

# The Digital Transformation of Pharmacy Services in Germany

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## Abstract:

The digitalization of retail pharmacy services in Germany has led to a profound change in the pharmaceutical market that is propelled by factors like an aging population, a need to obtain prescription medications, and government regulations that are meant to make the market more efficient. Online pharmacies are quickly expanding, and major players like Doc Morris and Shop-Apotheke Europe are taking their businesses online. The German regulatory system guarantees quality and patient safety, which are managed through the regulation of licensing and operations defined in accordance with given standards. Digital pharmacies have several advantages like accessibility, convenience, and cost savings, but they also have some issues, such as data protection and regulatory compliance. They are creating new realities for conventional pharmacies and forcing them to adopt to the changing environment by having an on-line presence and adopting technological advancements. The future of digital pharmacies is driven by advanced technology

like artificial intelligence and the application of blockchain, and the cooperation of digital and traditional pharmacies can improve patient care. Policy interventions must be in place to facilitate innovation and training in the digital pharmacy sphere to make it a contributing force to healthcare sector development.

## Introduction

The emergence of digital retail pharmacy services in Germany has led to a dramatic transformation of German's retail pharmacy market [1]. Germany's pharmaceutical retail market is forecast to grow from \$38.01 billion in 2022 to \$56.59 billion by 2030, and this compound annual growth rate (CAGR) is projected to be 5.1% during the forecast period of 2022-2030 [2]. This expansion boils down to several reasons, namely the aging population, the increased demand for prescription drugs, and governmental regulations. There is a high degree of industry consolidation as several large players control the entire market, for example, Rossmann, dm-Grocery Store, and Müller.

These players are in the process of making adjustments by providing online pharmacy services, which are becoming more and more common for consumers. According to Zalke (2023) [2], the German government has policies that have been put in place to reduce costs and make the healthcare system more efficient, such as price-reference mechanisms aimed at curbing the cost of some medical supplies and the use of generic drugs to promote efficiency. In addition, the market is also confronted by barriers, such as price controls, regulations, reimbursement policies, and competition from foreign and online pharmacies [3]. Conclusively, the introduction of digital pharmacy services has brought about dynamic changes to the way the German retail pharmacists operate and will have a positive effect on the future growth of the market.

The medication market's fast digitalization is a critical matter, and innovations are being introduced regarding patient care, data analysis, and drug development. Incorporating technology allows the provision of detailed healthcare through precision medications and data compilation. Patient readiness to interact with digital health devices, including personalized medication patches, contributes to accurate tracking and real-time metrics collection for health con-

ditions [4]. In addition, digitally enabled virtual care greatly increases the availability of medical services, meaning that patients never have to wait long for urgent treatment, as is the case with traditional healthcare systems. Moreover, technology brings forth regulatory simplicity because monitoring and reporting functions are done almost completely electronically; hence, consumer protection and data security are facilitated [4]. Finally, this paper will explore how digitalization is reshaping the pharmaceutical industry, emphasizing its benefits and future potential for innovation and personalized care.

## Digital Pharmacies in Germany: An Overview

Online pharmacies in Germany have become a fast-growing market, and revenues are expected to reach €2.27 billion in 2024, reaching an annual growth rate of 8.36% in 2028 [5]. This growth is driven by certain factors, and the opportunity to buy meds online seems to be one of the most attractive sources for modern people, as it allows them to filter through the wide range of available products. Additionally, medicine verification apps continue to become more popular, giving people the chance to get extra information [5]. Germany possesses a strong healthcare system as well as a high-tech population that has spurred the boom of online pharmacies. Germans put their trust in licensed and reliable platforms because the standards of quality and governmental regulations in their nation's healthcare sector are among the strictest in the world. Furthermore, the country's proven strong economy and the well-advanced, digital infrastructure in Germany strengthen the growth of online pharmacy websites, enabling these platforms to reach potential customers in a large volume.

The digital pharmacy sector in Germany is represented by various key players and stakeholders that have a significant impact on the development of the market [6]. Some major players in the online pharmacy arena include

pharmacies that have grown their offline operations to online platforms, such as DocMorris and Shop-Apotheke Europe [7]. Larger businesses have established brands and a high level of relational networking, which have helped them to gain a large customer base. Moreover, there are a number of new players entering and using technology, as well as start-ups providing innovative solutions covering medication, delivery, and health services [8]. The digital pharmacy industry has other relevant stakeholders, such as regulatory bodies, healthcare facilities, and technology companies that provide the infrastructure and offer the support required for an online pharmacy to properly operate and observe all the required laws and regulations. All in all, they are the players and contributors that make possible the protean growth and progress of the digital pharma sector in Germany by introducing innovations and increasing access to healthcare [6].

The regulatory framework imposed upon digital pharmacies in Germany is tough, as it is there to safeguard the quality of drugs and protect consumers. The most important regulatory authorities that supervise digital pharmacies are the Federal Institute for Drugs and Medical Devices (BfArM) and the Federal Joint Committee (G-BA) [9]. Such organizations determine what pharmacies are licensed and what other standards pharmacy operations are subject to, such as quality control indicators and data protection issues. Schulz et al. [10] denotes that digital pharmacies are bound to the German Pharmacies Act (ApBetrO), which is the body of legislation that governs the supply and distribution of pharmaceutical products. The implementation of these legal regulations is essential in order for online pharmacies to operate legally in Germany and to earn consumer confidence.

### **Advantages of Digital Pharmacies**

Digital pharmacies have numerous advantages that include inexpensive access to drugs, improved convenience, and effectiveness in the healthcare industry. One crucial advantage is that they allow medicine and pharmaceutical products to become more accessible to people. Digital pharmacies allow consumers to purchase medicines on the internet and reduce the necessity of going to a physical pharmacy [11]. This especially helps people with mobility problems,

those in remote areas, and even those who simply have a busy schedule and it's difficult for them to visit a pharmacy during opening hours. Digital pharmacies have become a way that patients can order online and get their prescription drugs delivered, ultimately giving patients hassle-free access to their medications.

The other advantage of digital pharmacies is the fact that they save customers time and give them convenience [12]. Digital pharmacies have made healthcare more straightforward as people can order medications from their smartphones or computers while they are at home or on the go. This makes it possible to bring the pharmacy to the patients without them coming in person to a pharmacy, waiting in line, or giving up their work time to get their prescriptions. Online pharmacies are also very often enriched with automated appointment reminders to deliver your medication on time and prescription tracking; therefore, digitalization remains a big plus for customers and helps avoid missing doses.

Additionally, digital pharmacies could serve to improve cost savings and reduce system inefficiencies in the healthcare system [13]. Online pharmacies have relatively low fixed costs, as they just need access to the Internet and tend to focus on efficient organization. Traditional brick-and-mortar pharmacies have higher costs, as they require physical space and many staff members. This can manifest itself in the form of cheaper prices for medications and other healthcare products, which in turn will help consumers reduce their overall healthcare costs. Moreover, paradigmatic pharmacies can enhance the pharmacy drug procurement process, decreasing the burden of administrative work on care givers and aiding in the quick delivery of medicines to patients. In general, the benefits of online pharmacies are brought about due to medicines being easier to access, the added layer of convenience, and cost-efficient health service for patients.

### **Challenges and Concerns**

When it comes to digital pharmacies for German customers, there are many issues that need to be taken into consideration to guarantee the safety of consumers and compliance with regulation. One major issue could be data protection and privacy problems. Digital platforms are being used more and more to deliver healthcare

services. Hence, there is a need to keep patient information confidential and protect it from data breaches. According to Marcus et al. (2022) [14], digital pharmacies must ensure their compliance with a highly rigid legal framework in Germany related to the confidentiality of private patient information under the General Data Protection Regulation (GDPR) in order to keep personal health information safe from those with unauthorized access.

Additionally, the importance of maintaining quality control and the authenticity of pharmaceutical products that are marketed through e-pharmacies could be another challenge [15]. Germany set up a rigorous system to check the quality of medications sold on the market and their distribution in order to make sure everything is in line with safety standards [16]. Digital pharmacies need to conform to these regulations for these reasons, and they have to gain the necessary approval and certification to be allowed to sell pharmaceutical products online. Establishing the authenticity of medicine is one of the most critical actions taken to stave off the distribution of spurious and low-quality products that could pose severe health risks to consumers.

Regulatory compliance and supervision can also be seen as being among the most relevant problems of digital pharmacies operating in Germany. The pharmaceutical industry is rigidly regulated in Germany, and digital pharmacies are not an exception. They must follow the country's existing laws and regulations, which include licensing, advertising restrictions, and pricing restrictions [17]. Moreover, digital pharmacies will be regularly checked and audited by regulatory bodies to verify whether or not their operations meet the requirements of these regulations. Strict adherence to regulatory requirements is one of the things that digital pharmacies should take into consideration if they want to remain legally operational and gain trust from consumers that their products are good, safe, and reliable.

### **Impact of Digital Pharmacies on Traditional Pharmacies**

The effect digital pharmacies have on conventional pharmacies is substantial and multi-dimensional. Firstly, the market is marked by rising competition and coping with changes in market

dynamics [18]. Now that digital pharmacies offer convenience and accessibility that was only found in brick-and-mortar pharmacies, physical pharmacies have competition from online channels. This competition has prompted conventional pharmacies to re-invent themselves by reconsidering their existing business models and services in order to gain a competitive edge in the market. Furthermore, the dynamic and emerging demands of both consumers and stakeholders are well entrenched. Consumers increasingly expect immediate service, customized offerings, and ease of use, which digital pharmacies meet through web portals and mobile app formats. Traditional pharmacies can no longer delay their adaptation to these changing expectations and must incorporate advancements in modern technology to provide similar options to patients.

Traditional drugstores should adjust to the digital age by leveraging various strategies. First of all, they can improve their online existence by allowing for online orders and delivery services, which will give their customers the option of receiving the drugs with convenience. Furthermore, mainstream pharmacies should invest in digital technologies, for example, automated dispensing systems and electronic health records, to boost efficiency and practicalize the operations. In addition to this, they could offer dedicated services and advice tailored to the needs of different individuals, which might aid in preventing them from being displaced by digital pharmacies. Through the integration of digital technologies and by responding to consumer needs, traditional pharmacies can maintain their position in the digital evolution and provide their communities with remaining services in an effective manner [19].

### **Future Trends and Opportunities**

The future of digital pharmacies is predicted to be influenced by the further development of digital technologies. Innovations of such technologies as artificial intelligence, machine learning, and blockchain are anticipated to be the major drivers for the enhanced efficacy and efficiency of digital pharmacy services. AI can be applied to create individualized medication regimens for patients by utilizing personalized patient data and machine learning algorithms that could reveal general patterns in medication

usage and possible medication interferences [20]. Blockchain technology brings forth an opportunity for pharmaceutical supply chain security and transparency improvement which will, in turn, lower the chances and threat of counterfeit drugs entering the market.

Collaboration between digital and traditional drug stores presents a significant chance to improve patient care. The advancement of digital platforms can be used by traditional pharmacies to increase the number of clients they reach and provide a broader range of services to improve convenience and accessibility [21]. While digital pharmacies can gain from the knowledge and experience of traditional pharmacies in regions where they can implement medication counseling and patient education, traditional pharmacies can also obtain benefits from digital tools. Through teamwork, both types of pharmacies will definitely improve the overall quality of practice and health outcomes of patients.

Policy recommendations can be instrumental in engendering innovation & growth in the digital pharmacy sector, which plays an important role in offering a better quality of life. Policy-makers should consider putting in place a regulatory framework that facilitates the manufacturing and deployment of digital technologies in pharmacy matters [23]. Actions may range from introducing financial bonuses for pharmacies to adopt digital facilities, applying fiscal policies that secure data privacy and confidentiality, and challenging the interoperability of various systems. Moreover, policymakers ought to think through how to support the training and competence of pharmacists to make sure they possess the relevant expertise required to apply these digital technologies in their area of practice effectively [22]. Through deliberate policy interventions to tackle the problems of digital pharmacy services, policymakers will be able to increase the positive impact on healthcare for patients.

## Conclusion

In summary, the study proves that the implementation of Digital Medication Review Tools (DMRTs) had a positive impact on the performance of students in conducting medication reviews. The study explores the DMRT's capacity to strengthen the range of communication skills provided, including both the subjective and ob-

jective data analyses and planning outcomes. In addition to that, the students displayed a preference to use DMRTs and therefore had higher confidence in their skills. This evidence demonstrates the value of including these clinical rotations within pharmacy training programs to develop the necessary competencies for students to be successful upon their graduation.

The prospects for the future of digital pharmacies in Germany seems to be bright, and this is attributed to the fact that technologies and the health system have recently been developing and changing. It is anticipated that the insertion of digital products and technology into pharmacy will revolutionize the practice of pharmacy by providing greater convenience, accessibility, and efficiency. Since digital and traditional pharmacies are the attainers and repositories, collaborations between them will be what enhances digitalization and improves the healthcare of patients. Pharmaceutical industry actors should be open to innovation and engage in digital infrastructure establishment, education, and vocational preparation in order to address the above opportunities.

The digital pharmacy sector needs active intervention from pharmaceutical stakeholders to realize its full potential. This involves implementing laws that enable digital penetration, cultivate collaboration between digital and traditional pharmacies, and allocate resources to ongoing training and upskilling pharmacists. Through joint action and digital innovations, all stakeholders will be able to contribute to the increased quality of pharmaceutical care and improved patient outcome while keeping the system efficient.

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