



(REVIEW ARTICLE)



Application of pharmacy management systems and digital marketing: Impact on highly efficiency and increased turnover

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Abstract

The pharmaceutical industry, particularly pharmacies, is undergoing a significant transformation driven by the rapid advancement of technology and digital marketing. This review explores how implementing technology, such as pharmacy management systems (PMS), mobile applications, and point-of-sale (POS) systems, enhances operational efficiency by improving stock management, reducing errors, and speeding up transactions. Additionally, digital marketing strategies, including social media, search engine optimization (SEO), and email marketing, help increase pharmacy visibility, build customer engagement, and drive sales growth. A systematic review of literature from reputable sources over the past decade was conducted to identify the impact of these technologies on pharmacy operations and turnover. The findings indicate that technology adoption improves operational performance and customer satisfaction, while digital marketing expands market reach and strengthens customer loyalty. However, small pharmacies face high implementation costs and a lack of technological expertise. Despite these challenges, the potential for growth remains substantial. Pharmacies can leverage these tools to increase efficiency, customer retention, and revenue. In conclusion, adopting technology and digital marketing is essential for pharmacies to stay competitive in an increasingly digital world, provided they address the challenges in implementation.

Keywords: Technology Adoption; Digital Marketing; Pharmacy Management Systems; Operational Efficiency; Customer Loyalty

1. Introduction

The pharmaceutical industry, particularly pharmacies, is undergoing a significant transformation along with the rapid development of technology and digitalisation. In recent years, pharmacies have acted as drug distribution points and as providers of more holistic healthcare services (1). The growing demand for faster, more efficient, and accessible healthcare services forces pharmacies to adapt to these changes. One of the most significant ways to respond to this change is by implementing technology and digital marketing (2). By using the right technology, pharmacies can manage stock, transactions, and patient information more efficiently, improving operational performance. In addition, an effective digital marketing strategy can increase pharmacy visibility, build customer loyalty, and expand market share (3).

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However, while technology and digital marketing offer great opportunities, their implementation in pharmacies is often faced with challenges. Many pharmacies, especially smaller ones, face difficulties implementing technology-based management systems and optimising digital marketing. This can be due to limited resources, both financial and knowledge of the latest technology. Therefore, it is vital to understand the extent to which technology and digital marketing play a role in improving pharmacies' operational efficiency and turnover and how pharmacies can overcome the challenges in implementing these technologies (4).

Along with the rapid development of technology, digital-based pharmacy management systems have become a basic necessity to manage pharmacy operations better. This includes software for stock management, transaction monitoring, and integrated patient data storage (5). With this technology, pharmacies can ensure sufficient stock, minimise errors in drug ordering, and speed up the transaction process. In addition, using mobile applications and websites also allows pharmacies to expand their market reach, make it easier for customers to make purchases, and provide online consultation services (6).

On the other hand, digital marketing is becoming a very important tool for pharmacies to reach a wider audience and increase turnover. Digital marketing through social media, search engine optimisation (SEO), and influencer-based marketing are some strategies that can be used to increase the visibility of pharmacies (7). In addition, email marketing to send promotions or product updates can also increase customer engagement and build long-term relationships (8). However, it is important to consider regulations governing the use of technology and digital marketing, especially concerning protecting customer personal data and applicable pharmacy policies.

The importance of implementing technology and digital marketing in pharmacies is driven by customers' increasing need for convenience and speed in obtaining products and health information. Therefore, this article aims to explore how technology and digital marketing can improve the efficiency and turnover of pharmacies and discuss the challenges and opportunities in their implementation. This discussion will clarify how pharmacies can utilise technology and digital marketing to stay competitive in an increasingly competitive market.

2. Review Methods

In preparing this review article, the literature was collected through searches in several leading databases such as Google Scholar, PubMed, and Scopus. The literature selection process was conducted by considering the relevance to technology, digital marketing, pharmacy management, and the quality of the methodology used in the research. All literature selected had to be from reputable sources and published within the last 10 years to ensure the data used was current and relevant to development trends in pharmacy.

The selected literature was then qualitatively analysed to identify key themes relating to the impact of technology and digital marketing on operational efficiency and increased pharmacy turnover. This analysis was conducted narratively, exploring how implementing technology such as pharmacy management systems, mobile applications, and automated sales systems can improve efficiency. Likewise, implementing digital marketing strategies, such as social media, SEO, and email marketing, contributed to the increase in visibility and turnover of the pharmacy.

In addition, to ensure the validity and quality of the literature used, the selected studies were evaluated based on explicit inclusion and exclusion criteria. The following criteria were used:

2.1. Inclusion Criteria

- **Reliable Source:** Articles published in reputable international journals and publicly accessible (e.g. via Google Scholar, PubMed, or Scopus).
- **Recent Research:** Literature published in the last 10 years (2013-2023).
- **Relevance to Topic:** Focus on technology and digital marketing in pharmacy management and its impact on pharmacy efficiency and turnover.
- **Transparent Methodology:** Research that uses a clear and accountable methodology, both qualitative and quantitative.

2.2. Exclusion Criteria

- **Unreliable Sources:** Articles from unverified or predatory journals or platforms.

- Old Literature: Articles published more than 10 years ago unless they significantly influence the discussion of the theoretical basis.
- Irrelevant Topics: Articles that discuss the application of technology or digital marketing outside the context of pharmacy and pharmacy.

The analytical methodology used in this review was descriptive qualitative, with thematic synthesis to group findings based on key relevant categories, such as the application of technology in pharmacy management and digital marketing strategies. The impact of technology and digital marketing on pharmacy efficiency and turnover was analysed through case studies and existing literature, as well as a critical evaluation of the research.

3. Results and Discussion

3.1. Technology in Pharmacy Management

3.1.1. Pharmacy Management System

A Pharmacy Management System (PMS) is software used to manage various aspects of pharmacy operations, such as stock management, sales transactions, and patient information recording (9). PMS allows pharmacies to reduce errors in stock recording, improve transaction accuracy, and simplify patient data management. PMS will enable pharmacies to maintain better control over drug inventory, optimise the use of storage space, and ensure the availability of drugs needed by patients (10). For example, research by Siti et al. (2021) showed that implementing PMS in Indonesian pharmacies can improve operational efficiency by up to 30% by reducing errors in stock management and transactions (11).

In addition, PMS also helps record patients' medication history more systematically, enabling pharmacies to provide more personalised and targeted services. This is important for improving service quality in pharmacies, which directly impacts customer satisfaction (12,13). A study by Zhang & Li (2020) also highlighted that PMS promotes more efficient stock and transaction management in large pharmacies, increasing pharmacy profitability (14).

3.1.2. Mobile and website applications

Mobile apps and websites increasingly improve customer convenience and operational efficiency of pharmacies (15). With mobile apps or websites, customers can order medicine online, check product availability, and get the health information they need without visiting the pharmacy in person. This makes it easier for customers and allows pharmacies to expand their market reach (16,17). For example, Ningsih et al. (2019) found that mobile applications for ordering medicine in Jakarta's pharmacies increased customer satisfaction and accelerated sales transactions. With the app, customers can place orders faster and receive real-time notifications about product availability (18).

From an operational perspective, mobile apps and websites enable pharmacies to manage stock more efficiently, provide automatic notifications to customers of product arrivals, and enable online payment processing. This aligns with the findings by Lim & Tan (2021), who mentioned that mobile apps can improve operational efficiency by minimising in-person interactions and increasing customer convenience (19).

3.1.3. Automated Sales System

Automated sales Systems, such as point of sale (POS), are very important in improving transaction efficiency and stock management in pharmacies. POS systems process sales transactions, automatically update inventory data and generate real-time financial reports (20). By using POS, pharmacies can reduce transaction errors, speed up the payment process, and increase customer satisfaction (21). Research by Wibowo & Haryanto (2020) in Indonesia showed that implementing POS systems in large pharmacies reduced transaction time by up to 50% while reducing errors in recording stock and transactions (22).

In addition, POS technology can also be integrated with other devices, such as barcode scanners, which speed up the stock counting process and reduce human error. In a study conducted by Jamil & Reddy (2020), it was found that implementing POS systems in large pharmacies could speed up the transaction process and increase sales volume. Thus, POS technology improves operational efficiency and directly contributes to the increase in pharmacy turnover (23).

3.2. Digital Marketing in Increasing Pharmacy Turnover

3.2.1. Marketing through Social Media

Social media marketing has become one of pharmacies' most effective digital strategies for reaching more customers. Platforms like Instagram, Facebook, and Twitter allow pharmacies to promote products, provide health education, and interact directly with customers (24,25). The use of social media can increase customer awareness of pharmacy products, be it medicines or other health products. Through engaging content, pharmacies can build closer relationships with customers and introduce their services more personally (26).

Research by Zhang et al. (2019) showed that using social media for pharmacy marketing can increase customer interaction by up to 40%, impacting growing sales of pharmacy products (27). Social media also allows pharmacies to educate customers about the proper use of drugs, possible side effects, and healthy living tips, which makes customers more trusting and loyal to the pharmacy(28). Thus, marketing through social media not only increases direct sales but also strengthens the brand image of the pharmacy.

3.2.2 Search Engine Optimisation (SEO) and Search Engine Marketing (SEM) for Pharmacy

Search Engine Optimisation (SEO) and Search Engine Marketing (SEM) are two key aspects of digital marketing that enable pharmacies to attract more traffic to their websites (29). SEO focuses on optimising web pages to make them easier for search engines like Google to find. By using the right keywords, pharmacies can ensure that their site appears on the first page of search results for a particular product or service. On the other hand, SEM involves using paid advertising to ensure that pharmacies appear in the top positions of search results (30,31).

The study by Kumar et al. (2021) revealed that implementing SEO and SEM strategies can significantly increase the visibility of pharmacies, with website visitors rising by up to 50% (32). This allows pharmacies to reach potential customers who may not have been aware of their existence. Search-based advertising (SEM) will also enable pharmacies to attract customers with higher purchase intent as they actively search for specific products (33).

3.2.3 Email and Influencer Marketing

Email marketing is one of the most direct and personalised marketing methods in digital marketing. With email, pharmacies can send special offers, discounts, or important information about their products and services directly to customers' inboxes. Through personalised emails, pharmacies can maintain customer relationships and increase opportunities for repeat purchases. According to research by Rafiq et al. (2020), email marketing increased sales conversion rates by 25% among registered customers.

Influencer marketing is also gaining popularity among pharmacies to promote their products. In the pharmaceutical industry, influencers who influence the health or lifestyle field can help increase the visibility of pharmacies and build trust with their audience (34). Influencers can share their experiences using the pharmacy's products or provide recommendations based on their health needs, significantly expanding its reach. A study by Chan & Ng (2021) showed that using influencers in pharmacy marketing can increase engagement and sales conversion by 30% (35).

3.3. Regulation Related to Technology and Digital Marketing in Pharmacy

3.3.1 Technology-related Regulation in Pharmacy

The use of technology in pharmacies is governed by several regulations that ensure that technology is applied appropriately and safely. One necessary regulation is the Minister of Health Regulation No. 9/2017 on Pharmacies, which regulates the operational standards of pharmacies, including the use of management systems and software in pharmacies. Efficient management systems and appropriate software can improve stock management, transactions, and overall pharmacy services (36).

In addition, Minister of Health Regulation No. 73/2016 on Pharmaceutical Service Standards in Pharmacies also regulates pharmaceutical service standards that include the utilisation of information technology to improve the efficiency and quality of services in pharmacies (37). In this context, technology should be used to ensure better service quality and transparency in every transaction at the pharmacy.

On the other hand, the Regulation of the Food and Drug Administration of the Republic of Indonesia Number 8 of 2020 also regulates the use of technology in online drug sales to fulfil the regulation of pharmaceutical, electronic system

operators (PSEF). This regulation ensures that online sales of drugs and food comply with applicable standards, including the use of technology for stock management and transactions (38).

3.3.2 Digital Marketing Regulations for Pharmacy

Regulations governing digital marketing in pharmacies are essential to ensure that pharmacies market their products legally and ethically, especially as pharmaceutical products are linked to public health. The Indonesian Food and Drug Administration Regulation Number 8 of 2020 provides guidelines for promoting medicines and pharmaceutical products online, including through social media and pharmacy websites (38).

In addition, Minister of Health Regulation No. 9/2017 also regulates the ethics of pharmaceutical product promotion, which includes how products can be promoted through digital marketing without violating existing provisions, such as not providing unproven or misleading health claims (36). Digital marketing in pharmacies must be carried out with due regard to applicable regulations not to harm consumers (39).

3.3.3 Customer Data Protection

Protecting customers' data, including health data, is one of the most important aspects of using technology and digital marketing in pharmacies. Law No. 27 of 2022 on Personal Data Protection regulates how pharmacies should safely collect, store, and use customers' personal data (40). Pharmacies must obtain consent from customers before collecting their data and ensure it is protected from unauthorised access (41,42).

At the international level, Regulation (EU) 2016/679, known as the General Data Protection Regulation (GDPR), governs the protection of customers' data in European Union countries, including data collected through digital channels such as mobile apps or pharmacy websites (43). Pharmacies serving international customers must comply with the personal data protection regulations applicable in their respective countries.

In addition, the Health Insurance Portability and Accountability Act (HIPAA) in the United States regulates the protection of patient data in the healthcare industry, including pharmacies. HIPAA ensures that patient health data is kept confidential and used only for legitimate and necessary purposes in healthcare (44).

3.4. Impact of Technology and Digital Marketing on Pharmacy Efficiency and Turnover

3.4.1 Impact of Technology on Operational Efficiency

The implementation of technology in pharmacies can have a significant impact on operational efficiency. Technologies such as pharmacy management systems (PMS) enable better management of stock and transactions by reducing human errors that often occur in manual processes. Using software to manage drug stocks and transactions also makes it easier for pharmacies to conduct real-time data analysis, improving the ability to make faster and more informed decisions (45,46).

For example, research by Siti et al. (2021) showed that implementing a technology-based pharmacy management system in Indonesian pharmacies reduced stock and transaction recording errors, leading to a 30% increase in operational efficiency (11). With a more integrated management system, pharmacies can also optimise inventory management, reduce wastage, and ensure that the required products are always available, thus improving service speed (47).

In addition, technology allows pharmacies to increase transaction speed through automated point-of-sale (POS) systems. Wibowo and Haryanto (2020) showed that using POS systems in large pharmacies reduced transaction time by 50%, allowing pharmacies to process more transactions in less time and improve service efficiency (22).

3.4.2 The Impact of Digital Marketing on Increasing Turnover

Digital marketing has become a key strategy in increasing pharmacy turnover. With effective digital marketing strategies, pharmacies can expand their market reach and increase customer engagement. Marketing through social media, SEO, and SEM allows pharmacies to promote their products and services directly to relevant audiences (48,49).

Social media, for example, allows pharmacies to interact with customers more personally and provide relevant health education. A study by Zhang et al. (2019) showed that marketing through social media can increase customer engagement by up to 40%, which then contributes to an increase in the pharmacy's product sales (27). In addition, SEO

and SEM techniques enable pharmacies to appear in the top search results on Google, attracting more traffic to the pharmacy website and increasing sales conversions (32).

Email marketing also plays an important role in maintaining customer relationships and increasing turnover. According to Rafiq et al. (2020), personalised email marketing can increase sales conversions by 25% by offering registered customers special offers and relevant product information (50).

3.4.3 A Case Study of a Pharmacy that Successfully Implemented Technology and Digital Marketing

Several pharmacies in Indonesia and internationally have successfully implemented technology and digital marketing to improve operational efficiency and turnover. One case study is Gu****n pharmacy, which has integrated a technology-based pharmacy management system and utilised social media to promote health products. Gu****n, with more than 300 branches in Indonesia, uses a POS system and mobile application that allows customers to order medicine online, make payments through the app, and get home delivery. Implementing a stock management system integrated with the mobile app enables the pharmacy to reduce errors and increase product availability efficiently.

On the digital marketing front, Gu****n utilises social media platforms such as Instagram and Facebook to build a customer community, provide health education, and offer regular product discounts. This contributes to increased sales and customer loyalty. Research by Chan & Ng (2021) shows that pharmacies that combine technology and digital marketing have experienced a 30% increase in sales, with more customers purchasing products through apps and following promotions through social media (35).

3.5. Challenges and Opportunities in Implementing Technology and Digital Marketing in Pharmacy

3.5.1 Challenges

Implementing technology and digital marketing in pharmacies promises many benefits but also faces several challenges. One of the main challenges is the cost of implementing and maintaining the technology. Advanced technologies such as pharmacy management systems (PMS) and mobile applications require considerable initial investment and ongoing maintenance costs (51,52). A study by Wibowo and Haryanto (2020) showed that large pharmacies can adopt technology, but small pharmacies often struggle with the cost of implementing and maintaining such systems (53).

In addition, barriers to technology adoption by small and medium-sized pharmacies are also a significant challenge. These pharmacies often lack the resources to train staff in using new technology or even have difficulty obtaining technology appropriate for the scale of their operations. According to research by Zhang et al. (2019), small pharmacies tend to prefer traditional stock and transaction management methods due to budget constraints and a lack of understanding of the long-term benefits of technology (27).

3.5.2 Opportunities

While the challenges are accurate, implementing technology and digital marketing also brings vast growth potential for pharmacies. With technology, pharmacies can expand their market, increase operational efficiency, and improve customer service (2,15). For example, pharmacies that use technology-based stock management systems can more easily manage inventory, reduce wastage, and ensure better product availability. A study by Siti et al. (2021) shows that pharmacies that adopt technology can improve their operational efficiency by up to 30%, which directly impacts increasing profitability (11).

On the other hand, increasing customer loyalty through service innovation and data-driven marketing is a vast opportunity for pharmacies (54). Digital marketing allows pharmacies to better understand customer preferences through data analysis, which can be used to create more personalised and relevant offers. Data-driven marketing, as practised by major pharmacies in Indonesia, allows them to offer more targeted promotions and services, which in turn increases customer loyalty. According to Chan & Ng (2021), using data for personalised marketing can increase customer loyalty by 25% (55).

4. Conclusion

Applying technology and digital marketing in pharmacies increases operational efficiency and turnover, with technologies such as pharmacy management systems and POS speeding up transactions and stock management. Digital marketing through social media, SEO, and data-driven marketing expands market reach and increases customer

engagement. Pharmacies must adopt the right technology and efficient digital marketing strategies to improve management and strengthen customer loyalty.

Compliance with ethical standards

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Disclosure of Conflict of interest

The authors declare that there is no conflict of interest related to the publication of this manuscript.

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