sampling Technique. It is a non-probability sampling technique where the 50 subjects must own a business or is employed in the business industry. They must also have experienced using a POS

application. The advantage of this type of sampling is the accuracy of the responses given their expertise and knowledge in using POS systems.

Business owners or retailers should consider using mPOS solutions to manage sales transactions in minimal costs and to be competitive in the business industry or integrate mobile POS applications for better customer service and productivity. Researchers must focus more on the evaluation of mPOS software specifications and advanced features in mobile apps and management systems.

Keywords: Polytechnic University of the Philippines, Bachelor of Science in Information Technology, Point of Sale (POS), Mobile Point of Sale (mPOS), Business

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# **Chapter 1**

**THE PROBLEM AND ITS SETTING**

## **Introduction**

Technological advancement in the retail industry has made its way to the development of mobile point-of-sale applications(mPOS). Today, adopting mPOS technology to either replace or complement traditional POS terminals is gaining popularity among business retailers. Acquiring a POS system is a long-term investment in every business. POS systems are utilized to accept payments from the customers in exchange for the goods that they bought. It is a vital tool in processing sales transactions with the customers.

This research is interested in developing a mobile-based point of sale application wherein the small and medium-size retailers will benefit. MPOS applications allow service and sales industries to conduct financial transactions almost anywhere in the store, improving the customer experience and freeing up space and cost dedicated to a legacy POS countertop. An MPOS reduces the cost in purchasing an electronic register or paying someone to support the software. These allow small business owners to conduct transactions without having to spend on expensive hardware implementations.

MPOS technology has provided various specialized features needed in hotels, restaurants, bars, pharmacy, salon, and mostly, in a retail store to manage their financial transactions. Most POS systems are equipped with inventory feature to track usage, make calculations for re-ordering of stocks, and invent on every single item differently. The difference with legacy POS and mobile POS when it comes to storing

data is that MPOS stores data on cloud and requires constant internet access while legacy POS stores data locally. The sales completed are recorded simultaneously as they take place hence your inventory record stays up-to-date. Most POS systems have built in reporting features that can calculate profit margin, sales trend, inventory counts, etc. You can view your sales report and deduce what products are the most profitable, and order your stocks based on the reports.

MPOS applications is not limited to processing transactions. The management can keep track of sales, manage its inventory, reorganize staff and operations and deduce strategies on marketing. Moreover, it can also increase sales opportunities since it can carry out transactions anywhere there is internet access. For example, sales assistants can provide customer service and accept payments at the same time. This will also give the sales assistants to give his/her opinions and market other products in the area increasing the probability of making another sale. Aside from increasing sales, MPOS may also minimize cost instead of using expensive retail machines. Small business may benefit from this because it provides automated support while costing less.

Despite the popularity of mobile POS, very few stores have really done anything particularly new with theirs. Somehow, the retailers doubt and hesitate in shifting from their old traditional ways to newer, competitive and efficient POS. The researcher aims to study the variables needed to completely help the business retailers to an advantage. The efficiency and productivity that mobile POS brings to the retailers is also of significance to the study and will somehow help in convincing other businessmen to take a step in renewing their ways. The research will also assess the willingness of the retailers to accept such new methods and what business industry is more likely to embrace the new trend.

## **Theoretical Framework**

**Minimalist theory**

The Minimalist theory of J.M. Carroll is a framework for the design of instruction, especially training materials for computer users. The theory suggests that (1) all learning tasks should be meaningful and self-contained activities, (2) learners should be given realistic projects as quickly as possible, (3) instruction should permit self-directed reasoning and improvising by increasing the number of active learning activities, (4) training materials and activities should provide for error recognition and recovery, and (5) there should be a close linkage between the training and actual system” (Kearsley, 2003).

**The Principle of Least Effort**

The principle of least effort is a broad theory that covers diverse fields from evolutionary biology to web design. It postulates that animals, people, even well-designed machines will naturally choose the path of least resistance or "effort". Their principle states that an information-seeking client will tend to use the most convenient search method, in the least exacting mode available. of navigational features is a common concern in software design.

## **Conceptual Framework**

Figure 1 The Conceptual framework forMobile-based Point of Sale Application: A Tool for Developing a Productivity Solution for Small and Medium-Sized Businesses.

Feedback

1. The Principle of Least Effort.
2. The Minimalist Theory.
3. Survey Questionnaire.
4. Design Prototype.
5. Apply statistical treatment to the gathered data from the survey questionnaire.
6. Analyze and interpret data to draw quality findings and conclusion.
7. mPOS prototype.
8. Mobile-based Point of Sale Application: A Tool for Developing a Productivity Solution for Small and Medium-Sized Businesses.

**INPUT**

**OUTPUT**

**PROCESS**

Figure 1 shows a diagram for the conceptual framework of this study on a systematic Information approach that starts from gathering information about the topic, applying statistical treatment to the data and analyzing the findings to completing the research Mobile-based Point of Sale Application: A Tool for Developing a Productivity Solution for Small and Medium-Sized Businesses.

## **Statement of the Problem**

1. The willingness of the respondents to switch from traditional POS to mobile POS or integrate an mPOS to their existing systems.
2. What is the level of importance of the given mPOS features to increase the productivity in the business?
3. What is the level of agreement of the respondents towards the following variables:

3.1 Mobility

3.2 Mobile Optimization

3.3 Payment

3.4 Real-Time Accessibility

## **Scope and Limitation**

The purpose of this study is to provide a productivity solution to the small and medium-sized businesses by using an mPOS. The research was conducted in Quezon City having purposely chosen 50 respondents that have prior knowledge and experience in business transactions and retail management software or Point of Sale systems. Researchers will use purposive paper survey, with which all respondents are requested to answer.

The research is conducted only to provide the researchers relevant information for the development of an mPOS application that will meet the specification requirements of small and medium-sized businesses. It will not discuss any further influences on other aspects and/or include complex specifications. The researcher

will only consider the view of the respondents about the given features and variables for developing a productivity solution to the small and medium-sized businesses

## **Significance of the Study**

The researchers conducted the study for the following benefactors:

**For the small or medium-sized businessmen or retailers**, the study will provide significant information about the features and advantages of mPOS applications. This research may also bring awareness to business entrepreneur who still uses manual process;

**For Programmers and Developers, t**he study will serve as reference or may contribute additional information in developing a mobile-based point-of-sale system. It may also serve as a foundation in developing new advanced approaches in the point-of-sale industry;

**For the Future Researchers**, this research can help other students who are undertaking research in-line with mobile point of sale applications. The study can be used as reference in their research and may provide additional information.

**Definition of Terms**

**Cloud storage.** The term refers to the model of data storage in which the digital data is stored in logical pools, the physical storage spans multiple servers (and often locations), and the physical environment is typically owned and managed by a [hosting](https://en.wikipedia.org/wiki/Internet_hosting_service) company**.** In the study, cloud storage was used to describe the storage in which some mPOS uses.

**Mobile Point of Sale (mPOS)**. The term rfers to a  [smartphone](http://searchmobilecomputing.techtarget.com/definition/smartphone), [tablet](http://searchmobilecomputing.techtarget.com/definition/tablet-PC) or dedicated [wireless](http://searchmobilecomputing.techtarget.com/definition/wireless) device that performs the functions of a cash register or electronic point of sale terminal. In the study, mPOS was used to propose an alternative for legacy POS systems or integrate it to the current system as part of the research.

**Point of Sale System(POS)**. The term refers to the combination of software and hardware that allows merchants to take transactions and simplify key day-to-day business operations. In the study, POS was used as a reference to assess the features and criteria preferred and needed by the users or required in the business.

**Small and medium-sized enterprises**. The term refers to the businesses whose personnel numbers fall below certain limits. Small enterprises outnumber large companies by a wide margin and also employ many more people. SMEs are also said to be responsible for driving innovation and competition in many economic sectors. In the study, small and medium-sized enterprises was used to as a describe one of the benefactors and target respondents of the research.

# **Chapter 2**

**REVIEWS OF RELATED LITERATURE AND STUDIES**

This chapter provides support in details and information to promote understanding of the nature of the study. It contains literatures and studies shown by different researchers and authors who worked on similar topics conducted in this study.

## **Point of Sale Devices/Terminals**

According to Agnes A. Gervacio (2015), President, NEC Philippines. The G5 52V1 enables the retailers to better manage their sales due to its high performance, and will help them more to focus on their business cores. NEC helped the small to leading retailers to transform their business.

2GO Travel (2016) pioneered the first prepaid travel card. 2GO Travel partnered with Globe Business, the enterprise ICT arm of the Globe Telecom, to have Globe Charge. It is an innovative solution that transform mobile phones to point of sale card terminals that accept debit and credit card payments. With Globe Charge they are able to empower the SME customers with a convenient payment device and

eliminate the need for costly traditional card terminals since it harnesses the integration of a smartphone and a mobile card reader into a POS unit.

BPI Senior Vice President Ginbee Go (2013) told the reporters that they are trying to make payments more convenient by launching new credit payment system

for mobile traders. She said that by converting mobile phones into a POS, merchants will be able to accept credit purchases and realize additional sale. The mobile phone will have to be constantly connected to WI-Fi or its own data connection. Transactions will be paperless since the receipts are sent via e-mail. The downloadable mPOS app will work with iOS devices and selected Android devices.

BBVA Compass (n.d.) to introduce a bundled product to provide these small businesses with a mobility solution to better satisfy their unique online and mobile banking needs. The 7-inch Samsung Galaxy Tab 3 is compatible and complements the new Business Mobility Bundle targeting micro-businesses. The BBVA Compass promotion resulted in a 40% to 50% increase in new household acquisition and checking accounts opened. The Galaxy Tab 3 was able to handle every function needed in the bundle and it allowed the owners of micro-businesses to easily accept credit-card payments and save time in accessing banking services, while generating countless spinoff benefits in productivity and customer engagement.

Delta Airlines’ Global Services (DGS) (n.d.) division has taken a proactive approach in their hub airport in Memphis, where they provide wheelchair assistance for three terminals and 98 gates. While customer service is the number one goal at DGS they are also threatened of fines from the US Department of Transportation if someone misses a connecting flight because of slow response to a wheelchair need. For time- and cost-savings, DGS turned to Intermec CS40 handheld mobile computers. The DGS agent carry the handheld mobile computer and meets the traveler at the gate then scan the bar code on their boarding pass to record the pick-up. In a 45-minute period, each agent handles about five passengers, but sometimes they can handle up to ten according to Farmakis. The test run of CS40 handheld

mobile computers was so successful that DGS plans to use them in more airports nationwide. Earl Thompson, Senior Vice President of Mobile Solutions Business at Intermec said that Intermec CS40 will continue to be a best-in-class option to support a fast and efficient mobile workforce.

After originally opening as an Italian deli and small restaurant specializing in organic fresh pasta and sauces, owner Steve Simonovich transitioned Santa Cruz Pasta Factory into a manufacturing and production operation. Now distributing to Bay Area grocery stores such as Whole Foods. Simonovich began running into trouble with his company’s manual processes – seeing a major increase in invoicing errors costing hundreds of dollars each month. After engaging with Intermec partner MSA Systems to develop and implement new software to manage their invoicing processes, the company deployed Intermec CN50 rugged mobile computers and PB51 rugged mobile printers to their fleet of delivery drivers, seeing immediate savings as a result. Under the new system, drivers are able to use the Intermec CN50s to complete all inventory – scanning in products to automatically create invoices. Once invoices are created, the Intermec PB51 printers quickly print off invoices and automatically sync with the company’s accounting system and its speed is fast. The drivers don’t need battery charger it last for a 10hr shift. They are only charged at the end of the day.

The CN50 saved time from 40 minutes of taking inventory and creating invoice down to 20 minutes. Additionally, the entering of invoices is now automated and invoices go directly into the company’s accounting system when the CN50s are docked each night.

## **Mobile Point Of Sale**

Monshouwer and Valverde (2011) from Concordia University a University Of Liverpool, successfully developed the prototype and architecture for integration of Point Of Sale terminals with financial institutions through web services. The architecture demonstrates that web services will integrate POS-terminal and payment providers across business and countries boundaries. This will make vendors more flexible without having to junk their legacy applications and negotiate about services and fees all over the world. The approach is iterative, generic, usable and can be extended to organization’s needs Monshouwer and Valverde from Concordia University a University Of Liverpool, successfully developed the prototype and architecture for integration of Point Of Sale terminals with financial institutions through web services. The architecture demonstrates that web services will integrate POS-terminal and payment providers across business and countries boundaries. This will make vendors more flexible without having to junk their legacy applications and negotiate about services technology. He cited a research informing the fast growing of mobile POS and its prediction of having 54.03 million units of mPOS installed globally in 2019. MPOS terminals can be configured to access other business systems via secure wireless infrastructure. Mobile POS compliments traditional solutions and can serve as the primary connection for different business management tasks. Combining Mobile applications with traditional systems multiplies the benefits.

The manager of Content Strategy at ShopKeep, Mrs. Grullon (2017), defined POS systems as a combination of software and hardware that allows merchants to take transactions and simplify day-to-day business operations. Modern POS systems

offers more than flexibility when processing daily transactions. It also improves chances of success by providing tools to streamline the business processes.

## **POS Software Applications**

Joyner (2011) operates a food truck business in Canyon Lake, Texas. When they started their food truck business, they wanted to have minimal start-up cost and a system that could grow along with their business. They found Registroid Cloud to be very valuable and reliable as they developed their menu and trained their staff. Registroid POS, when combined with cloud, proved to be a very flexible economical choice for Joyner's food truck business.

Haskins (2012) runs Haskins' Family Farm in Middletown, Virginia. He has been using Registroid Pro for their business since its release because it has all the functionalities they need. Registroid runs on Android and is available on many different platform including HTC phones and Samsung Tablets.

Anderson (2012) owns a start-up restaurant in Sleepy Eye, Minnesota and also uses Register Cloud with a tablet computer on their order counter. She utilizes the software by using her smartphone as an mPOS solution and let call-in and pre-order customers to bypass the line to pay immediately. They use Square for accepting credit card payments that is integrated with Registroid. Recipts are emailed directly to their customers and reports to her.

Celerant Technology (2010) provides a complete multi-channel solution for retail organizations; from point of sale, to inventory management, warehousing, integrated E-Commerce, mail order and more. Due to the success of Fontana Sports

Integrated E-Commerce site, Koechel the CTO of Fontana Sports, the decided to work with Celerant to give it a fresh redesign to improve existing functionality and increase the site’s conversion rate. The Fontana Sports look forward to enhancing their customers’ shopping experience even further by adding new features such as a Daily Deal, enhanced customer reviews and product videos for a richer customer experience.

Cary Country Club, in the northwest suburbs of Chicago (n.d.), is one of the premier scenic golfing destinations in Illinois. Cary's existing point-of-sale software had reached maximum functionality, but lacked some important features. The restaurant manager Debra Grochocinski decided to switch to Future POS. The Future POS software integrates all the restaurant operations, from inventory to the proper application of sales tax. Future POS also pulls in the retail operations of the pro shop, with the ability to offer varying discounts to club members. The security cameras are integrated with DVR software that provide an extra level of review. Cary's Future POS system includes multiple strategically placed security cameras along with Talon Digital Video Recording (DVR) software and owners and managers have the option of remote monitoring via web browser or smart phone. Restaurant customers can access to a loyalty program with Future POS. Grochocinski and the general manager anticipate stronger beverage sales and more accurate tracking of the brands sold with the rollout of handheld units with the beverage carts will be complete.

Saturdays Surf NYC opened in SoHo (n.d.), targeting a tribe of customers seeking a singular lifestyle focused on surfing, living, and working in New York City. Morgan Collett and other owners and employees use Macs in our everyday business got in touch with AMP Retail Solutions, a certified LightSpeed reseller to address the

problems with the current POS system. LightSpeed, built on a Mac platform, has the power of a traditional PC-based POS system with the aesthetics of Apple. The new POS have simplified the transaction and they can now help their customers anywhere in the store process credit card payments and generate invoices. Angus Mcintosh explained. The application includes a feature called “Show and Tell” that produces up to five high-resolution images of products that are too big or bulky to keep on the sales floor. Saturdays uses Show and Tell to give customers a closer look at the surfboards without having carry the boards up from the basement storeroom. LightSpeed can tell the user which products are selling quickly and which are lagging behind.

Johil Parbtani (n.d.), said that their software is a cloud-based application and is good for the employees to easily access to their schedules on any mobile devices or their online portal since they receive it via text or email.

Galan, Gollayan and Pedrosa (2015) researched on the Conformance of Cashier Live to Philippine Business Requirements for a POS. Cashier Live is practically efficient to use by businesses in the Philippines. It confirmed to the Philippine point of sale system requirements in terms of POS functionality, reporting, inventory management, customer management, employee management and retail accounting features.

A Comparative Study on the Usability and Security Features of Android OS Smartphone and IOS Phone was researched by Agnir, Meteo, and Mariñas (2015). The primary goal of the study is to know which mobile operating system has better features in its security and usability. Android OS and IOS have little difference in their

usability and security features. It is up to the people to chose which is better to use and what mobile operating system will provide better security for their devices.

Granito (2013), Shy Order Monitoring System boost the performance of the company by automating their business transactions. It is proved to lessen consumed time and increase productivity in work. SOMS is very helpful in tracking records of sales and orders and reduce error. Granito worked on a feasibility study about the Warehousing Management System (WMS) that focuses on managing the goods information with a user-friendly interface.

The study aims to know if a Warehouse Management System would be feasible in terms of the benefits it could give to Combox Incorporated. WMS can help a lot to make the business cycle easier and more convenient. Each product must be stocked properly to maintain its quality for a long period of time, error in stocking quality products can cause downfall on its business profit and reputation. For receiving and issuance processes, it is important to make it more reliable and accessible. Failure in achieving these things can create a problem between the company and their clients.

Gonzales (2013), AJ Construction Development Inc. is a real estate business where its primary operations are purchasing land, developing homes and selling units. Gonzales intends to determine if the Customer Information and Billing System would be feasible and would satisfy the company. The feasibility report is an investigation or research of the business processes performed by the company and analyzes the systems traditional file system or database systems used by AJ Construction Development Inc. The systems are studied to identify any inconsistencies and inadequacies in the business functions to propose a new system that will further help

the company to create fun, control and orchestrate its process of business from the beginning to the end.

## **Receipt and Invoices**

An article by Dela Peña (2014) in Philippine Star writes the announcement of the Bureau of Internal Revenue (BIR) that sales invoices are acceptable in lieu of official receipt for tax audit purposes. The BIR said that sales invoice shall be issued as principal evidence in the sale of goods and services.

According to tax and accounting center official receipts and commercial invoices (n.d.) are business matters that management shall likewise give attention. Registering principal and supplementary receipts and commercial invoices is a must for each establishment. It requires its representatives to indicate required information and renew the informations prior to the expiry of the authority to print invoices. Failure to follow these rules may end up in unnecessary penalties.

Business Tips advised that having official receipts and business invoice is a must if you are targeting big and corporate clients or if you want to increase the number of your customers. The Philippine tax code, all person subject to an internal revenue tax shall issue official receipts of each sale of goods and services valued P25 or more, with some provisions according to Section 237 of NIRC.

## **POS Features: Payment; Security; Interface; and Analytics**

Balagosa (2014), a Sales and Marketing Manager at Jinisys Software Inc., Point of sales systems is replacing the traditional cash registers for the better in

Philippines. The POS has redefined the level of efficiency and accuracy in the sphere of sales. The system is designed to cater to a wide range of operations and is customizable for any specific business. These systems have made the work at the counter a whole lot easier and manageable. POS Philippines is designed to automate and handle multiple functions at the sales point. Its primary function is to record and track every order placed and sales completed. The whole process takes lesser time compared to traditional methods of billing. Recording of sale details in the database help in bringing it up whenever required for analysis and verification. The interface of this system is very user friendly which facilitates faster response from the sales executive’s end. Touch screen UI is provided to the sales teams for quicker turnaround time.

Mang Inasal (n.d) is a fast-growing barbeque fast food chain that originated in Iloilo City, Philippines. Their POS system includes computer, monitor, cash drawer, receipt printer, a kitchen printer and a POS software. Many business retailers prefer to use hardware that has touch screens because of its flexible user interface and programming. It prevents mistypes and fasten ordering and canceling orders. Though they have less electricity consumption and are handy, they are more prone to breakdowns.

As reported in the Inquirer (2011), Philippines, more Filipinos are using debit cards as they enter the banking system. Debit cards are linked to a bank account or to a credit card and may also act as ATM cards. A prepaid card is a variant of a debit card which does not require a cardholder but only requires the user to reload the balance to continue making purchases with the prepaid card.

It was reported by Rappler (2014), Manila that starting July 06, the selected Black Mabuhay Taxis will accept ATM or credit cards as payment. Mabuhay Taxi teamed up with China Bank, BancNet and Megalink to provide cashless payments for the taxis in the Philippines.

Zebra Technologies White Paper (n.d.) defined mobility as an "untethered workforce". It also means bringing devices such as tablets and smartphones into the work environment that were originally designed for the consumer. While this empowers workers with convenient technology, such devices on their own may not be the most secure. Smartphones and tablets have open architecture making it vulnerable. It is important to address the security for the sake of the retailer's reputation and also to comply with the Payment Card Industry Data Security Standard (PCI DSS) as well as any local laws. To comply with PCI, the retailer should only allow authorized users can access the device, data, and network. There are also available softwares that create firewall and data encryption to protect the data on the device and in transit.

Catalan and Viloria (2016) Online Payment: Security and Reliability of Payment Using Credit and Debit Card is a research of Balmores, Caramoan, Catalan and Viloria from the Polytechnic University of the Philippines Quezon City Branch. They reviewed some related literatures and studies and concluded that online payment proves to be more convenient than paying in cash. It saves time and effort shopping from store to store when online shops offers the same products. Online payments, however, have flaws in terms of security and reliability since credit and debit card account informations are of interest by hackers.

Cadua ( 2015), Phishing and brute force guessing threatens the integrity of data uploaded in cloud, Cadua, since it uses methods such as social engineering and advanced technologies for fraudulent purposes. Hackers use these methods to leak your private photos and information, to hack bank accounts and to infiltrate websites. These cases prove that phishing and brute force guessing jeopardize the integrity of data.

Medeza (2016), Developers must also consider the user interface of the POS system. A good user interface must be easy to understand, responsive, flexible, has high performance and offers complete functionality. Medeza’s research is about how user interface of a POS system might slow down the service provided in the food industry business. Refraining from using to many buttons and icons will simplify the UI and make it more understandable. Prioritize the performance of the application and not just beautifying the design. A good user interface will lessen human error and ease training with the application. A design that focuses on providing the system’s functionality will provide better customer service.

Pronin (n.d.), the owner of Podarok's regularly looks into the sales data he obtains using their POS software to make more smart decisions. Pronin's favorite feature is the sales reports that can be filtered by day, month, hour and mostly by supplier. With the sales report feature, the management can predict what is going to happen next, thus, they can plan their staff roster and predict ordering in advance.

Lesonsky (2016), CEO at GrowBiz Media wrote an article in Small Business Trends saying that you utilize the information from your POS system and sales receipts to staff your store appropriately or make adjustments accordingly. You can also use

the data to plan for seasonal fluctuations in sales, therefore helping you manage cash flow and keep your business progressing.

Patrick Abbott (2017), the founder of Monks Coffee Roasters, knew he needed a point-of-sale system, so he started out with a well-known POS cloud software. But it turned out to be too complex for a small cafe like Monks (35 seats) and the monthly fee was expensive. After suffering for a few months he met John Staunton, CEO of Countr POS, and offered a customised version of the app. The customized version significantly reduced the error margins on the cash register and is very accurate. Having it is beneficial when evaluating sales data and valuable for making data-driven decision in real-time. The reporting tools provide actionable insights that he needs to measure the success of his business.

Cometa (n.d.) made a Feasibility Study Report on Ruth’s Foodmart Inventory and Record-keeping System and proposed an automated system to address the problems caused by using manual system. Ruth’s foodmart have problems with data duplication in inventory and reporting, data protection and security. Ruth’s Foodmart also addresses human error in storing files, back-up data, casualties and accidents. Cometa then proposed a system with centralized storing of data and additional features of record-keeping like alerts for products to be reordered.

Manuel and Tugcay (2017) proposed a Pharmacy point of sale system using JAVA and MS SQL Server as database platform. It is designed to manage the stock of drugs inside the pharmacy inventory and monitor the stock facility. The users of the system are the administrator, who have full access to the system, and the pharmacist, who have limited access and actions. This POS system automatically compute the

purchased item before distributing it to the in-patient inte grated to the patient management system. Another feature of the system is to print report such as sales and charge-slip report. The system monitors the expiration of drugs and its minimum quantity.

Since 1991, Gerald and Leslye Woodard (n.d.) have owned and operated the Woodard Mercantile, a small business in Maize, Kansas. What started in a grain elevator has transformed into a store that goes beyond your typical feed store:  the mercantile carries lawn and garden products, pet products, Traeger grills except for clothing and groceries. The Woodards were using an outdated program for the past seventeen years. The Woodards decided they needed a more reliable computer system that could give them better reporting and keeping track of categories, products, and past orders. After hearing about POS Prophet Systems at a trade show, they decided to upgrade their system and went with POS Prophet. What appealed to them about the POS Prophet Systems was that there wasn’t any large, upfront cost of buying the software. The computer automatically figures your margins and mark-up and a touch screen and a tax button screen is available. It eases the transaction with products that are stored in the warehouse and will only be loaded from the drive-thru.

## **Importance of Customers for the Development of POS**

Kapoor (2017), Vice President of IT at Pizza Hut InternatiPresident stressed the importance of customers in the advancement and transformation of technology. He said that consumers are the driving force of the retail industry and not the retailers themselves. Specifically in the retail and restaurant industries, mobile app consumers

are proving to be a much more loyal customer than not and having such creates a powerful business trend.

Moy (2017) is the Vice President and Co-Chief at Digital for Subway Restaurants. Having 26,000 restaurants, Subway was one of the earliest to launch a mobile ordering app investing in Apple Pay. They focus on providing the most seamless mobile order experience and also upgrade the app that doubled down on customer experience. They hired researchers to document the customer's feedback and experience to see the 'pain points' and add new capabilities and features accordingly.

## **Related Tools and Systems**

**Vend**

Vend is an application that will help you run your business efficiently and may increase the sales. Vend has a different variety of store industries such as clothing store or sportswear.

**Bindo**

Bindo is an POS system that is built for the Apple user specifically to the iPad users and is based on cloud storage. This application has an advance features that simplifies the inventory input in the database and its time clock for the employees time in and out.

**ShopKeep**

If you want a budget-friendly POS application you should try ShopKeep. It is a budget friendly application that is meant for iPad users and is based on the cloud storage. When you’re running a food business, TouchBistro is a very recommended

application because of its features such as reservation for the tables and the delivery management features.

**Loyverse**

Loyverse is a mobile POS System that is available on both OS such as Android and Apple. This is a user-friendly application with a simple features to monitor your sales and even monitor your inventory with the help of adding categories and items.

**Clover**

If you are looking for an Advanced POS System that will help your business then you should try clover, it is a complex and highly customizable software. if the user is not very familiar with the application, they should try the basic features.

**Linga**

Linga is a POS System for Apple iPad user. This is application is well suited for different types of restaurant. If you want to use some third-party hardware for POS, this application is compatible with that.

**POSGuys**

POSGuys is a POS application for restaurant and can also use different hardware and other peripherals for POS. With this application you can purchase items everywhere or in just one place. Square is good for small businesses because of its convenient on using the application it also offers the credit card process on mobile.

**Paypal**

If you don’t want to take a long time to setup your account, it is advisable to learn how to use Paypal. It has a very easy registration, you just need to sign up for

an account and enter your bank information. Anyone can use Paypal unlike the other credit card.

## **Synthesis and Relevance of Reviewed Literature and Studies**

The literatures and studies cited both local and foreign proves that mobile POS have already infiltrated the market. For the past years mobile POS has been contributing to the success of every business. POS system is a very important investment to every business and partakes in almost all financial functions of the business.

Mobile POS compliments traditional solutions and can serve as the primary connection for different business management tasks. Combining Mobile applications with traditional systems multiplies the benefits. Web services that integrate POS terminals and payment providers will make vendors flexible without phasing out traditional systems. The integration of a smartphone and mobile card reader to accept credit card purchases saves time in accessing banking services while generating countless of benefits in productivity and customer engagement and is really beneficial for microbusiness. Mobile point of sale apps allows paperless transactions since receipts can be sent via email. POS devices in sync with the systems that real time and has battery life that lasts provides great productivity and increase in sales. Real time payment processing rates is very ideal in a fast-paced world. POS software combined with cloud proved to be a flexible economical choice to some retailers and businesses.

The management of some organizations prefer to integrate other systems with their systems or have a Management Information Systems dedicated to provide all the

organizations’ needs in the business. One instance is having a cloud-based labor management application. Employees have instant access to their schedules on any mobile device or in the online portal since they receive it via text or e-mail. The organization have the right number of employees during our busiest times because of the scheduling system integrated to their POS system. They don’t overstaff or lack staff assistance thus minimizing cost for labor. Another is having security cameras integrated with DVR software that provide an extra level of review. Cary's Future POS system includes multiple strategically placed security cameras along with Talon Digital Video Recording (DVR) software and owners and managers have the option of remote monitoring via web browser or smart phone. Mobile POS app works on iOS devices and Android devices depending on the developers’ choice.

The favorite feature of most businessmen is the sales reports that can be filtered by day, month, hour and mostly by supplier, etc. With the sales report feature, the management can predict what is going to happen next, thus, they can plan their staff roster and predict ordering in advance. They can also use the data to plan for seasonal fluctuations in sales, therefore helping you manage cash flow and keep your business progressing.

Sales invoices are acceptable in lieu of official receipt for tax audit purposes. The BIR said that sales invoice shall be issued as principal evidence in the sale of goods and services. Registering principal and supplementary receipts and commercial invoices is a must for each establishment. Failure to follow these rules may end up in unnecessary penalties.

Developers must also consider the user interface of the POS system. A good user interface must be easy to understand, responsive, flexible, has high performance

and offers complete functionality. The user interface of a POS system might slow down the service provided in the food industry business. Touch screen UI is proved to have quicker turnaround time. Features like “Show and Tell” that produces up to five high-resolution images of products that are too big or bulky to keep on the sales floor give customers a closer look at the items without having carry it up from the basement storeroom. POS software can also tell the user which products are selling quickly and which are lagging behind. Having mobility as a feature provide time and cost savings because it is useful for drive thru and letting call-in and pre-order customers to bypass the line to pay immediately

Mobility is defined by researchers as an "untethered workforce". It also means bringing devices such as tablets and smartphones into the work environment that were originally designed for the consumer. While this empowers workers with convenient technology, such devices on their own may not be the most secure. Smartphones and tablets have open architecture making it vulnerable. It is important to address the security for the sake of the retailer's reputation and also to comply with the Payment Card Industry Data Security Standard (PCI DSS) as well as any local laws. Phishing and brute force guessing threatens the integrity of data uploaded in cloud since it uses methods such as social engineering and advanced technologies for fraudulent purposes.

Customers are very important in the advancement and transformation of technology. They are the driving force of the retail industry and not the retailers themselves. Specifically, in the retail and restaurant industries, mobile app consumers are proving to be much more loyal customers than not and having such creates a powerful business trend. Businessmen focus on providing the most seamless mobile

order experience and also upgrade the app that doubled down on customer experience. Some even hired researchers to document the customer's feedback and experience to see the 'pain points' and add new capabilities and features accordingly.

Reviewing the related literatures and studies and even other sources not included in this chapter, made the researchers knowledgeable of how critical it is to develop such system for it will be one of the foundations of the business. The data shall be secured and shall be stored meticulously. POS systems require different features depending on what type of business the retailers have therefore the developer must be innovative and knowledgeable about business transactions.

# **Chapter 3**

**METHODOLOGY**

This chapter presents the research design of the study, the respondents, the research instruments used, the data-gathering procedures used and the statistical treatment utilized in analyzing gathered data.

## **Research Design**

The researcher applied the descriptive and quantitative methods in conducting this research. This will guide the research in providing reliable information, in defining and elaborating the topic or sub-topics. The research will also measure the surveyed data to draw better analysis and conclusions.

## **Sources of Data**

The researchers used the Purposive Sampling Technique. It is a non-probability sampling technique where the subjects must own a business or is employed in the business industry. They must also have experienced using a POS system application. The advantage of this type of sampling is the accuracy of the responses given their expertise and knowledge in using POS systems.

The researchers set the number of respondents to 50. The respondents must not only have full knowledge about POS but also use them and have experienced the application for dependable scaling of the POS’ advantages and features. With this, the researchers are confident to procure significant data from the respondents. The researchers conducted the survey in Quezon City, specifically in the surrounding stores of Don Fabian St., Brgy. Commonwealth, SM Fairview and SM North in North EDSA.

## **Research Instruments**

The research instrument used in this study is a survey questionnaire in order to determine the key functions and features that will provide a productivity solution to the small or medium-sized retailers in using mobile-based point of sale application.

Opposite of the questions are the five (5) columns with different equivalents in which the respondents will choose one for each question.

Table 1

**Verbal Interpretation**

|  |  |
| --- | --- |
| **Rank** | **Verbal Interpretation** |
| 1 | Very Important/ Strongly Agree |
| 2 | Important/ Agree |
| 3 | Partially Important/ Partly Agree |
| 4 | Unimportant/ Disagree |
| 5 | Very Unimportant/ Strongly Agree |

Table 2

**LIKERT SCALE**

|  |  |
| --- | --- |
| **SCORE** | **CORRESPONDING REMARK** |
| 4.01 – 5.0 | Excellent |
| 3.01 – 4.0 | Good |
| 2.01 – 3.0 | Satisfactory |
| 1.01 – 2.0 | Fair |
| 0.0 – 1.0 | Unsatisfactory |

## **Data Generation Procedure**

The researchers will discuss the strategies that will be used in conducting the research. They will be searching for other available works about the topic of the study both in the library of internet for better reference. The researchers will be providing questionnaires for respondent’s evaluation.

After completing the evaluation, the researchers will count, compute and will tabulate the data gathered in order to determine the features of mPOS that will provide the small and medium-sized businesses a productivity solution when using an mPOS application.

## **Ethical Considerations**

The researchers took advantage of the malls in Quezon City. Catering many customers, malls are packed with a lot of vendors and businesses. Our target respondents are the employees or owners of the businesses that have experience using POS system applications. We patiently waited for their transactions to be over so as not to interrupt aby business opportunity. Once everything is clear, we humbly introduced ourselves being students of Polytechnic University of the Philippines taking the course Bachelor of Science in Information Technology. We also presented our identification card to build trust with our respondents.

Each copy of our survey questionnaire has an attached letter informing them of our purpose in conducting the research survey. We explained to them what mPOS can do that will help their business. When the respondents were done answering the

survey questionnaire, we thanked them for entertaining us even with their busy schedule. Sometimes we would buy their products as a form of gratitude. If ever the respondents would refuse in taking part with the research survey, we still thanked them and formally excused ourselves.

## **Data Case Analysis**

The proponents used Slovin’s Formula to determine the sample size needed for the survey.

**Percent**. This was used to provide relative distribution of the respondents according to some invariables. The formula for obtaining the percentage is:

𝒏

𝒙𝟏𝟎𝟎

𝒇

𝒑 =

Whereas:

p = percentage

f = frequency

n = total number of respondents

**Weighted Mean**. This was used to compute the average values of the observation:

Whereas:

f = frequency

x = corresponding rank of the verbal interpretation

n = total number of the respondents

# **Chapter 4**

**RESULTS AND DISCUSSIONS**

The following are the presentation, analysis and interpretation of the different variables and criteria which were discussed systematically.

1. **The Respondents’ Preference to Switch From Their Current POS Systems to mPOS**

Table 3 below shows the response of the respondents in frequency distribution (f) and percentage (P) that a majority of 42 respondents or 84% of them are willing to use mPOS application instead of legacy or traditional POS systems.

Table 3

**The Willingness of The Respondents To Switch From Their Current**

**POS Systems To mPOS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Preference | Yes | | | No | | |
| F | P | f | | P |
| Are you willing to use mPOS application instead of legacy or traditional POS systems? | 42 | 84% | 8 | | 16% |

Table 3 shows that among the 50 respondents 42 or 84% of them are considering the use of mobile point-of-sale applications while only 8 respondents or 16% of them still prefer to use their legacy POS systems.

## **2. Features Of Mpos Needed For Increasing The Productivity Rates In The Business**

Table 4 shows that inventory checks for clerks and customers and accepting payments both ranked first as the needed features for increasing the productivity rates of small and medium-sized businesses.

Table 4

**Mobile POS Features**

|  |  |  |  |
| --- | --- | --- | --- |
| Features | Mean | Verbal Interpretation | Rank |
| Inventory checks for clerks and customers | 4.86 | Very important | 1.5 |
| Create invoices, orders, and estimates | 4.68 | Very important | 4 |
| Enables a sales assistant to carry out end-to-end shopping transactions in a retail store using a handheld device | 4.44 | Very important | 5 |
| Opening/closing inventory count | 4.74 | Very important | 3 |
| Discounting of invoice | 4.42 | Very important | 6 |
| Accepts Payments | 4.86 | Very important | 1.5 |

Having a mean of 4.86, both inventory checks for clerks and customers and accepting payments are considered as a very important feature in an mPOS by the respondents. Other features are also very important in for increasing the productivity rates of small and medium-sized businesses.

## **3. Criteria That Will Provide A Productivity Solution For Small & Medium-Sized Business.**

**3.1 Mobilty**

Table 5 shows that enabling a sales assistant to carry out end-to-end shopping transactions in a retail store using a handheld device ranked first in providing mobility advantage to an mPOS application in proving a productivity solution for small & medium-sized businesses.

Table 5

**Mobility**

|  |  |  |  |
| --- | --- | --- | --- |
| Mobility | Mean | Verbal Interpretation | Rank |
| Can sell anywhere that has an online connection | 4.16 | Strongly Agree | 3 |
| Diminishes long queues, while providing extended product information to aid selling and enhancing the shopping experience | 4.18 | Strongly Agree | 2 |
| Enables a sales assistant to carry out end-to-end shopping transactions in a retail store using a handheld device | 4.24 | Strongly Agree | 1 |

Carrying out end-to-end shopping transactions in a retail store using a handheld device receive a mean of 4.24 receiving a high preference from the respondents. Selling anywhere there is an online connection, diminishing long queues and enhancing customers’ shopping experience also received a strongly agree of preference.

**3.2 Mobile Optimization**

Table 6 shows that having a smooth and fast checkout process and providing a real-time customer support are preferred by the respondents. Both ranked first in optimizing its mobile features in providing a productivity solution for small & medium-sized businesses.

Table 6

**Mobile Optimization**

|  |  |  |  |
| --- | --- | --- | --- |
| Mobile Optimization | Mean | Verbal Interpretation | Rank |
| A User-Friendly Search Function | 4.64 | Strongly Agree | 3 |
| A Smooth and Fast Checkout Process | 4.7 | Strongly Agree | 1.5 |
| Real-Time Customer Support | 4.7 | Strongly Agree | 1.5 |

A smooth and fast check out process and a real-time customer support both received a mean of 4.7, interpreted as strongly agree. The respondents strongly agreed that having a smooth and fast check out process; providing a real-time customer support; and a user-friendly search function will optimize the use of mobile gadgets in increasing the productivity of small and medium-sized businesses.

**3.3 Payments**

Table 7 shows that the ability to compute different types of paymentis most preferred by the respondents. It ranked first in the payment criteria of mPOs as way to increase the productivity rates of the small and medium sized businesses.

Table 7

**Payments**

|  |  |  |  |
| --- | --- | --- | --- |
| Payment | Mean | Verbal Interpretation | Rank |
| Can make use of an mPOS solution to securely accept different types of payments. | 4.56 | Strongly Agree | 2 |
| Can identify what type of payment was used | 4.4 | Strongly Agree | 3 |
| Can compute different types of payment | 4.6 | Strongly Agree | 1 |

The ability to compute different kinds of payment received a mean of 4.6, interpreted as strongly agree. The respondents also strongly agreed that accepting different types of payment as well as identifying its corresponding type will increase the productivity of small and medium sized businesses.

**3.4** **Real-Time Accessibility**

Table 3.4 shows that the ability access to inventory and price data in real-time for more accurate pricing at checkout to compute different types of payment will increase the productivity rates of the small and medium sized businesses. It ranked first on the preference of the respondents.

Table 8

**Real-time Accessibility**

|  |  |  |  |
| --- | --- | --- | --- |
| Real-time Accessibility | Mean | Verbal Interpretation | Rank |
| Real-time access to inventory and price data allows more accurate pricing at checkout | 4.68 | Strongly Agree | 1 |
| Quick and efficient price updates: List prices can be changed online by a manager and reflected instantly at the checkout register. | 4.6 | Strongly Agree | 2 |
| Anytime, Anywhere Access to Reports | 4.64 | Strongly Agree | 3 |

Real-time access to inventory and price data allows more accurate pricing at checkout received a mean of 4.64, interpreted as strongly agree by the respondents. Anytime, anywhere access to reports and quick and efficient price updates will increase the productivity rates of the small and medium sized businesses according to the respondents.

## **System Architecture**

Figure 2 The System Architecture for Mobile-based Point of Sale Application: A Tool for Developing a Productivity Solution for Small and Medium-Sized Businesses.

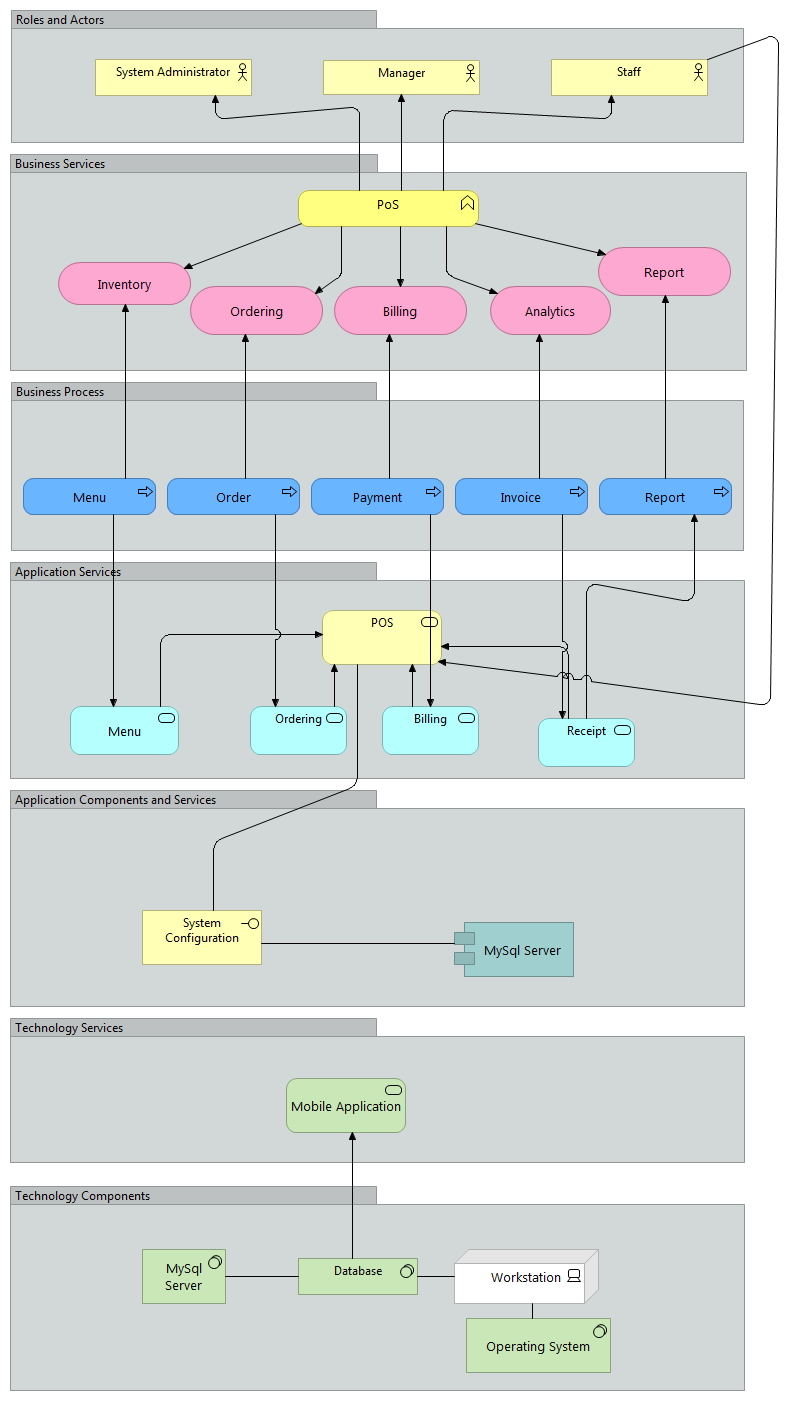
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Figure 2 shows a framework of the Mobile Point of Sale Application for developing a productivity solution for small and medium-sized businesses.

# **Chapter 5**

**SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION**

## **Summary of Findings**

From the presented data in the previous chapter, the following are the consolidated findings.

1. The Willingness Of The Respondents To Switch From Traditional POS To Mobile POS Or Integrate An Mpos To Their Existing Systems

Based on the presented data, there are 42 respondents who are willing to use mPOS application instead of legacy or traditional POS systems. The respondents who strongly agreed in using mPOS solutions to increase their productivity comprise 84% of the sample size.

1. The Mpos Features Needed For Increasing The Productivity Rates In The Business

Having a mean of 4.86, both inventory checks for clerks and customers and accepting payments received the highest preference from the respondents. Disregarding the score difference of the mean, all features are considered very important for increasing the productivity rates in the business. Discounting of invoice; creating invoices, orders, and estimates;enabling a sales assistant to carry out end-to-end shopping transactions in a retail store using a handheld device;opening/closing inventory count are the needed features for increasing the productivity of the business.

1. Criterias That Will Most Provide A Productive Mpos Application

Carrying out an end-to-end shopping transactions in a retail store using a handheld device; selling anywhere there is an online connection; diminishing long queues and enhancing customers’ shopping experience are the benefits that an mPOS have in terms of mobility. The respondents strongly agreed that these will help the small and medium sized business to increase their productivity.

The respondents strongly agreed that having a smooth and fast check out process; providing a real-time customer support; and a user-friendly search function will optimize the use of mobile gadgets in increasing the productivity of small and medium-sized businesses.

The ability to compute different kinds of payment; accept different types of payment; as well as identifying its corresponding type received a rating of strongly agree from the respondents in terms of payment for increase the productivity of small and medium sized businesses.

Real-time access to inventory and price data to allow more accurate pricing at checkout; anytime, anywhere access to reports; and quick and efficient price updates are preferred highly by the respondents in terms of real-time accessibility benefits for increase the productivity rates of the small and medium sized businesses.

## **Conclusion**

Based on the analyzed data and research findings, the researchers deduced the following:

1. The respondents are willing to switch or integrate mPOS in their current system or business process. Majority of the surveyed respondents are considering the advantages of using mPOS applications in their businesses.
2. The mPOS features are significantly important for increasing the productivity rates in the business. Inventory checks for clerks and customers; accepting payments; discounting of invoice; creating invoices, orders, and estimates;enabling a sales assistant to carry out end-to-end shopping transactions in a retail store using a handheld device;opening/closing inventory count are the needed features for increasing the productivity of the business.
3. There is a significant relationship between the given criteria and providing a productivity solution for small and medium-sized businesses.

In terms of mobility, Carrying out an end-to-end shopping transactions in a retail store using a handheld device; selling anywhere there is an online connection; diminishing long queues and enhancing customers’ shopping experience will help the small and medium sized business to increase their productivity.

In terms of mobile optimization, the respondents strongly agreed that having a smooth and fast check out process; providing a real-time customer support; and a user-friendly search function will increase the productivity of small and medium-sized businesses.

In terms of payment, the ability to compute different kinds of payment; accept different types of payment; as well as identifying its corresponding type will increase the productivity of small and medium sized businesses.

In terms of real-time accessibility, real-time access to inventory and price data to allow more accurate pricing at checkout; anytime, anywhere access to reports; and quick and efficient price updates will benefit the small and medium sized businesses in increase its productivity.

## **Recommendation**

In the light of the findings and conclusions, the following are hereby recommended:

1. For the business owners or retailers, consider using mPOS solutions to manage sales transactions in minimal costs and to be competitive in the business industry and integrate mobile POS applications for better customer service and productivity.
2. To the future researchers, focus more on the evaluation of mPOS software specifications and more advanced features in mobile apps and management systems.
3. For developers and software development companies, develop a POS that can manage the business in their daily transactions that may be upgraded for new requirements of the business. Consider the mobility and real-time accessibility advantages as well as the mobile optimization of the app and the forms of payment it can receive.
4. For the management of restaurants, integrate mobile POS or mobile ordering app in your traditional management systems. It may improve your customer service and your overall business.

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## Appendix 1 **Survey Questionnaire**



Republic of the Philippines

Polytechnic University of the Philippines

Quezon City Branch

Don Fabian St. Commonwealth Ave., Quezon City

Dear Respondents,

The 3rd year BSIT students are conducting a research study entitled: **Mobile-Based Point Of Sale Application: A Tool for Developing A Productivity Solution for Small and Medium-Sized Businesses**, in partial fulfilment of the subject Fundamentals of Research.

This survey is a part of a thesis student project at the Polytechnic University of the Philippines, Quezon City Branch under the guidance of Prof. Demelyn E. Monzon. To ensure your anonymity, all of your answers are kept in utmost confidentiality. Your completed survey answers will be only be seen by the researchers and their adviser, regardless of the situation, no individual responses will be identified on any of the questionnaires.

The research is concerned in knowing which criteria will most provide a productive mPOS for the small and medium size businesses.

Please read each question carefully and indicate your response by selecting the most appropriate choice.

Thank You and God Bless.

**PART I** Direction: Please fill up the following information on the space provided for.

NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

POSITION: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

COMPANY: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

BUSINESS TYPE/ INDUSTRY: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Are you willing to use mPOS application instead of legacy or traditional POS systems? YES\_\_\_\_\_\_\_ NO \_\_\_\_\_\_\_\_

**PART II** Direction: Check the chosen field according to the degree of importance.

1- Very Important

2- Important

3- Partly Important

4- Unimportant

5- Very Unimportant

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| FEATURES | 1 | 2 | 3 | 4 | 5 |
| 1. Inventory checks for clerks and customers |  |  |  |  |  |
| 2. Create invoices, orders, and estimates |  |  |  |  |  |
| 3. Enables a sales assistant to carry out end-to-end shopping transactions in a retail store using a handheld device |  |  |  |  |  |
| 4. Opening/closing inventory count |  |  |  |  |  |
| 5. Discounting of invoice |  |  |  |  |  |
| 6. Accepts Payments |  |  |  |  |  |

**PART III** Direction: Check the chosen field according to the degree of agreement.

1- Strongly Agree

2- Agree

3- Partly Agree

4- Disagree

5- Strongly Disagree

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MOBILITY | 1 | 2 | 3 | 4 | 5 |
| 1. Can sell anywhere that has an online connection |  |  |  |  |  |
| 2. Diminishes long queues, while providing extended product information to aid selling and enhancing the shopping experience |  |  |  |  |  |
| 3. Enables a sales assistant to carry out end-to-end shopping transactions in a retail store using a handheld device |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MOBILE OPTIMIZATION | 1 | 2 | 3 | 4 | 5 |
| 1. A User-Friendly Search Function |  |  |  |  |  |
| 2. A Smooth and Fast Checkout Process |  |  |  |  |  |
| 3. Real-Time Customer Support |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| PAYMENT | 1 | 2 | 3 | 4 | 5 |
| 1. Can make use of an mPOS solution to securely accept different types of payments. |  |  |  |  |  |
| 2. Can identify what type of payment was used |  |  |  |  |  |
| 3. Can compute different types of payment |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| REAL-TIME ACCESSISIBILITY | 1 | 2 | 3 | 4 | 5 |
| 1. Real-time access to inventory and price data allows for more accurate pricing at checkout |  |  |  |  |  |
| 2. Quick and efficient price updates: List prices can be changed online by a manager and reflected instantly at the checkout register. |  |  |  |  |  |
| 3. Anytime, Anywhere Access to Reports |  |  |  |  |  |

## Appendix 2 **Biographical Statement**



Alyana Mae L. Apo is a student taking a Bachelors degree on Information Technology in Polytechnic University of the Philippines – Quezon City Branch. She was born on the 22nd of September 1999 at Tagbilaran City, Bohol, Philippines. She is a member of the organization Commonwealth IT Society or COMMITS since her freshman year in the university.

Ms. Alyana is knowledgeable with the following Programming languages: C, C#, Java, COBOL, MS SQL and Visual Basic and has basic knowledge in HTML and MS SQL Server. She has proficient skills in MS Office Applications (MS Word, MS Excel, MS PowerPoint, MS Publisher and MS Front Page), Visual Studio, SQL Management Studio and is familiar with Multimedia Software such as: Adobe Photoshop, Adobe Dreamweaver, Adobe Flash, Adobe Illustrator, Adobe InDesign, Demo Builder, Movie Maker and Adobe Lightroom.

Ms. Apo developed a generic Point of Sale System on her sophomore year using C# as front end and MS SQL as back end. She can work alone or in a team and has very good communication skills. She can handle multiple tasks simultaneously and solves problems with perseverance. She is also willing to learn more skills and courses.



Clark Ian N. Woods was born on April 9, 1988. He is currently a college student in the Polytechnic University of the Philippines – Quezon City Branch majoring in Bachelor of Science in Information Technology. He is knowledgeable in business productivity tools and Multimedia Software (Adobe After Effects, Adobe Photoshop, Adobe Illustrator, Flash, Dream Weaver, Sony Vegas, Paint Tool Sai, Adobe Premiere, FL Studio, Da Vinci and Adobe Audition) and has knowledge in programming languages such as JAVA, C, C#, PHP, MySQL, MS SQL, HTML, CSS and JavaScript. He is also skillful in Network Configuration and hardware. As a student he is a fast learner and can handle multiple tasks.