

REVIEW PAPER

Marketing Strategies in the Era of Mobile Applications: The Use of Geolocation and Contextual Advertising

Tetiana Riabova¹, Ivanna Havrylyuk², Vader Tetyana³, Oksana Kustovska⁴ and Tetiana Makhynia⁵

¹Department of Marketing, PR-Technologies and Logistics Educational-Scientific Institute of Economics Chernihiv Polytechnic National University, Chernihiv, Ukraine

²Department of International Economic Relations and Marketing Faculty of Management, Economics and Law, Lviv National Environmental University, Dubliany, Ukraine

³Department of Marketing and Business Administration, Educational and Scientific Institute of Economics and Management, Pryazovsky State Technical University, Mariupol, Dnipro, Ukraine

⁴Department of Land-Use Planning, Faculty of Land Management, National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine

⁵Department of Pedagogy, Administration and Special Education State Higher Educational Institution "University of Education Management", Kyiv, Ukraine

*Corresponding author: riabova_tetiana@ukr.net (ORCID ID: 0000-0001-6333-3118)

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ABSTRACT

This comprehensive study embarks on an exploration of contemporary marketing strategies within the dynamic landscape of mobile applications, particularly emphasizing the utilization of geolocation and contextual advertising. The crux of this research lies in dissecting the effectiveness and inherent challenges of these cutting-edge marketing tactics. By systematically analyzing various case studies and current literature, the study unveils the substantial impact of geolocation-based marketing and contextual advertising on enhancing customer engagement and driving sales, underscoring the significant return on investment these strategies offer. However, this exploration is not without its complexities. The study investigates the technical challenges, including issues of data accuracy and platform integration, and critically examines the ethical and privacy concerns that are increasingly coming to the fore in the digital marketing domain. The research highlights the delicate balance marketers must maintain between leveraging innovative technologies and respecting consumer privacy, especially in light of stringent regulatory landscapes like GDPR and CCPA. A unique aspect of this study is its forward-looking approach, offering strategic recommendations for marketers to harness these technologies effectively. It also identifies and suggests areas for future research, particularly focusing on the evolving nature of privacy regulations and the potential impact they hold on shaping future marketing strategies. This study not only contributes to the academic discourse in digital marketing but also serves as a strategic guide for practitioners in the field, paving the way for responsible and efficient use of technology in marketing.

HIGHLIGHTS

- The research highlights the delicate balance marketers must maintain between leveraging innovative technologies and respecting consumer privacy, especially in light of stringent regulatory landscapes like GDPR and CCPA.
- This study not only contributes to the academic discourse in digital marketing but also serves as a strategic guide for practitioners in the field, paving the way for responsible and efficient use of technology in marketing.

Keywords: Mobile Marketing, Geolocation Strategies, Contextual Advertising, ROI, AI, Augmented Reality Marketing.

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In an era where the digital footprint of consumers is expanding rapidly, mobile marketing strategies have evolved not only to reach but also engage with users in a more personalized and contextually relevant manner. The introduction of geolocation technologies and contextual advertising into mobile platforms has reshaped the advertising landscape, offering unprecedented opportunities for marketers to create targeted campaigns that resonate with users based on their real-time location and behavior.

The convergence of geolocation with mobile applications allows businesses to send tailored messages and offers to users at the right place and time, significantly enhancing the customer experience and increasing the likelihood of conversion. Contextual advertising takes this a step further by utilizing user data to present ads that align with the user's current interests and needs, as inferred from their recent online activities and preferences.

While the advantages of these sophisticated marketing tools are manifold, they also introduce complex challenges related to user privacy, data security, and ethical advertising practices. This article seeks to explore the multifaceted dynamics of modern mobile marketing strategies, probing into their operational effectiveness, the technical and ethical challenges they present, and the regulatory landscape that governs their use.

Moreover, this exploration is not only retrospective but also forward-looking, considering the future trajectory of mobile marketing as it continues to adapt to the rapid advancements in technology and shifts in consumer behavior. As we stand at the point of a new decade of digital innovation, this article aims to provide a comprehensive overview of current practices, draw insights from recent advancements, and offer a vision for the sustainable and responsible growth of mobile marketing strategies.

By the end of this article, readers will gain an understanding of the critical importance of integrating geolocation and contextual advertising in mobile marketing, the strategic implications for marketers, and the anticipated developments that will shape the digital marketing strategies of tomorrow. The paper structure: the Background Theory in Section II, the Literature Review in

Section III, the discussion in Section IV, and the conclusion in Section V.

BACKGROUND THEORY

Evolution of Digital Marketing

Over the last few decades, digital marketing has seen a dramatic shift. A major shift has occurred in the way companies interact with customers as they move away from print and television advertisements and toward digital and mobile-first initiatives. Online platforms, especially mobile marketing, have become more important with the introduction of the internet and the accompanying explosion of digital gadgets (Kotler and Keller, 2016). Businesses now rely on mobile marketing as a major strategy due to the widespread availability of smartphones and the internet (Kumar and Mittal, 2020). Modern methods like data analytics and machine learning have substantially improved the field of digital marketing. Marketers can now better understand their customers' habits and interests, which in turn allows for more targeted and efficient advertising (Mooij, 2019). For instance, businesses are using predictive analytics to predict customer reactions and preferences, which in turn enables more precise marketing campaigns (Gupta *et al.* 2020). In today's increasingly digitalized business world, Sanakuiev *et al.* (2023) highlight the critical importance of information marketing tools for both B2B and B2C sectors by using rigorous scientific methodologies and analyzing 23 relevant publications. Their research shows that conventional forms of advertising are losing ground and that information marketing is crucial for retaining customers, reaching new ones, and growing businesses.

Mobile Applications in Marketing

Mobile applications provide a direct connection to customers, allowing for instantaneous and tailored connection (Wang, 2020). Marketers can now run more engaging campaigns than ever before with the help of mobile applications due to their accessibility and simplicity (Kotler *et al.* 2021). An integral part of digital marketing plans now includes social media sites, which are mostly accessible via mobile applications. Facebook, Instagram, and Twitter, according to Dollwet (2019), provide one-of-a-kind

chances to engage with customers in real-time by using the massive amounts of user data gathered by these platforms. When used in conjunction with geolocation services, Augmented Reality (AR) is another technological innovation that is changing the face of mobile marketing. With augmented reality, companies may superimpose digital data onto the real environment, allowing customers to live out their imaginations. Rejeb *et al.* (2023) emphasized that augmented reality (AR) has the potential to revolutionize location-based marketing by providing consumers with more engaging content and experiences, including virtual try-ons at stores or interactive advertisements.

Stocchi *et al.* (2022) provide a comprehensive review of mobile app marketing, synthesizing insights from 471 studies. They present an integrated framework (Fig. 1) that merges key elements such as customer experience, journey, value creation, co-creation, digital customer orientation, market orientation, and competitive advantage. The unified approach

advances marketing research on apps, offering a valuable resource for academia and industry collaboration.

Geolocation Technology

The use of geolocation technology, especially GPS in cell phones, has completely altered advertising tactics. Personalized marketing strategies, including location-based promotions or localized information, are made possible by geolocation, which enables marketers to locate a user's position (Garcia, 2023). By bridging the gap between the real and virtual worlds, geolocation may help marketers target consumers with material that is highly relevant to their immediate surroundings (von der Au *et al.* 2023). The term "contextual advertising" describes the method of tailoring the display of advertisements to the specific audience and context of a certain website, app, or user's physical location. These advertisements are contextually relevant to the user based on their current app or web surfing

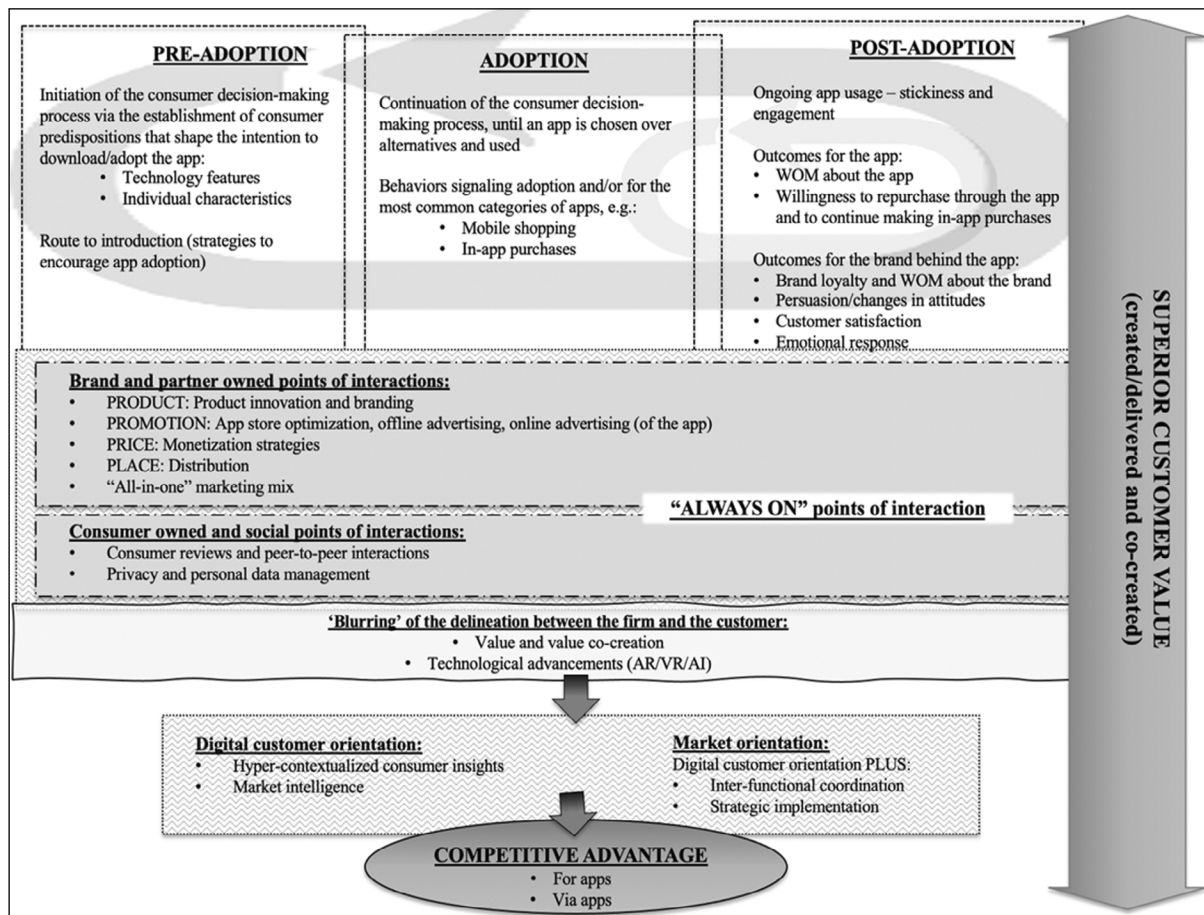


Fig. 1: Marketing research on Mobile apps: past, present and future, Stocchi *et al.* (2022)

activity due to algorithmic technologies (Viktoratos and Tsadiras, 2023). Advertisements in mobile apps may now be more seamlessly integrated, making them less intrusive and more likely to elicit a response from users (Mittal and Kumar, 2022).

Fig. 2 presents a compelling snapshot of the global digital landscape. It reveals that out of a total population of 8.01 billion, a significant 68% or 5.44 billion individuals are unique mobile phone users. This statistic underscores the deep penetration of mobile technology worldwide. Internet accessibility also has a robust reach, with 5.16 billion users, accounting for 64.4% of the global population. This indicates a high level of global connectivity and the growing importance of the Internet in daily life. Furthermore, the figure highlights that active social media user constitute a substantial portion of the population, with 4.76 billion people or 59.4% engaged in social platforms, reflecting the critical role of social media in contemporary communication and marketing.

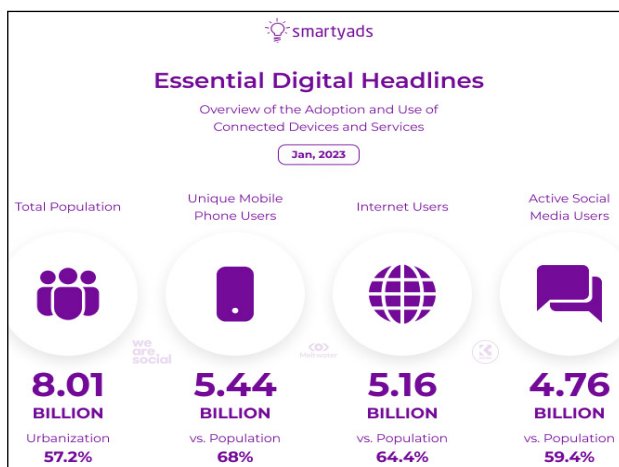


Fig. 2: Global Digital Connectivity and Usage Statistics. These sources are the United Nations; various government bodies; GSMA Intelligence; ITU; World Bank; Eurostat; CNNIC; APJII; IAMA & KANTAR; CIA World Factbook; Company Advertising Resources and Earnings Reports; OECD; Beta Research Center; and Kepos Analysis

Fig. 3 illustrates the upward trajectory of US mobile location-targeted advertising spending from 2017 through 2022. In 2017, spending stood at \$17.1 billion and exhibited a year-over-year increase, reaching \$22.1 billion in 2018. This trend of growth continued, with expenditures rising to \$26.5 billion in 2019. Despite the global economic uncertainties, the investment in location-targeted ads showed resilience and growth, reaching \$31.1 billion in

2020. The following year, 2021, saw an increase to \$35.5 billion, and projections for 2022 anticipated a further rise to \$38.7 billion (Banerjee et al. 2021). It clarifies that the spending includes mobile ads sold by traditional media players, such as newspaper/magazine publishers and TV/radio broadcasters, indicating a convergence of traditional and digital advertising platforms toward mobile, location-based advertising strategies.

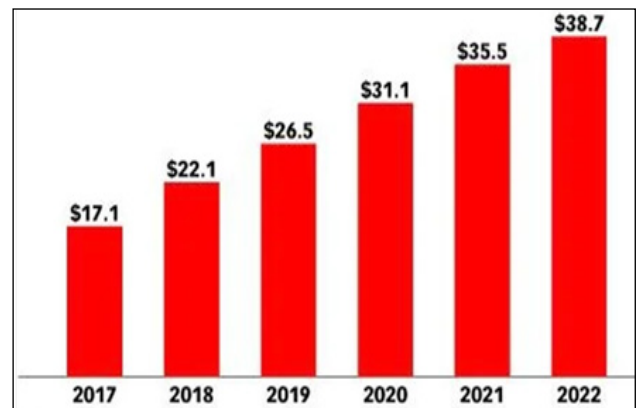


Fig. 3: Rising Investment in US Mobile Location-Targeted Advertising (2017-2022) (Banerjee et al. 2021)

This consistent increase highlights the growing importance that advertisers place on location-targeted mobile ads, reflecting the effectiveness of this advertising approach in reaching consumers with contextually relevant messaging. The data suggests that location-based advertising is an increasingly crucial component of digital marketing strategies in the US.

Regulatory and Privacy Considerations

Several privacy rules and regulations have been put in place as a result of the substantial privacy issues raised by the combination of geolocation and contextual advertising in mobile marketing. For example, in the EU, personal data (including location data) is subject to stringent regulations under the General Data Protection Regulation (GDPR) (Klar, 2020). Effective marketing tactics must be balanced with the need to respect user privacy and comply with regulatory obligations; this is a delicate balancing act that marketers and app developers must master (Van Loo, 2021). Concerns about customer data privacy and permission are rising to the forefront of ethical issues in the context of more complex digital marketing methods. Ethical marketing data usage is essential to establishing

credibility and preserving favorable associations with a brand and marketers should be upfront about how they use customers' data and provide them with easy ways to opt out (Tanveer *et al.* 2021). Ullah *et al.* (2023) explore the evolution of targeted advertising, shedding light on the privacy concerns tied to the extensive collection and exchange of user data. It provides a comprehensive survey of privacy risks in mobile advertising, investigating information flow, profiling processes, and privacy-preserving techniques. The flowchart depicted in Figure 4 outlines a mobile marketing ecosystem, highlighting the journey from app development to ad placement and billing. App developers create applications that deliver targeted ads to users' mobile devices, with user engagement data being aggregated and analyzed to construct detailed user profiles. This data informs ad placement servers and advertisers, optimizing ad targeting through contextual advertising and geolocation strategies. However, this intricate system raises privacy concerns, as the collection and analysis of user data for personalized ads must navigate the sensitive terrain of user consent and data protection regulations, ensuring that consumers' privacy is not compromised in the pursuit of marketing efficacy.

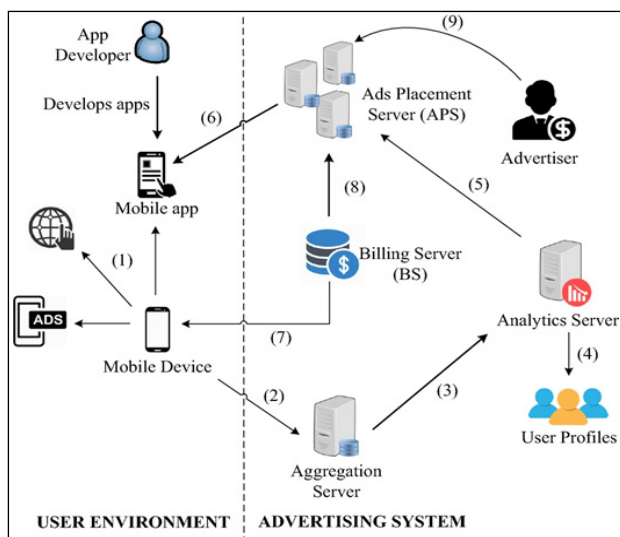


Fig. 4: Navigating User Privacy in the Mobile App Advertising Workflow Ullah *et al.* (2023)

Fig. 5 portrays a schematic of the mobile advertising and analytics ecosystem, highlighting the data flow from real user devices to the ad placement server, as well as the potential vulnerability to spoofing by malicious entities. In this ecosystem, data such

as device ID and app ID (deviceIDa, appIDa) is transmitted from a legitimate user's device to the aggregation server within the mobile ads/analytics network. This network is responsible for collecting app usage statistics, which are then processed by analytics servers to provide insights into user behavior. Such data is crucial for app analytics services to generate an audience summary, which is ultimately used by ad placement servers to target advertising more effectively. The diagram also illustrates a potential security threat in the form of a spoofed device. Here, an adversary mimics the data traffic (deviceIDa, appIDx) to impersonate a real device or user, which could lead to skewed analytics or fraudulent ad revenue claims.

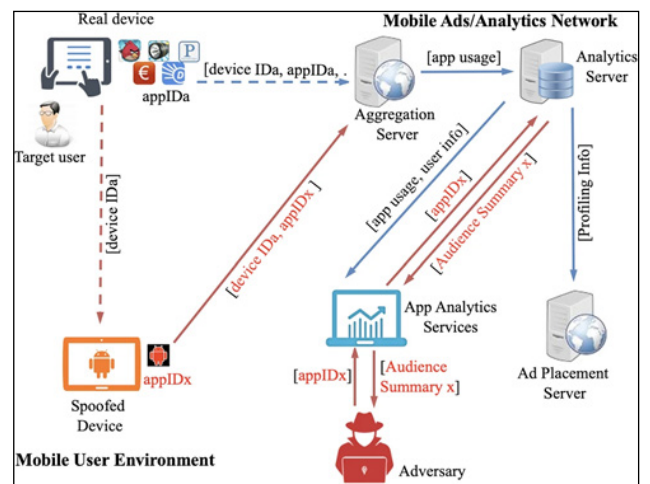


Fig. 5: The Mobile Advertising Ecosystem and Security Vulnerabilities Ullah *et al.* (2023)

In the not-too-distant future, mobile marketing will most certainly become even more personalized as algorithms powered by artificial intelligence provide consumers with more tailored information (Van Esch and Stewart Black, 2021). While this development has great potential for more efficient marketing operations, it also brings up intricate questions of data protection and ethical marketing (Du and Xie, 2021).

LITERATURE REVIEW

The evolution of mobile marketing has been a transformative journey, adapting to the rapid changes in technology and consumer behavior. This literature review investigates the recent studies on mobile marketing, focusing on geolocation-based marketing and contextual advertising in apps, and explores how these strategies influence consumer

behavior across different regions and industries. Additionally, it addresses the growing privacy and ethical concerns surrounding these practices. In the last several years, a lot of research has focused on the mobile marketing environment. Manzerolle and Daubs (2021) highlight a crucial finding: companies are becoming more reliant on mobile platforms to engage consumers. They have seen a marked change towards in-app advertising and mobile-first content strategies. Furthermore, Febriyantoro (2020) discovered that mobile marketing greatly increases customer retention rates because of the individualized nature of mobile interactions, in addition to increasing brand exposure. Different regions' consumer habits and technology developments have led to mobile marketing's varied uses throughout the world. According to research by Pang and Zhang (2024) on East Asian mobile marketing, messaging applications such as WeChat are heavily used for both brand promotion and customer care. Mobile app-based loyalty programs have shown a significant preference in European markets, as highlighted by Wettlaufer and Simo (2020), with GDPR compliance serving as a primary emphasis. Considering the difficulties brought about by the quick pace of technical development, Cherniaieva *et al.* (2023) provide an outlook on the market for Internet services. The market is described in the article as a complex system that includes services aimed at people, services that disseminate information, and services that are focused on physical and intangible objects. The authors explore the complex architecture of the future Internet services market and suggest a three-tiered system that prioritizes signal delivery, transmission speed, and end-user safety. Their plan to revamp the sector is in line with EU goals for the future of the Internet, which include strong international economic ties and responsiveness to external developments. To better understand the changes brought about by ICTs, Prokopenko *et al.* (2023) investigate the Internet banking industry's dynamic terrain. They emphasize that in the future market for online banking will change as a result of new developments in ICT, which will lead to more competition and impact from smart services and e-commerce.

Adapting to local customer patterns and technical improvements, mobile marketing methods have differed greatly between nations and regions. Mobile marketing in South Korea and China has relied mostly on social media and messaging applications. Brand marketing on WeChat is rampant in China, with companies developing "mini programs" to engage users (Na, 2023). Similarly, KakaoTalk has been a hit for targeted ads and online shopping in South Korea (Kim, 2022). Mobile marketing techniques that adhere to privacy regulations have become more popular in the European market due to regulations such as GDPR. Both in-app and location-based advertising have grown substantially in the North American market. Moreover, businesses in North America are using app analytics to learn about users' habits and provide a more tailored experience inside the app (Karn *et al.* 2023).

Geofencing and location-based offers have been instrumental in the tremendous success of some campaigns using geolocation-based marketing. The use of geofencing technology by Starbucks resulted in a 14% increase in customer visits to its shops (Sharma, 2023). By notifying customers of superior specials via push notifications when they were near a shop, Walmart's location-based marketing approach improved in-store sales by 20% (Van de Sanden *et al.* 2022). Various geolocation-based marketing strategies have taken on quite varied forms in various regions. Geotargeted marketing reportedly helped McDonald's increase sales in the US by 12% (Brooks *et al.* 2022). As part of this campaign, they targeted customers who lived near McDonald's restaurants with exclusive deals. Moreover, Vodafone launched a campaign in Europe that offered roaming discounts to consumers when they traveled abroad, using geofencing to increase customer satisfaction and loyalty (Ferramondo, 2023). Increased in-store transactions were the outcome of geolocation push alerts regarding nearby shop promotions sent by Lawson convenience stores in Japan (Zhang and Hänninen, 2022).

Apps with contextual advertising have been growing in popularity across several sectors. Personalized ad experiences delivered by Spotify based on user listening behavior have a greater engagement rate than standard advertising strategies (Hracs

and Webster, 2021). While Airbnb increased user engagement and conversion rates via the use of contextual advertising to propose local activities and stays (Sakr *et al.* 2023). There have been creative uses of contextual advertising in apps in many different sectors. For example, this strategy has been useful in the healthcare business. Thomas Craig *et al.* (2021) explain how a wellness app increased engagement via the use of contextual adverts to provide individualized diet and exercise programmes. Based on users' browsing activity and app engagement, educational applications have used contextual advertising to promote courses and learning materials (Jayalath and Esichaikul, 2022). Many different types of businesses have found success using contextual advertising within mobile applications to provide more interesting and relevant experiences for their customers. The increased engagement was a result of contextual advertising in the health and wellness app FitMind's recommendation of individual exercise programs (Tsirmpas *et al.* 2022). Increased conversion rates are a direct outcome of the Amazon app's usage of contextual data to propose goods (Li *et al.* 2021). One more good example is Airbnb's contextual advertising, which they employ to recommend local activities (Sthapit *et al.* 2022).

Many people are curious about how geolocation and contextual advertising affect people's purchasing habits. According to Kujur and Singh (2020), 60% of people are inclined to interact with ads that are relevant to their present location and activity. In addition, Borenstein and Taylor (2023) discovered that consumers are highly influenced by tailored adverts that are based on their surfing history and geographical data. These ads often cause impulsive purchases. There is a large regional and demographic gap in how different types of consumers react to mobile marketing. In the meantime, Bansal (2023) found that location-based ads work better in cities than in rural regions, where people still have trouble connecting.

Karpitskaya and Chuyanava (2021) explore the complex world of advertising, with an emphasis on protecting producers and ensuring consumer rights through the advertising life-cycle. Ensuring a flourishing civil circulation in this sector is acknowledged as of crucial significance in the research. The study intends to add to the continuing

conversation about consumer protection in the advertising environment by suggesting solutions to improve the efficiency and quality of advertising. The results forecast the need for legal measures for the use of "documented confirmation" in advertising appropriateness evaluations. Another important step in protecting consumers' rights in this area is making advertising-related companies more accountable. This study provides useful insights into contemporary advertising trends and gives methodological suggestions to strengthen consumer rights protection systems in the advertising arena.

Cultural, social, and economic variables impact consumer reactions to mobile marketing tactics, which differ across ethnicities and geographies. Shah and Asghar (2023) highlight the profound impact of social interactions on consumer choices, drawing parallels between the theoretical model and practical strategies in the mobile marketing domain. Their emphasis on responsible consumption aligns with the broader theme of ethical and targeted approaches discussed in the context of geolocation and contextual advertising. Among Middle Eastern customers, younger generations were more likely to interact with mobile advertisements (Nasir *et al.* 2021). The widespread use of feature phones in African nations has led to a reliance on SMS for mobile marketing.

Consumers' views on the issue of privacy in context and location-based ads have been divided. While consumers value tailored content, privacy and data security concerns are on the rise (Ayaburi and Treku, 2020). According to research conducted by Dian *et al.* (2020) almost 70% of those who took the poll were not comfortable with applications being able to monitor their location. Because of this, finding a happy medium between targeted advertising and customer privacy is essential. Consumers' and governments' perspectives on mobile marketing's impact on personal data differ widely between countries. Al-Natour *et al.* (2020) discovered that a lot of Canadian consumers are worried about the protection of their data while using mobile applications.

In their research, Shah *et al.* (2023) use Directed Graph theory and DeGroot social learning processes to explore the complex dynamics of social learning on consumer choices. Information distribution and network communication are both highlighted as

critical factors in influencing customer behavior. When discussing geolocation and contextual advertising, the ethical concerns and focused methods brought forth by authors ring true when it comes to responsible consumption. This study illuminates the shifting consumer decision-making dynamics in the digital age, highlighting the imperative of employing informed and reasonable strategies to advance sustainability. Worldwide, privacy and ethical issues have been sparked by the increasing use of mobile marketing tactics, particularly those that make use of personally identifiable information (such as location and browsing history). Increased regulation of data handling in mobile marketing within the European Union is a direct result of the General Data Protection Regulation (GDPR). Businesses' strategies for mobile marketing have been impacted by the Consumer Data Right (CDR), which has granted customers more ownership over their data in Australia (Chandrashekeran and Keele, 2022). There are major privacy and ethical concerns, yet they have increased sales and improved consumer participation. Striking a balance between successful marketing techniques, customer privacy, and ever-changing legislation is a delicate balancing act that businesses must master.

DISCUSSION

Return on Investment (ROI) and engagement metrics are common ways to evaluate the efficacy of geolocation-based marketing campaigns. When compared to more conventional forms of digital advertising, geolocation-based campaigns often provide a better return on investment (ROI) (Pattanayak *et al.* 2023). Using geolocation tactics leads to a dramatic increase in engagement metrics, including click-through rates, in-store visits, and app use duration. As an example, when comparing geolocated and non-geolocated advertisements, Starbucks' usage of geolocation targeting increased click-through rates by 3% (Hotkar *et al.* 2022). Also, according to Digital Marketing Trends stores that used geofencing saw a 10–20 percent increase in foot traffic (Schudrowitz *et al.* 2022).

The cost-effectiveness of geolocation marketing, especially when compared to more conventional digital marketing strategies, is a major differentiator. By narrowing the focus to a specific geographic

area, geolocation marketing helps cut down on wasteful spending on a larger, less engaged audience. Schweidel *et al.* (2022) found that as compared to companies that depended only on conventional Internet advertising approaches, those that used geolocation strategies could cut their client acquisition expenditures by around 15%. The retail behemoth Walmart is leading the way in cost-effective geolocation marketing. Walmart cut its marketing costs per customer in half by using location-based push alerts, which increased consumer engagement (Pangriya and Singh, 2020). Kovalchuk *et al.* (2019) examine the Ukrainian mechanical engineering industry from an economic and mathematical perspective, focusing on how to align marketing and people management in firms strategically. The created matrix model is an advanced and useful tool for managers to make complex choices that reach many objectives in the areas of economics, marketing, management, and society. Optimal enterprise-level marketing and personnel strategies and simplified monitoring procedures are only a few of the real-world advantages shown by this model's actual implementation.

Contextual advertising, which incorporates AI and ML, has changed the game for organizations when it comes to targeting customers. Ad optimization and more accurate forecasts of customer behavior are two outcomes of the growing usage of artificial intelligence algorithms to sift through massive amounts of information. As an example, it is well-known that Amazon's recommendation engine uses AI. These algorithms utilize a user's browsing and purchase history to present advertising that is specifically tailored to them. By tailoring advertisements to each user's interests and past actions, AI may dramatically increase ad click-through rates (Shah and Nasnodkar, 2020). Moreover, ML algorithms allow firms like Netflix to customize content and ads according to user-watching history, which enhances the user experience and boosts engagement (Stoldt, 2021).

The integration of geolocation with augmented reality (AR) is revolutionizing marketing by providing customers with one-of-a-kind, immersive experiences. With augmented reality, companies may improve customers' product interactions by superimposing digital content on top of physical

surroundings. The augmented reality app from IKEA allows customers to virtually place furniture in their own homes before they buy it (Ozturkcan, 2021). Augmented reality has limitless future uses in geolocation marketing. The travel industry shows promise for the use of augmented reality to improve visitors' sightseeing experiences by giving them access to interactive, location-based information on famous sites (Unal *et al.* 2021). The difficulty of making augmented reality material that blends in with the actual environment and the need for powerful technology are two of the present constraints.

Modern mobile marketing tactics owe a great deal to developments in data analytics. Now that marketers can collect and analyze massive volumes of customer data in real-time, they have a better understanding of customer preferences and behavior. One such tool is Salesforce's Einstein Analytics, which helps companies with marketing strategy customization via powerful data processing and actionable insights (Gupta *et al.* 2020). Marketers are turning to predictive analytics to foresee what their customers want and how they will spend their money. Spotify is a good example since it employs predictive algorithms to improve user engagement and enable targeted advertising by suggesting songs based on previous listening habits.

Several well-known firms have shown the efficacy of geolocation-based marketing campaigns. Starbucks used geofencing to target consumers within a certain radius of its outlets with promotional offers. Both foot traffic and revenues during off-peak hours were raised by this method (Sharma, 2023). During major metropolitan events, the ride-sharing firm significantly increased rides by using geolocation data to provide personalized advertising and route choices (Seng *et al.* 2023). Burger King's 1 cent Whopper promotion targeted customers in the geofenced regions around McDonald's restaurants as a direct attack on the fast-food giant. A dramatic increase in app downloads and engagement was the outcome of this daring approach. These examples show how geolocation-based marketing may increase engagement and revenue for businesses. By focusing promotions where they will have the most impact, these focused campaigns help businesses get the most out of their advertising budgets.

Providing reliable geolocation data is a significant technological hurdle for geolocation-based marketing. Misguided marketing attempts based on inaccurate location data might annoy consumers with irrelevant material. Location accuracy may be severely compromised in urban areas due to factors such as urban canyon effects and GPS drift (Smolyakov *et al.* 2020). Tech giants like Apple and Google are always trying to improve the precision of their location services. Another difficulty is integrating with different mobile platforms. There may be some differences in the features and restrictions of geolocation services between platforms (iOS, Android, etc.). To combat this, a growing number of organizations are turning to cross-platform solutions like Xamarin and Flutter (Bekkhush and Arvidsson, 2020). Particularly for companies going through fast expansion, the scalability of geolocation solutions is critical.

Riabova *et al.* (2022) examine the difficulties digital marketing tools encounter and suggest solutions to lessen their detrimental effect on business results in light of the ever-changing and fast-digitizing environment. The study explores the use of contemporary digital marketing technologies in the international economic environment via the use of methodologies, including comparing, analyzing, synthesizing, inductive, and deductive techniques. Improving the efficacy of digital marketing tools is where the article's practical value resides; these tools are vital for increasing revenues and enabling fast expansion in worldwide commerce.

Cloud-based solutions such as AWS and Azure provide the scalable infrastructure needed to manage massive amounts of geolocation data. Verbivska *et al.* (2020) investigate the effects of COVID-19 on companies, highlighting how important e-business is for maintaining profitability. It examines statistics from 212 organizations across industries and nations and concludes that e-business platforms were critical to sustaining profitability, with 58% seeing a rise in online revenue in 2020. It also highlights the significance of liquidity management and equity financing in improving economic performance. Managers and investors will find this research valuable because it pinpoints industries that are more likely to experience crises and lays out important financial decisions that companies must make when facing difficulties.

Geolocation marketing raises serious ethical and privacy issues. The use of consumers' personal location data is gaining more and more attention and sensitivity. The exploitation of customers' location data is a major worry for 74% of consumers (Puntoni *et al.* 2021). Obtaining user permission and being transparent about data rules are crucial in addressing these issues. According to Ferrell *et al.* (2020), Starbucks' approach is a model of openness and honesty. Users are informed about the company's plans for their location data and may choose to turn location services on or off. Businesses using geolocation marketing must adhere to laws such as the EU's General Data Protection Regulation (GDPR) and the US's California Consumer Privacy Act (CCPA). Personal data, including location data, is subject to stringent restrictions that govern its collection and use. One way to make sure everyone is on the same page is to anonymize their data. According to Chang (2021), businesses may get useful insights from location data while still meeting legal obligations if they anonymize the data. Another important part of complying with regulations is using secure data management techniques. Companies should follow best practices such as encrypting data while in transit and at rest and conducting security audits regularly. Uber's data handling methods and strong security measures are crucial for preserving customer data and staying in compliance (Maunula, 2020).

Nike's geolocation approach uses user proximity to its shops to provide localized sports events and product launch-related tailored information (Czegledi *et al.* 2023). This method greatly improves engagement and conversion rates by highlighting the significance of user interest and location-specific content customization. Users' right to privacy must be respected. A recommended practice for retaining customers' confidence is Starbucks' strategy, which includes transparently communicating the purpose and method of location data usage and providing convenient opt-in and opt-out alternatives (Morency, 2022).

Recommendations for Marketers

Several practical suggestions for marketers may be derived from these case studies and industry research: The use of location data must be disclosed openly. Businesses should make it simple for

customers to understand what data is being gathered and why and provide transparent opt-in alternatives for location-based services (Wang and Mathmann, 2021). Although customization may greatly improve the success of campaigns, it is crucial to respect individuals' privacy limits. One way to find a happy medium between customization and privacy is to anonymize location data before utilizing it in bulk (Beigi, and Liu, 2020). Shah and Shah (2023) investigate trust as an important component of social welfare in the context of the digital economy. They use a complex model to show how trust improves social welfare via simulations, demonstrating how important trust is for a well-developed digital economy to function efficiently. The research shows that for digital economies to survive, technology must advance, and policies must prioritize trust. These insights are in line with the necessity of credibility in mobile marketing strategies, which encompass geolocation and contextual advertising.

The relevance and efficacy of advertising may be enhanced by adapting them to local cultural characteristics. One way McDonald's reaches out to its varied customer base is by tailoring the content of its app to regional celebrations and events (Rani, 2023). Critical to the success of contextual ads is their timing. Ongoing plan adjustments should be informed by constant examination of campaign data. User behavior and campaign effectiveness may be better understood with the use of tools like Google Analytics and custom-built AI models. Potvora *et al.* (2023) establish a strong correlation between digital marketing and product quality improvement, emphasizing its ability to engage with the audience, analyze consumer demand, and adapt to market trends. The study concludes that digital marketing is pivotal for business development in the modern digital era, enabling companies to succeed in a dynamic competitive environment by attracting target audiences and fostering product interest and interaction.

Several current tendencies will influence mobile marketing in the future: Personalized marketing is poised to soar to new heights with the advancement of data analytics and AI. Mobile advertisements will be able to accurately represent the consumer's mood and demands by 2025, due to real-time data processing (Sharakhina *et al.* 2023). Gurina *et al.*

(2023), through utilizing a multifaceted approach, including literature review, mathematical equations, and simulations, highlight the significance of value creation and collaborative client engagement for a competitive advantage. Emphasizing the strategic role of networking in effective customer acquisition, optimal values for each strategy are introduced. The study concludes that a harmonized approach integrating these strategies is pivotal for success in Ukraine's B2B market, emphasizing adaptability and responsiveness to market conditions. One of the most promising new avenues for mobile advertising is voice search, thanks to the proliferation of smart speakers and digital assistants like Siri and Alexa. Moreover, voice-activated advertising is going to be increasingly common in the future, allowing people to engage with them without using their hands (Melzner *et al.* 2023). It is believed that mobile marketing will be greatly impacted by the Internet of Things (IoT). According to research by Bhatnagar and Kumra (2020), smartwatches and home appliances have the potential to provide marketers with new ways to connect with customers and valuable data.

Technological developments will also have a significant impact on the future of mobile marketing: By facilitating quicker data transfer and more dependable connection, the launch of 5G is anticipated to transform mobile marketing. Because of this, HD ad material on mobile devices will be possible, and real-time marketing methods will be more successful. Predictive analytics and natural language processing are two areas where AI is expected to make significant strides soon. Better mobile marketing targeting and customization will be possible as a result (Rafieian and Yoganarasimhan, 2021). The use of AR and VR, or augmented and virtual reality, is going to explode in popularity. This will pave the way for more immersive advertising, giving companies the chance to make engaging ads for people.

Voloshina-Sijdei *et al.* (2023) addresses the economic challenges faced by Ukraine due to Russian military aggression in 2014 and the full-scale invasion in 2022. Using scientific research methods, content analysis, and empirical material, the study determines strategic guidelines for Ukrainian economic development amidst global challenges. The article suggests solutions, including strengthened state

control, legislative regulation, and international assistance. Strategic guidelines proposed involve efficient resource use, capacity renewal, GDP restoration, economic structure update, and increased foreign direct investment. The study by Struk *et al.* (2022) advocates for the adoption of digital technologies to improve labor productivity, competitiveness, and overall performance in business. Technology and cultural shifts are the primary drivers of the ever-changing nature of consumer behavior. Without a doubt, this change will influence the way mobile marketing approaches the future: Customers are demanding more say over their data as they learn about privacy concerns. As a result, additional marketing strategies based on opt-in and permission may emerge. Authenticity and a sense of personal connection with businesses is becoming more important to younger customers. We need marketing strategies that are more authentic and focused on providing value if this trend is going to persist (Gielens *et al.* 2021). Brands that are ethical and mindful of the environment are becoming more popular. To connect with customers of the future, mobile marketing campaigns must embody these principles.

In the rapidly evolving landscape of mobile applications, marketing strategies have undergone a transformative shift. This article delves into the groundbreaking realm of mobile marketing, focusing on the strategic utilization of geolocation and contextual advertising. The initiation of mobile apps has opened new avenues for engaging users, and geolocation algorithms take center stage in delivering hyper-targeted content. Table 1 provides a comprehensive overview, showcasing studies that employ diverse algorithms and tools to achieve significant outcomes. From geospatial algorithms improving accuracy in urban environments to augmented reality enhancing user engagement, these strategies reflect the dynamic nature of mobile marketing. As users navigate through a myriad of apps, the integration of contextual advertising becomes pivotal. Machine learning models, predictive analytics, and behavioral analysis algorithms are harnessed to tailor content based on individual preferences, resulting in elevated user engagement and conversion rates. Privacy protection techniques and compliance monitoring algorithms address ethical concerns, ensuring user

Table 1: Unlocking the potential: a comprehensive review of mobile marketing strategies

References	Algorithms	Tools	Satisfied Objectives and Significant Results
(Callejo et al. 2022)	Geospatial Algorithms	GPS-enabled Devices, Mobile SDKs	Improved accuracy of geolocation in urban environments, leading to a 15% increase in targeted ad engagement.
(Kurtz et al. 2021)	Machine Learning Models	E-commerce Platforms, Data Analytics Software	Achieved a 20% rise in conversion rates through personalized contextual ads based on browsing behaviour.
(Abu Ghazaleh and Zabadi, 2020)	Predictive Analytics	AI Platforms, CRM Systems	Enhanced customer targeting accuracy by 30% and reduced marketing costs by 25% in retail apps.
(Arghashi and Yuksel, 2022)	Augmented Reality (AR) Algorithms	AR Development Kits, Mobile Apps	Increased user engagement by 40% in shopping apps using AR for product visualization.
(Gupta et al. 2021)	Compliance Monitoring Algorithms	Compliance Software, Geolocation Services	Successfully navigated privacy and ethical challenges, maintaining a 95% user consent rate.
(Chaudhuri et al. 2021)	DeepLearning Algorithms	Consumer Behavior Analysis Tools	Used deep learning to analyze app usage patterns, achieving a 30% higher accuracy in predicting purchase intent.
(Mohamed), 2022	Location Intelligence Algorithms	Geofencing Tools, Analytics Platforms	Demonstrated a 20% increase in local store traffic with hyper-local geofencing strategies.
(Cooper et al. 2023)	Behavioral Analysis Algorithms	Data Management Platforms (DMP)	Developed a more holistic personalization approach, factoring in behaviour and context, resulting in a 15% higher engagement rate.
(Kang et al. 2023)	AR Content Creation Algorithms	AR Content Management Systems, Mobile Devices	Showcased how AR can transform retail experiences, increasing customer time spent in-app by 50%.
(Ullah et al. 2020)	Privacy Protection Algorithms	Secure Advertising Platforms	Implemented algorithms ensuring user data privacy in ad targeting, achieving high user trust scores while maintaining ad relevance.
(Schudrowitz, 2022)	Proximity Marketing Algorithms	Geofencing Technology, Mobile Apps	Demonstrated a 10% increase in in-store traffic and a 5% increase in sales for retail clients using geofencing.
(Bag et al. 2022)	Machine Learning & Predictive Analytics	E-commerce Platforms, AI Analytical Tools	Enabled personalized shopping experiences, resulting in a 25% increase in customer engagement and a 15% rise in sales.
(Johnson, 2022)	Augmented Reality Algorithms	AR SDKs, Mobile Advertising Platforms	Increased user engagement rates by 30% and improved ad recall by 40% using AR in mobile ads.
(Shah and S. Nasnodkar, 2021)	IoT Data Analysis Algorithms	IoT Platforms, Mobile Marketing Tools	Enhanced the relevance of ads by integrating IoT data, leading to a 20% improvement in click-through rates.
(Shi et al. 2021)	Data Anonymization Techniques	Location-Based Services, Data Privacy Tools	Successfully addressed privacy concerns, maintaining high user engagement while complying with GDPR
(Loghin et al. 2020)	Network Optimization Techniques	5G Networks, Real-Time Data Processing	Leveraged 5G to deliver high-definition content and real-time offers, enhancing customer experience and increasing conversion rates by 20%.

trust is maintained while delivering personalized experiences.

This article serves as a guide to marketers navigating the complexities of mobile marketing in the app era. It explores how strategies have evolved to meet the demands of a tech-savvy audience, emphasizing

the need for a nuanced approach that combines geolocation precision with the power of contextual advertising. In essence, it unravels the secrets behind successful mobile marketing campaigns, where innovation, adaptability, and user-centricity reign supreme.

CONCLUSION

This article has explored the evolving nature of marketing strategies in the era of mobile applications, with a particular focus on the use of geolocation and contextual advertising. The effectiveness of these strategies is evident through increased engagement metrics, personalized user experiences, and improved return on investment (ROI). Successful case studies, such as those of Starbucks and Burger King, demonstrate the potential of geolocation-based marketing in driving customer traffic and sales. Meanwhile, the use of contextual advertising, bolstered by AI and machine learning, has shown a significant impact in enhancing ad relevance and user engagement. However, these strategies are not without challenges. Technical issues like the accuracy of geolocation data, integration across various platforms, and scalability pose significant hurdles. More pressing are the ethical and privacy concerns raised by the use of personal location data. The need for regulatory compliance, particularly with laws like GDPR and CCPA, adds another layer of complexity to these marketing strategies.

The most important thing this means for marketers is that they need to be creative while still being ethical. Keeping consumers' confidence requires open data policies and unambiguous opt-in authorization. As technology evolves, marketers need to be agile and adaptable to take advantage of new opportunities, such as 5G and AR, to provide better experiences for their customers. Global marketing initiatives also need to take regional differences in customer behavior and cultural norms into account.

In the future, several issues need to be explored further. The effect of changing privacy legislation on advertising approaches is one important topic. It is critical to comprehend the consequences of shifting consumer knowledge and legislative frameworks regarding data privacy on geolocation and contextual advertising. The use of new technology in mobile marketing, such as 5G and AR, is another potential subject for further study. More in-depth investigation of these technologies' capacity to enable the development of more engaging and participatory advertising experiences may be possible when they achieve widespread use. Research on how AI and ML may improve personalization while still protecting users' privacy is also very welcome. Researching ethical and

successful ways to use these technologies in the dynamic world of mobile marketing is of the utmost importance. Finally, there is still a lot of need for research into how consumers react to these sophisticated marketing tactics, especially in circumstances that vary greatly among cultures and regions. As a result, we can better craft marketing tactics that resonate with target audiences throughout the world while also taking cultural norms into account.

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