AI-DRIVEN PERSONALIZATION USING *LLMS* AND *SLMS* FOR HYPER PERSONALIZATION IN B2B AND B2C MARKETING: CHALLENGES AND FUTURE DIRECTIONS

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Abstract: *This paper presents a review of the current landscape of AI-driven personalization in B2B and B2C marketing, highlighting key challenges such as integration of LLMS and SLMs models into existing systems, scalability and performance issues, ensuring accuracy and relevance in recommendations. Future directions emphasize model efficiency, seamless integration, and ethical AI practices ensuring transparency, fairness, and data privacy. This paper conducts a theoretical meta-analysis (integrative literature review) to gather and synthesize findings from a broad range of studies on AI-driven personalization in marketing.*

Key words: *AI-driven personalization, LLM (Large language model), SLMs (small language models), hyper-personalization, personalized experience.*

1. Introduction

Artificial Intelligence (AI) is revolutionizing how businesses tailor experiences to individual customers, a practice broadly known as personalization. In marketing, personalization refers to designing and delivering content that resonates with each customer's unique preferences and needs (Chandra et al., 2022).

As consumers increasingly expect personalized interactions, it is reported that 71% of them expect companies to deliver tailored experiences, and 76% express frustration when this does not occur (Zaltzman, 2024). Surveys also show that over 90% of shoppers are more likely to shop with brands that recognize and remember them with relevant offers (Morgan, 2020).

In B2B markets, clients similarly demand relevance – a recent study found 72% of B2B customers expect mostly or fully personalized content when engaging with products and services (BOL-Agency, n.d.). These trends reveal why companies are rapidly investing in AI-driven personalization to improve customer engagement and loyalty. In B2C contexts, consumers' expectations for personalized experiences increase as they progress through the purchase journey. For instance, only 22% of consumers expect

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personalized content during product discovery, but this figure rises to 45% during post-purchase engagement (Marketing Charts, 2023). Additionally, 80% of consumers are more likely to make a purchase when brands offer personalized experiences (World Metrics, n.d.). This shows why companies are rapidly investing in AI-driven personalization to enhance customer engagement and loyalty (Smith, 2023).

2. Literature Review

2.1 AI-Driven Personalization in Marketing

Personalization has long been recognized as a critical strategy in marketing to improve customer experience and business outcomes (McKinsey & Company, n.d.). Traditional personalization often involved segmenting customers into groups and tailoring messages to segment profiles. Hyper-personalization takes this further by leveraging detailed data such as purchase history, browsing behaviour, and contextual information to tailor content to the individual in real-time. Hyper-personalization refers to the advanced use of AI-driven techniques, including machine learning and natural language processing (NLP), to create highly individualized and contextually relevant experiences. Unlike traditional personalization, which often involves simple rule-based systems, hyper-personalization leverages vast amounts of consumer data, enabling companies to deliver experiences that are finely tuned to an individual's specific needs, preferences, and behaviours (Ghosh and Singh, 2023).

Both B2B and B2C sectors benefit from personalization, although the methods and goals may differ. In retail consumer markets (B2C), personalization means recommending the right products or crafting the right message at the right time for each shopper, improving customer engagement, targeting, and direct conversions, resulting in higher satisfaction and sales (Jain et al., 2024). In B2B marketing, personalization often takes the form of tailored content and outreach for each target account (i.e. ABM), which can shorten sales cycles and deepen client relationships. Given the proven benefits, there is strong motivation to enhance personalization through AI. Recent literature (2020–2025) reflects this, with numerous studies exploring AI-based recommendation systems, predictive analytics for personalization, and the use of machine learning to automate customer segmentation and content personalization (Zhao et al., 2024).

2.2. Large Language Models (LLMs) in Marketing

Large Language Models (LLMs) in Marketing: LLMs like OpenAI's GPT-3/4, Google's LaMDA etc., have garnered significant attention for their ability to generate fluent text and understand complex prompts. In marketing, researchers have begun examining LLMs for tasks such as generating personalized product descriptions, writing tailored marketing copy, answering customer queries in a human-like manner, and even persuading customers. A notable example is the work by Matz et al. (2024), who demonstrated that generative AI can automate personalized persuasion. In their

experiments, personalized marketing messages crafted by ChatGPT (an LLM) were significantly more influential than non-personalized messages, across domains like consumer product marketing and even public campaigns. Remarkably, the LLM can generate customized messages based on minimal prompts detailing a recipient's profile, such as personality traits. This capability indicates that LLMs can effectively scale personalized marketing strategies that were previously labour-intensive, supporting the notion that Artificial Intelligence (AI) facilitates true mass personalization. Further studies and industry trials corroborate the efficacy of LLMs in content creation for marketing; notably, over 40% of marketers utilizing AI report employing it for content generation, including marketing texts, blogs, and emails (Chinn, 2025).

2.3. Small Language Models (SLMs) in Marketing

Alongside the excitement over LLMs, there is growing interest in small language models (SLMs), more compact AI models tailored to specific tasks or datasets. Unlike general-purpose LLMs with tens or hundreds of billions of parameters, SLMs might have millions to a few billion parameters and are often fine-tuned for a narrower domain. In marketing applications, SLMs can be highly useful for real-time and on-device personalization. Because they are lightweight, SLMs can run efficiently at the edge (e.g. on a website in the user's browser, in a mobile app, or on a local server) with low latency (Matz, 2025). This makes them suitable for delivering instant personalized content or recommendations as a user interacts with a digital platform, without always calling an external API.

The literature and industry reports highlight several advantages of SLMs for businesses: they offer faster response times and lower computational costs while still performing well on domain-specific tasks. Companies can train or fine-tune SLMs on their own proprietary data (e.g. internal sales data, industry-specific terminology) and deploy them behind their firewall, ensuring sensitive customer data is not continuously sent to third-party AI services. A report of the World Economic Forum from January 2025 has noted that many firms see SLMs as a cost-effective way to adopt AI, as these models allow organizations to "take charge of their AI destiny" by building models that are just large enough for their needs but not unnecessarily gigantic (Whiting, 2025).

2.4. Key Challenges in AI Personalization

A recurring theme in the literature is the ethical dimension of AI-driven personalization. Personalization inherently relies on user data – which raises privacy concerns. With hyper-personalization, the depth and granularity of data used (browsing habits, purchase history, even psychographic or inferred traits) can be unsettling to users if not handled transparently and consensually. Researchers Hari et al. (2025) point out ethical issues such as privacy, data protection, and information imbalance that arise when marketers deploy advanced AI on consumer data (Harinder, 2025). Legally, regulations like the General Data Protection Regulation (GDPR) in the EU require a legal basis (such as explicit consent) for using personal data for targeted marketing.

Algorithmic bias and fairness are fundamental concerns when utilizing AI models, especially those trained on historical data, which may inadvertently reflect societal biases embedded in past behaviours. In the context of marketing, this could manifest in the exclusion of certain customer groups from personalized offers or the delivery of inconsistent messaging due to biases present in the model's training data.

AI-driven personalization algorithms are often opaque (the "black box" problem), making it hard for consumers to understand why they see certain content. Lack of transparency can erode trust: users might feel manipulated if they realize an AI was nudging their choices without their knowledge. To counter this, experts advocate for explainable AI in personalization (Harvard Business, 2024), for instance, providing users with simple explanations or giving them control (opt-outs, preference settings) over the personalized content they receive.

3. Methodology

This paper uses a theoretical meta-analysis (integrative literature review) to gather and synthesize findings from a broad range of studies on AI-driven personalization in marketing. Rather than a quantitative meta-analysis of effect sizes, our approach is qualitative and conceptual, given the heterogeneity of the sources (spanning technical AI research, marketing journals, and industry reports). We followed principles of systematic literature review to ensure comprehensive coverage and to minimize bias in source selection.

We identified relevant studies through database searches, citation tracing, and inclusion of key industry publications. First, we searched academic databases (Google Scholar, IEEE Xplore, ACM Digital Library, Scopus) and publisher portals for terms such as "AI personalization marketing", "large language models marketing", "hyper-personalization B2C B2B", "account-based marketing AI", "contextual personalization AI", and "ethical AI marketing". We filtered results to focus on the past 5 years (approximately 2020–2025) to capture the recent surge in LLM-related research. However, we allowed inclusion of a few high-quality older sources for foundational concepts (e.g. seminal definitions of personalization, or earlier personalization statistics) where relevant. In parallel, we reviewed industry whitepapers and reports from reputable organizations (such as McKinsey, Accenture, Bain, Gartner) and articles from industry publications (Forbes, Harvard Business Review, Stanford etc.) that often discuss cutting-edge practices ahead of academic research. These industry sources were included to provide practical insights and real-world data points (for example, surveys of marketers or consumers). We screened the collected sources for relevance. This encompassed studies on AI algorithms for personalization (e.g. recommendation system improvements, LLM applications), papers on marketing strategies involving personalization (e.g. ABM tactics using AI), and articles on the implications of AI for personalized marketing (including ethics and consumer behaviour). We excluded papers that only tangentially mentioned personalization (e.g. general AI in marketing pieces that did not provide specific insight into personalization).

The inclusion criteria required that each source explicitly address AI-driven

personalization in marketing, including applications of LLM or SLMs, recommendation systems, or ethical implications. In total, 30 sources were analysed: 20 academic papers and 10 industry or trade reports, categorized into six thematic areas (presented in the table 1): 1. Hyper-personalization in Marketing (B2B & B2C); 2.Role of Large Language Models (LLMs) in Personalization; 3. Small Language Models (SLMs) for Lightweight Personalization; 4. Ethical and Privacy Concerns; 5. Integration of AI into Marketing Systems; 6. Future Directions and Emerging Trends.

For each source, we extracted key information regarding the role of AI in personalization, any reported findings (e.g. statistics on effectiveness, results of experiments, identified challenges), and any frameworks or taxonomies introduced. We paid special attention to recurring themes across sources. In the synthesis, we grouped insights into thematic categories corresponding to our section topics: for instance, uses of LLMs in content generation, uses of SLMs, applications in B2C vs B2B, ethical issues, and so forth. This thematic coding allowed us to compare and contrast findings across studies. Where possible, we also noted the methodology of sources (e.g. whether a claim came from an experiment, a survey, or an analytical piece) to weigh the level of evidence. Given the meta-analytic nature, we looked for points of convergence (areas where multiple studies agree or find similar results) as well as divergence (areas of debate or inconsistent findings). For example, many sources agreed on the benefits of personalization, but some differed on how consumers perceive AI-generated personalization, which we highlight in our analysis. We also tabulated some information for clarity – for instance, we created comparative summaries of LLM vs. SLMs characteristics from technical reports, and a summary of ethical considerations drawn from multiple sources.

Our analysis is primarily qualitative. We did not calculate aggregate effect sizes (as would be done in a statistical meta-analysis) due to the lack of directly comparable quantitative metrics across studies. Instead, we adopted an interpretive synthesis approach: we built a narrative that integrates findings from computer science (AI) research and marketing research. We cross-validated claims using multiple sources whenever possible (for instance, if an industry report stated a trend, we checked if academic research observed similar phenomena). Any conflicting observations in the literature were noted and are discussed as areas of uncertainty. To ensure academic rigor, we also considered potential biases: publication bias (the tendency for positive results to be published more), hype in industry articles, etc., and we reflect on these in the Discussion as limitations. Citations are provided throughout using APA style, and we preserved original reference attributions for accuracy. By combining evidence from diverse sources, our goal was to develop a well-rounded understanding of how LLMs and SLMs are driving hyper-personalization in marketing, the challenges encountered, and the anticipated future directions, as presented next.

4. Key Findings and Emerging Themes

Through our review, we identified several key themes regarding the use of LLMs and SLMs for hyper-personalization in B2C and B2B marketing:

1. LLMs Enable Scalable Content Personalization: A key development in AI-driven marketing is the ability of Large Language Models (LLMs) to enable scalable, individualized content generation. Historically, the task of creating personalized content for large customer bases required extensive human resources, making it impractical for many organizations. For instance, personalized content generated through LLMs has been shown to increase the likelihood of recipients taking desired actions, such as making a purchase or engaging with a brand, by matching the language and tone to individual preferences (Stanford MapLab, 2025).

2. SLMs Facilitate Real-Time and Contextual Personalization: Small language models (SLMs) are increasingly being leveraged for real-time personalization and on-device decision-making, providing a significant advantage in situations requiring quick predictions or classifications. Our analysis reveals that many organizations adopt a hybrid AI approach, deploying more resource-intensive LLMs for offline content creation (such as in cloud environments) while integrating lighter SLMs within their applications or websites for immediate, context-specific personalization.

3. Enhanced Account-Based Marketing (B2B) with AI: Account-Based Marketing (ABM) has gained traction in Business-to-Business (B2B) marketing strategies due to its ability to target high-value clients with personalized campaigns (Xgrowth, 2024). AI has further amplified the effectiveness of ABM by enabling marketers to deliver highly tailored content at scale. By utilizing AI in ABM, companies can prioritize their marketing efforts on accounts most likely to convert, while also creating individualized messaging that resonates with decision-makers at each account (Zhao et al., 2024).

The following table, Literature of AI-Driven Personalization in Marketing, summarizes key findings and challenges identified across various studies and industry reports.

Table 1

Literature Synthesis of AI-Driven Personalization in Marketing

Category	Research Papers	Key Findings & Challenges
Hyper-personalization in Marketing (B2B & B2C)	Jarek, K. and Mazurek, G. 2019. Marketing and artificial intelligence. Central European Business Review Chatterjee, S. 2021. The next generation of AI: How explainable AI enhances customer satisfaction. Journal of Business Research	Discusses the emergence of hyper-personalization using AI; key challenges include integration of AI into traditional CRM tools. Emphasizes the need for explainability in AI-driven personalization; the challenge is balancing personalization with transparency.
Role of Large Language Models (LLMs) in Personalization	Liu, P., Yuan, W., Fu, J., Jiang, Z., Hayashi, H., and Neubig, G. 2023. Pre-train, Prompt, and Predict: A Systematic Survey of Prompting Methods in Natural Language	Reviews prompting methods in LLMs; the challenge lies in aligning prompts with marketing intents and contexts.

Category	Research Papers	Key Findings & Challenges
	Processing. ACM Computing Surveys.	Challenge: Aligning prompt design with diverse user intents remains a technical bottleneck.
Small Language Models (SLMs) for Lightweight Personalization	Tay, Y., Dehghani, M., Bahri, D., and Metzler, D. (2022). Efficient Transformers: A Survey. ACM Computing Surveys.	SLMs enable on-device personalization for real-time marketing applications. Challenge: Balancing speed and model accuracy on low-resource devices is difficult.
Ethical and Privacy Concerns	Jobin, A., Ienca, M., and Vayena, E. 2019. The global landscape of AI ethics guidelines. Nature Machine Intelligence Shrestha, Y. R., Ben-Menahem, S. M., and von Krogh, G. 2019. Organizational Decision-Making Structures in the Age of AI. California Management Review Digital Marketing Institute (2025)	Challenges include lack of regulation enforcement and user consent in data collection. Highlights risks of centralized AI decision-making; challenges are related to accountability and fairness.
Integration of AI into Marketing Systems	Rust, R. T. and Huang, M. H. 2021. The Feeling Economy: How AI is Creating the Era of Empathy. Journal of the Academy of Marketing Science	Suggests a shift to affective computing; challenges include aligning AI-driven empathy with customer expectations. Explores AI's systemic impact on marketing; challenge lies in integration with legacy marketing systems.
Future Directions and Emerging Trends	Dwivedi. 2021. Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International Journal of Information Management,	AI supports dynamic content creation tailored to individual user behaviour. Ensuring factual correctness and avoiding bias in AI-generated outputs is a challenge.

Source: author's contribution

5. Conclusions

This paper conducted a theoretical, meta-analytic exploration of "AI-Driven Personalization Using LLMs and SLMs for Hyper-Personalization in B2B and B2C Marketing: Challenges and Future Directions". Our comprehensive review of recent literature leads to several key conclusions:

Future directions in hyper-personalized marketing will increasingly rely on multimodal AI systems, federated learning, and explainable AI to provide transparency, user control, and cross-platform consistency. As marketing ecosystems grow more complex with the inclusion of diverse data sources-text, images, videos, and behavioural signals—multimodal AI models capable of understanding and integrating these varied inputs will become central to delivering superior personalization. Moreover, privacy-preserving techniques like federated learning allow for personalization without centralized data collection, mitigating concerns about data security and compliance with evolving regulations like GDPR (Berkeley, 2025). At the same time, explainable AI techniques will be critical to demystify algorithmic decisions for marketers and customers alike, ensuring transparency and facilitating greater user trust. These technological advancements will enable organizations to offer personalization that is not only precise but also ethical, scalable, and aligned with consumer expectations for control and accountability (Li et al., 2021).

Across the reviewed literature, several gaps and contradictions emerge. While LLM-based personalization demonstrates strong efficiency gains, studies diverge on its ethical implications—particularly regarding data transparency and consumer autonomy. There is also a lack of empirical research validating SLMs performance in B2B environments, where real-time personalization and privacy constraints differ substantially from B2C contexts. These inconsistencies indicate the need for future studies combining quantitative performance analysis with an ethical impact assessment framework.

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