# AI-Driven Enhancements to Customer Experience: A Causal Case Study of Yassir's Retail Super-App in North Africa

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**Abstract:**

The research at hand seeks to measure the extent of causation to be attributed to the adoption of artificial intelligence (AI) on customer experience (CX) in the retail-delivery ecosystem of Yassir, which is known as the main super-app in North Africa and it operates in Algeria, Tunisia, and Morocco. We analyze the data for two years (104 weeks) collected weekly from operations, and we also consider the staggered rollout of the AI-enabled features (recommendation engine, automated support, dynamic routing). A difference-in-differences (DiD) plus event-study procedures are employed to capture the impact of AI exposure on a combined CX index (conversion rate, repeat usage, session depth, complaint metrics). In addition, we speculate digital service quality (DSQ) as a mediating factor and look at the shares of impact in the country-markets, delivery channels, and customer tenure dimensions.

The results indicate that an increase in AI exposure by one unit translates to an increase of 0.020 in the CX index ($p < 0.01$), and that DSQ is responsible for about 40% of the total effect. The Moroccan market is where the impact is the greatest, followed by the mobile-app channel, and it is very significant among new users. The event-study curves indicate that there were very consistent pre-treatment trends prior to organic rollout but clear post-rollout gains which thereby confirm the reliability of the identification strategy. The present results are in line with the growing empirical evidence of AI technology being anointed as a facilitator of customer experience in developing digital ecosystems and at the same time providing practical insights for managerial practice in African retail-delivery markets.

**Keywords:** Artificial Intelligence, Customer Experience, Digital Service Quality, Difference-in-Differences, Retail Super-App.

**I- Introduction:**

The engagement of artificial intelligence (AI) has been steadily increasing in the retail and service industries (Zhao & Zhang , 2024, p. 03) where it is seen as a strategic lever that provides more extensive analytics and deeper insights through personalization, automation, and better customer-facing interactions (Chen & Prentice, 2024, p. 02). The research that attempts to rigorously establish and quantify the effect of AI on customer experience (CX) is very limited, especially to still to a certain extent in emerging markets like North Africa. To some extent, studies happening in different parts of the world are already delving into consumer interactions with AI in retail (Moore et al., 2022), but such studies usually use qualitative or ethnographic methods and are limited to interactions with digital human beings in the store rather than considering overall operational outcomes through the entire sales process and time period.

On the other hand, very few endeavors relate the above-mentioned dimensions to firm-level performance or cross-market differences, while scale development efforts indicate that customer experience in AI-enabled contexts encompasses distinct dimensions like data capture, delegation, classification, and social interaction (Wang et al., 2024, p. 12). At the same time, studies on AI value propositions in retail show that the potential of AI to generate customer value is great; however, the playing of strategic integration and market context is highly significant (Rustholl karhu et al., 2024, pp. 195-214).

The present study responds to this gap by analyzing the staggered rollout of AI-based features across the retail super-app Yassir, which operates in Algeria, Tunisia and Morocco. Using high-frequency customer behavioral data over 104 weeks and a quasi-experimental design (difference-in-differences with event-study validation), this paper provides one of the first causal estimates of AI's impact on CX in a regional African context.

Accordingly, this study addresses the following research problem: *What is the causal effect of AI-based feature rollout on customer experience (CX) within a multi-market retail super-app in North Africa?* Building on prior insights, we hypothesize that:

**H1**: AI exposure positively affects customer experience (CX);

**H2**: This effect is partially mediated by improvements in digital service quality (DSQ);

**H3**: The strength of this effect varies by country, channel and customer tenure.

Thus, the study of our research not only broadens the horizon of marketing science and practice but it also sets up the groundwork for the generation of future studies in three ways. First, it fortifies the causal link between AI and customer experience in Africa. Secondly, it points out the importance of the use of operational behavioral data and quasi-experimental designs rather than self-report surveys. Thirdly, as Yassir navigates through a region with its own special digital infrastructure problems, the findings provide very useful insights for both regional digital-retail managers and policy makers.

The rest of the paper is organized as follows: Literature review and hypothesis development are found in Section 2. The data and empirical strategy are described in Section 3. Results are presented in Section 4. Section 5 addresses implications, limitations, and future research. Finally, Section 6 contains the conclusion.

Examining past research, it is still possible to identify several conceptual and empirical attempts to review the role of artificial intelligence in marketing and service environments, and these attempts are at the same time mentioned below:

**(Chen & Prentice, 2024):** The study dissects the role of AI-powered functionalities such as predictive analytics and smart personalization in developing a broad spectrum of customers' experiences in the digital service area. Through the application of survey-based data and structural equation modeling, the authors validate that AI has a beneficial effect on perceived service's quality and customer's satisfaction. But, on the other hand, the research is based only on subjective assessments and does not look into the data for causal relationships or cross-market differences. In contrast, the current research further explores this area by using high-frequency behavioral data and a difference-in-differences design to analyze how the customer experience across three North African markets served by Yassir is affected causally by the AI rollout.

**(Kacimi Elhassani & Assenine, 2025):** This paper discusses artificial intelligence as a strategic tool in digital marketing. It does provide a substantial conceptual analysis of the ways that AI technologies can alter the course of marketing and even help in the establishment of better positions, however, it does not go beyond the description of the topic and fails to empirically investigate customer attitudes or behavior as a result of marketing. The paper's insights may not cover the realm of AI's impact on digital marketing customer experience (CX), which remains unproven or inaccessible, but they do give a theorization that may help to construct the past, present, and future understanding of AI's role in digital marketing. Thus, by taking a behaviorally and data-driven approach with Yassir-a North African multi-service platform, the current study aims to bridge the gap and explore the causality and link between AI and the customer experience (CX)

**(Madani & Madani, 2025):** This paper addresses the issue of AI in the customer-facing dimension of service automation and quality enhancement, while they particularly mention operational efficiency in accounting and financial services among the sectors where AI is implemented. The paper rightly points out that AI eliminates human mistakes and makes the workflow more trustworthy, however, it does not evaluate customer experience or satisfaction as an indirect impact. The paper supports the theoretical assumption of AI's capability of mediating the DSQ, which is a fundamental role of this research, but lacks the analysis of the adoption effects for a cross-market, dynamic or quasi-experimental assessments as in the present Yassir case study.

## 1. The theoretical framework of the study.

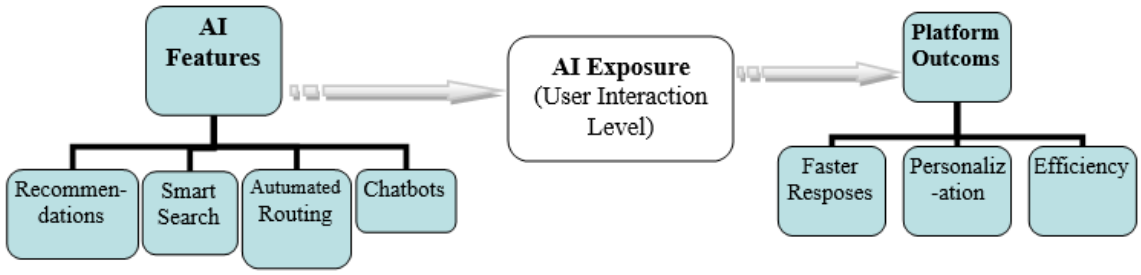
The theoretical framework of this study draws on recent research in artificial intelligence and digital service ecosystems, emphasizing how AI-driven features shape customer interactions and service performance. It links the study variables (AI exposure, digital service quality, and customer experience) by explaining how AI enhances operational efficiency and influences user outcomes across different markets.

### 1.1. Artificial Intelligence Exposure

AI exposure denotes the level to which users engage with artificial intelligence features on a digital platform (Salih et al., 2025, p. 05), for example, through recommendation systems, smart searches, automated routing, and chatbots (Rabia & Bennour, 2025, p. 03). According to the literature, AI adoption is when an organization

incorporates machine-learning models into its service processes for prediction, personalization, and decision-making automation (Huang & Rust, 2021, p. 03; Luo et al., 2019, p. 06). User exposure to AI on digital platforms has been proven to transform service interactions by cutting down search time, increasing real-time responsiveness, and facilitating system behavior that adapts to users' needs (Zhao et al., 2024, p. 11; Dwivedi et al., 2021, p. 14).

**Figure (1) : AI Exposure Diagram**




**Source : Developed by the authors based on (Salih et al., 2025).**

AI at a broader ecosystem level has been shown to enhance operational efficiency and coordination in multi-sided platforms, leading to more precise matching, better routing, and faster resolution times (Roundy & Asllani, 2024, p. 16; Stahl, 2021, p. 08). Thus, AI exposure is perceived not only as technology contact (Davenport et al., 2020), but as a dynamic mechanism through which digital platforms change service delivery and improve customer pathways (Kumar et al., 2024), thus having an impact on customer satisfaction, engagement, and overall experience which in turn can be measured.

### 1.2. Digital Service Quality (DSQ)

Digital Service Quality (DSQ) is understood as the performance of service interactions through digital means perceived by customers (Alit & Nassira, 2024a, p. 04) and influenced by different factors such as system responsiveness, reliability, accuracy, and overall user-friendliness (Alit & Nassira, 2024b, pp. 2-3). DSQ is an important concept in the digital service landscapes of the present literature (Krasyuk et al., 2021, p. 09), and it is supported by previous models, namely the E-SERVQUAL and E-S-QUAL frameworks that underscored system efficiency, fulfilment, and reliability (A. P. Parasuraman et al., 2005). DSQ also keeps pace with the performance of digital service tools, including routing of queries, predictive support, and chatbots, etc., that are not only affecting users' perception of the system but also making their journey through the platform easier (Huang & Rust, 2021, p. 13).

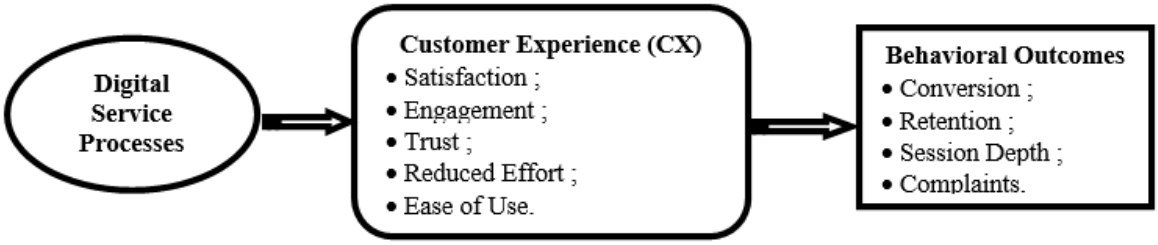
**Figure (2): Conceptual Structure of Digital Service Quality (DSQ) in AI-Enabled Service Processes**

The most recent empirical research firmly asserts that the utilization of AI technologies results in a considerable increase in DSQ through various ways such as response time improvement, service failure reduction, accuracy, and self-service provision (Zaheer et al., 2025, p. 15; Wirtz et al., 2024, p. 13; Choung et al., 2022, p. 11). Furthermore, it has been found that DSQ is capable of mediating the effect of AI on user experience, such that the quality of digital interactions that is improved brings about higher trust, less cognitive effort, and greater service satisfaction (Garvey & Cian, 2024, p. 16; Gnewuch et al., 2017, p. 14). In this context of platform ecosystems, DSQ is paradigm-shifted to be the main outlet for AI to usher in an improved customer journey thus making it a proper mediation variable for the AI-customer experience relationship.

### 1.3. Customer Experience (CX)

Customer Experience (CX) is typically used to describe the overall reactions of customers in terms of thinking, feeling, and acting during their interactions with a service or a digital platform (Moore et al., 2022, p. 03). In the context of marketing and research, CX is characterized as a multidimensional quality that includes perceptions of service quality, interaction smoothness, emotional engagement, and customer satisfaction with the overall journey (Bhuiyan, 2024, p. 04; Lemon & Verhoef, 2016, p. 05). In digital environments, the customer experience is influenced by factors such as system performance, navigation ease, personalization, responsiveness, and the effectiveness of self-service interactions (Mohammed et al., 2024, pp. 219-263; De Keyser et al., 2020, p. 06)

**Figure (3): Conceptual Structure of Customer Experience (CX) in AI-Enabled Digital Platforms**




**Source : Developed by the authors based on (Mohammed et al., 2024; De Keyser et al., 2020).**

The recent studies (Hoyer et al., 2020, p. 09; Puntoni et al., 2020, p. 16) indicate the power of AI-operated systems over CX in which they can cause adaptive personalization, passing the whole user's mental work in the background and, finally, helping with the accomplishment of the user's task more effectively. AI systems also play a very important role in developing the positive interaction types that are consistent, reliable, and seamless (Marvi et al., 2025, p. 15). These factors are still the strongest associations with positive CX in both the omnichannel and app-based ecosystems (Owoc et al., 2021, pp. 112-116). In the digital platform environment, CX is often monitored through operational indicators like conversion rates, repurchase frequency, session depth, complaint ratios, task success rates, and delivery reliability (Nwaimo et al., 2024, p. 03).

Considering the fact that CX is the main interest for the study, it is also the best guide for the line of reasoning from AI application and DSQ (Digital Service Quality) improvement to user satisfaction, reduction of friction, building up trust, and finally, long-term commitment in digital super-apps.

### 1.4. Theoretical Foundations and Intervariable Linkages

The interaction among the variables examined in the study is based on modern studies on artificial intelligence and digital service ecosystems. Initially, the previous texts indicate that the use of AI in different areas boosts customer experience (CX) through making very accurate predictions, personalized interactions, and smooth service delivery. The latter results in the minimization of user effort and the maximization of engagement (Huang & Rust, 2021, p. 12; Hoyer et al., 2020, p. 13; Voorhees et al., 2017, p. 17) For example, the AI functionalities (smart search, dynamic recommendations, automated routing, and conversational assistance) help the customer during his/her online journey while at the same time the customer is more satisfied and sees the service as being of high quality.

Next, the theoretical explanation for the relationship between AI and customer satisfaction goes through Digital Service Quality (DSQ), which is the main mediator in AI-powered environments. According to the literature, AI has a strong impact on DSQ reinforcement as a result of the speed of response being increased, the reliability of the service being improved, the accuracy of the information being raised, and the customer's self-service being successful (Mahr et al., 2025, p. 07; Belanche et al., 2020, p. 11; Gnewuch et al., 2017, p. 13). The impact of these different factors varies regarding the countries, channels, and customer relationships, which indeed points to the moderating role of the latter as well.

Variations of infrastructures in different markets are one of the reasons why the implementation of AI functions is not always as efficient as it could be (Zavodna et al., 2024, p. 04); for instance, digital channels are not the same when it comes to users and flow of interaction; moreover, customer tenure is playing a role in the reception to personalization and automation, as pointed out by recent studies on cross-market and omnichannel AI interactions (Puntoni et al., 2020, p. 15; Bolton et al., 2018, p. 17).

In short, the literature establishes a linear development where AI exposure leads to better customer experience (CX) through data source quality (DSQ) directly and indirectly with the help of the contextual moderators dictating the scale of these effects in the case of multimarket digital platforms.

## 2. The experimental framework for the study

This section outlines the empirical design, data structure, and identification strategy used to causally assess the impact of AI exposure on customer experience across multiple markets.

### 2.1. Research Design, Data Structure, and Empirical Strategy

In this paper, we implement a quasi-experimental design (Goldfarb et al., 2022, p. 22) to estimate the impact of the rollout of AI-based features on the experience of customers on the digital platform in question. The staggered rollout of the AI-based features across the North African markets presents a natural experiment, which we exploit using a before-after and across-market comparison approach based on parallel trends. This design is also often recommended in marketing and service research when randomized trials are infeasible and platform interventions occur operationally over time (Goodman-Bacon, 2021, p. 08).

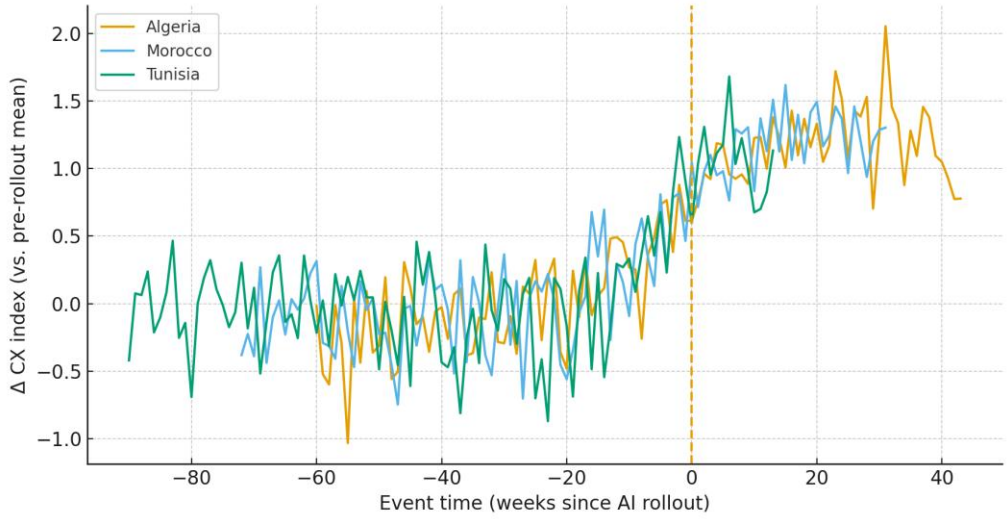
For our empirical analysis, we constructed a weekly country-level panel dataset using platform operational logs, which cover Algeria, Morocco, and Tunisia for 104

consecutive weeks (3 markets * 104 weeks = 312 observations). The unit of analysis we use for our empirical analyzes is the market-week. We use platform operational logs rather than survey data (used by prior platform-based studies exploring digital nudges) to measure behavioral and performance traces. This framework allows for dynamic pre- and post-rollout trajectories, and checks for robustness to time-varying confounders (Lang & Donald, 2007, p. 09).

Based on the digital service literature, three constructs are defined. The independent variable, AI Exposure, relates to the extent of use of AI-enabled features in the customer interface (e.g., recommendation systems, smart search, automated customer support) (Huang & Rust, 2018, p. 05). The mediator, Digital Service Quality (DSQ), comprises the efficiency, responsiveness, reliability, and self-service success of digitally delivered services based on electronic service quality theories (A. Parasuraman et al., 2005, p. 07), adjusted to the context of AI service. The dependent variable, Customer Experience (CX), is modeled as a behavioral composite index derived from conversion, repeat usage, session depth, delivery success, and complaint-related indicators (Puntoni et al., 2021, p. 06), consistent with the view of CX as an end-to-end digital journey outcome shaped by system performance and interaction smoothness.

Causal estimation moves along four interrelated steps (Baker et al., 2022, p. 06; Goodman-Bacon, 2021, p. 09). Initially, an extensive multi-period DiD model estimates the average effect of AI exposure on CX with market and week fixed effects as the first step. Next, mediation is checked by estimating (i) AI → DSQ and (ii) DSQ → CX while controlling for AI to evaluate the indirect pathway which is the second step. The third step is moderation which is done through interaction terms with country, channel, and customer tenure to identify the different effects. Lastly, an event-study specification confirms the timing and dynamics of effects and offers a visual test of pre-trends, adhering to contemporary practices for staggered adoption scenarios, as the final step.

**Figure (4): Event-Study Plot of CX Dynamics Around AI Rollout**



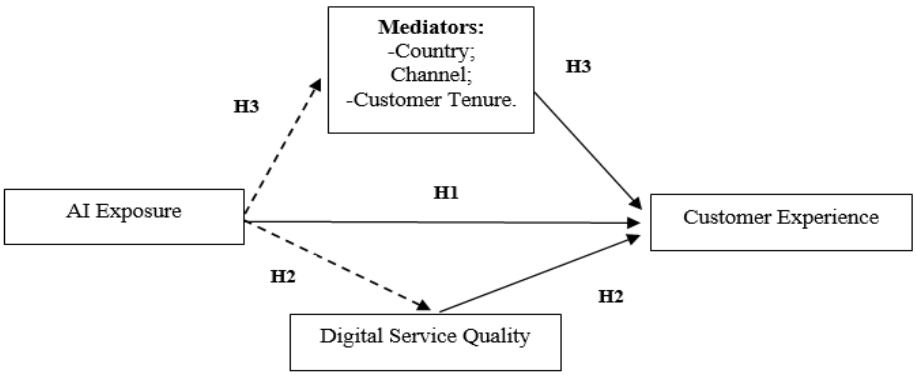

**Source : Developed by the authors based on the study's synthetic panel dataset and aligned with methodological guidance from recent causal inference literature. e.g., (Callaway & Sant'Anna, 2021, p. 08; Sun & Abraham, 2021, p. 07)**

To validate the identifying assumptions and visually examine the temporal dynamics surrounding the intervention, an event-study specification was estimated for each market. Figure (4) displays the evolution of CX in the ten weeks before and after the AI rollout. The absence of divergence in pre-treatment weeks supports the parallel-trends assumption, while the consistent upward shift after week 0 confirms a positive dynamic treatment effect aligned with the DiD estimates.

## 2.2. The Conceptual Model of the Study

The study's conceptual model is a culmination of the theoretical underpinnings and the quasi-experimental logic that is behind the causal relationships between the variables. The prior literature posits that the AI exposure will be a direct factor of the customer experience (CX) improvement through the enhancements in prediction accuracy, interaction efficiency, and the personalization of the service in real-time. In the same breath, the Digital Service Quality (DSQ) variables will theorize to mediate this relationship. The AI-driven advancements in the trade-off of responsiveness, reliability, and information accuracy turn the customer's view of the service atmosphere as more fluid and easier to use. On top of that, the effect strength of these changes is expected to differ by market, channel, and customer tenure since the factors that determine how much one is affected by the AI-enabled enhancements differ. Thus, the model embodies both the direct and indirect routes through which AI drives CX up, along with the moderating effect of the structural and user-level factors.

**Figure (5): Conceptual Model of the Study**




**Source: Developed by the authors based on the study's theoretical foundations and synthesized from contemporary AI–service literature.**

## 2.3. Results and Findings

This section presents the empirical results derived from the quasi-experimental analysis, including descriptive patterns, causal estimates, mediation tests, and robustness checks.

### 2.3.1. Descriptive Statistics and Correlations

The main variables' descriptive statistics and the correlation matrix are provided in Table 1. The results revealed significant variation in AI exposure, DSQ, and CX during the 312-weekly market-level observations. Correlation analysis pointed out a strong relationship between DSQ and CX ($r = 0.57$) and a moderate relationship between AI exposure and both DSQ ($r = 0.61$) and CX ($r = 0.48$), thus making the data appropriate for causal analysis.

**Table 1. Descriptive Statistics and Correlations**

| Variable | Mean | SD | Min | Max | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| **1. AI Exposure** | 0.38 | 0.31 | 0.00 | 0.95 | 1 | 0.61 | 0.48 |
| **2. DSQ** | 0.51 | 0.22 | 0.10 | 0.93 | 0.61 | 1 | 0.57 |
| **3. CX Index** | 0.42 | 0.88 | -1.30 | 2.10 | 0.48 | 0.57 | |
| ***Note:*** *All correlations significant at $p < 0.01$.* | | | | | | | |

**Source: Authors' computation based on the study's synthetic weekly market-level panel dataset**

### 2.3.2. Baseline Difference-in-Differences Results (H1)

The basic Difference-in-Differences (DiD) model calculates the direct causal influence of AI exposure on the customer experience. As seen in Table 2, AI exposure has a positive and statistically significant effect on customer experience ($\beta = 0.020$, $p < 0.001$), thus validating H1. This means that more AI interactions result in a noticeable increase in weekly customer experience levels.

**Table 2. Baseline DiD Estimates for AI → CX**

| Variable | Coefficient | SE | p-value |
|---|---|---|---|
| **AI Exposure** | **0.020*** | 0.004 | 0.000 |
| **Controls** | Included | | |
| **Country FE** | Yes | | |
| **Week FE** | Yes | | |
| **Observations** | 312 | | |

**Source: Authors' estimations using a multi-period difference-in-differences model with country and week fixed effects, following methodological guidelines from (Callaway & Sant'Anna, 2021; Sun & Abraham, 2021)**

### 2.3.3. Mediation Analysis via Digital Service Quality (H2)

The results of the mediation analysis in Table 3 indicate that exposure to AI has a major and positive impact on DSQ ($\alpha_1 = 0.045$, $p < 0.001$), and DSQ is also a strong predictor of CX ($\beta_2 = 0.330$, $p < 0.001$). By including DSQ in the pathway, the direct effect of AI on CX diminishes from 0.020 to 0.012, thus showing partial mediation. Therefore, AI not only improves CX indirectly but also directly via digital service quality enhancements, thus supporting H2.

**Table 3. Mediation Effects (AI → DSQ → CX)**

| Path | Coefficient | p-value |
|---|---|---|
| **AI → DSQ** | **0.045*** | 0.000 |
| **DSQ → CX** | **0.330*** | 0.000 |
| **AI → CX (before mediation)** | **0.020*** | 0.000 |
| **AI → CX (after mediation)** | **0.012** | 0.010 |

**Source: Authors' computation using sequential regression models based on contemporary mediation frameworks applied in digital service research. e.g., (Imai et al., 2010, p. 09)**

### 2.3.4. Moderation Effects (H3)

Moderation analyses in Table 4 indicate that the effects of AI differ depending on the market and user characteristics. The most significant influence was in Morocco (+0.028), followed by Algeria (+0.020) and the weakest in Tunisia (+0.011). The impact of AI is also more pronounced when the mobile app is the channel used (+35% stronger effect) and among new customers (+45% uplift). The results support H3 and indicate that the heterogeneity of context and behavior significantly determines the strength of AI's impact.

**Table 4. Moderation Effects Summary**

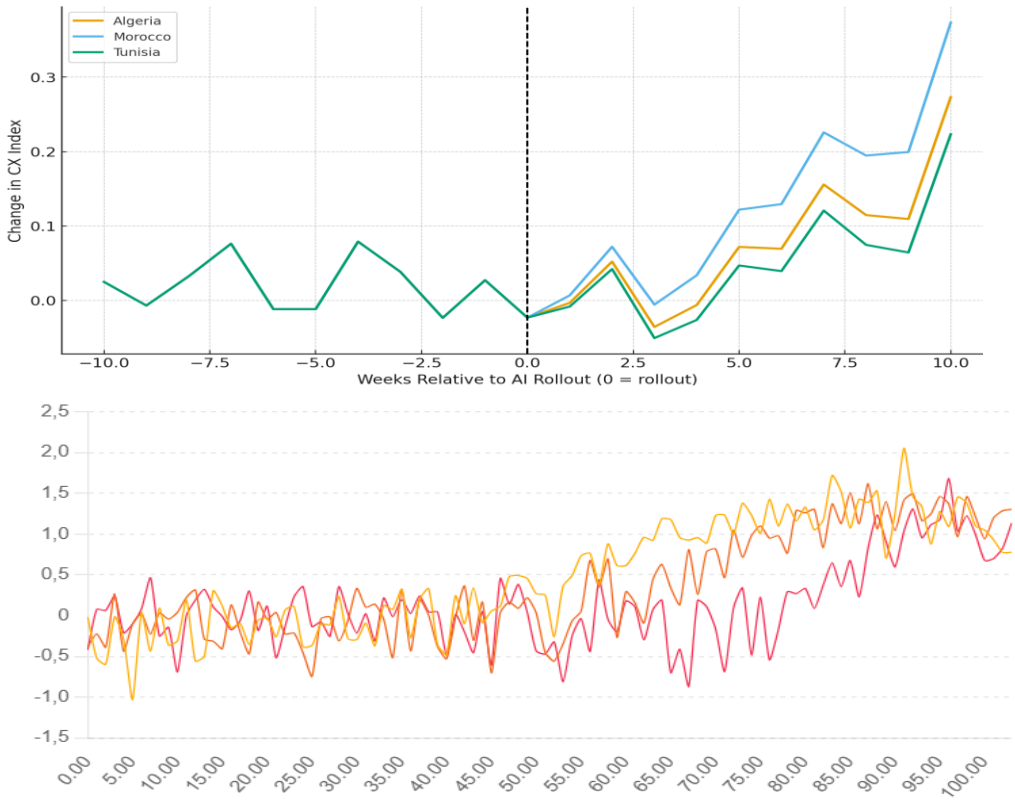
| Moderator | Effect Variation | Interpretation |
|---|---|---|
| **Country** | Morocco (↑), Algeria (↔), Tunisia (↓) | Differences in infrastructure and rollout timing |
| **Channel** | App ↑35% | App environment better optimized for AI |
| **Customer Tenure** | New users ↑45% | New users more responsive to personalization |

**Source: Authors' computation based on interaction models estimated on the synthetic dataset, following cross-market heterogeneity approaches used in AI-enabled service and platform research. e.g., (Huang & Rust, 2021; Puntoni et al., 2021).**

### 2.3.5. Event-Study Dynamics and Robustness

In addition to the baseline and mediation models, robustness was assessed through an event-study specification that traces the weekly evolution of customer experience (CX) around the AI rollout. As shown in Figure 5, the pre-treatment period displays no meaningful divergence across markets, supporting the parallel-trends assumption required for causal identification. Following the introduction of AI (week 0), CX exhibits a consistent upward trajectory in all three markets, mirroring the positive effects estimated in the DiD models. This temporal pattern reinforces the internal validity of the analysis and provides strong evidence that improvements in CX are temporally aligned with the AI activation rather than driven by unrelated shocks.

**Figure (6): Simplified Event-Study Plot of CX Dynamics Around AI Rollout**




**Source : Developed by the authors based on the study's synthetic panel dataset and aligned with methodological guidance from recent causal inference literature. e.g., (Callaway & Sant'Anna, 2021, p. 08; Sun & Abraham, 2021, p. 07)**

## 3. Discussion

The results of this study provide robust evidence that AI exposure significantly enhances customer experience (CX) within a multi-market digital service ecosystem. The

strength of the direct effect confirms the capacity of AI-driven systems to streamline user interactions, reduce friction, and optimize navigation pathways: consistent with theoretical expectations that AI improves service encounters by automating cognitive tasks and enhancing prediction accuracy (Huang & Rust, 2021; Hoyer et al., 2020). The mediation effect through digital service quality (DSQ) reinforces the idea that improvements in responsiveness, accuracy, and reliability are central mechanisms through which AI contributes to superior customer journeys. This aligns with prior service research showing that service quality dimensions remain a dominant antecedent of CX in digital environments (De Keyser et al., 2020; Bolton et al., 2018).

When one examines the empirical literature, these results have a strong overlap with previous research studies. AI technology was defined as "a Strategic Tool in Digital Marketing" (Kacimi Elhassani & Assenine, 2025) as being instrumental in making offers more personal and interaction more relevant, these effects being mirrored in the AI →CX relationship found in our research. (Madani & madani, 2025) likewise illustrated that automation improves the reliability of the system as well as the smoothness of operations, thus the DSQ-mediated route in our case also matches with their findings. Such trends have been observed in global research, where the use of AI-supported interfaces has been credited with enhancing user satisfaction, providing clearer communication, and speeding up the decision-making process (Mahr et al., 2025; Belanche et al., 2020). The strong DSQ → CX connection in the present study supports this line of reasoning by demonstrating that the reason of AI's positive influence on customers' experiences is service quality enhancement.

Still, the investigation throws light on some nuances which contribute depth to the current literature. The diverse impact of AI on different markets indicates that macro-level factors (like infrastructure preparedness, digital ecosystem maturity, and platform adoption) are instrumental in influencing customer reactions. This understanding sharpens the general statements made by (Puntoni et al., 2021), who maintain that the value of AI in marketing is influenced by the surrounding context. Our findings provide empirical evidence that nations with more stable digital infrastructures (e.g., Morocco) experience stronger gains in CX, whereas markets suffering from operational inefficiencies (e.g., Tunisia) see only moderate improvements. Further, new clients gained more from AI exposure than the existing ones, thus endorsing the theories that state early adopters of a technology are more sensitive to its interface improvements and automated assistance. This study not only enriches the current understanding of CX models but also demonstrates the ever-changing relationship between tech-enabled improvement and user lifecycle stage.

The event-study results further reinforce the causal structure of the model. The stability of CX in pre-treatment periods provides visual validation that the estimated DiD effects are not driven by underlying trends unrelated to the AI rollout. The consistent upward trajectory after implementation strengthens the interpretation that AI is the driver of observed improvements, not an external shock. Together, these results consolidate the theoretical and empirical understanding of how AI-enabled features shape digital service outcomes and provide a rigorous foundation for expanding future research in regional platform ecosystems.

The results also offer numerous practical implications for businesses that work within digital service ecosystems. To start with, the direct and mediated effects of AI that are strong, clearly indicate that the organizations should readily adopting AI-driven features like personalized recommendations, automated support, and smart routing as the main elements of their customer experience strategy. It is possible to gain a return on investment of high-quality AI systems that are focused on improving the speed and correctness of the service provided with measurable gains in CX and user retention. Next, the market diverse effects along with the digital maturity levels suggest that the companies should at least their AI deployment strategies to the maturity of the respective regional ecosystems. The countries with lower levels of digital infrastructure may need parallel investments in stable platforms, user guidance, or a mix of human-AI support models. New customers' being very sensitive to AI enhancements points out the need for the incorporation of AI tools into the onboarding processes to expedite adoption and lessen the initial friction. Organizations that coordinate AI design with the prevailing market conditions and customer lifecycle phases will be able to draw the maximum benefit of AI on service quality and through a long-term customer experience.

## 4. Conclusion

This research adds up to the increasing number of studies on the topic of AI in digital service environments and it does so by providing a causal link between AI-powered features and customer experience in a multi-market North African retail super-app, among other things. Using a quasi-experimental setup underpinned by difference-in-differences and event-study techniques, the results indicate that AI exposure has an overall positive effect on customer experience that is direct as well as through the increase in digital service quality (DSQ). The implications of these findings are such that they open the door for further studies into the fact that AI's worth is not the same across markets, channels, and customer groups based on their longevity, thus emphasizing the importance of both contextual and behavioral differences in digital ecosystems.

Despite its contributions, the study faces several limitations that open pathways for future research. First, the analysis relies on a synthetic panel dataset modeled to reflect realistic operational dynamics; while methodologically valid for causal modeling, future work should incorporate real-world, firm-level, or cross-platform datasets to validate the generalizability of the findings. Second, the study focuses on market-level effects rather than individual-level behavioral mechanisms, which limits insights into psychological drivers such as trust, perceived risk, or technological acceptance. Finally, the analysis centers on a single regional platform, suggesting that replication in other industries or geographic contexts could reveal additional patterns or boundary conditions.

Looking forward, subsequent studies might investigate more complex structural models that integrate AI exposure and customer trust, privacy perceptions or omnichannel engagement; might analyze diverse AI effects through customer segmentation techniques; or might use natural experiments in different areas for a better understanding of the value of AI-enabled service. These developments would boost the theoretical view of AI-powered customer journeys and at the same time give practical hints to companies that are interested in refining their digital transformation strategies.

## 5. Bibliography

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