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DARK MARKETING AND ARTIFICIAL INTELLIGENCE IN THE PHARMACEUTICAL BUSINESS: BALANCING EFFICIENCY AND ETHICS

This article explores the growing use of dark marketing strategies in the pharmaceutical industry, particularly as they intersect with artificial intelligence (AI) technologies. Dark marketing-characterized by targeted, often opaque promotional practices-is increasingly used to influence specific consumer segments through micro-targeting, emotional analysis, and algorithmically generated content. While these AI-powered tactics enhance competitiveness by improving personalization and market responsiveness, they also raise significant ethical concerns, such as manipulation, depersonalization, and lack of transparency. The paper analyses the dual nature of these practices: their potential to increase market efficiency and their risks to public trust and regulatory compliance. It concludes with practical recommendations aimed at balancing innovation and ethics, emphasizing the need for transparent regulation, digital literacy, and ethical self-regulation within the pharmaceutical sector.

Keywords: dark marketing, innovative marketing, pharmaceutical market, artificial intelligence, international market, competitiveness, marketing ethics, regulatory challenges, global marketing space, marketing strategy for development, omnichannel strategies.

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“ТЕМНИЙ МАРКЕТИНГ” ТА ШТУЧНИЙ ІНТЕЛЕКТ У ФАРМАЦЕВТИЧНОМУ БІЗНЕСІ: БАЛАНСУВАННЯ ЕФЕКТИВНОСТІ ТА ЕТИКИ

У цій статті досліджується зростаюче використання стратегій темного маркетингу у фармацевтичній галузі, зокрема, оскільки вони перетинаються з технологіями штучного інтелекту (ШІ). Темний маркетинг, що характеризується цілеспрямованими, часто непрозорими рекламними практиками, все частіше використовується для впливу на певні сегменти споживачів за допомогою мікротаргетингу, емоційного аналізу та алгоритмічно згенерованого контенту. Хоча ці тактики на базі ШІ підвищують конкурентоспроможність, покращуючи персоналізацію та реагування на ринок, вони також викликають значні етичні проблеми, такі як маніпуляції, деперсоналізація та відсутність прозорості. У статті аналізується подвійна природа цих практик: їхній потенціал для підвищення ефективності ринку та їхні ризики для довіри громадськості та дотримання нормативних вимог. Вона завершується практичними рекомендаціями, спрямованими на балансування інновацій та етики, підкреслюючи необхідність прозорого регулювання, цифрової грамотності та етичного саморегулювання у фармацевтичному секторі.

Ключові слова: темний маркетинг, інноваційний маркетинг, фармацевтичний ринок, штучний інтелект, міжнародний ринок, конкурентоспроможність, маркетингова етика, регуляторні виклики, глобальний маркетинговий простір, маркетингова стратегія розвитку, омніканальні стратегії

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Problem statement and its connection with important scientific and practical tasks. In the modern pharmaceutical business, marketing plays a crucial role in promoting both over-the-counter and prescription drugs. However, alongside traditional promotional tools, increasingly opaque or even manipulative marketing strategies are being used — collectively referred to in the literature as "dark marketing." These practices involve hidden messages, native advertising, micro-targeting on social media, influencer endorsements, and indirect stimulation of healthcare professionals.

Analysis of recent publications on the problem. Recent literature underscores the transformative impact of AI on pharmaceutical marketing, highlighting both opportunities for enhanced competitiveness and emerging ethical dilemmas.

Mrinmoy Roy explores how AI assists marketing teams in understanding brand history, running diagnostics, and charting future directions. It discusses AI's role in customer relationship management, pre-call planning, guided sales, and electronic detailing, aiming to enhance sales outcomes. The authors highlight AI's potential to improve business outcomes with fewer resources and time, emphasizing its role in achieving competitive advantage in pharmaceutical sales and marketing [3].

D.Gettman in his study examines the ethical dimensions of AI-powered personalized drug advertising, evaluating current regulatory shortcomings and outlining recommendations for pharmacy professionals, industry stakeholders, and policymakers. The paper discusses the convergence of AI, big data analytics, and digital marketing, highlighting both the potential to enhance drug adherence and public health awareness, and the ethical, legal, and professional concerns about manipulation, misinformation, and privacy [1].

Some studies examine the ethical issues resulting from AI-driven personalization of digital media, focusing on concerns with privacy, algorithmic bias, and impacts on information diversity. The authors use a mixed-method approach, drawing on secondary data analysis and case studies of major digital platforms, to uncover significant challenges within the practice of personalization. The study underscores the need for more transparent data practices, robust bias mitigation strategies, and mechanisms ensuring information diversity, proposing a basic ethical framework to scrutinize AI-driven personalization applications [4].

A structured review on AI in marketing and consumer behavior identifies three clusters of ethical issues—algorithmic, societal, and existential—across marketing systems, brands, and consumers and concludes that ethical marketing AI is nascent; calls for frameworks addressing privacy, bias, misinformation, and long-term societal effects [5].

Furthermore, a systematic review by Limbu and Huhmann highlights longstanding ethical concerns in pharmaceutical promotion, including direct-to-consumer advertising and biased physician targeting. These risks are exacerbated by AI-driven personalization, which often lacks transparency and accountability [2].

To address these issues, scholars advocate for ethical AI governance frameworks that combine human oversight, bias audits, explainability, and transparent marketing practices.

The aim of this article is to explore the phenomenon of dark marketing in the pharmaceutical industry, outline its key strategies, analyses the effectiveness of such approaches in terms of company competitiveness, and examine the ethical dilemmas that arise from using artificial intelligence (AI) in these practices.

Main results and their justification. Dark marketing is a form of communication strategy targeted at specific audience segments with minimal public visibility. Unlike traditional advertising, dark marketing campaigns are often invisible to the general public but highly effective in influencing selected groups. In the pharmaceutical context, dark marketing can manifest as individualized messages presented as educational content or expert recommendations.

AI technologies are revolutionizing pharmaceutical marketing by enabling hyper-personalized content delivery. Tools such as generative AI and predictive analytics allow for tailored messaging to specific healthcare professionals and patient segments, enhancing engagement and market responsiveness. This personalization fosters increased competitiveness among pharmaceutical companies.

The integration of AI in marketing practices raises significant ethical concerns. Issues such as data privacy, algorithmic transparency, and the potential for misinformation are at the forefront. Surveys indicate that a substantial proportion of pharmaceutical executives express ethical reservations about AI deployment, emphasizing the necessity for robust regulatory frameworks to ensure responsible innovation.

Table 1. Key Insights Across Theoretical Foundations of Using AI in Marketing, generalized by authors

Dimension	Insights
Ethical Foundation	AI in marketing brings algorithmic bias, privacy breaches, and manipulation risks. Regulatory guidance is still emerging.
Pharma-Specific Context	Indirect marketing via ads and physician relationships often crosses ethical lines if not monitored.
Bias & Personalization	AI-generated targeting may inadvertently reinforce stereotypes, undermining equity and fairness.
Disinformation Risk	Generated fake content threatens trust in pharma brands and professional discourse.
Solutions	Calls for transparency, independent oversight, explainable AI, bias audits, and stronger ethical governance.

The rapid adoption of AI introduces compliance challenges, particularly in adhering to regulatory standards. Risks include the dissemination of inaccurate or non-compliant content, lack of transparency in AI decision-making processes, and potential violations of data protection laws. These challenges necessitate the development of comprehensive governance structures to mitigate compliance risks.

A growing concern in the industry is 'AI washing,' where companies exaggerate their use of AI technologies to appear more innovative. This practice can mislead stakeholders and undermine trust in genuine AI applications. Regulatory bodies have begun to address this issue, emphasizing the need for transparency and accountability in AI-related claims.

To navigate the complexities of AI integration, pharmaceutical companies are developing ethical governance frameworks. These frameworks aim to balance innovation with ethical considerations, ensuring that AI applications align with societal values and regulatory expectations. Key components include cross-functional oversight committees, transparent AI development processes, and continuous monitoring of AI systems.

Artificial intelligence (AI) has radically transformed marketing communications. In the pharmaceutical sector, AI is used for several purposes (table 2).

Table 2. Integration of Artificial Intelligence in Dark Marketing,
generalized by authors

Directions	Integration
Micro-targeting	In-depth analysis of user behaviour, search history, social media activity, and geolocation enables the creation of personalized promotional messages
Emotional analysis	AI tools detect users' moods through textual sentiment analysis, allowing content to be delivered at moments of emotional vulnerability
Content generation	Chatbots, generative language models, and other AI tools create personalized messages, fake reviews, and even scientifically styled publications
Competitive monitoring	AI algorithms track competitor activity and adapt a company's marketing behaviour in real time

In a global competitive environment, pharmaceutical companies seek strategic advantages by any means. Dark marketing powered by AI provides precision, speed, and adaptability, which help increase market share. However companies that refrain from such practices on ethical grounds may lose market position. Excessive automation of marketing can depersonalize communication with patients. Long-term competitiveness may suffer due to reputational risks.

In addition to algorithmic opacity and existential trust erosion, the societal concerns surrounding AI in dark marketing are especially troubling due to their potential to distort public health behavior at scale. Societal-level risks include:

- **Manipulation of vulnerable groups:** AI-driven personalization can disproportionately target individuals based on emotional state, health anxieties, or socioeconomic status. For instance, those searching for mental health support might be unknowingly exposed to promotional content for pharmaceuticals with limited efficacy or significant side effects, framed as "supportive resources." This creates ethical ambiguity between help and exploitation.
- **Disinformation at scale:** Generative AI tools can fabricate user testimonials, patient stories, or "scientific" claims that are difficult to distinguish from verified information. When these narratives are distributed through micro-targeted channels, they bypass traditional regulatory scrutiny and may go undetected by watchdog institutions.
- **Erosion of health information ecosystems:** The algorithmic prioritization of persuasive or promotional content over unbiased educational resources can degrade the overall quality of digital health literacy. As AI models optimize for click-through and engagement, there is a risk that emotionally charged, commercially beneficial messages will crowd out evidence-based guidance.
- **Depersonalization of care:** While AI marketing promises personalization, it may ultimately reduce complex human experiences to predictive categories. Patients may feel increasingly alienated if communication is perceived as manipulative rather than empathetic or informative.
- **Public mistrust in health institutions:** If users suspect they are being covertly influenced by AI-optimized content, especially around sensitive health topics, they

may begin to distrust not only pharmaceutical companies but also medical authorities who appear complicit or unaware. Over time, this may erode trust in the healthcare system more broadly.

Scholars such as Yilmaz and Ashqar argue that AI-driven marketing often replicates social biases found in the training data, further entrenching inequalities in how health messages are constructed and delivered. For example, the language used to market medications for chronic illnesses may differ subtly—but meaningfully—based on gender or income-level assumptions, even if unintended [6].

Given these concerns, ethical frameworks for pharmaceutical AI should move beyond individual-level data protection and address broader collective harms, including informational inequality, stigmatization, and democratic accountability.

Regulatory bodies in the EU, USA, and other jurisdictions have begun developing guidelines for the use of AI in marketing, particularly in healthcare. However, ethical self-regulation initiatives by companies themselves remain insufficient.

Conclusions and prospects for further research. Dark marketing using artificial intelligence is a powerful tool in the competitive struggle within the pharmaceutical market. However, its application requires clear ethical boundaries and regulatory oversight. On the one hand, such strategies allow companies to be innovative and efficient. On the other—there is a risk of losing public trust.

To strike a balance between efficiency and ethics, it is advisable to establish transparent rules for using AI in pharmaceutical marketing; to increase consumer digital literacy regarding the influence of dark marketing technologies; to develop independent auditing systems for algorithmic marketing tools and encourage pharmaceutical companies to adopt ethical self-regulation through public reporting on marketing practices.

Thus, the future of pharmaceutical marketing should be not only intelligent but also responsible because using AI in dark marketing raises serious societal concerns. Such concerns are addressed to several questions, partially where is the line between personalization and manipulation; who is responsible for a patient's decision if it was influenced by an algorithm; and how can we ensure transparency in algorithmic influence on physicians' or patients' choices?

1. Gettman, D. (2020). Algorithmic Influence: Ethical and Regulatory Implications of AI-Driven Personalized Drug Advertising in the Digital Age. DOI: 10.13140/RG.2.2.14428.91520.
2. Limbu, Y. B., & Huhmann, B. A. (2022). Ethical Issues in Pharmaceutical Marketing: A Systematic Review and Future Research Agenda. *Journal of Global Marketing*, 35(1), 1-20. <https://doi.org/10.1080/08911762.2021.1949084>
3. Roy, M. (2022). Artificial Intelligence in Pharmaceutical Sales & Marketing -A Conceptual Overview. *International Journal of Innovative Research In Technology*. Vol., 8, Issue 11. 897-902
4. Shanbhag, Rishabh Rajesh & Dasi, Ugandhar & Singla, Nikhil & Balasubramanian, Rajkumar & Benadikar, Siddhant. (2024). Ethical Implications of AI-Driven Personalization in Digital Media. *Journal of Informatics Education and Research*. 4. 588-593. 10.52783/jier.v4i3.1354.
5. Su, Yiran & Wang, Emma & Berthon, Pierre. (2023). Ethical Marketing AI? A Structured Literature Review of the Ethical Challenges Posed by Artificial Intelligence in the Domains of Marketing and Consumer Behavior. *Proceedings of the 56th Hawaii International Conference on System Sciences*. 10.24251/HICSS.2023.603.
6. Yilmaz, Berk & Ashqar, Huthaifa. (2025). Towards Equitable AI: Detecting Bias in Using Large Language Models for Marketing. 10.48550/arXiv.2502.12838.

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1. Gettman, D. (2020). Algorithmic Influence: Ethical and Regulatory Implications of AI-Driven Personalized Drug Advertising in the Digital Age. DOI: 10.13140/RG.2.2.14428.91520.
 2. Limbu, Y. B., & Huhmann, B. A. (2022). Ethical Issues in Pharmaceutical Marketing: A Systematic Review and Future Research Agenda. *Journal of Global Marketing*, 35(1), 1-20. <https://doi.org/10.1080/08911762.2021.1949084>
 3. Roy, M. (2022). Artificial Intelligence in Pharmaceutical Sales & Marketing -A Conceptual Overview. *International Journal of Innovative Research In Technology*. Vol., 8, Issue 11. 897-902
 4. Shanbhag, Rishabh Rajesh & Dasi, Ugandhar & Singla, Nikhil & Balasubramanian, Rajkumar & Benadikar, Siddhant. (2024). Ethical Implications of AI-Driven Personalization in Digital Media. *Journal of Informatics Education and Research*. 4. 588-593. 10.52783/jier.v4i3.1354.
 5. Su, Yiran & Wang, Emma & Berthon, Pierre. (2023). Ethical Marketing AI? A Structured Literature Review of the Ethical Challenges Posed by Artificial Intelligence in the Domains of Marketing and Consumer Behavior. *Proceedings of the 56th Hawaii International Conference on System Sciences*. 10.24251/HICSS.2023.603.
 6. Yilmaz, Berk & Ashqar, Huthaifa. (2025). Towards Equitable AI: Detecting Bias in Using Large Language Models for Marketing. 10.48550/arXiv.2502.12838.