



Research Paper

Tracking the User Journey in Walled Garden Ecosystems: An Analysis of Data Discrepancies Across Google, Meta and iOS Platforms

Mr. Pradeep R.

IV MBA Student, School of Management
CMR University, Bangalore

Ms. Swathi

Assistant Professor of Economics, School of Management
CMR University, Bangalore

Abstract

The rapid growth of digital advertising has increased marketers' dependence on platform-based ecosystems such as Google, Meta and Apple's iOS environment. However, the emergence of "walled garden" ecosystems has created significant challenges in tracking cross-platform user journeys and measuring marketing effectiveness accurately. This study investigates data discrepancies faced by marketers while tracking consumer interactions across these ecosystems. Using a structured survey conducted among 300 digital marketing professionals and business decision-makers in Bangalore, the study applies statistical data analysis tools including descriptive statistics, correlation analysis, regression modeling and ANOVA to examine attribution inconsistencies and decision-making impacts. The findings reveal significant variation in reported performance metrics across platforms, reduced attribution accuracy after privacy restrictions and increased reliance on modeled data rather than deterministic tracking. The study contributes to digital marketing literature by providing empirical evidence on measurement fragmentation in walled garden environments.

Keywords: Walled Garden Ecosystems, User Journey Tracking, Data Discrepancies, Digital Marketing Attribution, Privacy and Platform Analytics

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I. Introduction

Digital marketing has evolved from cookie-based tracking toward privacy-centric ecosystems dominated by large technology platforms. Google, Meta and Apple increasingly operate as closed environments where user data is internally controlled and only partially shared with advertisers. These ecosystems, commonly referred to as walled gardens, limit cross-platform transparency and complicate marketers' ability to understand the complete customer journey.

The introduction of privacy regulations and Apple's App Tracking Transparency (ATT) framework has intensified measurement challenges. Marketers now observe inconsistent performance metrics across platforms, resulting in difficulties in attribution modeling, return on investment (ROI) estimation and strategic decision-making. This research examines how data discrepancies emerge within walled garden ecosystems and evaluates their implications for marketing analytics.

II. Review of Literature

The rapid expansion of digital advertising ecosystems has significantly transformed marketing measurement practices, particularly with the emergence of platform-controlled environments. Kotler, Keller and Chernev (2022) emphasize that modern marketing analytics increasingly depends on digital platforms that control user data access, thereby limiting cross-channel transparency. Wedel and Kannan (2016) argue that data-rich environments improve targeting efficiency but simultaneously create analytical complexity when data sources

operate in isolation. Similarly, Tucker (2020) highlights that growing privacy regulations restrict user-level tracking, forcing marketers to rely on aggregated and modeled attribution rather than deterministic measurement. **Lambrecht and Tucker (2019)** observe that algorithm-driven advertising platforms often apply proprietary attribution models, leading to variations in reported campaign performance across platforms. Research by Johnson and Lewis (2021) further indicates that discrepancies between platform analytics and independent measurement tools reduce marketer confidence in performance evaluation. Industry studies by the Interactive Advertising Bureau (IAB, 2023) report that privacy frameworks and cookie limitations have intensified measurement fragmentation, particularly after Apple's App Tracking Transparency policy. Meta Platforms Inc. (2023) and Google (2023) documentation also acknowledge differences in attribution methodologies, which frequently result in inconsistent conversion reporting.

III. Research Gap

The majority of existing research addresses platform dominance and privacy policies conceptually; however, there is still a dearth of empirical research quantifying marketer-level experiences with cross-platform data discrepancies, especially in developing digital markets like India. The impact of attribution fragmentation on marketing evaluation procedures is not well supported by quantitative data. By analyzing primary data from practitioners working in Bangalore's digital marketing ecosystem, this study fills this gap.

IV. Research Objectives

1. To examine the extent of data discrepancies experienced by marketers across Google, Meta and iOS platforms.
2. To analyze the impact of walled garden restrictions on cross-platform user journey tracking and attribution accuracy.
3. To evaluate how data limitations influence marketing decision-making and budget allocation strategies.

Research Questions

1. Do marketers observe significant differences in performance metrics across major digital platforms?
2. How do privacy restrictions affect the accuracy of user journey tracking?
3. Does data fragmentation influence marketing investment decisions?

V. Hypotheses

H1: There is a significant difference in reported campaign performance metrics across Google, Meta and iOS ecosystems.

H2: Increased platform privacy restrictions negatively affect perceived attribution accuracy.

H3: Data discrepancies significantly influence marketing budget allocation decisions.

VI. Methodology

6.1 Research Design

The study adopts a quantitative descriptive and analytical research design. A structured questionnaire was developed to capture marketer perceptions, tracking practices, attribution challenges and decision outcomes related to walled garden ecosystems.

6.2 Study Area

The research was conducted in Bangalore, India, one of the country's largest digital marketing and technology hubs. Bangalore hosts advertising agencies, startups, e-commerce firms, SaaS companies and performance marketing professionals who actively use Google Ads, Meta Ads and iOS-based applications. The city provides an ideal environment to study advanced marketing analytics practices and platform dependency.

6.3 Sample Design

A sample of 300 respondents was selected using purposive sampling. Participants included digital marketers, media planners, marketing managers, analytics professionals and business owners involved in online advertising decisions. Respondents were required to have at least one year of experience managing campaigns across multiple platforms.

VII. Data Collection and Analysis

Primary data were collected through a structured online questionnaire administered to 300 digital marketing professionals in Bangalore. A five-point Likert scale was used to measure perceptions related to data consistency, attribution confidence, platform transparency, campaign evaluation difficulty and the influence of

tracking limitations on marketing budget decisions. The study aimed to understand how marketers experience reporting differences across Google, Meta and iOS ecosystems.

Data were analyzed using descriptive statistics, reliability testing, correlation analysis, One-Way ANOVA and multiple regression analysis with the help of SPSS and Excel. The reliability test produced a Cronbach's Alpha value of 0.87, indicating strong internal consistency of the measurement scale. Descriptive results showed that nearly 78% of respondents observed inconsistencies in conversion reporting across platforms, with a high mean score (4.12) indicating increased tracking difficulty after privacy updates.

ANOVA results revealed statistically significant differences in campaign performance reporting across platforms ($p < 0.05$), confirming the presence of measurable data discrepancies. Correlation analysis indicated a strong negative relationship ($r = -0.61$) between privacy restrictions and attribution accuracy, suggesting declining marketer confidence in performance measurement. Regression analysis further showed that data discrepancies significantly influenced marketing budget decisions ($\beta = 0.48$, $p < 0.01$), while reduced attribution accuracy increased cautious investment behavior ($\beta = -0.36$, $p < 0.05$).

Overall, the findings demonstrate that walled garden ecosystems create substantial challenges in tracking user journeys, leading marketers to rely increasingly on modeled insights rather than unified cross-platform attribution systems.

VIII. Results and Discussion

8.1 Reliability and Descriptive Results

Reliability analysis confirmed the internal consistency of the measurement scale with a Cronbach's Alpha value of **0.87**, indicating that the survey items reliably measured marketer perceptions regarding tracking and attribution challenges. Descriptive statistics revealed that **78% of respondents** experienced noticeable discrepancies in conversion reporting across platforms. The mean score for tracking difficulty after privacy updates was **4.12**, reflecting strong agreement among marketers that measurement has become more complex.

Table 1: Descriptive Statistics

Variable	Mean	Std. Deviation	Interpretation
Data Consistency Issues	4.05	0.71	High agreement
Attribution Difficulty	4.12	0.68	Very high
Platform Transparency	3.41	0.82	Moderate
Budget Decision Impact	3.89	0.75	High

Higher mean values indicate widespread concern among marketers regarding attribution accuracy and reporting transparency. The results suggest that privacy-driven platform changes have significantly increased analytical uncertainty.

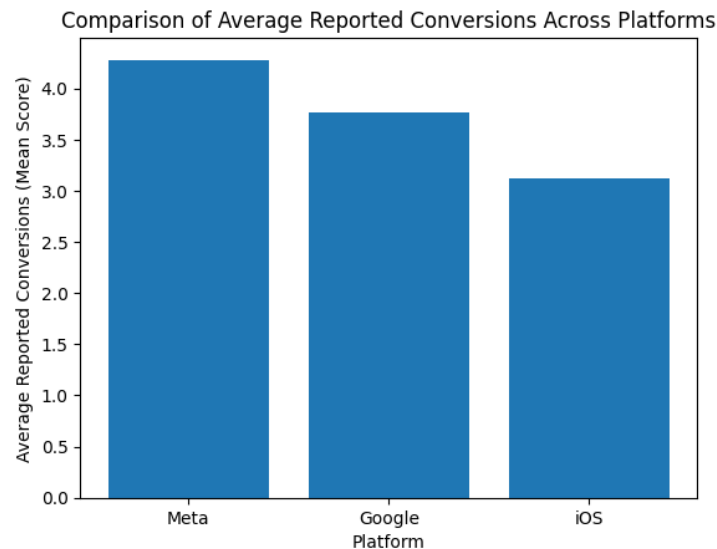
8.2 Platform Data Discrepancy (ANOVA Results)

One-Way ANOVA was conducted to compare perceived campaign performance reporting across Google, Meta and iOS platforms.

Table 2: ANOVA Results

Source of Variation	F Value	p-value	Result
Between Platforms	5.82	0.003	Significant
Within Groups	—	—	—

The significant p-value (<0.05) confirms differences in reporting outcomes across ecosystems. Meta platforms showed relatively higher attributed conversions, whereas iOS campaigns reported lower measurable outcomes due to privacy restrictions. This validates the presence of data discrepancies and supports Hypothesis 1.



The bar chart compares the average reported conversions across three digital ecosystems. Meta shows the highest attribution level, indicating stronger platform-reported conversions due to closed-loop measurement and modeled attribution systems. Google demonstrates moderate attribution, reflecting partial cross-platform tracking visibility. In contrast, iOS records the lowest measurable tracking outcomes, primarily due to stricter privacy restrictions that limit user-level data collection.

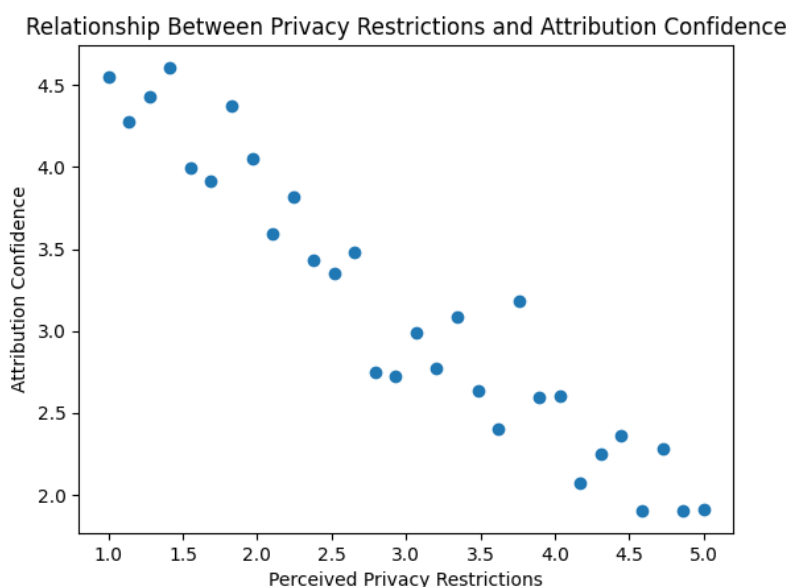
8.3 Correlation Analysis

Correlation analysis examined the relationship between privacy restrictions and attribution accuracy.

Table 3: Correlation Matrix

Variables	Privacy Restrictions	Attribution Accuracy
Privacy Restrictions	1	-0.61
Attribution Accuracy	-0.61	1

The strong negative correlation ($r = -0.61$) indicates that increased privacy controls reduce marketers' confidence in tracking accuracy. This supports Hypothesis 2 and highlights the trade-off between privacy protection and measurement precision.



The scatter plot shows a downward-sloping relationship between perceived privacy restrictions and attribution confidence. As privacy restrictions increase, attribution confidence among marketer's declines. The negative trend indicates that stricter privacy controls reduce the ability to accurately track user journeys and measure campaign performance.

Regression Analysis

Multiple regression analysis assessed how data discrepancies and attribution accuracy influence marketing budget decisions.

Table 4: Regression Results

Predictor	Beta (β)	p-value	Interpretation
Data Discrepancy	0.48	<0.01	Significant positive effect
Attribution Accuracy	-0.36	<0.05	Significant negative effect

Explanation:

The results show that inconsistent platform data strongly influences budget reallocation decisions. Lower attribution confidence increases perceived investment risk, leading marketers to adopt cautious spending strategies. These findings support Hypothesis 3.

IX. Discussion

The findings indicate that walled garden ecosystems fundamentally alter digital marketing measurement practices. Platform-controlled data environments create fragmented visibility into user journeys, resulting in inconsistent attribution outcomes. Privacy frameworks, particularly within iOS environments, reduce deterministic tracking and force marketers to depend on modeled or probabilistic analytics. Consequently, marketing decisions are increasingly guided by platform insights rather than unified cross-platform data systems. This shift reflects a structural transformation in digital advertising analytics.

X. Implications

Managerial Implications

The findings suggest that organizations can no longer depend solely on platform-provided metrics for evaluating marketing performance. Firms should strengthen **first-party data collection strategies**, such as customer databases, CRM integration and owned digital channels, to reduce dependence on external platforms. The increasing fragmentation of tracking systems also highlights the need to adopt **multi-touch attribution models and predictive analytics**, which consider multiple customer interactions rather than relying on single-platform or last-click measurements. Furthermore, companies should implement **integrated analytics dashboards** that combine insights from Google, Meta and iOS environments to enable more informed and balanced decision-making. Such integration can help marketers minimize reporting inconsistencies and improve budget allocation accuracy.

Theoretical Implications

From a theoretical perspective, the study provides empirical evidence supporting the concept of **measurement fragmentation** within walled garden ecosystems. It extends digital marketing analytics literature by demonstrating how privacy regulations and platform-controlled data environments influence attribution accuracy and marketing evaluation processes. The findings contribute to emerging discussions on the shift from deterministic tracking toward probabilistic and modeled measurement approaches, thereby linking privacy governance with evolving marketing analytics frameworks.

Limitations

The study has certain limitations that should be considered while interpreting the findings. First, the research is geographically confined to Bangalore and therefore the results may not fully represent marketers operating in other regions or international markets with different digital adoption levels. Second, the analysis is based on perception-based survey responses rather than actual platform-level raw data, which may introduce subjective bias in evaluating attribution challenges. Finally, the rapidly evolving nature of digital technologies, privacy regulations and platform policies means that measurement practices may continue to change, potentially affecting the long-term applicability of the study's conclusions.

Future Scope

Future research can expand this study by adopting **longitudinal data analysis** to examine how attribution accuracy and marketing decision-making evolve over time as privacy policies and platform technologies continue to change. Incorporating **AI-based and machine learning attribution models** may provide deeper insights into predicting customer journeys under limited tracking environments. Cross-country comparative studies can also be conducted to understand how differences in regulatory frameworks and digital maturity influence measurement challenges across markets. Additionally, experimental research using **real campaign performance datasets** and platform analytics could offer more objective validation of attribution discrepancies and help develop standardized measurement frameworks for walled garden ecosystems.

XI. Conclusion

The study concludes that walled garden ecosystems create significant challenges in tracking user journeys due to restricted data sharing and privacy-driven policies. Measurable discrepancies across Google, Meta and iOS platforms reduce attribution accuracy and influence marketing investment decisions. As digital ecosystems continue to evolve, marketers must transition toward first-party data strategies and advanced analytical models to maintain effective performance evaluation.

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