Chapter 10
Modeling Click Intention in E-Commerce Advertising a Hybrid PLS-SEM and ANN Approach: Modeling Click Intention in E-Commerce Advertising

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ABSTRACT

This study explores the factors influencing consumers' intention to click on e-commerce advertisements using Partial Least Squares Structural Equation Modeling Artificial Neural Networks (PLS-SEM ANN). The main objectives of the research are to identify the key factors affecting click-through rates (CTR), assess the moderating role of privacy concerns, and predict the most significant factors influencing click behavior. A survey was conducted with 528 valid responses from consumers using e-commerce platforms such as Shopee, Lazada, and TikTok Shop, as well as companies operating on those platforms in Vietnam. The results show that Trust (T) and Information Quality (IQ) are the most significant predictors of click-through intention, with path coefficients of 0.352 ($p < 0.01$) and 0.770 ($p < 0.01$), respectively. Privacy Concern (PC) negatively affects click intention, with a path coefficient of -0.411 ($p < 0.01$),

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indicating that as privacy concerns increase, consumers are less likely to engage with advertisements. Additionally, Artificial Intelligence (AI) was found to have a positive impact on Trust, with a path coefficient of 0.656 ($p < 0.01$), enhancing the relevance and personalization of advertisements. Integrating PLS-SEM and ANN provides a comprehensive approach to modeling both linear and nonlinear relationships. The ANN model achieves an R^2 value of over 0.85 for predicting click intention, demonstrating its ability to capture complex relationships that PLS-SEM may not identify. Importance-Performance Map Analysis (IPMA) shows that Trust (T) is the most important factor driving click behavior, with a performance score of 84%, followed by Information Quality (IQ) with a performance score of 65%. This study contributes significantly to understanding consumer behavior in the context of digital advertising.

I.INTRODUCTION

In the digital and AI-driven era, e-commerce has rapidly expanded into a vital platform for global businesses and consumers (Khrais, 2020). With advancements in artificial intelligence (AI), Big Data, and precision marketing, firms increasingly optimize advertising strategies and personalize content to attract customers (Lu, 2024). This technological shift intensifies competitive pressure, requiring manufacturers to adopt effective marketing strategies to reach the right customers at the right time (Tsai, Wu & Chang, 2012; You et al., 2015). Online advertising has therefore become a dominant approach for stimulating click intention and boosting conversion rates, enabling businesses to leverage data-driven insights for new market opportunities (Lytras, Raghavan & Damiani, 2017). On major platforms such as Amazon, Shopee, Lazada, Alibaba, and TikTok Shop, competition revolves around maximizing click-through rates (CTR), which typically range from 3–5% in 2023. TikTok Shop has accelerated e-commerce growth through personalized advertising. In Vietnam, e-commerce transactions grew 40% in 2024, exceeding $13.8 billion, with Shopee holding 73.1% and TikTok Shop capturing 9.9% market share (YouNet ECI, 2024). In China, manufacturers increasingly adopt precision marketing on social media due to mobile internet expansion (Chuanpeng Yu et al., 2019; Zhu & Chen, 2015). WeChat, with over 1 billion MAUs, integrates social networking, business data, and payment systems, creating a powerful data ecosystem (Yanes & Berger, 2017). However, while AI enhances ad targeting, rising personalization also increases privacy concerns, influencing CTR. Studies show CTR remains low—below 0.01% (Lambrecht & Tucker, 2013) and only 0.46% for display ads (Google Ads Benchmark, 2023)—highlighting the ongoing challenge for e-commerce firms to improve advertising effectiveness. Therefore, a critical question arises:

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