# Point of Sale (POS): System Development, Implementation and Design

Literature Review

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## Introduction

### What is the Point of a POS System in a Retail Store?

One of the most crucial tools in a retail store is the Point of Sale System. It is the main system that every staff should be trained on how to utilize. Without it, it would be very difficult to keep track of a lot of operations that happen in an organization.

Generally, by owning an efficient POS System, you can ensure that all the necessary actions are running as they are supposed to be. For example, reading information about a customer or keeping records of your sales. As a result, at the end of the day, you have access to a bunch of reports which are automatically generated by the system.

As far as payments are concerned, an efficient POS System is created in such a way to accept multiple payment methods so that consumers are more flexible. Different payment methods can be either via JCC or cash. Hence, a good POS System must be able to handle both ways.

Another valid reason to own a POS System is that it helps customers check out faster since it speeds up the operation of the transaction between the seller and the customer. That being so, “The longer your customers wait in line, the slower your turnover and lower your sales.” (Wong, 2019).

### How can a POS System enhance different sectors in your company?

As stated by Karen Wong (2019), “*Retail stores that invest in a strong POS system are quick to see a huge return on investment”.* Everything that a POS System does, counts towards the improvement and efficiency of an organization, whether it is something simple, such as the positioning of the cash in the cash drawer, or if it is something more important, such as the systems’ design and architecture.

A big and severe issue that a lot of companies go through nowadays, is handling a lot of data. Consequently, POS Systems come to the rescue to solve this problem. One of the most important processes that a POS System can help you grow your retail business, is by analyzing valuable information in an automated fashion. The information can range from your daily, weekly, monthly, or even yearly sales to your stock, staff, or customer data.

It is true that a well-designed POS System can aid in saving one’s time and money by reducing the need to achieve repetitive tasks daily and a lot of other reasons. Therefore, this study aims to discuss what a Point of Sale System is and other sectors that will be useful to comprehend its behavior, design, and architecture.

## What is a Point of Sale System?

### The role of a Point of Sale System in a Retail Store

Overall, a Point of Sale System is the place where your staff can record transactions on a daily basis. But on a deeper meaning, a POS System can do so much more than that. In most incorporations, a Point of Sale System works as a device to save day-to-day information and print receipts for the customers. What is not that obvious, is that it could perform as a base unit to save and retrieve information about how your organization is increasing or decreasing its performance, sales, etc.

Usually, a POS System is divided into two parts. One part is the User Interface, which is a way to allow customers and sellers to exchange products and let the consumers keep their receipts as proof of the transaction. The other part is all the other functionalities that are also working in the background while the first part is running. Thoroughly, it can work as a device that automatically overviews the statistics of your company and informs you about the current position of your retail store. Furthermore, it can also notify you if something is not working well if there are fraud and other possible reasons that could harm the production of your organization in any way.

### The basic functionalities of a Point of Sale System

According to research, there are a few basic functionalities that must be included in such a system. Firstly, it must be able to handle transactions, meaning money and product exchanges. Additionally, it should print receipts and save information about transactions. More precisely, it should be able to insert, update, or delete information in a database daily. Information can be a selection of staff, customers, sales information, or any other type of information the company wants to save. Another useful functionality that can be included in a Point of Sale System, is the ability to apply discounts in a selected price or create customer accounts with their information.

Moreover, creating reports is a big part in the Point of Sale System. Such a system ought to automatically generate daily, weekly, or even yearly reports about the sales and other information that are needed to be recorded in a retail store. For example, there can be reports which can display the total hours that the staff has worked, the earnings of the company, or even a comparison between the earnings of each year. Additionally, there can be reports about the increase or decrease in the sales, which item sells, or in which time of the year there are the most sales. All types of reports can be specifically requested by the organization.

Typically, a Point of Sale System must perform a few more elemental operations apart from generating reports, handling transactions, and other functionalities that have been mentioned above. Firstly, it should be able to track the stock in order to give us a warning when an item is out of stock. Secondly, it must have the functionality to add, modify, and delete employees in the system, and be able to track their performance. These are a few of the basic functionalities that a Point of Sale System has to do according to Agnes The Stubbs.

### What a Point of Sale System Includes

A Point of Sale System does not only include a screen that is available to the user but many other components that can be helpful to fulfill its purpose. An important part of a POS System is a functional printer, which must be able to print receipts for the customers in an appropriate size, which is considered a small and thin layer of paper with a lot of information. Additionally, there are some restrictions about the receipt that must be considered. Not only the information should be easily readable for every individual, but there is also a set of information that should be included in the receipt according to the laws of your country.

Another important part of an efficient POS System is a Credit Card Terminal. Such a terminal allows consumers to achieve contactless or by credit card transactions. Owning such a device would make your customers more flexible as far as their payment is concerned. Generally, the present invention of the Point of Sale System transaction point is applicable to a selection of different transaction types. Concisely, it can accomplish the support of a range of transaction types such as cash, card, cheque, and other methods of product-money exchanges in a convenient fashion.

An optional device in a Point of Sale System can be a machine that can help detect frauds is Fake Money Detector. Such a machine will aid in identifying if a customer has provided the company with false money. Let us not forget that the use of fake money is becoming a serious problem our days.

Followed by that, an essential part of a Point of Sale System is the Cash drawer. Since cash is still in the picture after many years, we still have to support them up to this day.

Of course, the best thing about technology is that once it gets there, it can easily be updated. Therefore, there are more optional devices that can be included here. Most likely, more will be added in the near future depending on the development of technology.

## How can a Point of Sale System help you save money?

With the rapid development of software technology, we can take advantage of such technologies to make the most of them in the retail industry. A huge role that a Point of Sale System does is saving us time and money. For example, years ago when such systems did not exist, we had to record everything on paper. These were not the best years since this solution had a lot of disadvantages. Everything could be lost in a day, human mistakes could happen, or there was a huge amount of information that could not be recorded or managed by a single person. Now, technology came to the rescue and everything can happen in the blink of an eye.

Firstly, a big advantage that a Point of Sale System can offer us is that it speeds up the serving process. Before such systems, the staff had to manually record the items that the customers wanted to buy. Since this is a human action, this procedure is slow, and mistakes could happen. Now, the POS can calculate everything and the only thing that the staff has to do is to click a few buttons. I mean, the last thing we want is for customers to start taking off or not having a good experience in our store because they had a long time waiting to be served. As a result, the staff is happier and more relaxed, and the customers can leave without thinking that their purchase took too long.

Secondly, an important part of owning a Point of Sale System is being able to automate everyday procedures. For example, instead of having to manually search for records that happened a few years ago to compare them with today's’ records, you can just have access to all records by the click of a button. Additionally, it can automate operations like summing up the total hours that the members of the staff have worked daily or notify a manager if there is a strange behavior in the system. Consequently, at the end of the day, a Point of Sale System can do almost everything for you, and you will not be required to do complex work to get the same results.

Likewise, a segment of a Point of Sale System is that frauds can be easily detected. To be more specific, since daily transactions are recorded, we can see the total amount of funds for each day. The fact that the retail industry is highly prone to theft. There are many cases when the amount of money in the cashier was less than expected. Usually, the reason for that is the misuse of change by cash by an employee. Another possible reason is when a staff member was secretly taking money from the cashier, or cases. In whatever way, if the total profit is higher or lower than the amount that has been found in the cashier, then there might be a need for something to be investigated.

With higher technology and the development of transaction methods, there are a lot of ways that customers can pay. Up to this day, we are experiencing payments such as cash, credit cards, debit cards, cheques, mobile payments, electronic bank transfers, PayPal, and more. As a store manager, you must be responsible for giving the ability to your customers to pay on their terms. A Point of Sale System can provide transactions with most of the existing facilities, and it can always be easily updated or upgraded if any other payment options come up. As a business, we would not want to lose customers due to the fact that they do not have the capability of paying in any way that they can.

In the rear, there are a lot more benefits that such a system can offer. For example, it can reduce the time we need in order to enter data, show us a more manageable inventory for our sales depending on our stock, and more. Generally, it can lead us to an improved organization, by reducing clutter, wasted time, and energy that the staff has to go through every day.

## Design Approaches

Since this study is about Point of Sale Systems on a screen, we are focusing on the design patterns of existing projects that are developed for Windows. There are a lot of factors that must be taken into consideration when designing a Point of Sale System. First of all, we have to count the Ergonomic Design, which is all about the positioning and the area around the system, meaning if it is comfortable to use, etc. Secondly, there is the User Interface Design, which is all about the actual design of the System. In detail, the selection of colors, the text, and other factors must be handled carefully to make this a successful design. Another design which is as equally important as the others is the Database Design. Specifically, the entities, relationships, normalization, etc. that will boost up the system to be efficient and fast. With a well-done database design, we can achieve fast results and many more which will be followed in the Database Design Approaches Section.

### Ergonomic Design Approaches

Starting with the ergonomics, we have to think about the distance that the member staff will have from the screen. Specifically, the appropriate distance differs from all people, so the more flexible the position of the screen is, the better. It is necessary to consider that this is a device that will be used for a lot of hours, so it needs to be adjustable in order to make sure that everyone is well by using it.

At the same time, another section that has to be acknowledged is the physical space around the Point of Sale System. For instance, the space around the counter must not be overcrowded, but it has to be filled with other third-party devices that are needed for completion of a sale. Any other unnecessary items should be stored somewhere else away from the screen. The reason to that, is to avoid having a mess near to where the money is, and also keep the staff concentrated on providing their services to the customer instead of looking for any lost equipment.

### User Interface Design Approaches

A huge section in building a Point of Sale System is the User Interface. An efficient and effective implementation of a well-done POS System could fail because of a bad User Interface Design. There are a lot of ways that such a design can be implemented and have successful results.

A Point of Sale System requires a quick and responsive interface, which is accurate and easy to use. This study focuses on using a Touch Screen Interface for a Pint of Sale System. Considering that touch screens are used a lot worldwide and they designed to create an interactive environment with the user. According to Samuel Sjöberg, “in combination with the special needs that arise from touch screen interaction, makes it a prime candidate for design driven by findings in human-computer interaction.”. That is the reason that a touchscreen would be a lot more effective towards building a Point of Sale System. By using a touch screen, we speed up the time a person needs to complete a sale. Another vital situation is the time the system takes to process anything. The last thing we want is for the system to take a long of time while processing an order, because that would lead in huge delays for every customer. After all, the system was created to speed up this process, not the opposite.

What is essential, is the use of appropriate coloring for the selection of colors. As an example, you would not want a black background with red text in the display since it will cause a difficulty in reading for the user. Not to mention the use of big and clear font for the text for obvious reasons. Additionally, since we are focusing on touch screens, staff should be able to handle the screen well and not press other buttons by accident. In order to achieve that, the buttons and letters must be big enough and clear to the eye. Since there will a generous distance between the screen and the staff, they should be able to handle the Point of Sale System without making an effort to read the text or being careful not to mistakenly press the wrong button. Hence, it is important to mark down these small details because if the user interface design is not well-done, it will definitely affect the success of the System, no matter how good everything else is.

In the same manner, consistency is something influential that must be shared between different pages. Based on observation, users do not like it when pages in any software are inconsistent. As reported by Prashamsa Mishra, when different pages are inconsistent, they confuse the user. On the other hand, consistency provides clarity. Factors that should be consistent in a system are based on the color scheme, the styling of the pages, the font type and size, background images and effects (Mishra, 2013). Consistency also is applied when similar images around the world mean the same in the application as well. Digital Images meaning the burger icon which usually symbolizes navigation in an application, or the save icon which has a floppy disk. Hence, the software should be consistent by itself as an application but be consistent with the outside world standards as well.

### Database Design Approaches

For the most part, Point of Sale Systems allow organizations to analyze a wide variety of data. By using such a system, we have the ability to analyze the behavior of the customers and adjust our sales behavior for our own benefit. In previous years, companies had to save all information they had by writing them on paper. Obviously, this is not the best option, but it is the only one they had. Today, having a database when owning an organization seems like the only way. Having all information virtually is safer because it avoids losing any data due to possible reasons. For example, having them stolen, or losing them due to a physical destruction, or any other reason. In that event, it is necessary for an organization to own a database system which will manage to save all important information.

In essence, a database design must start with an Entity Relationship Diagram (ERD) which can be used for data modeling and understanding of relationships across different entities. For a retail store, entities could range from staff, categories of products, the actual products, customers etc. Next up is the Relational Model Diagram. The Relational Model would create a better understanding of the tables, member data and relationships that must be implemented in the database. Moving, the actual SQL code has to be implemented to create such a database with the entities and other values that have been implemented in the previous diagrams. Finally, the appropriate data must be entered in the database.

One element that we cannot ignore when creating a database, is normalization. Creating an efficient database is crucial, since we eliminate repetitive data and we also ensure that the data entered are in a correct and logical order. With this way, our implementation of the database design will be more straight-forward and clearer to the people who use it. Additionally, with data normalization, our data are less complicated since it reduces the number of the inconsistency that come from processing data.

Having a good database design matters due to multiple reasons. In consonance with Noah, this would help you in dividing information in subject-based tables which aids in the clearness of the information. Plus, your data will not only be accurate, but will also joined together with keys to support their integrity. With all of these together, your organization will be ready to accommodate processing of your data and export any needed reports for any possible reason.

## Conclusion

After gathering this information, I have concluded that Point of Sale Systems play a huge part in a retail store. Procedures can be automated, the time needed to complete a task is less and all daily information can be saved in an automated manner. As a result, valuable time and money are saved every day. By having a well-done Point of Sale System, your organizations’ performance will increase, and the results will be extraordinary. By the end, you will have difficulty in believing about how everything was managed to be done in a retail store in the past without such systems.

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