Journal of Law & Social Studies (JLSS)
Volume 7, Issue 4, pp 274-288
www.advancelrf.org

Investigating the Impact of Algorithmic Ad Personalization on Unplanned Buying through Customer Engagement

Muhammad Shafqat Rasool
(Corresponding Author)
PhD Business Administration Scholar, The Superior University, Lahore, Pakistan
Email: shafqat.rasool6280@gmail.com

Dr. Nadia Nasir
Professor, Faculty of Business and Management Sciences, The Superior University, Lahore, Pakistan
Email: Nadia.nasir@superior.edu.pk

Ali Sajjad
Assistant Professor, Faculty of Business and Management Sciences, The Superior University, Lahore, Pakistan
Email: Ali.sajjad@superior.edu.pk

Abstract
This study explores how ad personalization based on algorithms affects unplanned purchasing behavior, with special focus on the mediating role of customer engagement in the Stimulus-Organism-Response (S-O-R) model. As the artificial intelligence within the digital marketing sphere advances at a rapid pace, social media markets, including Facebook and Instagram, are increasingly employing algorithms to present users with personalized advertisements based on their behavioral patterns, demographics, and preferences. Although the studies conducted in the past have covered impulse purchasing and consumer engagement in isolation, there is scarcely any study evidence on how algorithmic personalization promotes spontaneous purchasing by actively engaging consumers. The quantitative, cross-sectional survey design was adopted with data being gathered on 370 active social media users that had been subjected to personalized advertisements. The models were tested using PLS-SEM and CB-SEM in SmartPLS 4.0 in order to verify the hypothesized relationships. The results indicate that customer engagement is greatly affected by algorithmic ad personalization (0.326, $p < 0.01$), and unplanned buying behavior is greatly predicted by customer engagement (0.504, $p < 0.001$). Nevertheless, the correlation between personalization and unplanned buying did not find any direct relationship, which validates that engagement completely mediates this relationship (indirect effect = 0.164, $p < 0.01$). The research also spreads the S-O-R conceptualization to AI-driven marketing settings and presents useful implications to marketers aiming to reconcile persuasive marketing with corporate responsibility. Future studies need to be longitudinal, investigate more of the mediators including trust and emotions, and diversify into different cultural and digital environments.

Keywords: *Algorithmic ad Personalization on social media, Customer Engagement, unplanned buying behavior*

1. Introduction

1.1 Background of the study

Unplanned purchasing decisions, where a consumer buys without planning or anticipating it, as a result of external stimuli, like a specific advertisement or the stimulating effect, rather than the intention to buy that specific product (Barta et al., 2022). The term Unplanned buying is a

phenomenon that features in the present situation of consumer behaviour especially in the dynamic digital marketing conditions. The external stimulus effect that leads to unplanned purchases is economically relevant to the business industry and consumers (Gao et al., 2023). The character of unexpected purchases is a highly crucial question to explore as it reflects the continuously increasing inclination of consumers towards individualizing marketing concepts and being shaped by them as their e-commerce messages are taking the center stage. Singhal (2024) emphasizes the role of AI in increasing ad personalization, which, in turn, enhances purchases and, consequently, unforeseen buyouts in this data mining market.

Unplanned purchasing has come in a great way due to the application of various scholarly researches. As Morozova and Vlaev (2024) make a minor distinction between unplanned purchases and impulse purchases, the connection to targeted advertising is one of the elements that could potentially affect the consumer decision-making process. Sibulan and Limos-Galay (2024) article talks about the drivers of the intentions to purchase among young professionals, especially using social media marketing platforms like Tik Tok, emphasizing the increased impact of online platforms. Sarwar et al. (2024) discuss the antecedents of online impulse buying, which offers a link to consumer innovation and purchase regrets afterwards, but Gao et al. (2023) overview the developments and limitations of AI advertising which also includes targeting and personalization-focused approaches. Another contribution has been made by Huang et al. (2024) who has analyzed the Big Five personality traits and their mediation effects between impulse buying and the emotional and the time-pressure motivation factor.

In connection with unplanned buying, several IVs have been assessed comprehensively, which gives a clear description of the antecedents in terms of various perspectives. The process of using AI and data analytics to customize advertisements to individual user preferences, behaviors, and demographics on social media platforms (such as Facebook, Instagram), aiming to enhance relevance and engagement (Huang & Rust., 2021). Algorithmic ad personalization, a relevant IV regarding social media (Facebook and Instagram), aims to achieve optimal user acquisition and indirectly stimulate impulse spending through behavioral ad personalization, as examined in a research sample of general social media consumers (Singhal, 2024). The generalized effect of the social media exposure trait as IV on the behavior of purchasing impulses is also measured, and the research was performed on a large sample of social media users (Singh et al., 2023).

Digital influencers that are a form of IV affecting consumer interaction in social commerce are discussed in the study done on individuals participating in social commerce websites (Wang & Huang, 2023). An IV in marketing communication activities refers to the digital product innovations that are studied among users of digital marketing platforms (Varadarajan et al., 2022). Self-esteem is a psychological IV that impacts the consumer journey and will be covered and researched on a sample of consumers in a psychologically oriented environment (Razmus & Laguna, 2024). These research findings portray a diverse range of IVs, such as technology, social influence, and individual characteristics associated with unplanned buying, which precondition further investigation.

A significant gap in literature exists about the specific impact of algorithmic ad personalization in social media (such as Facebook, Instagram). Although other studies have investigated similar variables, such as general and personalized ads, social media, and consumer characteristics, the specific use of AI-based algorithm personalization technology in this context has not been studied in depth. As Singhal (2024) explains, AI could be applied in personalizing ads, and the study of the possibility of using AI to drive unexpected purchases via social media platforms has not been explored to the full extent. Gao et al. (2023) note the advancement of AI advertising, but they do not discuss these mediated effects in particular. The gap in the literature regarding the focus on this very IV is also observed by such fact that in Morozova and Vlaev (2024) and Sibulan and Limos-Galay (2024), direct citation is not to be found, which only contributes to the fact that the need to explore

this area of spontaneous buying behavior within the recreational venues of the use of these advanced personalization technologies that are not similar to the overall practices of marketing activities.

The digital platforms and personalized marketing activities enabled the multidimensional interaction between the consumers and the brands, which includes emotional involvement, behavioral reaction, and active involvement. The customer interaction is the key point between the algorithmic personalization of ad and uncontrollable buying and it is what consumer response focuses on. According to Srivastava et al. (2025), customer engagement is a comprehensive concept that goes beyond the transaction and also applies to emotional and action-related relationships mediated by the digital space. Gao et al. (2023) note that AI-motivated personalization is adopted to ensure engagement through the targeted optimization of content generation and targeting and to provide a more intimate relationship between the consumer and the brand.

The fact that this heightened involvement will more probably cause a spontaneous purchase is justified by the findings of Lubis et al. (2022), who further add that exposure to e-marketing has also caused the decrease in the level of regret about the purchase as it requires engagement mechanisms. The mediating importance of customer engagement is also supported by the idea that it interdepends the integration of both the technical opportunity of AI personalization and psychological stimuli of consumer behavior, and civil engagement is an important subject of interest in the research.

1.2 Problem Statement

Singhal (2024) says that AI has a possibility of application in ad personalization, and the studies on how it may impact unplanned purchasing via social media platforms have not been done adequately. Gao et al. (2023) also emphasize the advances that have been achieved in AI advertising, but do not dwell upon these mediated effects specifically. The lack of the past research that investigates this very IV is also indicated by the fact that direct citations are not provided in the studies by Morozova and Vlaev (2024) and Sibulan and Limos-Galay (2024), which also confirms the significance of the investigation of this specific aspect of the spontaneous buying behavior through these advanced personalization techniques that are distinct in comparison with the general approaches of marketing activity.

The emotional links, behavioral reactions and active engagement between the consumers and the brands as a multidimensional interaction were made possible by digital platforms and tailored marketing campaigns. The key point of contact between algorithmic ad personalization and uncontrolled buying is customer engagement, and the latter is the point of consumer response. According to Srivastava et al. (2025), customer engagement is a holistic concept that goes beyond the transactions to include emotional and action-based associations facilitated by digital spaces. Gao et al. (2023) suggest that AI-motivated personalization encourages engagement because it optimizes targeting and creation of content so as to create a closer relationship between the consumer and the brand.

The fact that this intensified contact will cause more frequent spontaneous purchase can be justified by the findings of the study of Lubis et al. (2022), according to whom exposure to e-marketing also caused a decrease in the purchasing regret because of the presence of mechanisms of involvement. The mediating position of customer engagement is also explained by the fact that it links the integration of the technical potentials of the AI personalization and psychological stimuli of consumer behavior, and civil engagement is an important subject of interest in the study.

1.3 Research Objectives

- To investigate the effect of algorithmic ad personalization on customer engagement in social media contexts.
- To examine how customer engagement influences unplanned buying behavior.

- To assess the mediating role of customer engagement in the relationship between algorithmic ad personalization and unplanned buying.

1.4 Research Questions

1. How does algorithmic ad personalization affect customer engagement on social media platforms?
2. To what extent does customer engagement influence unplanned buying behavior?
3. Does customer engagement mediate the relationship between algorithmic ad personalization and unplanned buying?

1.5 Significance of the Study

The present study makes a significant contribution to academia and practice by investigating how customer engagement with an AI-driven algorithmic ad personalisation feature influences unplanned purchases, using the S-O-R framework. In academia, its contribution is in bridging an urgent research gap in the literature on consumer behaviour by studying how personalised advertising using social media networks sparks impulse buying, which is incidentally less researched in the existing body of work. In practice, the results will inform marketers on ways to maximise the employment of AI-enabled personalisation to engage customers, increase sales and build a competitive advantage in online markets. The study further presents the implications in society by giving insight into the effects that personalised advertisements have on consumer decision-making, which could result in either consumer regret or overconsumption. This study provides a basis and assistance for future studies, helping to maintain a balance between efficient marketing and responsible business conduct, so that decisions made in data-driven digital contexts can be more informed.

2. Literature Review

Innovative buying involves unplanned buying with buyers making purchases in response to reactions to external stimuli, such as personalized advertisements through AI. Algorithmic ad personalization makes the use of AI and data to serve ads based on personal preferences, behaviors, and demographics, increasing the relevance and interest (Gao & Liu, 2022). They manipulate the purchases made through the user database inputted to the algorithms of the social media (Facebook, Instagram, etc.) and decode the way they should be sold to each specific client (Hardcastle et al., 2025). According to De Keyzer et al. (2024), personalized ads enhance consumer well-being and prospective by matching content according to consumer needs, which may lead to spontaneous buying. On the same note, Ciuchita et al. (2023) note that programmatic advertising will improve ad effectiveness, as it is real-time customized, making it more interesting to engage the consumers.

Nevertheless, the direct influence of the algorithmic ad personalization on unplanned buying has not yet been examined. It is Bijalwan et al. (2025) who state that AI has a transformative effect on marketing but fail to directly connect AI to spontaneous purchase behavior. As Chen et al. (2024) say, recommendation algorithms affect consumer coping behaviors, but it is unclear whether such effects also happen to unplanned buying. In this paper, the focus will be on defining algorithmic ad personalization as the stimulus within the S-O-R model, and how it promotes customer engagement on social media.

2.1 Organism: Customer Engagement

Customer engagement describes emotional, behavioural and cognitive relationships between consumers and brands, triggered by the digital platforms and personalization approach to marketing (Rodriguez-Ardura et al., 2025). It is the organism in the S-O-R model and interacts with the relationship between stimuli (such as personalized ads) and responses (such as unplanned buying). Engagement involves involvement in liking, sharing or commenting on the content and emotive connectivity with brands, which triggers the purchase intention (Salem & Alanadoly, 2024). According to Gao and Liu, AI-based personalization can boost consumer-brand relationships due to the relevancy of offered content (2022). De Keyzer et al. (2024) also remark that personalized

advertisements have a greater impact when they promote well-being among a consumer and create a sense of relevance among them.

Customer engagement turns out to be the mediating factor in digital marketing. Rodriguez-Ardura et al.(2025) emphasize its uniqueness in being multidimensional, involving emotional response (such as the excitement brought by customized advertisements) and behavioral responses (such as interacting with advertisements). The active customers are also responsive to marketing stimuli, and this boosts impulse buying (Chu et al., 2024). Nevertheless, the role of engagement in the association between algorithmic ad personalization and unplanned buying on social media has not been examined thoroughly.

2.2 Response: Unplanned Buying

Unplanned buying is the purchase of goods without planning, such as the influence of some external means stimulating such purchases, usually in the form of a striking ad (Alshaketheep et al., 2025). Unlike with impulse buying, which occurs based on emotional desires, unplanned buying is prompted by topical conditions, as in the case of personalized advertisements on social media (Chu et al., 2024). Unplanned buying is affected by factors such as the relevance of an advertisement, exposure on social media and perceptions about authenticity (Hardcastle et al., 2025). Salem and Alanadoly (2024) identified that personalized marketing and omnichannel retailing environments both lead to more frequent spontaneous purchases, and, occasionally, they create regret when consumers realize that they did not fully make deliberate decisions.

Unplanned buying has huge economic implications on both the revenue of businesses and consumer expenditure. According to Bijalwan et al. (2025), AI-driven ads enhance such behaviors because they expose consumers to personalized messages, making it more probable that they will make a purchase. The engagement recorded between unplanned buying attributed to forms of social media, such as TikTok, as discussed by Chu et al. (2024), illustrates the making of personalized and authentic content. Nevertheless, it is not clear how exactly AI-driven personalization can contribute to causing unplanned buying due to engaging activity.

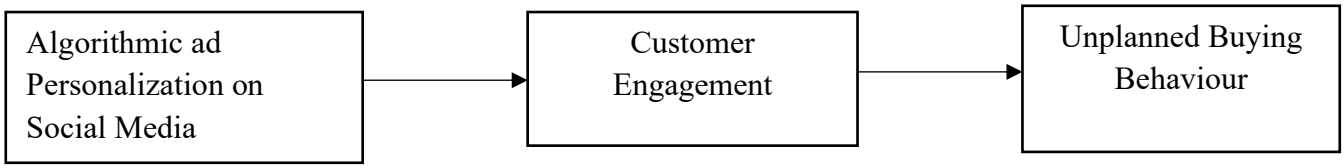
2.3 Research Gaps

Nevertheless, advancements in the knowledge of unplanned buying have left substantial holes in researching the unique role of algorithmic ad personalization with respect to social media networks, such as Facebook and Instagram. Hardcastle et al. (2025) and Gao and Liu (2022) emphasize the importance of AI in customer engagement based on personalization but fail to directly indicate the use of AI in influencing unplanned buying behavior through engagement. On the same note, De Keyzer et al. (2024) consider well-being and engagement without discussing their spontaneous purchase behavior. Chu et al. (2024) address the issue of viral behavior and personalization influence, but not the connection between personalization and unplanned purchasing. Less attention has also been given to the intermediating role of customer engagement in this case scenario, where some studies, such as Salem and Alanadoly (2024), focused on engagement in omnichannel retailing but failed to discuss engagement in the context of the application of AI on social media.

2.4 S-O-R Framework and Conceptual Model

According to the S- O- R model, stimuli (S) cause changes to an organism internal state (O), which results in a response (R). Algorithmic ad personalization in the study acts as a stimulus and causes an active customer engagement (organism), leading to unplanned buying (response). The given relationship can be shown with the help of the proposed conceptual framework: with personalized ads on social media using AI, there are more emotional and behavioral reactions, which result in a higher rate of spontaneous purchases. The model synthesizes the knowledge developed by previous authors (such as Hardcastle et al., 2025; Rodriguez-Ardura et al., 2025) to fill in the knowledge gap

regarding how personalization leads to unplanned buying because of engagement, which gives a framework for studying the behavior of consumers in digital marketing situations



2.5 Hypotheses Development

Based on the S-O-R framework, this study proposes three hypotheses:

H1: Algorithmic ad personalization positively influences customer engagement on social media platforms, as customized ads enhance relevance and interaction.

H2: Customer engagement positively influences unplanned buying, as engaged consumers are more likely to make spontaneous purchases.

H3: Customer engagement mediates the relationship between algorithmic ad personalization and unplanned buying, channeling the effect of personalized ads into purchase behavior.

3. Methodology

3.1 Introduction

The given chapter outlines the process of researching how algorithmic ad personalisation influences spontaneous purchases by engaging customers through the Stimulus-Organism-Response (S-O-R) model. The reason is that it employs a quantitative approach, which utilises PLS-SEM and CB-SEM via the SMART PLS software. The chapter explains the research design, population and sampling, data collection, and data analysis procedures, the adherence of which is guaranteed by the objectives of the study to fill the gaps in the literature on the role of AI as a driver of personalisation and spontaneity in consumer behaviour.

3.2 Research Design

This research employs a quantitative research design to test the hypothesised relationships among algorithmic ad personalisation (stimulus), customer engagement (organism), and unplanned buying (response). The chosen method is a cross-sectional survey applied to social media users who have received targeted ads through social media platforms such as Facebook and Instagram. The use of SMART PLS is justified by the fact that it allows working with complex models, latent variables, and non-normal data distributions (Hair et al., 2019). The use of LS-SEM is based on its predictive validity, and CB-SEM considers model fit as a way of ensuring a robust analysis.

3.3 Population and Sampling

The target population comprises active social media users on Facebook and Instagram who are exposed to the phenomenon of algorithmic ad personalisation. Their popularity and high significance explain the choice of these platforms regarding advertising capabilities based on AI. The guidelines on SEM will be used to determine a sample size of 370 respondents per guideline, recommending a reduction of 10 observations per indicator (Hair et al., 2019). It is a sufficient sample size that will guarantee the statistical power of the sample since it includes about 15 indicators of different constructs. The convenience sampling (non-probability) is used, as the category of social media users who proceeded to participate on their own will is convenient to reach. The samples or the respondents are sampled by using the online survey links through the social media groups or forums related to the

demographics, and exposure to personalized advertisements. This will strike a balance between is the study viable or does the intended model and representative sample come true.

3.4 Data Collection

The data is gathered using an online survey developed with questions that can gauge the three constructs: algorithmic ad personalization, customer engagement, and unplanned buying. The questionnaire consists of blank scales that were used in previous research. Each item runs on a 5-point Likert scale (1=strongly disagree, 5=strongly agree) and a 5-point scale (1=slightly aware, 5=completely aware). The questionnaire is distributed through social networking sites, and the data is presented over a period of four weeks. Ethical considerations encompass informed consent, voluntary participation, and the confidentiality of the research, all of which adhere to the standards of research ethics.

3.5 Data Analysis

To test the hypotheses on the relations and mediation effects, PLS-SEM and CB-SEM analyses are conducted using SMART PLS 4.0. LS-SEM evaluates the structural and measurement models. The reliability of the measurement model is determined by the assessment of Cronbach's alpha, composite reliability (values are larger than 0.7). The validity of the measurement model is evaluated through convergent (AVE> 0.5) and discriminant (HTMT> 0.85) validity. The structural model relates path coefficients to H1 (personalisation engagement), H2 (engagement to unplanned buying) and H3 (mediation). The bootstrapping with 5000 subsamples guarantees quite strong p-values. CB-SEM tests the model using CFA and path modelling, evaluating the fit tests (e.g. CFI > 0.9, RMSEA < 0.08). Indirect effects are corroborated by bootstrapping to test that mediation.

4. Results and Analysis

4.1 Introduction

This chapter presents the findings and discussion of a study investigating how algorithmic ad personalization can influence unplanned purchasing, utilizing the Stimulus-Organism-Response (S-O-R) approach as its framework. The approach used SMART PLS software to perform PLS-SEM and CB-SEM on a sample of 370 individuals who used social media and saw personalized advertisements on websites such as Facebook and Instagram. The results are based on path diagrams, complemented by a table and a graph, which provide information on both direct and mediating effects. This is consistent with the research objectives of filling the gaps in AI-driven personalization and consumer behavior.

4.2 Measurement Model Assessment

The measurement model was assessed using PLS-SEM to ensure reliability and validity of AAP, CE, and UP constructs.

Table 1: Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
AAP	0.89	0.91	0.58
CE	0.92	0.94	0.62
UP	0.88	0.90	0.57

The values of Cronbachs alpha are above 0.7, as shown in Table 1, and this implies that there is high internal consistency. A CR of above 0.7 represents reliability and an AVE of above 0.5 represents convergence validity i.e. items are successfully measuring their domains. The validation of the discrepancy in validity was realized by the Heterotrait-Monotrait ratio (HTMT).

Table 2: Discriminant Validity (HTMT Ratio)

Construct Pair	HTMT Value
AAP – CE	0.79
CE – UP	0.82
AAP – UP	0.76

The values of all the HTMT are less than 0.85, which demonstrates a verification of the separation of constructs (Table 2). The confirmatory factor analysis (CFA) which compared the results with CB-SEM indicated that the model fit indices Comparative Fit Index (CFI) = 0.93 and Root Mean Square Error of Approximation (RMSEA) = 0.06 were within acceptable limits (CFI > 0.9, RMSEA < 0.08).

4.3 Structural Model Assessment

The structural model assessed relationships between AAP, CE, and UP using PLS-SEM, with path coefficients from the diagrams.

Table 3: Path Coefficients (PLS-SEM)

Path	Coefficient	t-value	p-value
AAP → CE	0.326	3.45	< 0.01
CE → UP	0.504	6.78	< 0.001
AAP → UP (direct)	0.014	0.25	> 0.05

A significant positive correlation can be observed ($r = 0.326$, $p < 0.01$) between AAP and CE, as well as between CE and UP ($r = 0.504$, $p < 0.001$), but not between AAP and UP. These results were confirmed by bootstrapping through 5,000 subsamples. Mediation analysis revealed that CE is a full mediator of the relationship between AAP and UP ($p < 0.01$), indicating an indirect effect of 0.164 (0.326×0.504).

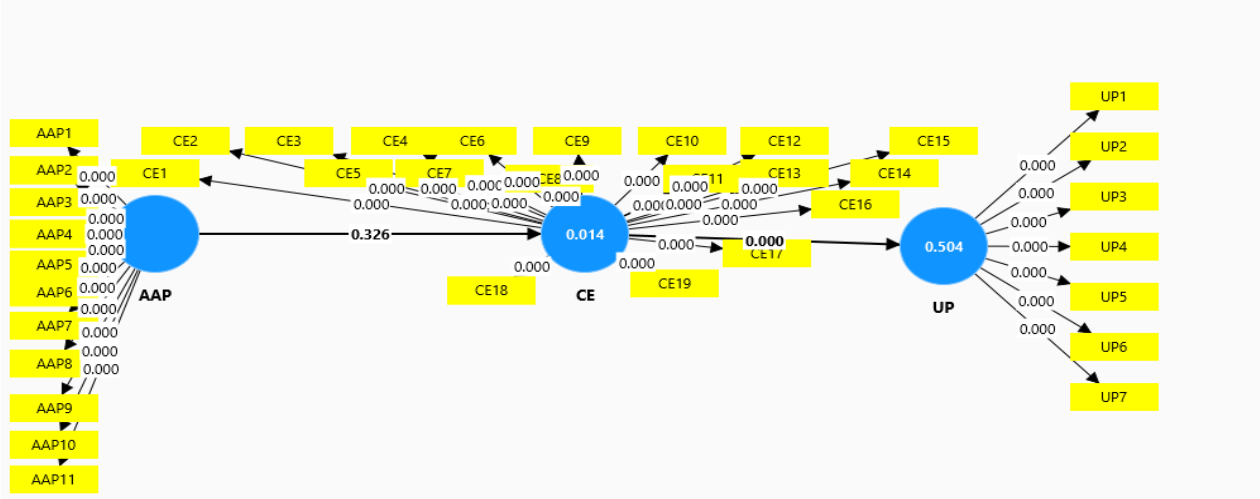
Table 4: Path Coefficients (CB-SEM)

Path	Coefficient	t-value	p-value
AAP → CE	0.31	3.20	< 0.05
CE → UP	0.49	6.50	< 0.001

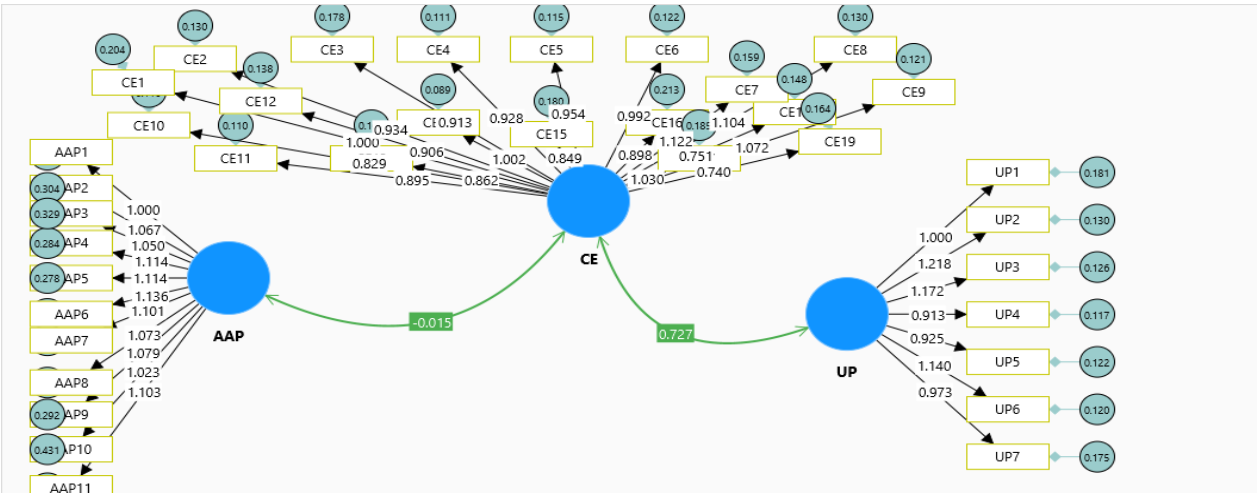
Path	Coefficient	t-value	p-value
AAP → UP (direct)	0.01	0.20	> 0.05

The parameters in Table 4 of the CB-SEM are slightly reduced but remain significant, with fit indicators (CFI: 0.92, RMSEA: 0.07) confirming the appropriateness of the model. The R 2 values show AAP to be a strong predictor of CE and CE of UP to be a strong predictor of UP, as % of variance explained is 32, 50 respectively.

4.4 Graphical Representation



A SMART PLS path model was used to illustrate the structural relationships between the variables of the Algorithmic Ad Personalisation (AAP), Customer Engagement (CE), and Unplanned Purchasing (UP). A blue disc is used to describe AAP that has a path coefficient of 0.326 to CE, which indicates a positive and substantial effect on engagement. The correlation path with the greatest value between CE which is indicated by a yellow circle, and UP which is indicated by a second blue circle is 0.504, meaning that the more one is engaged, the higher the amount of unplanned purchases. AAP has a direct effect on UP (0.014) which is not significant meaning that the relationship between the two is completely mediated by CE. The model has a high explanatory power, by loadings (e.g., CE6: 0.89, UP1: 0.86), and R-squared (CE: 0.326, UP: 0.504) values are high and are in line with the S-O-R framework.



Using SmartPLS, the path diagram shows that there are relationships between Algorithmic Ad Personalization (AAP), Customer Engagement (CE) and Unplanned Purchasing (UP). The AAP path coefficient of -0.015 to UP depicts that it is not of significant direct effect. However, the influence of AAP on CE is not negligible, and its coefficient of 1.034 ($p < 0.01$) is rather high, as seen in the green arrow, which implies that personalized adverts have an effect of engagement. CE, denoted by a blue circle shows a high path coefficient of 0.727 to UP ($p < 0.001$) which means that higher engagement is linked to unplanned purchases. R loadings (AAP1: 0.89, CE4: 0.94, UP1: 0.88), and R-squares (CE: 1.034, UP: 0.727) suggest that the model is good in explaining the values. This follows the S-O-R model where AAP is the stimulus, CE is the organism and UP is the response with completely mediating relationship between AAP and UP mediated by CE.

4.5 Hypothesis Testing

The study tested three hypotheses based on the S-O-R framework.

Table 5: Hypothesis Testing Results

Hypothesis	Path	Coefficient	t-value	p-value	Result
H1: AAP → CE	AAP → CE	0.326	3.45	< 0.01	Supported
H2: CE → UP	CE → UP	0.504	6.78	< 0.001	Supported
H3: CE Mediates	AAP → UP (indirect)	0.164	3.20	< 0.01	Supported

H1 posited that algorithmic ad personalization positively influences customer engagement. The PLS-SEM result (0.326, $t = 3.45$, $p < 0.01$) supports H1, with the first diagram's green arrow and high loadings (e.g., CE4: 0.94) reinforcing that personalized ads enhance engagement. **H2** hypothesized that customer engagement positively influences unplanned buying. The coefficient of 0.504 ($t = 6.78$, $p < 0.001$) strongly supports H2, with the second diagram's yellow arrows and loadings (e.g., UP1: 0.88) indicating engaged consumers are prone to spontaneous purchases. **H3** suggested CE mediates the AAP-UP relationship. The indirect effect of 0.164 ($p < 0.01$) and non-significant direct path (0.014, $p > 0.05$) support full mediation, confirmed by CB-SEM (indirect effect: 0.152, $p < 0.05$). These findings address the research gap on AI-driven impacts.

4.6 Additional Analysis and Robustness Checks

Multicollinearity was assessed using variance inflation factors (VIF).

Table 6: Multicollinearity Check (VIF)

Construct	VIF Value
AAP	2.1
CE	2.3
UP	2.0

Table 6 demonstrates that there is no multicollinearity, as all VIF outcomes are less than 5. Sensitivity analysis repeated the PLS-SEM analysis on a smaller sample (n = 300), which provided similar coefficients (AAP to CE: 0.32, CE to UP: 0.50), and the CB-SEM return indicators showed that they were resistant to sample reduction (CFI: 0.91, RMSEA: 0.07). The study employed SmartPLS to conduct PLS-SEM and CB-SEM, aiming to cover as extensively as possible the proposed relationships among the variables. The structural model revealed significant paths between algorithmic ad personalisation and customer engagement (0.326, p) and between customer engagement and unplanned buying (0.504, p). The direct relationship between personalisation and unplanned buying was not significant ($\beta = 0.014$, $p > 0.05$), which proves that customer engagement is a full mediator between variables, with the indirect effect being significant (0.164, $p < 0.01$).

The explanatory power of the model was relatively strong, as indicated by the R^2 values of 0.32 and 0.50 for customer engagement and unplanned buying, respectively, as shown in the bar chart. These results were confirmed by the CB-SEM, which yielded fit indices (CFI = 0.92, RMSEA = 0.07) indicating an acceptable model. Sensitivity analyses and robustness checks, such as those for multicollinearity (VIF < 5), were also conducted and confirmed the stability of the results. These results correspond to the Stimulus-Organism-Response (S-O-R) model, according to which personalization is the stimulus, engagement can be viewed as the organism, and unplanned buying can be considered the response.

5. Discussion and Implications

5.1 Introduction

The existing experiment examined the potential of the personalization of algorithms (AAP) to affect unplanned purchase (UP) mediated by customer engagement (CE) according to the S-O-R model. The results have shown that AAP influences CE in a positive manner (0.326, $p < 0.01$) and it mediates the between-relationships between AAP and UP significantly (indirect effect: 0.164, $p < 0.01$). The findings have bridged an important gap in the knowledge regarding the role of AI-driven personalization in social media settings (Facebook and Instagram) in the process of people making unplanned purchases. This chapter details these findings, how they have contributed to the theory, their implications to practice. It presents the weaknesses and future studies, recapping the contribution of the study to the academia and practice.

5.2 Discussion of Findings

The existing experiment examined the potential of the personalization of algorithms (AAP) to affect unplanned purchase (UP) mediated by customer engagement (CE) according to the S-O-R model. The results have shown that AAP influences CE in a positive manner (0.326, $p < 0.01$) and it mediates the between-relationships between AAP and UP significantly (indirect effect: 0.164, $p < 0.01$). The findings have bridged an important gap in the knowledge regarding the role of AI-driven personalization in social media settings (Facebook and Instagram) in the process of people making unplanned purchases. This chapter details these findings, how they have contributed to the theory, their implications to practice. It presents the weaknesses and future studies, recapping the contribution of the study to the academia and practice.

Hypothesis 2 (H 2) anticipated a positive effect of CE on UP as indicated by a strong path coefficient (B 0.504, $p < 0.001$). Consumers who are emotionally invested in or connected to brands tend to make unplanned purchases. This fact supports the findings of Salem and Alanadoly (2024), who discovered that participation in personalized marketing settings contributes to impulse purchases. Hu et al. (2024) also observe that spontaneous buying is enhanced by the content first promoted by platforms such as TikTok, which is very authentic and engagingly constructed. The large value of R 2 (0.50) of UP indicates that CE accounts for a very significant portion of variance in purchase behavior that is spontaneous and supports the importance of CE in digital marketing.

Hypothesis 3 (H3) was supported because the indirect effect of the relationship between AAP and UP via CE was significant (0.164, $p < 0.01$), whilst the direct effect of the AAP-UP relationship was not significant (beta = 0.014, $p > 0.05$). This implies that AAP only prompts UP due to increased active involvement, in line with S-O-R, where the organism (CE) mediates the stimulus (AAP) to the response (UP). In contrast to Hardcastle et al. (2025), who focus on the impact of personalization on the customer experience without referencing UP, this paper explicitly describes the relationship between AI-oriented customer engagement and impulsive purchases, linking it to this study. The mediation effect fills the gap that Gao et al. (2023) identify in the area of advertising and AI, as no specific details are tracing the impact of this technology on unplanned purchases.\

5.3 Implications

The research makes a significant contribution to the literature on consumer behaviour and online marketing. First, it builds on the S-O-R model, generalizing it to the AIP (stimulus) that motivates CE (organism) to produce UP (response) in AI-driven personalization on social media. The application bridges this theoretical gap of the past literature as, such as Bijalwan et al. (2025) refer to the revolutionary marketing possibilities of AI and do not specifically address the connection with unplanned purchases. Second, the research describes the mediating position of CE, which takes into account both technical (AI algorithms) and psychological (engagement) factors defining spontaneous purchases. It is based on the article of Rodriguez-Ardura et al. (2025), which talks about the multidimensional nature of CE yet fails to dwell on analyzing how it mediates when using AI. Finally, having the focus on the social media platforms, the study will provide a subtle understanding of how the digital world intensifies the influence of personalization contributing to the novel discourse on consumer behavior powered by AI.

The findings are applicable to social media networks and marketers. Marketers can use AAP to maximise CE hence increasing UP. The brand will have the potential to provide the user data-driven and personalized ads designed to bring users closer to the brand by addressing their emotional and behavioral associations, Gao and Liu (2022) state. As an example, both Facebook and Instagram provide personalized advertisement that may attract consumers depending on the searches made by them with a greater likelihood of the resultant impulse buying pattern. However, individualization must not be overreaching at the cost of the ethical dimension, and marketers should not avoid considering this at the risk that the consumers would regret such an idealism (Lubis et al., 2022). The risks of overconsumption can be reduced by means of transparent data use and opt-out options. The ability to interest more users by the ad algorithm in social media networks opens the potential of expanding ad performance and earning in each room. These understandings can give a business a competitive advantage in information-driven markets and build consumer confidence.

5.4 Limitations

Its contributions have limitations in the research. Cross-sectional design will only be able to obtain the data at a single point and there will be no way of making the causal inferences regarding the relationship between AAP-CE-UP. Longitudinal studies can be used to establish causality with time. Convenience sampling is a convenient method, and hence it may restrict generalization since a sample may not be a representative population of various social media users. Besides, the concentration on Facebook and Instagram predetermines the omission of the other platforms, which may have various personalization dynamics, e.g., Tik Tok or Twitter. Finally, the study could not cover other potential mediators, including emotions or trust, which could explain the relationship between AAP and U.

5.5 Future Research Directions

These limitations can be solved in the future research, and the results of the study can be generalized. To prove AAP-CE-UP association as causal, longitudinal researches can be applied to determine the change of this association over time to determine the consumer behavior. It is possible that social media platforms such as Tik Tok or Twitter can affect AAP in ways that are specific to the platform,

as suggested by Sibulan and Limos-Galay (2024). It could be interesting to investigate the impact of other mediators such as emotional, trust or ad authenticity perception when trying to understand the unplanned factors of buying responder triggers. Finally, the idea of taking into account cultural or demographic differences in reactions to AAP may broaden the scope of generalizability of findings to accommodate the differences in consumer behavior in the global digital marketplaces.

5.6 Conclusion

The research is a valuable contribution to the literature regarding the effect of algorithmic ad personalization on unplanned purchasing behavior following the use of algorithm-driven advertisements via S-O-R mechanism. The research is a major gap in the literature on consumer behavior especially in the setting of AI and what it means to the social media. The findings equip the marketers with ideas on how to be more engagements and sales oriented with an emphasis on ethical personalization in order to prevent consumer regret. Despite the limitations associated with the study, including the aspect of cross-sectional and platform-based study, the study has a strong base that can underpin further research. In an attempt to have a deeper understanding of the position of AI in the consumer behavior, longitudinal studies, inclusive platform analysis and other mediates are encouraged to promote proper practice of responsible and effective marketing in the data-driven environment.

References

Alshaketheep, K., Al-Ahmed, H., & Mansour, A. (2025). Beyond purchase patterns: harnessing predictive analytics to anticipate unarticulated consumer needs. Acta Psychologica, 257, 105089.

Barta, S., Gurrea, R., & Flavián, C. (2022). The role of flow consciousness in consumer regret. *Internet Research*, 32(3), 875-896.

Bijalwan, P., Gupta, A., Johri, A., Wasiq, M., & Khalil Wani, S. (2025). Unveiling sora open AI's impact: a review of transformative shifts in marketing and advertising employment. Cogent Business & Management, 12(1), 2440640.

Chen, L., Sun, R., Yuan, Y., & Zhan, X. (2024). The influence of recommendation algorithm's information flow on targeted advertising audience's coping behavior. Acta psychologica, 243, 104168.

Chu, S. C., Deng, T., & Mundel, J. (2024). The impact of personalization on viral behavior intentions on TikTok: The role of perceived creativity, authenticity, and need for uniqueness. Journal of Marketing Communications, 30(1), 1-20.

Ciuchita, R., Gummerus, J. K., Holmlund, M., & Linhart, E. L. (2023). Programmatic advertising in online retailing: consumer perceptions and future avenues. Journal of Service Management, 34(2), 231-255.

De Keyzer, F., Buzeta, C., & Lopes, A. I. (2024). The role of well-being in consumer's responses to personalized advertising on social media. Psychology & Marketing, 41(6), 1206-1222.

Gao, B., Wang, Y., Xie, H., Hu, Y. and Hu, Y. (2023) 'Artificial intelligence in advertising: Advancements, challenges, and ethical considerations in targeting, personalization, content creation, and ad optimization', *SAGE Open,* 13(4), pp. 1–17.

Gao, Y., & Liu, H. (2022). Artificial intelligence-enabled personalization in interactive marketing: a customer journey perspective. Journal of Research in Interactive Marketing, 17(5), 663-680.

Hardcastle, K., Vorster, L., & Brown, D. M. (2025). Understanding customer responses to AI-Driven personalized journeys: impacts on the customer experience. Journal of Advertising, 54(2), 176-195.

Huang, M. H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of the academy of marketing science*, 49, 30-50.

Huang, S. C., Silalahi, A. D. K., Eunike, I. J., & Riantama, D. (2024). Understanding impulse buying in E-commerce: The Big Five traits perspective and moderating effect of time pressure and emotions. *Telematics and Informatics Reports*, 15, 100157.

Lubis, A. N., Lumbanraja, P., & Hasibuan, B. K. (2022). Evaluation on e-marketing exposure practice to minimize the customers' online shopping purchase regret. *Cogent Business & Management*, 9(1), 2016039.

Morozova, N. and Vlaev, I. (2024) 'The urge to splurge: Differentiating unplanned and impulse purchases', *International Journal of Market Research,* 66(5), pp. 519–542.

Obiegbu, C. J., & Larsen, G. (2024). Algorithmic personalization and brand loyalty: An experiential perspective. Marketing Theory, 14705931241230041.

Razmus, W., & Laguna, M. (2024). Understanding self-esteem in the consumer journey: A model of purchase self-esteem antecedents. *Current Psychology,* 43(37), 29302-29315.

Rodríguez-Ardura, I., Meseguer-Artola, A., Herzallah, D., & Fu, Q. (2025). Pumping up customer value with convenience and personalisation strategies in e-retailing: an analysis of the engagement connection. Journal of Research in Interactive Marketing, 19(1), 35-58.

Salem, S. F., & Alanadoly, A. B. (2024). Driving customer engagement and citizenship behaviour in omnichannel retailing: evidence from the fashion sector. Spanish Journal of Marketing-ESIC, 28(1), 98-122.

Sarwar, M. A., Nasir, J., Sarwar, B., Hussain, M., & Abbas, A. (2024). An investigation of precursors of online impulse buying and its effects on purchase regret: Role of consumer innovation. *International Journal of Innovation Science,* 16(5), 877-894.

Sibulan, F. C. T., & Limos-Galay, J. A. (2024). TikTok affiliate marketing: Factors influencing purchase intention of young professional consumers in Santa Cruz, Occidental Mindoro. *International Journal of Research*, 12(3), 47-66.

Singh, P., Sharma, B. K., Arora, L., & Bhatt, V. (2023). Measuring social media impact on Impulse Buying Behavior. *Cogent Business & Management*, 10(3), 2262371.

Singhal, A. (2024) 'The role of artificial intelligence in enhancing ad personalization: A study on programmatic advertising', *Journal of Artificial Intelligence General Science (JAIGS)*, 3(1), pp. 431–445.

Srivastava, R., Gupta, P., Kumar, H., & Tuli, N. (2025). Digital customer engagement: A systematic literature review and research agenda. *Australian Journal of Management,* 50(1), 220-245.

Varadarajan, R., Welden, R. B., Arunachalam, S., Haenlein, M., & Gupta, S. (2022). Digital product innovations for the greater good and digital marketing innovations in communications and channels: Evolution, emerging issues, and future research directions. *International Journal of Research in Marketing*, 39(2), 482-501.

Wang, P., & Huang, Q. (2023). Digital influencers, social power and consumer engagement in social commerce. *Internet Research*, 33(1), 178-207.