

The Evolution of Point-of-Sale Systems from Traditional to Mobile Solutions

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ABSTRACT

POS systems have evolved and changed how retail and service-oriented businesses operate by improving efficiency and client satisfaction. Historically, POS consisted of fixed cash registers and manual inventory, and it has evolved to a system where POS solutions are more mobile. This paper discusses the evolution of POS systems, from the conventional fixed POS to the current mobile POS system, the technology factors underlying the evolution, and its implications for businesses and consumers. Issues under consideration are the drawbacks of conventional POS terminals, growing trends in mobile POS technologies, and advantages to be gained from their use, namely faster transactions, better control over data, and, possibly, better consumer satisfaction. The research also explores the various mobile POS systems' uses in distinct industries, their contribution toward innovation, and process improvements. Thus, based on the evaluation of the existing and potential developments in mobile POS solutions, this paper is targeted at presenting the essential aspects of the concept to determine its role and importance in the contemporary retail environment. The conclusion, therefore, recommends that organizations adopt mobile POS technologies to improve the increasing market and offer ideas for future research and development in the field of mobile POS.

Keywords: Point-of-sale (POS) systems, conventional POS, mobile POS, customer experience, data management, operational efficiency, and retail industry

1. Introduction

Point-of-sale (POS) systems have been a part of the organizational structure of retail and service businesses as tools that help with sales and stock control. Earlier POS systems were much more extensive, involving cash registers supported by numerous formalities that, in most cases, created confusion. However, with the years of progress, these systems have been adapted from a technological viewpoint, thus bringing forth the mobility approach in POS solutions. The knowledge of this evolution can help firms comprehend the current state of the technological landscape and apply it to the maximum advantage of mobile POS solutions. The modern POS systems use wireless communication, cloud computing, and advanced software to provide organizational flexibility and efficiency. Mobile POS systems assist transaction processes in becoming more efficient

and contribute to overall customer satisfaction because of increased efficiency and individual attention. This paper analyses the transition from traditional to mobile POS, looking into the factors that have forced the change, the problems experienced, and the gains accrued to businesses and consumers.

2. Problem Statement

Conventional POS systems have numerous disadvantages that adversely affect business processes and customers. These rigid systems involve fixed hardware, which makes the transaction structures highly preordained. Manual systems linked to standard POS techniques are likely to contain errors that affect supply chain and sales predictions because of variances in inventory records. Besides, real-time data analysis cannot be integrated, reducing the business's ability to provide timely

recommendations. Consumers are becoming more demanding, especially in speed and personalization for faster and personal service delivery; this causes the traditional point-of-sale systems to take longer and, therefore, less customer satisfaction. Furthermore, conventional systems are expensive to maintain and require complicated staff training, which is unsuitable for most business organizations. Solving these issues requires more flexible, efficient approaches to improve operational tasks' effectiveness and customer experience.

3. Literature Review

POS systems have been explored in the academic and business literature to analyze their development over decades along with technological and business requirements. Conventional POS systems, encompassing fully developed cash registers, were historically the dominant type of POS systems used in retail businesses. These systems were quite suitable for the simple 'transactional' type of work but lacked the kind of 'flexibility' and 'real time' working the business demanded, especially in managing data. The weaknesses of traditional POS systems, such as the vulnerability of the systems to error and the inconvenience of manually checking the inventory, are known.

Mobile technology has revolutionized POS systems, bringing changes to the systems. Mobile POS systems that rely on wireless technology and cloud computing¹ appeared in the early 2000s. Currently, there are several benefits of adopting mobile POS over traditional POS, including faster transactions, enhanced data accuracy, and the convenience of making transactions at any location within a store or outside. Furthermore, mobile POS systems are beneficial in generating a better consumer experience due to time-saving and tailored provision of services.

Over the past few years, mobile POS studies have stressed the need for improving functions such as analytics, customer relationship management (CRM)² and inventory tracking³. These systems enable the organization to act fast by providing integrated decisions since market trends take time to analyze, thus improving the operation. However, moving from the conventional fixed terminal POS to the mobile POS is relatively easy for businesses, including data security, system reliability, and system implementation costs.

In addition, there is a rising focus on the literature regarding the importance of mobility integration with corporate processes to reap the full benefits of mobile POS systems². This literature reveals that mobile POS has many advantages.

4. Solutions

The transition from conventional POS systems to mobile POS solves many issues related to conventional POS solutions by providing businesses with more mobility, speed, and convenience for consumers.

A. Technological Advancements

The general development of mobile POS systems is attributed to significant technological developments. Such systems employ wireless communication, cloud computing, and sophisticated software solutions to transform the transactional environment.

B. Wireless Connectivity

Mobile POS systems use wireless interfaces such as Wi-Fi and Bluetooth; the connections do not require cables. The wireless functionality enhances the movement of the salespeople

since they can attend to customers and complete transactions at any location within the facility.

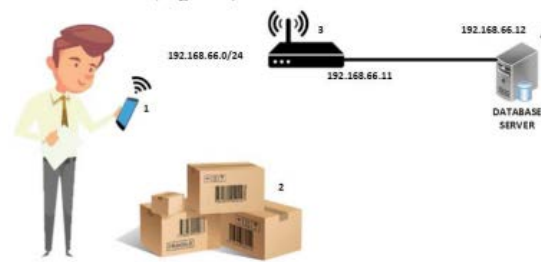


Figure 1: Cashier utilizing Mobile POS Wireless capabilities. Adapted from⁷.

C. Cloud Computing

As a result of integrating mobile POS systems, data management is done from the cloud computing platforms. This serves to ensure that businesses get timely data on their sales, stocks and customers' trends in various outlets. There is also improved security, software updates, as well as disaster recovery solutions offered in cloud-based systems¹. Secure Socket Layers (SSL) are responsible for enhancing security and privacy.

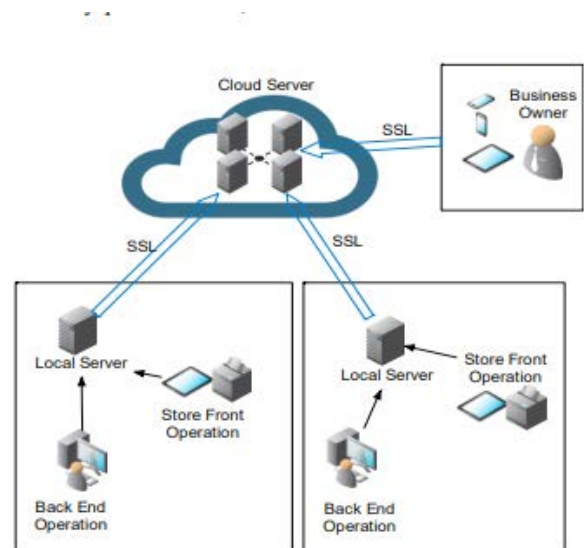


Figure 2: Recommended Cloud-based infrastructure. Adapted from¹.

D. Advanced Software Applications

Mobile POS systems have embedded software in the system, which comprises sales tracking options, inventory management, customer relation management (CRM), and analytics². All these applications are beneficial for businesses, mainly giving them insights into the market and optimizing business procedures.

E. Implementation Strategies

The transition from conventional POS devices that are fixed to more versatile ones, such as mobile POS, needs to be done thoroughly. Various strategies are crucial for successful implementation.

The first step involves conducting a business needs assessment exercise. A pre-research scan is important for a business as it enables one to research the business needs. This entails assessing the effectiveness of current POS systems, as well as determining the problems that are experienced, and outlining the goals of the new mobile POS solution.

The next step involves vendor selection. The decision about the vendor is sensitive. Some of the key points that businesses should take into account when choosing POS solutions include the credibility of the vendor, the available features in their POS solutions, compatibility, support and prices³. Selecting more than one vendor and asking them to demonstrate their products helps in making the best decision when choosing the products to purchase.

Another important step is the pilot testing of the selected mobile POS. It is necessary to carry out pilot studies before the mass implementation of chosen solutions in businesses. This way, they are able to see areas of concern, source opinions from the staff members and maybe make the appropriate changes to the system.

The other critical step involves staff training and getting agreements regarding vendor support. It is critical to develop and provide sufficient training to employees for the mobile POS to be easily integrated². Training should include the features of the merchandise using the mobile POS system, general problems, and suggestions on how to address the clients effectively. Vendor support is also imperative throughout the implementation process and after implementation.

The final step involves integration with existing systems. Mobile POS systems should also be synchronized with other business applications and programs like accountancy, stock, and customer relationship management software. By integrating point-of-sale and customer relationship management systems, data about customers may be easily shared².

F. Benefits to Businesses

The move to mobile POS systems is, in many ways, beneficial to the business as it enhances business activities and, at the same time, enhances revenue. First, mobile POS enhances sales personnel's mobility and flexibility.

The sales personnel can use mobile POS systems to adopt a flexible working model where they walk around the store, serving the customers and ringing up the sales simultaneously. By offering flexibility, the client can avoid waiting long hours and enhance their shopping experience.

Secondly, mobile POS ensures real-time inventory management³. As for the inventory is replenished and updated in line with the inventory records, which are obtained through mobile POS systems. This assists in avoiding conditions such as stockouts and overstock situations, thus managing inventory and its costs.

Additionally, mobile POS offers enhanced data analytics functionalities. Mobile POS comes with analytical features that help track sales and customer and employee performance. Such enables business owners spot trends and modify tactics based on analyses of sales data, quantity of stock, and consumer buying patterns³.

Also, mobile POS promotes cost-saving. Most mobile POS systems are cheaper than the traditional POS systems. They involve using fewer infrastructures, are cheaper to maintain, and are flexible enough to grow with the business. Furthermore, organizations are more cost-effective and have fewer requirements for facilities and structures in the physical plane.

Mobile POS is easily integrated with customer relationship

management (CRM) functionalities. Mobile POS softwares includes CRM features and aspects, and the collected customer information can be easily stored. It becomes possible to apply targeted sales and promotion, to use bonus points, and thus to develop long-term cooperation with clients².

With mobile POS, transactions are processed faster, making the checkout time shorter since the sales can be done anywhere within the store. This minimizes the time customers wait and increases their level of satisfaction. Also, the mobility of a POS system dramatically improves the customer experience and is increasingly vital to today's retail market.

Mobile POS offers personalized service. This technology allows the sales associates with mobile POS devices to peruse through customers and their purchasing records, in a better position to advise or attend to the customer more specifically. This is a plus for the store since it makes shopping more fun; thus, customers are likely to revisit the store.

Lastly, mobile POS ensures seamless payments. Mobile POS systems offer multiple payment options, such as credit/debit cards, mobile wallets, and contactless payments. Such cuts out all payment concerns and adapts to customers' preferences for making payments easily.



Figure 3: Summarizing the Benefits of Mobile POS.

G. Implementation Success Stories

1. **Apple Stores.** Apple was amongst the first companies to implement mobile POS systems in its operations. Apple has developed a customer-centric shopping solution with mobile gadgets for their sales associates. The possibility of payments throughout the store space and the delivery of necessary information about the clients also increased service quality and consumption satisfaction.
2. **Nordstrom.** Nordstrom, a major fashion retailer, adopted the mobile POS systems to enhance customer interaction and business efficiency⁶. The mobile POS has enabled sales associates to attend to customers' needs, learn the stock status in different branches, and manage returns correctly. This has, in turn, contributed to better customer satisfaction and hence improved sales.
3. **Starbucks.** Starbucks also employs mobile POS systems so that it can easily handle many transactions that are usually processed in this outlet. Mobile POS has improved the speed of service and engagement between customers and the platform due to the system's mobile payment system and the Starbucks rewards program.

H. Future Outlook and Trends

Mobile POS systems are also a work in progress, with AI and machine learning poised to set the next development

course. These technologies shall help in the growth of predictive techniques where businesses can foresee a customer's need or the usage of a particular item. Businesses can enhance inventory management, tailor customer experiences, and boost sales with the help of AI-powered mobile point-of-sale systems⁴. Another area where AI may be useful is ordering targeted marketing promotions to encourage customers' additional purchases. Machine learning algorithms will strengthen fraud detection and other security procedures for safer transactions.

Another development that will enhance the mobile POS system is IoT because it will link various items present in the selling area. These will interconnect to offer real-time customer trends, product stocks, and store performance. POS systems integrated with IoT technology can help eliminate manual item reorders and send alerts for periodic check-ups and maintenance of hardware components for better functioning. Currently, many point-of-sale devices used by payment service providers are increasingly relying on Internet of Things (IoT) SIM cards for a primary or backup connection. Also, IoT offers a platform for delivering unique shopping experiences through smart shelves and comprehensive guidance throughout a store.

Other related technologies, including augmented reality (AR) and block chain technologies, are also expected to influence mobile POS systems. AR can offer customers examples of how they can use and try the products virtually, improving the shopping experience. Blockchain enables advanced track and trace capabilities in supply chain management⁴. At the same time, the blockchain will improve transaction safety and increase accountability, decreasing the possibility of a deceitful scenario and increasing the quantity of data.

5. Impact

A. Operational Efficiency.

Mobile POS is arguably one of the most influential advances and has brought positive changes in operative business in the retail and service sectors. These systems decrease the amount of time required for transactions in sales and inventory management and have traceable cost implications. To increase the efforts on customer service and hence improve the general shopping experience of customers, hired staff will be able to pay more attention in this area. Due to this, human intervention when performing specific tasks is eliminated fully or partially, hence minimizing or eradicating errors. Thus, companies and organizations achieve their goals with fewer difficulties and higher efficiency.

B. Customer Satisfaction.

Another benefit of the use of realized POS systems is an improvement in the levels of customer satisfaction. Mobile transactions are fast and efficient; hence, customers can complete their purchases within short durations and reduce instances of having to wait. Customers get a chance to be served individually due to their ability to use their smart gadgets to access details such as purchase history and preferences. The option is also provided for customers to make payments directly to the merchants through contactless and mobile payments. Full embodiment of these aspects ensures that customer experience is improved so that clients remain loyal and revisit the business.

C. Data-Driven Decision Making.

The available mobile POS systems have made decision-

making easy by providing real-time data analysis, making data-driven decision-making easier. A business will now be able to make significant and beneficial decisions within the shortest time possible because of this knowledge of its sales, customers, and stock. This information assists in making correct decisions concerning stock, marketing and other aspects of business. The capability to control the processes from the moment when they are initiated and to regularly modify the flow of the processes as they evolve means that companies can efficiently adapt the functioning of the processes more effectively. All these lead to better management for increased and sustainable strategic growth in the future.

D. Scalability

Mobile POS systems also have high levels of scalability so that they can be adopted no matter the size of the firm. They can also be scaled up or down in size to accommodate the dynamism of the needs of the expanding business. These are important for effectiveness in management as the business environment changes, requiring flexibility. Moreover, since they are portable point-of-sale systems, they have lower implementation costs as well as maintenance expenses, which are familiar with the fixed POS terminals and hence suitable for growing businesses. This scalability gives much assurance that businesses will always be able to benefit from mobile POS systems as they expand and transform in terms of market tendencies.

6. Uses

Mobile POS terminals are used in various business fields, and all the spheres receive the advantages of mobility provided by the used systems.

A. Retail

In retail, the use of mobile POS improves customer experience because the purchase of the products can be conducted by salespersons at any location within the store. Mobile POS in retail shops that can process payments, print receipts, scan barcodes and coupons, and operate independently of human workers. They also include components like inventory management, customer relation management (CRM) and sales analysis.

B. Hospitality

Some ways mobile POS systems are utilized in restaurants, cafes, and hotels include order taking, management of reservations, and payments. The compatibility with other systems, including kitchen displays and booking platforms, makes operations run more efficiently.

C. Healthcare

The mobile POS systems in healthcare facilities help patients sign in for their appointments and pay their bills⁵. This avoids complications, saves time for the admin personnel, and enhances the patient's experience.

7. Scope

Mobile POS systems are not limited to mere transactions; they can perform numerous related activities relevant to a certain company or enterprise's processes.

A. Inventory Management

Mobile POS systems also facilitate real-time inventory

monitoring³, avoiding wrong demands such as overstock or understock. It is important and greatly beneficial for great aspects of supply chain management.

B. Customer Relationship Management (CRM)

Mobile POS systems allow businesses to acquire and analyze customer data with the help of CRM functionalities². It allows targeted advertisements, discounts and bonuses, and optimization of business interaction with clients.

C. Sales and Analytics

The mobile POS makes sales analytics encompassing sales data, customer preferences, and employee performance available. These are useful more so in strategizing business and eradicating operational inefficiencies.

D. Integration with Other Systems

Mobile POS can also be connected to other business applications like accounting software, Human Resource Management (HRM) systems, and Supply Chain Management (SCM) systems². It also provides clean and efficient data flow, contributing highly to the total organizational functionality.

8. Conclusion

The transition from the traditional POS system setup to the mobile POS solution greatly defines a key advancement in the retail industry and service sectors. This paper identifies various benefits associated with implementing mobile POS systems, including efficiency, customer satisfaction, and data benefits. With mobile POS systems being easily set up, portable and highly configurable, they can easily find applications in any business domain, including retail and hospitality, healthcare and field services. The usage of mobile POS systems significantly affects businesses, bringing benefits in the form of cost reduction, optimization of resources, and evidence-based decisions. These systems also help them gain a competitive advantage that is attained through the delivery of fast customer services, personalized service, and efficient payment systems to meet and exceed their customer's needs. This trend will intensify in the future as mobile POS systems adapt to improved technologies, including, for instance, AI, IoT, augmented reality, and blockchain.

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