

The Economics of Digital Platform Advertising Design: A Review of the Synergistic Mechanism of Form, Context Matching, and Long-Term Value

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Abstract

Traditional digital platforms generally believe that increasing the frequency and impact of advertising can lead to a linear increase in revenue. This review integrates the theories of two-sided markets, psychological resistance, and customer lifetime value to explore the contradiction between the immediate monetization orientation and the long-term sustainable development of the platform and constructs a transmission path of how advertising design affects the long-term value of enterprises. This review concludes that mandatory intrusive advertisements will trigger user resistance, promote the popularization of advertisement blocking, and reduce user retention, while user-autonomous advertising designs, such as skippable and reward-based designs, can balance advertising effectiveness and long-term user value. At the same time, algorithm-driven contextual advertisements can replace privacy-sensitive cross-site tracking, resolving the contradiction between personalization and intrusion. This review believes that the essence of digital advertising design is a long-term asset allocation decision, which can provide a reference for the sustainable value growth of platforms under privacy regulation.

Keywords

digital platform monetization, advertising design, two-sided market, psychological reactance, customer lifetime value

1. Introduction

In the current digital economy dominated by computational advertising and algorithmic traffic orchestration, the business model supported by online advertising has become the economic foundation of digital platforms, covering areas such as social networks and practical mobile applications [1]. In this market environment, the “Freemium” strategy model has become the standard configuration for most internet platforms and applications to attract users. Under this strategy, the platform provides core information or entertainment services at almost no cost, thereby accumulating a large amount of user traffic. Based on the massive user base, it then attracts third-party advertisers to place advertisements to achieve profitability [2, 3, 4]. However, in the excessive pursuit of optimizing short-term financial income and immediate revenue per thousand impressions, digital platforms are increasingly encountering sharp frictions within their internal ecosystems. The indiscriminate putting of high-frequency and highly intrusive advertising designs, such as non-skippable pre-

rolls and pop-up windows, is rapidly eroding the core user experience [3]. The aggressive profit model of the platforms has led to psychological resistance, psychological friction [3, 5], and active technological avoidance in user behavior [6], which will damage the long-term value of the platforms.

To mitigate this economic friction related to survival, the digital marketing science field has moved away from the simplistic binary academic debates, such as “should the platform display advertisements” or “is advertising good or bad”. In contrast, the present research focuses on a more complex issue: how platforms apply intelligent advertising designs to balance the conflicts between revenue generation through traffic and user experience. At this point, two core strategic design solutions have emerged: structure optimization and algorithmic context matching. For the structure optimization, the advertising design of user empowerment formats, such as skippable video ads that restore user autonomy, or advertisements that offer in-app rewards to users after they finish watching, has been empirically demonstrated to effectively reduce negative externalities, which means maintaining the number of displayed advertisements without reducing user retention rate [7, 8]. In the aspect of algorithmic context matching, by aligning the advertising content with the real-time cognitive environment of users, the promotional interference can be transformed into highly practical information assets [9]. In the current post-cookie era, third-party information tracking is limited, and traditional third-party behavioral tracking advertising is facing a serious legal crisis [10]. Therefore, such algorithm matching becomes particularly important.

This literature review systematically evaluates how changes in digital advertising design parameters are reflected in long-term economic returns through the integration of consumer psychology and platform economics theories.

2. Theoretical Background

In order to assess the impact of digital advertising design on the economic return of the platform, this review constructs a comprehensive theoretical framework that connects the market structure at the macro level, micro-level consumer psychology, and intertemporal corporate finance. By integrating these theories into a coherent narrative, this study explores the central theme of how platforms address the design of digital advertising to increase the long-term economic returns.

2.1 Two-Sided Market Theory and Cross-Side Externalities

The most fundamental micro-theoretical basis for the profitability of digital platforms is derived from the Two-Sided Market Theory [4, 11]. Digital platforms act as the central connecting role, coordinating two different groups of end-users, consumers and advertisers, whose economic utilities are connected through asymmetric cross-group externalities [11]. Advertisers obtain positive externalities from a large user base. The increase in platform users will enhance the opportunities for advertising exposure and conversion revenue. The value of all advertisers' advertisement placements will increase, leading to an increase in the total revenue for advertisers. In contrast, the increase in the number of intrusive advertisements and exposures has led users to bear weakly positive or negative externalities. The increase in advertisements implies an increase in the frequency of advertisement loading, which will significantly affect the user experience.

2.2 The Psychological Resistance Theory and Perceived Intrusiveness

To understand the cognitive and emotional dynamics of users' loss due to advertisements, most studies have adopted the Psychological Resistance Theory, which points out that when the freedom of an individual is restricted or deprived, the individual will resist to regain their freedom [12]. When users browse digital platforms, they will enter a mental situation oriented towards specific goals, and the intrusiveness of some advertisements is the reason for triggering psychological resistance [5]. Specifically, when advertisements forcibly appear and interrupt the user's task environment, such as a non-skippable pop-up, users will psychologically evaluate this external interference as an infringement on their freedom and autonomy [5, 13]. This cognitive assessment of perceived intrusiveness will immediately trigger a psychological resistance, which is a state of motivation aimed at restoring one's own freedom.

2.3 The Customer Lifetime Value Framework

To balance short-term profit and the long-term sustainability of the platform, most marketing literature relies on a dynamic customer lifetime value framework. This kind of financial marketing model views the user base as a long-term capitalized organizational asset, rather than as an immediate transaction variable [14]. Under this framework, due to the positive correlation between user retention rate and user lifetime value, an increase in the number of intrusive advertisements cannot sustain the customer lifetime value, and the long-term asset income of the platform cannot be guaranteed.

3. Literature Review

3.1 The Negative Externalities of Intrusive Advertising and the Short-Term Profit Backlash

The existing literature on the negative externalities of intrusive advertising disclosure presents a thematic convergence. The research direction has evolved from simple correlation tracking to exploring the structural damage within the platform ecosystem. For a long time, platforms have been focusing on the profit generated by advertising placements under the short-term drive of advertisement numbers and frequency [11]. However, recent empirical studies have revealed a systematic and internal counterproductive model, thereby posing a severe challenge to the mindset that overly focuses on the advertisers' end of the two-sided market.

Recent studies assess user dissatisfaction as a permanent and destructive force. The empirical research shows that when the platform completely deprives users of their autonomy over advertisements, for example, through non-skippable pop-ups, it triggers a strong sense of intrusiveness [3]. The intrusion of advertisements will disrupt the user's mental flow, thereby interfering with their original goals [5, 12]. Similarly, studies have also pointed out that frequent advertising exposure will cause varying degrees of consumer aversion [15]. Consumers' assessment of this kind of behavior goes beyond mere visual aversion. It escalates to a serious threat to their personal digital sovereignty and freedom of action, thereby instantly triggering a strong psychological resistance. Moreover, studies also proved that this resistance has long-term economic destructive power, destroying the users' willingness to voluntarily make payments for advanced services [3]. This indicates that the pursuit of visual advertising exposure benefits is essentially an advanced overdraft of the platform's core assets. It sacrifices the long-term core revenue at the cost of directly causing a decline in the user's long-term survival curve, ultimately leading to the shrinkage of the platform's total capitalized value, which is customer lifetime value.

Once the intrusiveness of advertising formats reaches the critical value of consumers' tolerance, their defensive responses will change structurally. Users will inevitably take actions to reduce the exposure to advertisements on their own [16]. With the development of times, a relatively common practice is to use ad-blockers [15]. This kind of physical interception method has unidirectionally severed the cross-group externalities between users and advertisers [11]. This enables users to avoid the negative externalities brought about by advertisers, and reduces their probability of consumption, which means it will prevent platforms from monetizing through advertisement displays in the future, and will also suppress the actual online consumer purchases in the entire digital economy for a long time [6, 15]. Thus, the short-term monetization strategy that excessively exploits the benefits from users' attention will eventually lead to the collapse of the platform's two-sided market ecosystem, as users continuously leave, causing a systematic breakdown.

3.2 Non-Intrusive Form of Strategic Reorganization

To address the negative interference caused by intrusive advertisements to users, digital marketing literature has shifted towards evaluating non-intrusive advertising architectures. By modifying the intrusive characteristics of advertisements, it is theoretically possible to reduce the psychological resistance of users [5, 12], thereby reducing the negative externalities borne by users to a certain extent [4, 11], without sacrificing the return on investment for advertisers. This research direction proposes two main intervention measures: granting users more control and establishing a bilateral value exchange.

The first intervention measure focuses on incorporating perceptual control during advertisement playing. Thus, the trigger path of psychological resistance can be intercepted at its source. Research shows that even if users choose to skip the advertisement, merely the presence of the control option can reduce the level of

perceived intrusive cognition, proving that the existence of the selection mechanism plays an important role in psychological buffering [3, 8]. This means that obtaining control rights cuts off the intrusion warning halfway before the sense of intrusiveness has fully solidified into a psychological resistance. Additionally, since this mechanism grants consumers the right not to watch, it also helps advertisers precisely filter out the traffic with no purchase intention, and the remaining viewing behavior has a higher click rate and brand loyalty, significantly increasing the advertiser's willingness to pay.

The second design transforms the advertisement exposure from a one-way cognitive extraction to a two-way value exchange, thereby establishing the platform's long-term customer lifetime value assets in the financial field. Research indicates that the rewarded advertisements in the mobile application ecosystem, where users actively watch commercial advertisements in exchange for in-app virtual items or unlocking advanced functions, demonstrate a significant reversal of consumer behavior [7]. Compared with the traditional intrusive pop-up advertisements that trigger intense psychological confrontation [5], rewarded advertisements shift users' psychological feelings from passive victimization to active exchange.

3.3 Privacy Regulation and Restrictions on Algorithm Matching

With the implementation of global data privacy regulations, the traditional cross-site tracking behavior based on third-party cookies for personalized advertising is facing a legal and technical crisis. This macro change re-plans the underlying logic of digital monetization of the academic and industrial communities, after dividing the deep behavioral privacy tracking: how can platforms maintain the monetization efficiency of advertisers?

There is a certain conflict between the precision of advertising personalization and the intrusiveness of advertisements. Existing research has found that when two strategies are combined, where platforms deliver highly personalized advertisements based on user privacy tracking using physically intrusive formats, consumer purchase willingness and brand attitudes experience a sharp decline [17].

Introducing this discovery into the psychological resistance theory can illustrate the imbalance of the two-sided market at the individual cognitive level. The study pointed out that when a highly intrusive format and deep personal behavioral data tracking are forcibly combined, users, facing the rough interruption of their psychological goal orientation, will additionally generate a sense of privacy vulnerability that digital territory is being secretly spied on [5, 18], which means the platform not only excessively controls users at the physical level but also violates users' digital sovereignty at the psychological level. This interaction of physical and privacy threats pushes the users' perceived intrusion to extremes, changing into a strong psychological resistance. In the final financial model, this interaction directly transforms into users' aversion towards the platform at the user end, causing an irreversible decrease in users' intertemporal survival probability, and subsequently leading to an asset impairment of the customer lifetime value.

In order to restore the macro dynamic balance of the two-sided market under the influence of privacy restrictions, algorithmic context matching is regarded as a solution. Matching the commercial information of advertisements with the immediate cognition, time, and space environment of consumers can change the influence of commercial interference [9]. By matching advertisements with the current active content theme of the page or the real-time intentions of consumers, advertisements no longer serve as an external interference to users' psychological goals. Instead, they will become valuable and decision-supporting information assets, which eliminates the cause of psychological resistance without relying on illegal and privacy-infringing tracking methods.

4. Key Finding

4.1 The Nonlinear Threshold for Mandatory Monetization

Traditional research on the platform economy usually assumes that the damage to user experience caused by advertising exposure is linear [4, 11]. In fact, the negative advertising for users shows a non-linear characteristic: at low levels of advertising density, the interference is relatively weak, and the loss of utility grows gradually; however, when advertising is excessive, information overload triggers users' psychological resistance, and the marginal disutility rises rapidly, leading to an accelerated deterioration of the negative

externalities. Meanwhile, the two-sided market network externalities can trigger an endogenous cliff effect. Once the advertising intensity exceeds the threshold, the user retention suddenly drops sharply. This reverse selection at the user level will cause the platform to permanently lose its user exposure value, ultimately resulting in a significant loss of user lifetime value.

4.2 Advertising Monetization under the Empowerment of the User Autonomy

The negative impacts brought about by advertising monetization are not impossible to change. They can be mitigated by optimizing the design of advertisements. The platform can return the option to the user by setting up functions such as skipping advertisements, thereby reducing the user's resistance from the root [3, 8]. If this is further upgraded to a mutually beneficial incentive model, it can better align with the users' usage intentions [7]. The platform can not only help advertisers screen invalid traffic, improve the effect of delivery and transformation, but also continue to stabilize the growth trend of user retention, and ultimately achieve a benign balance between advertising liquidity efficiency and user long-term value

4.3 Advertising Paradox under Privacy Regulation and Information Substitution Equilibrium

In the context of increasingly strict privacy regulations, if the platform relies on excessive interference with users to make up for the decline in advertising effectiveness, it will fall into a vicious cycle of precise delivery and excessive interference, which will not only aggravate the user's privacy and interrupt the user experience but also further deplete the user's long-term value. To break this negative cycle, the core is to use the scenario-based information matching mode: instead of tracking the user's historical privacy data, the algorithm combines the current content, time, and scene to push advertisements. Advertising that meets the current needs of users will be regarded by users as useful information rather than harassment, reducing users' disgust without infringing privacy, and ultimately forming a long-term, healthy, and sustainable business ecosystem.

4.4 Finding Insight

Based on relevant studies, each research has shown a high degree of consistency in the micro-to-macro transmission of the loss of customer lifetime value caused by strong intrusiveness. The micro-psychological mechanism of psychological resistance and blocking payment transformation caused by deprivation of control [3] has formed a perfect empirical closed loop with the macro-measurement results of users' radical confrontation with advertising interception technology [6]. This collectively proves that excessive exploitation of attention dividends will lead to a nonlinear endogenous rebound, directly leading to a cliff-like drop in the survival probability curve across multiple periods and multiple stages, and ultimately shows the shrinkage of the platform's long-term core intangible assets.

Furthermore, this review summarizes two major trends in the monetization of digital advertising. Firstly, the profit model of platforms is shifting from relying on the exploitation of users' privacy to achieving monetization through algorithmic matching of scenarios. Secondly, user experience is gradually changing from forcing users to consume their attention to giving users the option and establishing a mutually beneficial cooperation model.

5. Discussion

5.1 Research Limitation

Although the existing research has certain reference value, there are still some deficiencies. Firstly, the setting of research indicators is unreasonable. Most studies only use short-term experiments and immediate conversion data, lacking long-term tracking data, making it difficult to accurately measure the continuous negative impact of users' resistance emotions on their long-term value. Secondly, there are limitations of single-platform research. The existing models mostly only target a certain type of platform, without considering the aversion generated by users on a single platform, which will affect their tolerance for use on other platforms. Thirdly, the research perspective is rather one-sided. Most studies only focus on the issue of user churn but ignore the fact that although mild advertising forms can filter out high-quality traffic, they may

make niche brands that rely on forced exposure difficult to promote, thereby reducing the types of platforms advertising partners and making the ecosystem more monotonous.

5.2 Future Research Direction

Future research can further explore the user behavior mechanism of generative AI native advertising and analyze the dynamic relationship between privacy compliance, advertising interception, and platform customer life cycle value through long-term empirical modeling to improve the research system in related fields.

6. Conclusion

In conclusion, this paper integrates consumer psychology theory with macroeconomic and financial frameworks to systematically examine the economic principles underlying digital platform advertising design. It demonstrates that the negative externalities of advertising are not fixed but can be optimized through user-enabled forms of advertising and AI-driven contextual matching, enabling platforms to break the dilemma of binary opposition between profitability and user experience by transforming intrusive advertisements into valuable information that enhances user decision-making. At the level of management practice, digital platform enterprises should abandon the thinking of short-term traffic and large-scale realization; stop relying on the extensive operation mode of cookie tracking and forced pop-up advertising; avoid the risk of privacy violations and brand loss; and rely on the multi-modal semantic understanding model to carry out compliance and efficient contextual advertising operations, and maintain the core assets of the user life cycle.

References

- [1] Evans, David S. 2009. "The Online Advertising Industry: Economics, Evolution, and Privacy." *Journal of Economic Perspectives* 23 (3): 37–60. DOI: 10.1257/jep.23.3.37
- [2] Boudreau, K. J., Jeppesen, L. B., & Miric, M. (2022). Competing on freemium: Digital competition with network effects. *Strategic Management Journal*, 43(7), 1374–1401. <https://doi.org/10.1002/smj.3366>
- [3] Riedel, A., Mulcahy, R., Beatson, A., & Weeks, C. (2025). Advertising in Freemium Services: Lack of Control and Intrusion as the Price Consumers Pay. *Journal of Advertising*, 54(3), 322–341. <https://doi.org/10.1080/00913367.2024.2393078>
- [4] Rochet, J. C., & Tirole, J. (2006). Two-sided markets: A progress report. *RAND Journal of Economics*, 37(3), 645–667. <https://doi.org/10.1111/j.1756-2171.2006.tb00036.x>
- [5] Edwards, S. M., Li, H., & Lee, J.-H. (2002). Forced Exposure and Psychological Reactance: Antecedents and Consequences of the Perceived Intrusiveness of Pop-Up Ads. *Journal of Advertising*, 31(3), 83–95. <https://doi.org/10.1080/00913367.2002.10673678>
- [6] Todri, V. (2022). Frontiers: The Impact of Ad-Blockers on Online Consumer Behavior. *Marketing Science* (Providence, R.I.), 41(1), 7–18. <https://doi.org/10.1287/mksc.2021.1309>
- [7] Oc, Y., Bernritter, S., Plangger, K. & Sotgiu, F. (2025). Touch, Swipe, and Tilt: Exploring the Impact of Mobile In-App Advertising Content on Consumer Brand Choice Intention.
- [8] Yin, S., Li, B., & Zhou, Q. (2023). The impact of skippable advertising on advertising avoidance intention in China. *Marketing Intelligence & Planning*, 41(8), 1121–1137. <https://doi.org/10.1108/MIP-07-2022-0298>
- [9] Bleier, A., & Eisenbeiss, M. (2015). Personalized Online Advertising Effectiveness: The Interplay of What, When, and Where. *Marketing Science* (Providence, R.I.), 34(5), 669–688. <https://doi.org/10.1287/mksc.2015.0930>
- [10] Tinkler, A. (2021). Future-proofing your digital measurement for the post-cookie era. *Journal of Digital & Social Media Marketing*, 9(3), 229–235. <https://doi.org/10.69554/SVPV7790>
- [11] Armstrong, M. (2006). Competition in two-sided markets. *The Rand Journal of Economics*, 37(3), 668–691. <https://doi.org/10.1111/j.1756-2171.2006.tb00037.x>

- [12] Brehm, J. W. (1966). A theory of psychological reactance. Academic Press.
- [13] Li, H., Edwards, S. M., & Lee, J.-H. (2002). Measuring the Intrusiveness of Advertisements: Scale Development and Validation. *Journal of Advertising*, 31(2), 37–47. <https://doi.org/10.1080/00913367.2002.10673665>
- [14] Gupta, S., Lehmann, D. R., & Stuart, J. A. (2004). Valuing Customers. *Journal of Marketing Research*, 41(1), 7–18. <https://doi.org/10.1509/jmkr.41.1.7.25084>
- [15] Todri, V., Ghose, A., & Singh, P. V. (2020). Trade-Offs in Online Advertising: Advertising Effectiveness and Annoyance Dynamics Across the Purchase Funnel. *Information Systems Research*, 31(1), 102–125. <https://doi.org/10.1287/isre.2019.0877>
- [16] Elpers, J. L. C. M. W., Wedel, M., & Pieters, R. G. M. (2003). Why Do Consumers Stop Viewing Television Commercials? Two Experiments on the Influence of Moment-to-Moment Entertainment and Information Value. *Journal of Marketing Research*, 40(4), 437–453. <https://doi.org/10.1509/jmkr.40.4.437.19393>
- [17] Goldfarb, A., & Tucker, C. (2011). Online display advertising: targeting and obtrusiveness. *Marketing Science*, 30(3), 389+. <https://doi.org/10.1287/mksc.1100.0583>.
- [18] Aguirre, E., Mahr, D., Grewal, D., de Ruyter, K., & Wetzels, M. (2015). Unraveling the Personalization Paradox: The Effect of Information Collection and Trust-Building Strategies on Online Advertisement Effectiveness. *Journal of Retailing*, 91(1), 34–49. <https://doi.org/10.1016/j.jretai.2014.09.005>

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