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Transforming Customer Journey Mapping with AI: From Static Pathways to Dynamic Orchestration

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Abstract

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This study examines how artificial intelligence is transforming customer journey mapping from static diagrams into dynamic orchestration across omnichannel environments. It adopts a systematic literature review of peer reviewed journal articles on artificial intelligence enabled journeys, customer experience, process mining, and journey orchestration. The synthesis reveals a clear shift from linear paths toward data driven systems that use contextual signals to personalise content, timing, and channel choice in real time. Studies highlight the growing role of chatbots, voice based assistants, recommender systems, and process mining techniques in reshaping touchpoints and visualising actual paths, but also show that these applications are often implemented in organisational silos. The review conceptualises artificial intelligence enabled customer journey mapping as an integrated capability that spans data infrastructure, analytical models, experience design, and governance. It concludes that alignment between journey representations and decision engines is required to achieve continuous, cross channel orchestration. The article also outlines future research directions on governance and performance outcomes.

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1. Introduction

Firms operate in increasingly complex, data rich and omnichannel environments where customers move fluidly across physical, digital and social touchpoints. Traditional customer journey mapping (CJM) has helped managers visualise sequences of touchpoints and pain points, yet in practice many maps are static snapshots that are updated infrequently and only loosely connected to operational data and decision systems (Hoyer et al., 2020). At the same time, advances in artificial intelligence are reshaping how firms sense, predict and respond to customer behaviour across the journey, suggesting that CJM must evolve from descriptive diagrams toward a more dynamic, continuously optimised orchestration capability (Davenport et al., 2020; Huang & Rust, 2021).

Recent work in marketing and customer experience positions artificial intelligence as a strategic resource that can automate routine interactions, augment managerial decision making and enable hyper-personalised experiences at scale (Davenport et al., 2020; Huang & Rust, 2021). Empirical and conceptual studies show that new technologies such as virtual assistants, chatbots, recommender systems and smart devices reshape the customer experience at pre-purchase, purchase and post purchase stages, often in ways that blur firm-defined "pathways" and generate highly individualised journeys (Hoyer et al., 2020). Building on this view, emerging research argues that customer journeys should be understood as data-driven, feedback-rich systems in which customer "digital signals" serve as inputs to learning algorithms that adapt content, timing and channel selection in near real time (Schweidel et al., 2022).

Within this broader transformation, a growing stream of studies explicitly links artificial intelligence to the customer journey. Dhiman et al. (2023) show that the perceived value of AI tools such as chatbots and voice assistants shapes adoption intentions in the pre-purchase phase, highlighting how AI changes journey antecedents and evaluation criteria. Gao and Liu (2023) frame AI-enabled personalisation in interactive marketing explicitly from a customer journey perspective and demonstrate that AI can tailor interactions across multiple stages in ways that strengthen engagement and relationship quality. Complementing this, He and Zhang (2023) synthesise evidence on AI-powered touchpoints across the journey and identify how different AI applications cluster at awareness, consideration, purchase and post-purchase stages, while also calling for more work on orchestration across touchpoints rather than optimisation of isolated interactions.

At the same time, advances in machine learning, process analytics and explainable AI are beginning to automate parts of CJM itself. Okazaki and Inoue (2022), for example, propose a model-fusion approach that combines sequence models and process mining techniques to automatically derive customer journeys from behavioural logs, arguing that AI can reduce subjectivity in mapping and reveal latent paths that are invisible in workshop-based mapping exercises. In parallel, scale-development work on customer experience in AI-enabled products underscores that AI changes not only functional performance but also data capture, delegation and social dimensions of experience, which need to be reflected in how journeys are conceptualised and managed (Wang et al., 2024). Together, these studies suggest that AI has the potential to transform CJM from a static representational

tool into an operational layer that continuously learns from interaction data and steers customers through context-aware, adaptive pathways.

However, despite this progress, the literature still offers only a fragmented view of how AI capabilities can be systematically integrated into CJM to enable dynamic journey orchestration. Existing work often focuses either on specific AI applications at single touchpoints or on high-level discussions of AI in marketing, with limited attention to the organisational, analytical and technological capabilities required to move from occasional, manually updated maps to always-on orchestration systems that coordinate decisions across channels and functions (Hoyer et al., 2020; Huang & Rust, 2021; Gao & Liu, 2023). Questions remain about how firms should architect data and analytics pipelines for AI-driven journey insight, how to balance automation with control and transparency, and how dynamic orchestration affects customer value creation and firm performance over time.

This study therefore seeks to explore how artificial intelligence can reshape customer journey mapping, shifting it from static, pre-defined pathways toward a more dynamic and continuously orchestrated process. Specifically, it seeks to conceptualise AI-enabled CJM as an integrated capability that links data infrastructure, analytical models and decision engines with CX design and governance, and to identify key antecedents, mechanisms and outcomes associated with this transformation. By doing so, the paper contributes to emerging debates on AI in marketing and customer experience by reframing CJM as a living system that is continuously shaped by algorithmic learning and real time feedback, rather than a fixed representation of an assumed "typical" customer path.

2. Literature Review

Firms increasingly compete in omnichannel arenas where customers fluidly combine websites, apps, social media, physical stores, and service centres, creating journeys that are long, non-linear, and highly contextual. Empirical work on AI-enabled customer experience shows that such environments generate rich streams of behavioural and contextual data, but that firms often struggle to translate these data into cohesive experiences across touchpoints (Ameen et al., 2021). Traditional customer journey mapping, which relies on workshop based diagrams and infrequently updated "typical paths", risks oversimplifying this complexity and under-representing dynamic feedback between customer responses and firm actions.

In parallel, research on artificial intelligence in the digital customer journey documents how chatbots, recommender systems, and virtual try on tools are now embedded across pre-purchase, purchase, and post purchase stages, especially in digital commerce (Araújo et al., 2022). These studies highlight that AI applications alter not only the sequence of touchpoints but also the decision logic within each step, enabling micro level adaptation of content, timing, and offers. Text-mining analyses of user feedback on AI services further reveal that customers evaluate these systems along dimensions such as usefulness, convenience, and perceived control, and that these experiential themes vary across service contexts and stages of the journey. Together, this work suggests that AI shifts customer journeys from relatively standardised paths toward more personalised, data driven trajectories.

Conceptual work on AI-powered marketing extends these insights by framing AI as a dynamic capability that reconfigures how firms sense, interpret, and respond

to customer signals across channels (Kumar et al., 2024). From this perspective, AI does not simply automate isolated interactions but supports continuous orchestration of journeys through real-time segmentation, predictive models, and decision engines embedded in campaign management and customer-experience platforms. However, much of this literature focuses on functional applications (e.g., targeting, recommendations, pricing) rather than on the integrated design of end to end journeys, leaving a gap between AI marketing capabilities and CJM practices.

A complementary stream shows that AI related techniques can transform the mechanics of journey mapping itself. Studies that combine process mining with customer or patient journey mapping demonstrate how event logs can be used to automatically reconstruct actual paths, identify variants, and expose bottlenecks in complex service systems (Shafei et al., 2024). This data driven approach reduces subjectivity in manually produced maps and introduces temporal and performance metrics directly into journey representations. Yet much of this work remains confined to specific sectors (e.g., healthcare) and typically stops at descriptive analytics, with limited integration into ongoing decision rules that would adjust journeys in real time.

Overall, the emerging literature paints a picture of rapid but fragmented progress: AI research emphasises capabilities for hyper personalisation and predictive decision making at the journey level, while CJM and process mining studies focus on better visualising existing paths. What remains under explored is how these strands can be integrated into a coherent, AI enabled CJM capability that continuously ingests interaction data, learns from evolving patterns, and orchestrates

journeys dynamically across organisational silos. This gap motivates further work on governance, data architecture, and cross functional routines that link AI models and journey representations to operational actions in omnichannel environments.

3. Methods

The study adopts a systematic literature review method to synthesise and integrate existing knowledge on how artificial intelligence reshapes customer journey mapping from static pathways into dynamic orchestration. The review begins with the development of a clear protocol that specifies the research questions, key constructs (artificial intelligence, customer journey mapping, omnichannel experience, orchestration), and eligibility criteria. Peer-reviewed journal articles written in English and indexed in major scholarly databases such as Scopus and Web of Science are searched using combinations of keywords related to AI, customer journeys, customer experience, process mining, and journey orchestration. The search results are screened in multiple stages: first by title and abstract to remove clearly irrelevant, non-scholarly, and duplicate records, and then by full text assessment to ensure that each retained study addresses AI-enabled touchpoints, journey analytics, or CJM practices in a marketing, service, or omnichannel context. Data from the final set of articles are extracted using a structured coding template that captures bibliographic information, research design, context, AI techniques, journey stages considered, orchestration mechanisms, and reported outcomes for customers and firms. The coded material is then analysed through a combination of descriptive synthesis (to map publication patterns, focal contexts, and

methodological tendencies) and thematic analysis (to identify recurring mechanisms, capability configurations, and governance issues). This procedure enables the construction of an integrative framework of AI-enabled CJM and the derivation of conceptual propositions regarding antecedents, processes, and consequences of dynamic journey orchestration.

4. Results and Discussion

The systematic review shows a clear shift from viewing customer journeys as linear, manager drawn paths toward understanding them as dynamic, data driven systems that unfold across omnichannel environments. Consistent with Hoyer et al. (2020), many studies still describe CJM as a static tool used to visualise "typical" sequences and pain points, yet empirical work on AI-enabled customer experience indicates that firms now operate in contexts where journeys are highly individualised and continuously reshaped by digital interactions (Ameen et al., 2021). This tension between static mapping and fluid behaviour provides the backdrop for the growing interest in artificial intelligence as an orchestration mechanism rather than merely a support technology.

Across the corpus, AI appears most visibly at the level of touchpoints and micro-decisions. Studies on chatbots, voice assistants and recommender systems illustrate how AI applications intervene at pre-purchase, purchase and post purchase stages to personalise content, timing and offers in real time (Araújo et al., 2022; Dhiman et al., 2023; Gao & Liu, 2023). These findings support the argument that customer "digital signals" act as inputs into learning algorithms that adapt the

journey on a moment to moment basis (Schweidel et al., 2022). However, the evidence also suggests that such applications are often implemented in silos: AI optimises individual touchpoints or campaigns, while the underlying CJM practices remain descriptive and disconnected from operational decision systems. This helps explain why the literature repeatedly calls for a move from local optimisation to cross-touchpoint orchestration (He & Zhang, 2023).

A second key result concerns the role of analytics and process technologies in transforming the mechanics of journey mapping itself. Contributions that integrate process mining and sequence modelling demonstrate that behavioural logs can be used to reconstruct actual paths, reveal hidden variants and quantify performance metrics such as delays and drop off points (Okazaki & Inoue, 2022; Shafei et al., 2024). These approaches directly address long standing critiques about the subjectivity and incompleteness of workshop based CJM Hoyer et al. (2020), providing more granular and empirically grounded views of how customers move through systems. Yet most of these studies stop at descriptive or diagnostic analytics; they rarely close the loop by embedding insights into decision engines that would proactively reroute customers or trigger interventions, limiting their contribution to true dynamic orchestration.

Third, the review highlights that AI enabled CJM is increasingly framed as a capability configuration rather than a single tool or project. Conceptual work on AI-powered marketing positions AI as a dynamic capability that reconfigures how firms sense, interpret and respond to customer signals across channels (Huang & Rust, 2021; Kumar et al., 2024). Parallel research on AI-enabled products indicates that AI

changes not only functional performance but also perceptions of delegation, control and social interaction, which in turn shape customer experience across the journey (Wang et al., 2024). Taken together, these strands imply that dynamic journey orchestration requires the alignment of data infrastructure, analytical models, CX design and governance mechanisms, not just the deployment of isolated AI tools. However, few empirical studies explicitly examine how these elements are integrated inside organisations, leaving a gap between high-level capability frameworks and day to day CJM practice.

Overall, the findings suggest that artificial intelligence has begun to transform customer journeys at the level of touchpoints, analytics and capability narratives, but that the integration into a coherent, always on orchestration layer remains incomplete. AI is already used to personalise and predict within specific stages, and process-mining approaches enhance the fidelity of journey representations (Araújo et al., 2022; Okazaki & Inoue, 2022), yet most firms still rely on static maps for planning and separate AI systems for execution. This misalignment reinforces the central proposition of this study: that future research and managerial efforts should focus on designing AI enabled CJM as an integrated capability that continuously ingests interaction data, learns from evolving patterns and coordinates actions across organisational silos (Davenport et al., 2020; Gao & Liu, 2023). In doing so, scholars and practitioners can move closer to the vision of CJM as a living, algorithmically supported system rather than a one-off representation of a "typical" customer path.

5. Conclusion

The review concludes that artificial intelligence is fundamentally reshaping the logic of customer journey management, but that practice and scholarship have yet to fully catch up with this shift. Across the literature, AI technologies such as chatbots, voice assistants, recommender systems, and process mining tools have clearly moved journeys away from fixed, linear pathways toward more personalised, data driven trajectories that evolve in real time. At the same time, most organisations still rely on static, workshop based maps for planning, while AI systems operate in parallel as optimisation engines at individual touchpoints. This misalignment between descriptive CJM and operational AI prevents firms from realising the full potential of dynamic journey orchestration, and it explains why many contributions emphasise the need to move from local, touchpoint-level optimisation to cross channel coordination supported by continuous learning from customer "digital signals."

Taken together, the findings position AI enabled CJM not as a single tool, but as an integrated capability that spans data infrastructure, analytical models, experience design, and governance. For practitioners, this implies that investing in isolated AI applications is insufficient unless they are embedded within coherent architectures that link journey insights to decision engines and organisational routines. For scholars, the review highlights several promising avenues for future research, including the design of end to end orchestration frameworks, the governance of algorithmic decision-making along the journey, and the impact of dynamic CJM on customer value creation and firm performance. Advancing these

agendas will help move CJM from a static representation of "typical" paths toward a living system that is continuously shaped by algorithmic learning and real-time feedback.

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