

A Data-Driven Evaluation of Telco-Based Deterministic Targeting for Programmatic Advertising Systems

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ABSTRACT

Deterministic audience targeting based on verified identity data has emerged as a promising alternative to probabilistic approaches in programmatic advertising, particularly in response to increasing data fragmentation and privacy constraints. However, empirical evidence evaluating its effectiveness in real-world campaign environments remains limited. This study presents a data-driven evaluation of telco-based deterministic targeting using campaign data from a programmatic advertising platform. A mixed-methods approach is employed by integrating quantitative performance metrics, including click-through rate (CTR), viewability rate, cost-per-click (CPC), and cost-per-mille (CPM), with qualitative insights obtained from platform users. The analysis focuses on assessing the impact of deterministic targeting on audience relevance and engagement performance across multiple campaigns. The results indicate that telco-based deterministic targeting improves audience precision and maintains stable engagement performance, particularly in terms of CTR and viewability. However, the findings also reveal that improved targeting accuracy does not necessarily translate into higher conversion outcomes, as campaign performance is influenced by additional factors such as media placement, creative execution, and platform optimization capabilities. This study contributes to the field of data-driven advertising systems by providing empirical evidence on the effectiveness of identity-based targeting in real-world settings. It further highlights the practical limitations of deterministic approaches and emphasizes the need for integrated optimization strategies in programmatic advertising ecosystems.

INTRODUCTION

In recent years, digital advertising has experienced significant growth and increasingly relies on data-driven strategies to improve campaign effectiveness. The adoption of programmatic advertising has enabled automated media buying and real-time optimization,

allowing advertisers to deliver more relevant messages to targeted audiences (Chaffey & Ellis-Chadwick 2019); Malthouse & Li (2017). As a result, audience targeting has become a central component in determining advertising performance.

However, the effectiveness of targeting strategies has been challenged by the growing limitations of third-party cookies and increasing concerns regarding user privacy. Regulatory changes and technological restrictions have reduced the reliability of probabilistic tracking methods, which traditionally infer user identity based on behavioural patterns (Kumar & Gupta, 2016); (Goldfarb & Tucker, 2011). These limitations raise questions about the accuracy and sustainability of conventional audience targeting approaches.

In response to these challenges, deterministic data approaches have emerged as an alternative, offering more precise audience identification based on verified user information. One example is Telco-based targeting, which utilizes subscriber-level data (TelcoID) to enable more accurate audience segmentation. Compared to probabilistic methods, deterministic approaches are expected to improve targeting precision and enhance advertising relevance (Johnson et al., 2022); (IAB Tech Lab, 2023).

Despite this potential, empirical studies evaluating the effectiveness of deterministic targeting in real campaign environments remain limited. Previous research has primarily focused on general targeting mechanisms and personalization effects, with less attention given to platform-specific implementations and real-world performance outcomes (Tucker, 2014); (Lambrecht & Tucker, 2013); (Novatiq, 2025); (Kannan and Viswanathan, 2019). As a result, there is a need for empirical investigation into how deterministic targeting performs in practice, particularly in emerging programmatic platforms (Li et al., 2019).

This study aims to evaluate the effectiveness of Telco-based audience targeting within the AdXelerate platform. By analysing campaign performance data and incorporating user perspectives, this research seeks to assess whether deterministic targeting contributes to improved engagement and overall campaign effectiveness. The study adopts a mixed-methods approach to provide a more comprehensive understanding of both performance outcomes and practical implementation challenges.

The findings of this study are expected to contribute to the growing discussion on data-driven advertising in the post-cookie era, while also providing practical insights for advertisers in optimizing targeting strategies within programmatic ecosystems.

Programmatic advertising has transformed the digital advertising landscape by enabling automated media buying and real-time decision-making based on data signals. This approach allows advertisers to optimize campaign delivery and improve audience targeting efficiency through algorithmic processes (Malthouse & Li, 2017). As a result, data has become a critical asset in determining advertising effectiveness, particularly in identifying and reaching relevant audiences. The effectiveness of programmatic advertising is closely linked to the quality and accuracy of the underlying data used for targeting. Data-driven targeting enables advertisers to segment audiences based on demographic, behavioural, and contextual

attributes, thereby increasing the likelihood of user engagement (Kumar & Gupta, 2016). However, the success of this approach depends on the reliability of the data sources and the methods used to identify users.

Probabilistic vs Deterministic Targeting Approaches

Traditional digital advertising has largely relied on probabilistic targeting methods, which infer user identity and preferences based on browsing behaviour and device-level signals. While this approach allows for large-scale audience reach, it is often associated with limitations in accuracy and identity resolution (Lambrecht & Tucker, 2013).

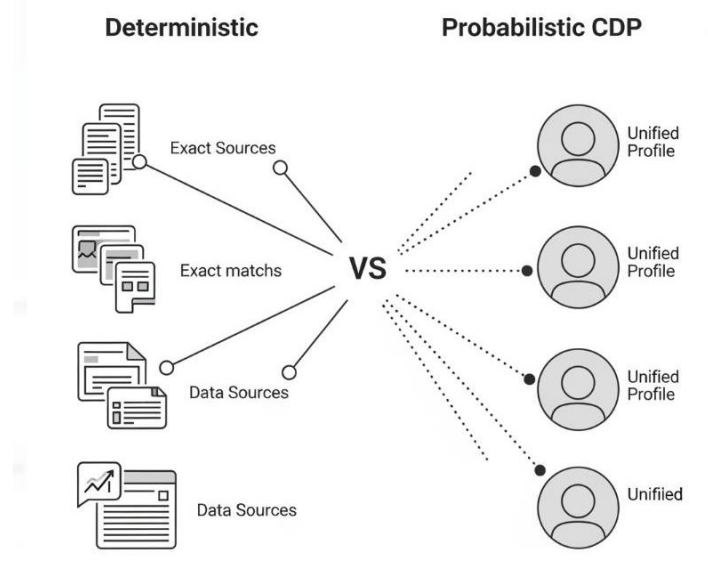


Fig 1. Comparison between deterministic and probabilistic targeting approaches in programmatic advertising.

With the increasing restrictions on third-party cookies and heightened privacy regulations, the effectiveness of probabilistic methods has been challenged. These changes have led to a growing interest in deterministic targeting approaches, which rely on verified user data to enable more precise audience identification (Goldfarb & Tucker, 2011) ; (Johnson et al., 2022). Deterministic data, such as Telco-based identifiers, offers a higher level of accuracy by linking advertising exposure to authenticated user profiles. This approach is expected to improve targeting precision and enhance the relevance of advertising messages (IAB Tech Lab, 2023). However, the practical effectiveness of deterministic targeting in real-world campaign environments remains an area that requires further empirical validation.

Advertising effectiveness is commonly evaluated through metrics such as engagement and conversion. Engagement indicators, including click-through rate (CTR), reflect the extent to which users interact with advertisements, while conversion metrics represent the ability of campaigns to achieve desired outcomes, such as purchases or sign-ups. Previous studies suggest that improved targeting can increase engagement by delivering more relevant content to users (Tucker, 2014). However, higher engagement does not necessarily guarantee

improved conversion outcomes, as user decision-making is influenced by multiple factors beyond targeting, including creative quality, user experience, and contextual relevance (Li et al., 2019). This distinction highlights the importance of evaluating targeting effectiveness not only in terms of engagement performance but also in relation to broader campaign objectives.

While existing literature has explored various aspects of digital advertising, including targeting mechanisms and personalization strategies, limited research has examined the effectiveness of deterministic targeting using real campaign data, particularly within emerging programmatic platforms.

Most prior studies focus on generalized models or experimental settings, with less emphasis on platform-specific implementations and real-world performance outcomes (Boerman et al., 2017). As a result, there is a gap in understanding how deterministic data approaches, such as Telco-based targeting, perform in practice. This study addresses this gap by providing empirical evidence on the effectiveness of Telco-based audience targeting within the AdXelerate platform, using a combination of quantitative campaign data and qualitative user insights.

METHOD

Research Design

This study employs a mixed-methods research design to evaluate the effectiveness of Telco-based deterministic targeting within programmatic advertising systems. The approach integrates quantitative analysis of campaign performance data with qualitative insights from platform users to provide a comprehensive understanding of targeting effectiveness.

The quantitative component focuses on identifying patterns in campaign performance across different audience segments and media placements, while the qualitative component captures user perspectives regarding targeting accuracy, campaign outcomes, and platform limitations. This combined approach enables a more holistic evaluation of both performance metrics and practical implementation factors.

Data Sources

The quantitative data used in this study were obtained from multiple advertising campaigns executed through the AdXelerate platform during 2025. The dataset consists of campaign-level performance data collected from various campaigns across different industries and objectives.

The dataset includes key metrics such as impressions, clicks, click-through rate (CTR), sessions, and viewability. In addition, the dataset provides detailed audience segmentation based on deterministic TelcoID data, including age groups, device categories, and geographic distribution (e.g., top regions or cities). Media-related data, including publisher performance and media affinity, are also included to evaluate the role of media placement in campaign effectiveness.

All data were aggregated at the campaign level and analyzed to identify patterns in targeting performance across different segmentation and media variables.

To complement the quantitative analysis, qualitative data were collected through structured surveys involving key stakeholders, including account managers, media planners, and advertisers who actively use the AdXelerate platform. These responses provide insights into perceived targeting accuracy, campaign effectiveness, and operational challenges in achieving desired outcomes.

Variables and Measurement

This study evaluates targeting effectiveness using three main categories of variables: performance metrics, audience segmentation variables, and media-related variables.

1. Performance Metrics
 - a. Impressions: representing the total number of ad exposures
 - b. Clicks: indicating direct user interaction with advertisements
 - c. Click-through rate (CTR): measuring engagement efficiency relative to impressions
 - d. Sessions: representing post-click user activity and serving as a proxy for conversion-related outcomes
 - e. Viewability: indicating the proportion of ads that are visible to users
2. Audience Segmentation Variable
 - a. Age groups: derived from deterministic TelcoID data
 - b. Device categories: reflecting user access behaviour (e.g., Android, iOS, device tier)
 - c. Geographic distribution: representing user location at regional or city level
3. Media-Related Variables
 - a. Publisher / media placement: representing the platforms or channels where ads are delivered
4. Qualitative Variables

Qualitative variables capture user perceptions related to:

 - a. Targeting accuracy
 - b. Campaign performance
 - c. Challenges in achieving conversion outcomes
 - d. Platform usability and limitations

Data Analysis Techniques

The quantitative data are analysed using descriptive and comparative methods to evaluate campaign performance across different audience segments and media placements. Performance indicators such as CTR, clicks, and sessions are examined in relation to segmentation variables (age, device, and geographic distribution) and media-related variables (publisher and media affinity).

The qualitative data are analysed using thematic analysis to identify recurring patterns in user responses, particularly regarding targeting accuracy, engagement performance, and conversion challenges.

To enhance the validity of the findings, this study applies a triangulation approach by integrating quantitative results with qualitative insights. This enables cross-validation between observed campaign performance and user perceptions, providing a more comprehensive evaluation of targeting effectiveness.

Research Scope and Limitations

This study focuses on evaluating Telco-based deterministic targeting within a single programmatic advertising platform, AdXelerate. As a result, the findings may not be fully generalizable to other platforms with different data sources, targeting mechanisms, or optimization capabilities.

The analysis is primarily based on campaign-level performance metrics, which may not fully capture long-term business outcomes such as revenue or customer lifetime value. In addition, session data are used as a proxy for conversion-related outcomes, which may not directly reflect actual conversions.

The qualitative findings are based on user perceptions, which may be influenced by subjective experiences and individual expectations. Despite these limitations, the study provides empirical insights into the application of deterministic targeting in real-world campaign environments and highlights key factors influencing its effectiveness within programmatic advertising systems.



Fig 2. Research framework illustrating the relationship between deterministic and probabilistic data, targeting algorithms, and campaign performance outcomes in programmatic advertising.

FINDING AND DISCUSSION

Overview of Campaign Performance

The analysis of multiple campaigns conducted on the AdXelerate platform during 2025 shows consistent delivery performance across key metrics, including impressions, clicks, and viewability. Campaigns demonstrate relatively stable click-through rates (CTR), indicating that the platform is capable of reaching relevant audiences at scale. However, variations in performance become more apparent when analyzed at a more granular level. Differences in

engagement metrics across campaigns suggest that targeting effectiveness is influenced by segmentation strategies, media placement, and campaign configuration.

Table 1. Campaign performance summary across key metric.

No	Campaign	Total Impression	Total Click	Avg. CTR	Total Session
1	SA (May)	4,413,118	12,42	0.28%	-
2	SA (Jul–Aug)	851,511	4,168	0.49%	-
3	BAZ	323,959	1,09	0.34%	-
4	MO (May)	2,180,454	8,449	0.39%	4,347
5	MO (June)	2,705,682	8,482	0.31%	3,711
6	KAH (May)	5,164,660	10,957	0.21%	4,62
7	KAH(June)	8,936,680	32,577	0.36%	14,492
8	War Deco	6,288,297	26,688	0.42%	12,761
9	War FC	7,386,461	29,739	0.40%	13,567
10	Emi	2,455,907	6,607	0.27%	4,572

The campaign performance results demonstrate that the AdXelerate platform consistently delivered advertising impressions, clicks, and viewability across multiple campaigns, indicating that deterministic audience targeting provides a stable foundation for large-scale programmatic advertising. The relatively consistent click-through rates (CTR) suggest that verified identity-based targeting enables advertisers to reach audiences with greater relevance than conventional probabilistic approaches. This finding supports the argument that high-quality audience data constitute a critical determinant of campaign effectiveness in data-driven advertising ecosystems (Malthouse & Li, 2017; Kumar & Gupta, 2016).

Nevertheless, noticeable differences in campaign performance indicate that targeting precision alone cannot fully explain engagement outcomes. Campaign-level variations imply that advertising performance emerges from the interaction of audience segmentation, campaign objectives, bidding strategies, and media allocation rather than from audience identity alone. Similar conclusions were reported by Li et al. (2019), who demonstrated that advertising performance depends on the integration of targeting strategies with attribution and optimization mechanisms throughout the customer journey. Likewise, Tucker (2014) argued that personalized targeting increases advertising relevance but does not uniformly improve user responses across all campaign contexts.

These findings are also consistent with more recent studies emphasizing that the effectiveness of deterministic identity solutions depends on complementary optimization processes, including real-time bidding algorithms, inventory quality, and contextual relevance (Johnson et al., 2022; IAB Tech Lab, 2023). Consequently, the stable performance observed in this study suggests that Telco-based deterministic targeting provides a reliable infrastructure for audience identification. However, maximizing campaign performance

requires integrated optimization of targeting, media delivery, and creative execution. Therefore, advertisers should evaluate campaign success using multiple performance indicators rather than relying solely on CTR or impression volume, particularly in increasingly privacy-centric digital advertising environments.

Effectiveness of Telco-Based Audience Targeting

The findings indicate that Telco-based deterministic targeting contributes to improved audience relevance, as reflected in relatively stable engagement metrics such as CTR and click volume. Campaigns utilizing audience segmentation based on TelcoID data show more consistent performance compared to broader targeting approaches.

From a segmentation perspective, performance varies across different audience groups. Certain age segments demonstrate higher engagement levels, indicating that demographic precision enhances targeting relevance. Similarly, device-based segmentation reveals differences in user interaction, suggesting that access behaviour plays a role in campaign outcomes.

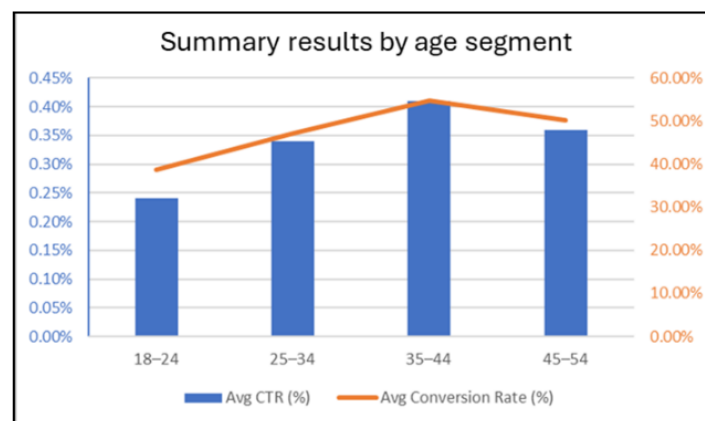


Fig 3. Summary results by age segment

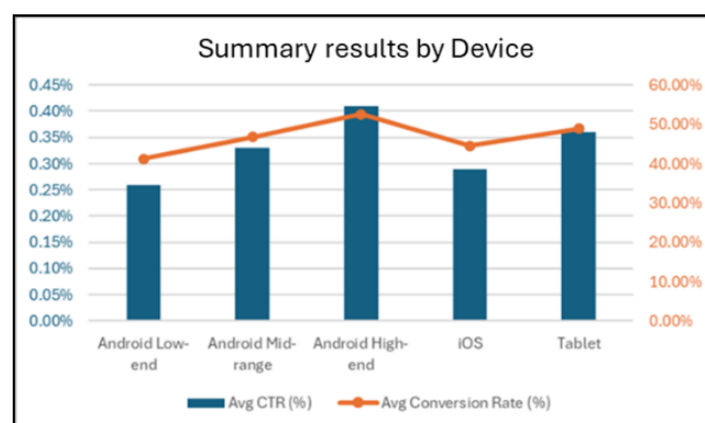


Fig 4. Summary results by Device

Geographic analysis further shows that campaign performance is concentrated in high-density regions, reflecting both audience distribution and media availability. These findings

suggest that deterministic data enables more precise audience identification, but its effectiveness depends on how segmentation strategies are applied..

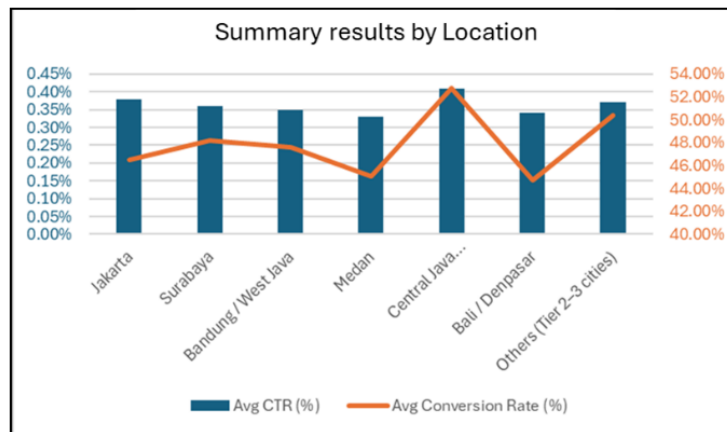


Fig 5. Summary results by Location

The findings demonstrate that Telco-based deterministic targeting enhances audience relevance by producing relatively stable click-through rates (CTR) and click volumes across multiple campaigns. Unlike probabilistic targeting, which infers user identity from cookies or browsing behavior, deterministic targeting relies on verified subscriber identities, thereby reducing audience misclassification and improving segmentation accuracy. These results support the proposition that identity-based targeting can increase advertising precision in an increasingly privacy-regulated digital environment (Goldfarb & Tucker, 2011; Johnson et al., 2022).

The observed differences in engagement across age groups, device categories, and geographic locations further indicate that demographic and behavioral heterogeneity significantly influences campaign performance. This finding aligns with Lambrecht and Tucker (2013), who argued that advertising effectiveness increases when personalization is delivered to audiences with genuine informational needs rather than indiscriminately across all users. Similarly, Kannan and Li (2017) emphasized that effective data-driven marketing depends on integrating high-quality customer data with predictive analytics to optimize audience selection. Device-specific variations also corroborate the findings of Kim and Lee (2022), who reported that mobile identity data improve advertising relevance by enabling more accurate cross-device audience recognition.

Despite these advantages, the present study indicates that improved targeting precision alone does not guarantee superior campaign outcomes across all audience segments. Differences in user behavior, digital literacy, media consumption patterns, and purchasing intentions may moderate the relationship between targeting accuracy and engagement. This observation is consistent with recent evidence suggesting that deterministic identity solutions should be integrated with contextual signals and real-time optimization algorithms to maximize advertising effectiveness (IAB Tech Lab, 2023; Boerman et al., 2017). Therefore, Telco-based deterministic targeting should be considered an enabling technology for audience

identification rather than a standalone determinant of campaign success within contemporary programmatic advertising ecosystems.

Influence of Supporting Campaign Factors

In addition to audience targeting, campaign performance is influenced by media-related variables, particularly publisher selection and media affinity. The analysis shows that performance varies significantly across publishers, indicating that media placement plays a critical role in shaping engagement outcomes.

Certain publishers generate higher CTR and click volume, suggesting stronger alignment between audience segments and media environments. Conversely, limited inventory availability in specific publishers may constrain campaign performance, regardless of targeting precision. These findings indicate that targeting effectiveness is not solely determined by audience data but is also influenced by contextual delivery factors within the programmatic ecosystem.

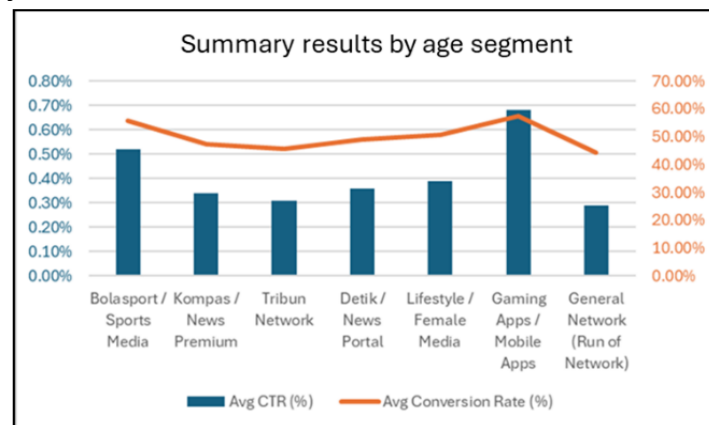


Fig 6. Summary results by age segment

The results reveal that publisher selection and media placement substantially influence campaign performance, even when deterministic audience targeting is applied. Campaigns delivered through publishers with stronger audience affinity consistently generated higher CTR and click volumes, indicating that advertising effectiveness depends not only on identifying the right audience but also on delivering advertisements within appropriate media environments. These findings reinforce the concept that contextual relevance remains a critical determinant of advertising performance in programmatic ecosystems (Li et al., 2019).

The variation in publisher performance suggests that media quality and inventory availability moderate the effectiveness of deterministic targeting. Even highly accurate audience identification may produce suboptimal outcomes when advertisements are delivered through low-engagement publishers or limited advertising inventories. Similar conclusions were reported by De Haan et al. (2018), who demonstrated that media allocation decisions significantly affect return on advertising investment regardless of targeting precision. Likewise, Chaffey and Ellis-Chadwick (2019) emphasized that successful digital campaigns

require synchronization between audience segmentation, media planning, and optimization strategies rather than relying solely on audience data.

Furthermore, creative quality represents another important factor influencing user engagement. Research consistently shows that relevant and persuasive advertising content enhances users' cognitive and emotional responses, thereby increasing interaction and campaign effectiveness (Fill, 2013; Dehghani & Tumer, 2015). Consequently, deterministic targeting should be viewed as one component within a broader advertising ecosystem where media selection, creative execution, bidding strategies, and platform optimization collectively determine campaign outcomes. Advertisers should therefore adopt an integrated optimization framework that simultaneously considers audience quality, contextual placement, and creative relevance to maximize both engagement and downstream business performance.

Qualitative Insights and User Evaluation

The qualitative findings indicate that users perceive Telco-based targeting as accurate and relevant, particularly in reaching intended audience segments. Respondents highlight that deterministic data improves audience matching and campaign alignment.

However, users also report challenges in achieving conversion outcomes, despite relatively strong engagement performance. Several respondents emphasize that campaign success is influenced by additional factors, including creative execution, media selection, and platform usability. These findings suggest that while targeting improves audience relevance, its effectiveness in achieving campaign objectives is influenced by broader operational and strategic factors.

Table 2. Qualitative. Summary results

Tema	Insight Utama
Targeting	Accurate (strong TelcoID)
Engagement	Quite good CTR
Conversion	Difficult to achieve
Media	Limited publishers
Creative	Very influential

The qualitative findings complement the quantitative analysis by demonstrating that practitioners generally perceive Telco-based deterministic targeting as an effective approach for improving audience relevance and campaign alignment. Respondents consistently acknowledged that verified subscriber data facilitated more accurate audience matching, supporting previous studies that identified first-party and deterministic identity solutions as essential components of post-cookie digital advertising (Johnson et al., 2022; IAB Tech Lab, 2023). These perceptions reinforce the quantitative evidence indicating stable engagement performance across campaigns.

However, respondents also emphasized that achieving conversion remains considerably more challenging than generating engagement. This finding reflects the multidimensional

nature of consumer decision-making, where clicks represent only an intermediate stage within the customer journey rather than the final marketing objective. Tucker (2014) argued that personalized advertising increases user attention but does not necessarily translate into purchasing behavior because conversion is influenced by additional psychological, contextual, and transactional factors. Similarly, Schiffman and Wisenblit (2019) highlighted that purchase decisions are shaped by complex interactions among consumer motivation, perceived value, and external environmental stimuli.

Participants further identified creative execution, publisher selection, and platform usability as critical determinants of campaign success. These observations are consistent with Boerman et al. (2017), who concluded that advertising transparency, contextual relevance, and user experience significantly affect advertising effectiveness beyond audience targeting. Consequently, the qualitative evidence suggests that deterministic targeting should be integrated with broader campaign management strategies that optimize creative quality, media planning, and user experience to achieve sustainable improvements in campaign performance and conversion outcomes.

Integration and Synthesis of Findings

The integration of quantitative and qualitative findings reveals a consistent pattern. Quantitative results show stable engagement performance across campaigns, while qualitative insights confirm that users perceive targeting as accurate and effective in reaching intended audiences.

However, both data sources indicate that improved engagement does not always translate into conversion-related outcomes, as reflected in session-level performance. This suggests that while deterministic targeting enhances audience precision and interaction, its effectiveness in driving downstream outcomes remains dependent on additional campaign factors.

Overall, the findings indicate that Telco-based deterministic targeting contributes positively to audience relevance and engagement consistency. However, its overall effectiveness is conditional upon broader elements within programmatic advertising systems, including media availability, creative execution, and platform capabilities.

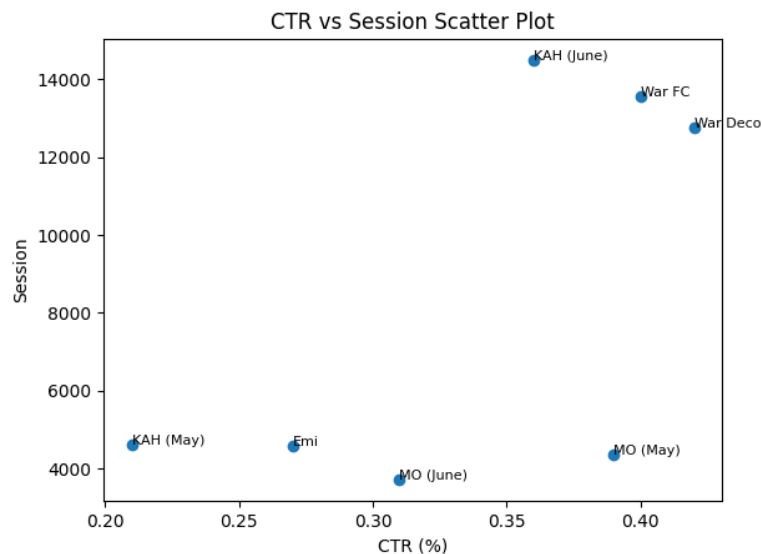


Fig 7. Relationship between click-through rate (CTR) and session-level outcomes across campaigns. The scatter plot illustrates the variation in session performance relative to engagement levels, indicating that higher CTR does not consistently lead to increased post-click activity.

This study demonstrates that while Telco-based deterministic targeting improves audience relevance and engagement consistency, its effectiveness in driving downstream outcomes remains conditional on broader campaign and system-level factors.

The integration of quantitative and qualitative findings provides strong evidence that Telco-based deterministic targeting improves audience precision and maintains consistent engagement across diverse advertising campaigns. Both datasets indicate that verified identity data enhance advertisers' ability to reach relevant audiences, resulting in relatively stable CTR and click performance. This convergence strengthens the reliability of the findings through methodological triangulation and supports previous research emphasizing the strategic value of deterministic identity solutions within privacy-oriented advertising ecosystems (Johnson et al., 2022; Malthouse & Li, 2017).

Nevertheless, the integrated analysis also demonstrates that higher engagement does not consistently produce stronger post-click outcomes. The observed discrepancy between CTR and session-level performance indicates that campaign effectiveness depends on multiple interconnected factors extending beyond targeting accuracy. Li et al. (2019) argued that advertising attribution should encompass the entire customer journey because user interactions are influenced by sequential touchpoints rather than isolated advertising exposures. Likewise, Kumar and Gupta (2016) emphasized that customer engagement should be interpreted as part of a broader value creation process rather than as a direct predictor of conversion.

From a practical perspective, these findings suggest that deterministic targeting should be implemented within an integrated programmatic advertising framework combining

audience identity, contextual media placement, creative optimization, and continuous campaign monitoring. Recent industry guidance similarly recommends combining deterministic identity solutions with artificial intelligence, contextual advertising, and real-time optimization to improve both advertising efficiency and consumer experience in the post-cookie era (IAB Tech Lab, 2023). Therefore, the present study contributes empirical evidence that deterministic targeting serves as a valuable strategic resource but achieves optimal effectiveness only when supported by complementary technological and managerial capabilities throughout the digital advertising ecosystem.

CONCLUSION

This study provides a data-driven evaluation of Telco-based deterministic targeting within programmatic advertising systems, using campaign performance data from the AdXelerate platform. The findings indicate that deterministic targeting contributes to improved audience relevance and consistent engagement performance, as reflected in stable CTR and click activity across campaigns.

However, the results also reveal that higher engagement does not consistently translate into improved post-click outcomes, as observed in session-level performance. The analysis shows that campaigns with relatively high CTR do not always generate proportional session activity, indicating that targeting effectiveness is not solely determined by audience precision.

These findings suggest that while Telco-based deterministic targeting enhances interaction and audience alignment, its overall effectiveness in driving campaign outcomes remains dependent on additional factors, including media placement, creative execution, and platform capabilities.

This study highlights the importance of evaluating targeting effectiveness as a multi-dimensional construct, where engagement metrics alone are not sufficient to assess overall performance. Future research may further explore the interaction between targeting, media, and user journey dynamics across different programmatic platforms.

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