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THE STUDY OF THE PRACTICAL ASPECTS OF THE FUNCTIONING OF MOBILE APPLICATIONS OF PHARMACY CHAINS IN UKRAINE

In the context of active digitalization of the pharmaceutical market and the growth of the share of sales through mobile channels, a detailed analysis of the practical aspects of the functioning of mobile applications of pharmacy chains is critically important for ensuring their competitiveness and customer retention.

Aim. To study the practical aspects of the functioning of mobile applications of pharmacy chains in Ukraine.

Materials and methods. To achieve this goal, the content analysis, desk research methods, logical generalization of results and the graphical method were used. The study analyzed user reviews from Google Play and App Store platforms, as well as review aggregator sites. The data was collected using a web search for queries. In total, more than 1,650 reviews were reviewed for five pharmacy chains. The methodology included the qualitative analysis of complaints about the user experience, functionality, registration, search and performance, considering the frequency of mentions of problems.

Results and discussion. Based on the analysis of more than 1,650 user reviews, it has been found that low ratings of pharmacy chain apps in Ukraine are mainly associated with three groups of problems, such as technical problems (crashes, low performance), inconvenient interface (UX/UI), and the unsatisfactory overall user experience. The key errors that are often the subject of user complaints have been identified. They are: problems with registration and authorization (users often reported difficulties and failures when creating an account or logging in, often related to sending confirmation codes or linking to loyalty cards); an inconvenient home page and navigation (the home screen often lacks key functional elements or its structure is confusing, which makes it difficult for users to quickly find the necessary sections or promotions); errors in purchase scenarios (a significant number of complaints focus on difficulties in the final stages of the order, such as the inability to select the delivery/pick-up method, errors when applying discounts or bonus points, as well as payment failures); geolocation problems (inaccurate or slow determination of the user's location, as well as incorrect display of availability and stocks in the pharmacy directly lead to frustration and order cancellation); search shortcomings (the search function often lacks flexibility and accuracy (e.g., poor handling of typos, inability to search by active ingredient, or inability to return relevant results), which makes it difficult to find specific medicines); the illogical catalog structure and filtering (users noted that the organization of product categories was often misunderstood, and the filtering options were insufficient or did not work correctly); problems on the product page; poor performance.

Conclusions. Low ratings of pharmacy chain apps in Ukraine are due to technical problems (crashes, slowness), inconvenient UX (registration, search, navigation) and the lack of key functions (data storage, filters). This leads to the loss of customers since 67 % of e-commerce sales occur through mobile channels. Recommendations on mobile applications of pharmacy chains in Ukraine have been developed; it helps to increase the rating of apps and the patients' satisfaction of pharmacy chains.

Keywords: digital marketing; mobile applications; pharmaceutical industry; pharmacy chains; user feedback

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ВИВЧЕННЯ ПРАКТИЧНИХ АСПЕКТІВ ФУНКЦІОНУВАННЯ МОБІЛЬНИХ ЗАСТОСУНКІВ АПТЕЧНИХ МЕРЕЖ В УКРАЇНІ

В умовах активної цифровізації фармацевтичного ринку та зростання частки продажів через мобільні канали детальний аналіз практичних аспектів функціонування мобільних застосунків аптечних мереж є критично важливим для забезпечення їхньої конкурентоспроможності й утримання споживачів.

Мета – вивчення практичних аспектів функціонування мобільних застосунків аптечних мереж в Україні.

Матеріали та методи. Для досягнення поставленої мети було використано контент-аналіз, методи кабінетного дослідження, логічного узагальнення результатів та графічний метод. Проаналізовано відгуки користувачів з платформ Google Play та App Store, а також сайтів-агрегаторів відгуків. Дані збиралися за допомогою веб-пошуку за запитами. Загалом було розглянуто понад 1650 відгуків для п'яти аптечних мереж. Методологія містила якісний аналіз скарг на користувацький досвід, функціональність, реєстрацію, пошук та продуктивність з урахуванням частоти згадок проблем.

Результати та їхнє обговорення. За результатами аналізу понад 1650 відгуків користувачів установлено, що низькі рейтинги застосунків аптечних мереж в Україні пов'язані переважно з трьома групами проблем: технічні проблеми (збої, низька продуктивність), незручний інтерфейс (UX/UI) та незадовільний загальний користувацький досвід. Визначено ключові помилки, які часто є предметом скарг користувачів: проблеми з реєстрацією та авторизацією (користувачі часто повідомляли про труднощі та збої під час створення облікового запису або входу в систему, часто пов'язані з надсиланням кодів підтвердження або прив'язкою до карток лояльності); незручна головна сторінка та навігація (на головному екрані часто відсутні ключові функціональні елементи або його структура є заплутаною, що ускладнює користувачам швидкий пошук потрібних розділів чи акцій); помилки у сценаріях покупок (значна кількість скарг зосереджена на складнощах на завершальних етапах замовлення, таких, як неможливість вибору способу доставляння/самовивезення, помилки під час застосування знижок або бонусних балів, а також збої оплати); проблеми з геолокацією (неточне або повільне визначення місцезнаходження користувача, а також неправильне відображення наявності та запасів в аптеці безпосередньо призводять до розчарування та скасування замовлення); недоліки пошуку (функції пошуку часто бракує гнучкості і точності (наприклад, погане оброблення друкарських помилок, неможливість пошуку за активним інгредієнтом або неможливість повернення релевантних результатів), що ускладнює пошук конкретних ліків); нелогічна структура каталогу та фільтрація (користувачі зазначали, що організація категорій продуктів часто не зрозуміла, а параметри фільтрації недостатні або працюють некоректно); проблеми на сторінці продукту; низька продуктивність.

Висновки. Низькі рейтинги застосунків аптечних мереж в Україні зумовлені технічними проблемами (збої, повільність), незручним UX (реєстрація, пошук, навігація) та відсутністю ключових функцій (зберігання даних, фільтри). Це призводить до втрати клієнтів, оскільки 67 % продажів електронної комерції відбуваються через мобільні канали. Розроблено рекомендації щодо мобільних застосунків аптечних мереж в Україні, що сприяє підвищенню їхнього рейтингу та задоволеності пацієнтів аптечних мереж.

Ключові слова: аптечні мережі; відгуки користувачів; мобільні застосунки; цифровий маркетинг; фармацевтична галузь.

Introduction. In the modern era of digital transformation, mobile applications have become crucial as the main channel of interaction between business and consumers, especially in the field of retail pharmaceuticals. The success of a pharmacy chain today critically depends on the effectiveness of its mobile application as it becomes not just a convenient tool, but a fundamental digital point for attracting and retaining customers, directly forming their long-term loyalty. According to the research, a significant part of e-commerce transactions occurs precisely through mobile platforms, which makes them critically important for the sustainable business development [1].

However, many Ukrainian pharmacy chains face the problem of low ratings and a significant number of negative reviews of their mobile applications on Google Play and the App Store. A low rating not only reflects consumer dissatisfaction, but also directly affects loyalty, reduces the number of downloads and, as a result, leads to the loss of potential and existing customers. There is an urgent need to identify and systematize the main factors that cause these negative ratings.

The analysis of available reviews shows that the reasons can lie both in the technical plane (glitches, slow operation) and in the user experience plane (inconvenient interface, complex registration, inefficient search, errors when placing an order). To date, there are no comprehensive analytical studies that would deeply study these factors and offer practical recommendations for their elimination.

Thus, the problem of the study lies in the lack of a deep understanding of the factors that lead to low ratings of mobile applications of pharmacy chains in Ukraine, which hinders the development of effective strategies to increase their competitiveness and customer satisfaction.

The issues of development, operation and evaluation of mobile applications in the field of healthcare and e-commerce have been reflected in a number of modern scientific publications by domestic and foreign authors [2-4]. These studies focus on the growing role of mobile technologies in the pharmaceutical industry and their impact on the customer experience.

Among foreign scholars, Yum K. and Yoo B. [5] studied the impact of the service quality on the patient loyalty through their satisfaction in mobile social networks. The work of Zhai Yu., Song X., Chen Ya. and Lu W. [6] is devoted to the analysis of the user satisfaction with mobile medical applications, which includes the study of thematic and sentiment trends in reviews.

Domestic scholars also pay attention to this issue. The work by I. V. Pestun and Z. M. Mnushko [7]

is devoted to studying the influence of modern multi-channel marketing tools on the process of obtaining medical and pharmaceutical information by consumers. The work of Posilkina O. V., Krasnopolska T. E. and Lisna A. G. [8] considers the aspects of improving the activities of state institutions in the field of healthcare based on digital marketing.

Despite the significant amount of research related to mobile applications in the pharmaceutical industry, there are a number of unresolved aspects of the problem that require further study, and this study is aimed at solving them:

- *An insufficient analysis of industry specificity*. Most of the existing research focuses on general factors that affect application ratings (UX/UI, technical stability) [6]. However, there is no in-depth analysis of issues specific to the pharmaceutical industry that can significantly impact the user experience (e.g., deficiencies in the prescription order management or issues with the loyalty program integration).
- *The lack of quantification of the impact of errors*. Despite mentions of the impact of reviews on ratings, there has been no detailed quantitative analysis of the relationship between the type of issue reported in the review and the specific rating decrease. It is unclear which error – a broken search function or a payment failure – has a more devastating impact on the overall rating.
- *An unexplored relationship between business processes and rating*. The impact of specific business solutions and operational processes of the pharmacy network on the rating of the application (e.g., order delivery speed, availability of online consultation with a pharmacist) has been almost completely investigated.

Addressing these issues will allow for more accurate and practical recommendations for the development and improvement of mobile applications in the pharmaceutical industry.

Aim. The aim of the article is to study the practical aspects of the functioning of mobile applications of pharmacy chains in Ukraine.

Materials and methods. To achieve this goal, the content analysis, desk research methods, logical generalization of results and the graphical method were used. The study analyzed user reviews from Google Play and App Store platforms, as well as review aggregator sites. The data was collected using a web search for queries. In total, more than 1,650 reviews were reviewed for five pharmacy chains. The methodology included the qualitative analysis of complaints about the user experience, functionality, registration, search and performance, considering the frequency of mentions of problems.

Results and discussion. In 2025, pharmaceutical marketing is rapidly changing under the influence of digitalization, personalization and work with big data. Companies are actively implementing artificial intelligence, automation and analytics to optimize campaigns, using social networks for direct interaction with patients and doctors, and also emphasizing the branded content that increases trust and recognition [9-11]. Those who quickly adapt to these trends will gain a competitive advantage.

In 2024, about 18,000 pharmacies operated in Ukraine, which was around 85 % of the prewar number. Considering the population in Ukraine, which, according to the Kyiv School of Economics (KSE), was about 31.2 million people in 2023, this corresponds to one pharmacy for every 1,777 people. For comparison, in Poland, one pharmacy serves 2,951 people, while in Germany one pharmacy serves 4,691 people [12].

The modern pharmaceutical market of Ukraine is characterized by intense competition where leadership is determined not only by the number of pharmacies, but also by the implementation of innovative technologies and effective business models. The top 5 pharmacy chains in Ukraine include "ANC", "Podoroghnyk", "Pharmacy 911", "Bazhaemo zdorovye" and "Good Day Pharmacy". These chains are presented in Table 1 [12].

The market leader in terms of sales is the Zaporizhzhia company "Apteka-Magnolia", which includes such chains as "ANC", "Kopiika", "SHAR@", "Medpreparaty" and "Farmakopeika". Despite the smaller number of pharmacies compared to the main competitors, the company provides the highest level of revenue – 16.3 % of the total sales volume in the market. This result was made possible thanks to the active implementation of innovative technologies, in particular, likomats for self-receiving online orders [12]. The second place in terms of the turnover is occupied by the "Podorozhnyk" chain,

Table 1

THE MARKET SHARE ANALYSIS OF THE TOP 10 PHARMACY CHAINS IN UKRAINE

Company name	Brands	Number of pharmacies	Trade turnover-2023, billion UAH	Market share, %
LLC "Pharmacy-Magnolia"	"ANC", SHAR@ Pharmacy	1143	20.4	16.3
"Podoroghnyk" Group of Companies	"Podoroghnyk" Pharmacy chain	1744	18.4	15.5
PF "Gamma-55"	"Pharmacy 911" Wholesale Price Pharmacy	1532	17.0	13.0
LLC "Sirius-95"	"Bazhaemo zdorovye" Pharmacy	1002	14.2	10.6
LLC "Pharmastor"	"Good Day Pharmacy"	736	7.4	5.5
LLC "Med Service Group"	Med-service Pharmacy	566	4.3	3.1
LLC "Pharmaceutical Company "Healthy Family"	Pharmacy Yod, Family pharmacy	566	3.8	3.1
LLC "Market Universal LTD"	DS Pharmacy chain	394	2.7	2.0
LLC "Zi"	Good Pharmacy	419	2.3	1.7
PJSC "AM Pharmacy"	Family of pharmacies, Pharmacy from the warehouse	362	2.0	1.6

which is the absolute leader by the number of pharmacy institutions. In a short period, from 2021 to 2023, the company rose from the fourth to the second place, indicating the effectiveness of its development strategy. The increase in the number of retail outlets (from 1,744 to 1,813 as of 2024) and the active development of its own brands, such as Baum Pharm, allowed the company to accumulate a 15.5 % market share, with about 10 % of the total number of pharmacies. This emphasizes the success of business diversification and the focus on the production of its own products. The third place in terms of revenue is occupied by the "Pharmacy 911" network. This company demonstrated high resilience in martial law conditions, overcoming significant losses (over 500 pharmacies, mainly in the Kharkiv region). The rapid recovery and active increase in the number of pharmacies to pre-war indicators indicates the flexibility and adaptability of the business model. An important innovation was the launch of mobile pharmacies – specialized vehicles for delivering medicines to front-line settlements. This solution not only satisfies social needs, but also expands the market coverage [12].

The low rating of Ukrainian pharmacy chain mobile applications indicates the presence of errors due to which the pharmaceutical business loses customers. A pharmacy chain application that prevents users from making a purchase is worse than its absence. We studied the most common errors in mobile applications of Ukrainian pharmacy chains repelling users and preventing them from increasing sales through mobile channels.

According to analysts [2], the share of visits to online pharmacy websites from mobile devices is 70 %, while from desktops it is only 30 %. In 2024, more than 60 % of online orders for pharmacy products were made from a mobile phone or tablet. Half of them is through applications. But in order for users to download an application and make purchases in it, you need to monitor its rating. The rating of the application affects the number of its downloads. According to our research, half of users ignores applications with a rating below 4 stars. More than 80 % will not download a service with a rating below 3 stars. The rating in the store affects the reputation of the brand as a whole. During our research, it was determined that about 55 % of users were wary of a pharmaceutical organization if its application did not reach 3 stars.

The issue of the feasibility of investing in mobile applications by pharmacy chains has previously been considered in detail. Ordering medicines online has become commonplace for consumers. At the same time, orders are placed more often through mobile channels in the pharmacy sector. But simply launching a mobile application is not enough. A good user experience is important for sales growth. The user must

quickly find the product, add it to the cart and make a purchase. It is desirable that this process takes a minimum of actions. Unfortunately, there are cases when the application literally prevents the buyer from completing the purchase. This causes the rating to drop. Each bad rating is minus one customer and even more because someone does not complain, but simply leaves silently. A low application rating is a loss of users, profit and trust in the brand.

We analyzed the most common errors in mobile applications using the example of Ukrainian chains "Good Day Pharmacy" (4.5 star rating on the App Store, 3.9 thousand reviews; 4.0 stars on Google Play, 0.7 thousand reviews), "ANC" (4.9 stars, 68 thousand reviews; 4.6 stars on Google Play, 0.8 thousand reviews), "Podoroghnyk" (3.7 stars, 1.2 thousand reviews; Google Play data have not been found), "Bazhaemo zdorovye" (4.4 stars on the App Store, 1.5 thousand reviews; 4.2 stars on Google Play, 12.9 thousand reviews) and "Pharmacy 911" (2.0 stars on the App Store, 1.1 thousand reviews; Google Play data have not been found). We analyzed the functionality, UX and technical aspects of mobile applications based on the user feedback.

To conduct a comprehensive study, the content analysis method based on the study and systematization of user reviews from various platforms was used. This approach allowed us to obtain an objective picture of the problems faced by users of mobile applications of pharmacy chains. The data were collected using a web search for relevant queries focused on reviews of mobile applications of leading pharmacy chains. The main sources of information were the official application stores – Google Play and App Store where users left ratings and comments directly after interacting with the application. In addition, to obtain a wider range of opinions, review aggregator sites, such as Hotline.ua and Otzyvua.net, were involved. In total, more than 1,650 reviews were analyzed, relating to five key market players: "Good Day Pharmacy", "ANC", "Podoroghnyk", "Bazhaemo zdorovye" and "Pharmacy 911".

The methodology used included the qualitative analysis of the user complaints, which were classified by us into the main problem categories: the registration and authorization (covering the account creation and unsolicited messages); the home page and navigation (concerning the interface usability and the content overload); purchase scenarios (addressing issues during the checkout process, such as the cart clearance and order disappearance); geolocation (related to location services and manual pharmacy selection); the search engine (focusing on the effectiveness, accuracy, and stability of the search function); the catalog and filters (involving illogical categories, the deep product nesting, and limited filtering options); the product page (dealing with unstructured descriptions, hidden analogs, and the lack of reviews); productivity (encompassing frequent crashes, instability, and slow performance); additional features (concerning the correct operation of loyalty programs, the customer support, and innovative solutions); and finally, the feedback monitoring (highlighting the need for a system to collect and analyze the user feedback from various sources). Special attention was paid to the frequency of mentions of specific problems. This made it possible to determine which shortcomings are the most critical for users and require priority solutions. The results of this analysis formed the basis for conclusions on the key factors affecting the rating of mobile applications in the pharmaceutical industry. According to the distribution, the productivity category proved to be the most critical, accounting for 23.5 % of all reported issues. Catalog and filters ranked second with a share of 18.0 % of complaints. The search engine category came next, constituting 14.0 % of the user complaints. Three categories – purchase scenarios, product page, and registration and authorization – had a similar frequency of mentions, accounting for 12.5 %, 10.5 %, and 8.0 % respectively. The additional features category was mentioned with a frequency of 7.0 %. The least frequently mentioned categories – home page and navigation, feedback monitoring, and geolocation – accounted for 2.5 %, 2.0 %, and 2.0 % each, respectively.

Table 2 provides recommendations for improving the functionality, user experience (UX) and technical aspects of mobile applications of Ukrainian pharmacy chains. The recommendations were developed based on the user feedback analysis from such pharmacy chains as "Good Day Pharmacy", "ANC", "Podoroghnyk", "Bazhaemo zdorovye" and "Pharmacy 911".

Table 2

RECOMMENDATIONS FOR IMPROVING MOBILE APPLICATION RATINGS AND INCREASING THE PATIENTS' LOYALTY OF UKRAINIAN PHARMACY CHAINS

Category	An example of the problem	Recommendation
1	2	3
Registration and authorization	"ANC" – the forced registration and spam after entering data ("registered and immediately flooded with the email spam")	Avoid the forced registration at the initial stage. Allow viewing of the assortment without authorization, offer the registration only when placing an order
	"ANC" – an excessive number of fields to fill	Request the minimum amount of data (e.g., just a phone number and a code from an SMS). Explain the purpose of the data to increase trust
	"ANC" – users complain about advertising messages after registration	Avoid sending spam after the registration. Add opt-out settings
Home page and navigation	"Good Day Pharmacy" – an inconvenient navigation	Display the main categories (medicines, medical equipment, cosmetics) on the home page for quick access
	"ANC" – the overloaded content leads to missed clicks	Avoid the content overload to prevent accidental clicks. Optimize the design for mobile devices
Purchase scenarios	"ANC" – the basket is cleared after authorization	Keep items in the cart after exiting the app or logging in
	"ANC", "Pharmacy 911"– orders disappear or are not displayed	Notify about the order status (number, readiness time, pickup address) in the "Orders" section
	"Pharmacy 911" – users only learn about the lack of delivery in the cart	Inform in advance about the lack of delivery in the product card
Geolocation	"Good Day Pharmacy" – it is not possible to manually select a pharmacy	Allow the manual selection of a pharmacy for self-pickup. Provide the background geolocation without blocking the functionality
Search engine	"Good Day Pharmacy" – searching in gives errors or does not find drugs by name	Add query examples (by name, symptoms) and support for "problematic" formulations
	"Good Day Pharmacy" – the search causes crashes ("often closes")	Fix search errors that cause the app to crash
Catalog and filters	"Good Day Pharmacy" – illogical categories and deep embeddedness	Create logical categories by problems or organs ("for the heart," "for colds"). Reduce nesting to 2–3 clicks
	"ANC" – a limited number of filters	Add advanced filters: price (with slider), availability, release form, active ingredient, volume, quantity per package, prescription
Product page	"Podoroghnyk" – unstructured descriptions	Structure descriptions in drop-down lists (manufacturer, indications, release form, expiration date)
	"Bazhaemo zdorovye" – hidden analogs	Display analogs in a carousel, not in hidden lists
	The lack of feedback in most applications	Add product reviews as 95 % of users focus on them
Productivity	"Good Day Pharmacy" – frequent crashes ("Unstable. Crashes frequently")	Conduct codebase audits, refactoring, and code reviews to eliminate crashes and slow performance
	"Good Day Pharmacy" – Constant crashes ("the application crashes")	Implement a monitoring and logging system to quickly detect errors
Additional features	"ANC" – the inability to use bonuses	Integrate loyalty programs (bonuses, discounts) with correct operation, like in "Podoroghnyk"
	"ANC" – the lack of support and contact numbers	Add online consultations with pharmacists to increase trust
	"Good Day Pharmacy", "ANC", "Podoroghnyk", "Bazhaemo zdorovye" and "Pharmacy 911" – the lack of innovative solutions	Consider innovations, such as likomats, like at "Apteka-Magnolia"

Continuation of Table 2

1	2	3
Feedback monitoring	"Good Day Pharmacy", "ANC", "Podoroghnyk", "Bazhaemo zdorovye" and "Pharmacy 911" – the lack of feedback	Create a feedback collection and analysis system with Google Play, App Store, Hotline.ua, Otzyvua.net for a prompt response
	"ANC" – the lack of feedback	Add a feedback feature in the app for the quick problem resolution

In general, the largest share of user complaints (55.5 %) is focused on three key aspects, namely: technical stability (productivity), convenience of searching, and selecting products (catalog and filters, search engine). This indicates that in order to increase the loyalty and rating of the Ukrainian pharmacy chain applications, it is necessary to first eliminate technical failures and optimize the main functional blocks related to the product navigation.

Conclusions

1. Low ratings of mobile applications of Ukrainian pharmacy chains are due to a complex of technical and functional problems that negatively affect the user experience. Among the main shortcomings are frequent technical failures, such as crashes, slow operation and general instability of the software, which undermines the user trust. Added to this, there are problems with the user experience (UX), in particular, an inconvenient interface, the complex navigation, the illogical catalog structure and inefficient search. The registration and authorization process often becomes a barrier due to forced registration and an excessive number of fields. In addition, the applications have significant shortcomings in the search engine and filtering, which makes it difficult to find the necessary products, and the purchase scenarios are inconvenient since the cart can be cleared after exiting the application, and information about the order status is often missing.

2. Additional problems include geolocation shortcomings, which make it difficult to choose a pharmacy for self-collection, and unstructured information on product pages, which lack clear descriptions and reviews. The applications also suffer from low performance (especially in the "Good Day Pharmacy" and "Pharmacy 911" chains) and the lack of additional features, such as the integration of loyalty programs or online consultations. The lack of proper monitoring of reviews makes it difficult to respond promptly to complaints. All these factors lead to lower app ratings, the loss of patients and, as a result, to reduced profits, given that 67 % of e-commerce sales occur through mobile channels. As a result of the study, it has been determined that the recommendations developed, such as simplifying the registration, improving the search, optimizing the performance, and introducing innovations, have the potential to significantly increase application ratings and enhance the loyalty of patients of Ukrainian pharmacy chains.

Prospects for further research. To more effectively monitor and analyze reviews, a promising direction is the development and implementation of tools based on machine learning (ML). These tools will be able to automatically classify reviews by problem categories, analyze tone, and detect hidden patterns. This will allow pharmacy chains not only to respond quickly to complaints, but also to prevent the emergence of new problems by identifying them at an early stage.

Thus, further research should go beyond the traditional qualitative analysis and move to quantitative and predictive modeling. This will provide developers and marketers of pharmacy chains with scientifically sound tools to create highly competitive and customer-oriented mobile applications.

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