

PROGRAMMATIC ADVERTISING: Evolution, Efficacy, and Ethical Implications In The Digital Age

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Abstract

The digital landscape has witnessed significant transformations over the past few decades, with programmatic advertising emerging as a pivotal force reshaping the world of brand communication. This article delves deep into the evolution of online advertising, highlighting the inefficiencies of traditional digital ad-buying methods that paved the way for the algorithmic and data-driven paradigm of programmatic advertising. While offering advantages like precision targeting, automation, scalability, and real-time analytics, programmatic advertising has challenges, especially concerning data privacy, regional nuances, and ethical considerations. Through a lens of global and regional case studies, the article underscores the intricate dynamics and cultural sensitivities crucial for successful campaigns. As we stand at the cusp of technological advancements, integrating Artificial Intelligence, Augmented Reality, and 5G into the programmatic ecosystem promises further evolution. The article concludes with robust recommendations for researchers, emphasizing the importance of interdisciplinary studies, ethical considerations, and the need for continuous adaptation in this ever-evolving digital world.

Keywords: Data Privacy; Digital Evolution; Programmatic Advertising

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INTRODUCTION

In our swiftly evolving commercial world, the significance of digital advertising for businesses and brands to effectively relay their narratives to an international audience has surged. Digital advertising represents promotional campaigns executed via electronic mediums from standard computers to modern smartphones and tablets. These campaigns span various tactics, such as banner displays and search engine marketing (Chaffey & Ellis-Chadwick, 2019). Amidst these myriad techniques, a standout innovation that has caught the attention of industry stalwarts is programmatic advertising.

Programmatic advertising actively buys and sells ad space in real-time using algorithms. This automation enhances media buying decisions by homing in on specific audience segments backed by data insights (Li & Kannan, 2014). At its heart, programmatic advertising leverages machine learning and sophisticated data analyses to ensure ads reach the most apt viewers, mitigating the need for manual placements. This automated accuracy guarantees that ads resonate with the intended viewers, driving more effective campaigns (Chen et al., 2019). Furthermore, programmatic advertising markets heavily rely on

information elicited from analyzing web users and pages, indicating the importance of data in this domain (Li et al., 2017).

The financial trajectory of programmatic advertising has been noteworthy. While specific figures for 2019 are challenging to pinpoint, the broader advertising landscape has shown a positive association between advertising expenses and financial performance, suggesting that investments in advertising can lead to improved financial outcomes (Acar & Temiz, 2017). This trend aligns with the industry's pivot towards more refined advertising methods. Firms are increasingly recognizing the benefits of tailored advertisements, with evidence suggesting that both display advertising and paid search advertising have positive effects on firm performance and value (Bayer et al., 2020).

However, the journey of programmatic advertising is full of roadblocks. Debates in both academic and commercial spheres have revolved around data privacy issues, potential ad fraud, and the intricacies of the foundational tech (Chen et al., 2019). Nonetheless, intrinsic to evolutionary paths, these challenges have spurred further advancements, meticulous refinements, and enriched dialogues among industry professionals.

Given the recent developments in the advertising domain, there is an urgent need for an in-depth examination of programmatic advertising. As businesses grapple with the changing dynamics and new technologies, regulations, and challenges emerge, understanding programmatic advertising becomes paramount. This article highlights its core components, merits, hurdles, and metamorphosing role in the broader digital advertising tapestry.

Historical Context of Programmatic Advertising In Digital Advertising

The evolution of online advertising has been remarkable, charting a course from simplistic beginnings to its current multifaceted existence. As the World Wide Web expanded during the 1990s, so did the opportunities for advertisers. The initial banner advertisements, often seen as intrusive and unesthetic, marked the rudimentary steps of the digital advertising world. Over the years, as technologies advanced and user behaviours shifted, the nature and forms of online ads became more varied, including video ads, interactive ads, and social media promotions (Nyström & Mickelsson, 2019).

However, with evolution came complexities. Traditional methods of digital ad buying, though foundational, needed more inefficiencies. Advertisers primarily depended on direct relationships with publishers, leading to manual negotiations, a lack of transparent pricing, and labour-intensive ad placements. This process took a lot of time and resources, often resulting in ads getting placed in non-ideal digital environments and failing to engage the intended audience effectively. Furthermore, the inability to track and measure the

effectiveness of these advertisements in real time was a glaring limitation (Daugherty et al., 2017).

Challenges with traditional advertising methods led to the emergence of programmatic advertising, a revolutionary shift in how people procured digital ad spaces. Instead of traditional buying methods, programmatic advertising introduced automated, data-driven processes that facilitated the efficient purchase of ad spaces (Guitart et al., 2020). At its core, programmatic advertising employs sophisticated algorithms and real-time data to automate ad buying, optimising placements to reach the most relevant audiences. The programmatic advertising streamlined the process and significantly reduced the human errors and inefficiencies associated with manual placements.

The introduction of programmatic advertising was not merely a solution to existing problems but also brought along a suite of advantages. With programmatic, advertisers gained the ability to target ads with laser precision, ensuring relevance and increasing the likelihood of user engagement. The real-time nature of programmatic meant advertisers could adjust campaigns instantaneously based on data feedback, thereby maximising their return on investment. On the other hand, publishers could optimise ad revenues, given the dynamic pricing models enabled by real-time bidding (Palos-Sanchez et al., 2019).

Having understood the historical underpinnings of programmatic advertising, it becomes crucial to delve deeper into its inner workings. The successive sections will explore the core tenets of programmatic advertising, unravelling the technologies, strategies, and intricate data plays that form the backbone of this transformative advertising approach.

METHODs

The methodology employed in this research revolves around a secondary data analysis drawn from extensive literature reviews. Secondary data analysis, a method by which data initially collected by other researchers is repurposed, serves as a valuable tool to tap into existing datasets, offering a plethora of variables that can spawn new research inquiries (Chaffey & Ellis-Chadwick, 2019; Li & Kannan, 2014). This paper's secondary data has been sourced from various platforms, including websites, books, scholarly articles, and journal publications centred on programmatic advertising.

This research commences with comprehensive literature reviews on the evolution and intricacies of programmatic advertising. The data gathered touches on several facets of the subject, including its objectives, aims, target audience, and the technological infrastructure that supports it. Following this, the data is meticulously analysed, shedding light on the opportunities and challenges that programmatic advertising presents in the contemporary

digital age, emphasising ethical implications and data privacy concerns (Li et al., 2017; Palos-Sanchez et al., 2019).

RESULTS AND DISCUSSION

Programmatic Advertising Fundamentals

Central to modern digital advertising, programmatic advertising operates on core mechanisms and platforms that drive its unparalleled efficiency and precision. Real-time Bidding (RTB) is the primary engine behind this paradigm. RTB is an automated auction system allowing advertisers to bid on ad impressions in real-time, targeting specific users based on pre-set criteria. When a user visits a website, the site passes information about the user to an ad exchange. The ad exchange then auctions this information to the advertiser who offers the highest price. This entire bidding process, astoundingly, occurs in milliseconds, ensuring the user sees the ad almost instantaneously upon loading the webpage (Guitart et al., 2020).

While RTB exemplifies the dynamic nature of programmatic buying, there are more deterministic purchasing methods, namely Direct Buys and Programmatic Direct. These methods involve purchasing digital ad space at a fixed price, bypassing the auction process. Advertisers typically reserve direct buys for premium ad placements or when they want high control over where their ad displays. On the other hand, programmatic direct still leverages automation but combines it with these predetermined prices and placements (Busch, 2015).

Integral to the fine-tuned targeting capabilities of programmatic advertising is using Data Management Platforms (DMPs). DMPs are sophisticated tools that collect, integrate, and manage large data sets from various sources. Advertisers utilize these platforms to segment and categorize data, gaining insights into user behaviours, interests, and demographics. This data processing informs the targeting strategies, ensuring advertisers display ads to the most relevant audience segments (Li et al., 2017).

Facilitating these processes are two pivotal platforms: Supply-Side Platforms (SSPs) and Demand-Side Platforms (DSPs). SSPs allow publishers to manage, sell, and optimize their ad inventory in an automated fashion, ensuring they extract maximum value from their digital real estate. Conversely, DSPs serve advertisers, enabling them to purchase ad impressions across various publisher sites tailored to specific target audiences. These platforms communicate in real-time, bridging the gap between advertisers' demands and publishers' supplies (Chen et al., 2019).

Having understood the fundamental roles of SSPs and DSPs in the programmatic advertising process, it becomes crucial to assess the overall efficacy of this advertising approach. The efficacy and efficiency of programmatic advertising arise from this intricate interplay of technologies and platforms. As we have journeyed through its foundational elements, exploring its overarching impact on the advertising landscape becomes pertinent.

In subsequent sections, we will delve into the tangible benefits that programmatic advertising bestows upon advertisers, shedding light on its transformative potential in digital marketing. With the technology's foundational elements clarified, let us now delve deeper into the numerous benefits programmatic advertising offers to its users.

Benefits Of Programmatic Advertising

The digital landscape has witnessed a significant shift towards programmatic advertising, driven by its many advantages to advertisers and publishers. One of the primary benefits is the precision targeting capability of programmatic platforms. Unlike traditional advertising, which often casts a broad net in hopes of capturing a few interested individuals, programmatic advertising adopts a more focused approach. By harnessing vast amounts of data, advertisers can customize their ads to specific audience segments based on behaviours, interests, demographics, and more. This targeted approach ensures that the right message is delivered to the right individual now, enhancing engagement rates and advertising effectiveness (Iyer et al., 2005).

The efficiency and automation introduced by programmatic advertising in the ad-buying process is another notable advantage. The era of manual negotiations and labour-intensive ad placements is becoming obsolete. Programmatic platforms have automated a significant portion of the media buying process, streamlining operations, and ensuring optimal pricing for ad spaces. This automation reduces overheads, minimizes human errors, and expedites ad deployment, offering advertisers agility in the dynamic digital environment (Palos-Sanchez et al., 2019).

Furthermore, programmatic advertising offers scalability and extensive reach. Advertisers are no longer limited to direct relationships with a select group of publishers. They can access a vast network of publishers through programmatic exchanges, reaching diverse audience segments across various platforms and regions. This extensive reach ensures that brands can establish a comprehensive digital presence, resonating with global audiences (Qi et al., 2018).

The subsequent allure of programmatic advertising lies in its real-time analytics and optimization capabilities. Ad campaigns have evolved from static entities to dynamic, adaptable initiatives. Advertisers can monitor campaign performance in real-time, gleaning insights into which ads are effective and which are not. Using the insights from these analytics, advertisers can adjust campaigns on the fly, ensuring continuous refinement for maximum impact.

The versatility of programmatic advertising is evident in its seamless integration with other digital marketing techniques. Whether it is content marketing, SEO, or social media promotions, programmatic advertising can be incorporated to enhance the overall efficacy

of digital marketing strategies. While recognizing the transformative potential of programmatic advertising, it is crucial to understand that, like any innovation, it comes with challenges and criticisms. The following sections will delve into these potential pitfalls and areas of contention associated with programmatic advertising.

Case Studies in Programmatic Advertising

Programmatic advertising, a cornerstone of modern digital marketing, has seen numerous success stories and challenges. By delving into specific campaigns, we can extract valuable insights and better comprehend the nuances of this advertising modality.

A global success story that underscores the evolution of programmatic advertising is the transition from traditional advertising theories to digital strategies. Kerr et al. (2015) explored whether conventional advertising theories remain relevant in today's interactive digital marketplace. Their findings suggest a paradigm shift, emphasizing the need for advertisers to adapt and innovate in the face of rapid technological advancements. This evolution is evident in the rise of programmatic advertising, where real-time data and dynamic content adjustments have become the norm, ensuring that ads are tailored to the viewer's preferences and behaviours.

In Indonesia, a burgeoning digital market, Gojek is a prime example. Originating as a ride-hailing platform, Gojek expanded its services to include food delivery, digital payments, and more. To promote its diverse offerings, Gojek employed programmatic advertising, emphasizing regional targeting. Ads tailored to specific Indonesian cities were dispatched, such as promoting their food delivery service in culinary hubs like Bandung. While the campaign elevated brand awareness, Gojek encountered challenges with ad placements, with some ads inadvertently appearing on irrelevant or competitor sites. This situation underscores the importance of continuous monitoring and refinement in programmatic campaigns, even with automation (Palos-Sanchez et al., 2019).

Drawing parallels between the global shift towards digital strategies and Gojek's regional targeting, it is evident that programmatic advertising offers unmatched precision. However, it also necessitates vigilance from advertisers. While the global industry's evolution showcases the potential of technology in advertising, Gojek's experience highlights the challenges that can emerge, emphasizing the need for continuous oversight.

As we transition from these real-world applications, we must gaze forward, contemplating the evolving trajectory of programmatic advertising. The forthcoming sections will delve into the dynamic future of this domain, exploring emerging trends, innovations, and the potential metamorphosis of the digital marketing landscape.

The Future of Programmatic Advertising

As the digital domain continues its relentless evolution, programmatic advertising stands at an inflection point. The undeniable allure of technology's transformative potential is exciting and tempered by the cautionary tales of regulatory challenges and market shifts.

The confluence of emerging technologies, notably Artificial Intelligence (AI) and Augmented Reality (AR), offers tantalizing possibilities for programmatic advertising. AI, with its data processing capabilities and predictive prowess, can further enhance the precision of ad targeting. Envision a future where AI-driven algorithms dynamically adjust ads based on real-time consumer behaviour. Combine this with AR, and there is potential for immersive ad experiences that blur the boundary between the virtual and the tangible, a concept further explored by Porter and Heppelmann (2017) in the Harvard Business Review.

The advent of 5G technology is another game-changer. Beyond just speed, 5G promises unparalleled connectivity and bandwidth. The technology can have profound implications for programmatic advertising, especially in real-time bidding scenarios. Data packets transfer faster, making the ad delivery process more instantaneous providing richer, lag-free multimedia experiences (Chen et al., 2019).

Nevertheless, for all its technological promise, programmatic advertising's journey forward will be equally shaped by data privacy considerations. With regulations like the GDPR in Europe becoming the gold standard, the industry is undergoing a seismic shift. Striking the right balance between offering personalized ad experiences while respecting privacy mandates will be a pivotal challenge in the years ahead (Palos-Sanchez et al., 2019).

Speculation is also rife about consolidation in the programmatic ecosystem. Given the plethora of platforms and intermediaries today, a growing consensus exists about the benefits of a more streamlined landscape. Such unification can reduce complexity, ensuring advertisers can navigate the ecosystem more easily (Busch, 2015).

Contemplating the potential directions of programmatic advertising's trajectory underscores its dynamic nature, influenced by technology and governance. As we pivot towards this horizon, it becomes crucial for researchers to be the torchbearers. The ensuing section offers a roadmap for scholarly exploration in this dynamic realm.

Recommendations For Researchers

In the ever-evolving tapestry of digital marketing, programmatic advertising has solidified itself as an essential strand. Its intricate weave of data analytics, real-time bidding, and precision targeting has revolutionised the ad space. However, as with any evolving field, programmatic advertising offers a treasure trove of untapped research opportunities.

1. Research Gaps & Opportunities: One of the most compelling areas awaiting exploration is the interplay between data ethics and programmatic strategies. In our

data-driven age, understanding the balance between harnessing information and ensuring ethical practices is paramount (Mittelstadt et al., 2016). Furthermore, current literature primarily needs to represent the role of nuanced cultural differences more prominently in programmatic success across regions. A study into regional preferences and sensitivities could offer brands invaluable insights into tailoring their ad campaigns to resonate better with diverse audiences (Martínez-Martínez et al., 2017).

2. **Methodological Advancements:** Researchers' methodological tools can significantly shape their findings' depth and breadth. Leveraging big data analytics can offer a macro understanding of user interactions with programmatic ads (Chen et al., 2012). On the other hand, ethnographic studies can shed light on the micro-understanding of individual user experiences. Furthermore, integrating neural networks could unearth patterns in success and failure, offering a predictive lens into the future of programmatic ad campaigns (Heaton, 2018).
3. **Collaborative Ventures:** An interdisciplinary research approach can provide holistic insights. Collaborations between computer scientists, social scientists, and digital marketing experts can synthesise perspectives, resulting in a more comprehensive understanding of programmatic advertising (Min et al., 2016). The technological intricacies, societal implications, and commercial angles can all be better understood when these disciplines converge in research endeavours.
4. **Ethical Considerations:** As programmatic advertising burgeons; it presents researchers with a moral imperative. Delving deep into the ethical aspects of programmatic advertising especially in areas of data privacy, user consent, and the moral ramifications of ad-targeting based on sensitive data—is crucial (Buckner, 2019). A comprehensive exploration here can guide industry standards and promote ethical best practices.
5. **Historical & Cultural Context:** Digital environments are mutable, shaped by technological advancements and shifting user behaviours. Researchers can trace patterns by juxtaposing historical data against the contemporary landscape, offering predictions about future trends (Webster, 2014). The cultural fabric of diverse populations also impacts their interactions with programmatic ads. Herein lies another expansive research field, ripe with opportunities for understanding and harnessing these nuances.

Furthermore, the burgeoning realm of programmatic advertising necessitates standardisation and benchmarking. The rise of this advertising form beckons for industry-wide standards and benchmarks. Engaging in defining, studying, and evolving these benchmarks

can be a significant contribution by researchers, fostering consistency and guiding evolution in the industry (Hatcher & Yu, 2018).

As we pivot towards the culmination of this discourse, we recognise that the future holds boundless potential and challenges. It beckons the research community to be the guiding beacons, illuminating the way forward in programmatic advertising.

CONCLUSION

Programmatic advertising, rooted in the digital epoch's mosaic, has transformed how brands communicate, connect, and convert. Its inception and subsequent growth trace back to the inherent inefficiencies in traditional ad buying, propelling the digital world towards an era marked by automation, precision, and real-time analytics. Through real-time bidding, direct purchases, and the intricate dance of Supply-Side Platforms (SSPs) and Demand-Side Platforms (DSPs), programmatic advertising promises unprecedented efficiency. However, like all innovations, it has not been without its share of challenges and criticisms.

From the presented case studies, it becomes abundantly clear that success in programmatic advertising rests not only on technological might but also on cultural understanding, regional nuances, and ethical considerations. While one campaign may thrive, leveraging data and real-time insights, another may face challenges, especially if not sensitive to the regional dynamics and preferences, as witnessed in the Indonesian example. While understanding regional dynamics is essential, it is equally important to recognize the broader technological shifts on the horizon that will redefine programmatic advertising.

Nevertheless, the horizon of programmatic advertising is anything but static. As we stand on the cusp of integrating this dynamic with emerging technologies like Artificial Intelligence, Augmented Reality, and the speed of 5G, the landscape is poised to become even more intricate. Add to this the evolving dynamics of data privacy, and we are looking at a future that demands agility, foresight, and continual adaptation. The research community, in this journey, is indispensable. They can illuminate the path forward by identifying gaps, pioneering methodological advancements, fostering collaborations, and championing ethical imperatives. With this future landscape painted, it becomes evident that staying updated is not just an advantage, but a necessity for all stakeholders in the programmatic advertising space.

In this swiftly shifting digital realm, one truth emerges paramount: The quest for knowledge is endless. As the tapestry of programmatic advertising evolves, every stakeholder—brands, marketers, technologists, and researchers—must be in a perpetual state of learning, adapting, and innovating. The challenges, though present, are stepping stones, urging us to

leap forward, driven by the possibilities that tomorrow holds. As we navigate this exhilarating trajectory, the onus is on us to ensure that while we leverage the power of programmatic advertising, we do so ethically, responsibly, and with an unwavering commitment to value creation for all stakeholders.

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