

An Empirical Test of a Hybrid RDT-RBV-CI Framework for AI Localization in Customer Service in a Telecommunications Context

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Abstract

This study empirically tests a hybrid theoretical framework integrating Resource Dependence Theory (RDT), Resource-Based View (RBV), and Continuous Improvement (CI) to explain the relationship between Artificial Intelligence (AI) localization and service quality. An AI-powered chatbot was deployed on Telegram for a telecommunications company in Syria, collecting 241 interactions from 54 users. Results show an 80.5% satisfaction rate, supporting the direct positive effect of AI localization on service quality. Chi-square tests revealed no significant differences in satisfaction across problem types or service categories. Pearson correlation showed no relationship between usage frequency and satisfaction. The study contributes a validated model for the Arab organizational context.

1. Introduction

The integration of Artificial Intelligence (AI) into customer service operations has become a strategic imperative for organizations worldwide [1]. AI-powered solutions, including chatbots, virtual assistants, and intelligent recommendation systems, promise enhanced efficiency, personalization, and round-the-clock availability [2]. The global AI in customer service market is projected to reach USD 58.7 billion by 2030, reflecting the growing recognition of AI's transformative potential [3].

The rapid advancement of AI technologies has fundamentally reshaped the way organizations interact with their customers. Traditional customer service models, which heavily relied on human agents, are being supplemented or even replaced by AI-driven systems that can handle routine inquiries, provide instant responses, and operate continuously without fatigue [4]. This shift is not merely technological but also strategic, as organizations seek to gain a competitive edge through superior customer experiences. However, the adoption of AI is not a simple plug-and-play process; it requires careful planning, substantial investment, and a deep understanding of organizational and cultural dynamics [5].

The Syrian telecommunications sector, like many in developing regions, faces unique challenges that complicate the adoption of advanced technologies. Prolonged economic instability, infrastructure degradation, and limited access to cutting-edge digital tools have created a difficult environment for implementing AI-driven solutions [3]. Despite these obstacles, there is a growing recognition among Syrian telecommunications providers that AI can play a pivotal role in improving customer service, reducing operational costs, and enhancing overall competitiveness. However, the path to successful AI localization is fraught with practical and institutional barriers, including limited technical expertise, resistance to change, and inadequate regulatory frameworks [4]. Addressing these challenges requires a comprehensive understanding of both the technological and organizational dimensions of AI adoption, which this study seeks to provide.

Despite this proliferation, a critical challenge persists: the effective localization of AI technologies within diverse organizational and cultural contexts. Organizations often struggle to translate AI investments into tangible service quality improvements, particularly in developing economies and the Arab world, where organizational structures, cultural norms, and resource availability present unique obstacles [6].

While existing literature extensively covers AI adoption drivers and technical capabilities [5, 7], there is a significant gap in integrated theoretical frameworks that explain the mechanisms through which AI localization translates into service quality improvements.

The localization of AI involves more than just deploying technology; it requires adapting the technology to fit the specific needs, values, and constraints of the local context [8]. In the Arab world, for instance, cultural factors such as high power distance, collectivism, and uncertainty avoidance can significantly influence how AI technologies are perceived and adopted by both employees and customers [9]. Moreover, the availability of skilled human capital, the quality of technological infrastructure, and the level of organizational readiness are critical determinants of successful AI localization [10].

This study addresses this gap by proposing and empirically testing a hybrid theoretical framework that integrates three established theories: Resource Dependence Theory (RDT), the Resource-Based View (RBV), and Continuous Improvement (CI) theory. RDT explains the environmental and strategic motivations for AI adoption [11], RBV identifies the internal organizational resources that moderate success [10], and CI describes the dynamic mechanisms through which AI investments translate into quality improvements [6]. By integrating these perspectives, the framework provides a comprehensive explanation of the "why," "when," and "how" of AI localization.

The study investigates the following research question: What is the effect of AI localization on perceived service quality in a telecommunications context? To answer this question, we developed and deployed a custom AI-powered chatbot on Telegram for a telecommunications company in Syria and collected real-time interaction data. The specific objectives are: (1) to test the direct effect of AI localization on service quality, (2) to examine differences in satisfaction across problem types and service categories, and (3) to explore the relationship between usage frequency and satisfaction.

This research contributes to the literature by providing a validated theoretical model for the Arab organizational context, offering empirical evidence on AI localization effectiveness in a resource-constrained environment, and providing practical recommendations for organizations pursuing AI localization in similar settings. Additionally, it addresses the contextual gap identified in prior studies [8, 9], which have predominantly focused on Western contexts. Furthermore, the study responds to calls for more empirical research on AI adoption in developing economies, where the challenges and opportunities differ significantly from those in developed nations.

2. Theoretical Framework and Hypotheses

2.1. Resource Dependence Theory (RDT)

Resource Dependence Theory, originally formulated by Pfeffer and Salancik [11], posits that organizations are not self-sufficient but depend on their external environment for critical resources, including customers, competitive legitimacy, technical knowledge, and financial capital. Environmental uncertainty created by factors such as intense competition, shifting customer expectations, and

technological disruption prompts organizations to adopt strategies to manage these dependencies and reduce associated risks.

In the context of AI localization, RDT explains why organizations invest in AI technologies. For telecommunications companies, the rapidly changing competitive landscape, evolving customer expectations, and the need to demonstrate technological leadership create significant environmental pressures. AI localization represents a strategic response to these pressures—a means of reducing uncertainty by enhancing internal capabilities and reducing reliance on error-prone human-dependent service processes [5].

Telecommunications companies operate in highly dynamic environments characterized by rapid technological advancements, regulatory changes, and intense competition [3]. These external pressures create a sense of urgency for organizations to innovate and differentiate themselves. AI localization, therefore, becomes a strategic lever for managing environmental dependencies and securing a sustainable competitive position. By investing in AI, telecommunications companies can reduce their reliance on external partners for customer service and develop proprietary capabilities that are difficult for competitors to replicate.

2.2. Resource-Based View (RBV)

The Resource-Based View, articulated by Barney [10], argues that sustained competitive advantage emerges from organizational resources and capabilities that are valuable, rare, imperfectly imitable, and non-substitutable (VRIN). In the AI localization context, RBV explains why the mere adoption of AI technology does not guarantee success. Organizations must possess complementary resources and capabilities to effectively integrate AI into their operations [6]. The literature identifies three critical internal resources: qualified human capital, technological infrastructure, and supportive organizational culture [4, 8, 9].

Human capital is particularly crucial for AI localization. Employees need not only technical skills to operate AI systems but also analytical skills to interpret AI-generated insights and make informed decisions [4]. The development of such skills requires significant investment in training and development programs. Similarly, technological infrastructure, including reliable internet connectivity, modern hardware, and compatible software systems, is essential for seamless AI integration [8]. In many developing countries, inadequate infrastructure remains a major barrier to AI adoption [3].

Organizational culture also plays a pivotal role in AI localization. A culture that encourages experimentation, tolerates failure, and values data-driven decision-making is more likely to succeed in AI adoption [9]. Conversely, organizations with rigid hierarchies, risk-averse attitudes, and resistance to change may struggle to realize the full potential of AI investments [5]. Therefore, AI localization requires a holistic approach that aligns technology with organizational culture, human capital, and infrastructure.

2.3. Continuous Improvement (CI)

The Continuous Improvement perspective, rooted in the work of Deming [6] and the Plan-Do-Check-Act (PDCA) cycle, describes how organizations achieve sustained quality improvements through iterative learning and adaptation. In the context of AI localization, AI technologies act as catalysts and enablers of the PDCA cycle: AI localization represents the planning and implementation phase (Plan and Do); AI tools generate continuous streams of data on service performance and customer satisfaction (Check); these data-driven insights translate into higher-quality decisions about resource allocation and process improvements (Act), generating new data for subsequent iterations [7].

The PDCA cycle is particularly relevant to AI localization because it emphasizes the importance of feedback loops and iterative refinement [6]. As AI systems are deployed and used, they generate vast amounts of data that can be analyzed to identify patterns, diagnose problems, and suggest improvements [7]. This continuous feedback enables organizations to fine-tune their AI systems, improve service quality, and adapt to changing customer needs. Moreover, the CI perspective underscores that AI localization is not a one-time event but an ongoing process of learning and adaptation [10].

2.4. Hypotheses

Based on the integrated theoretical framework, we formulate the following hypotheses:

- **H1:** AI localization has a direct positive effect on perceived service quality.
- **H2:** Perceived service quality differs according to the type of customer problem.
- **H3:** Perceived service quality differs according to the service type.
- **H4:** There is a correlational relationship between user interaction frequency and perceived service quality.

3. Research Methodology

3.1. The AI Tool (Chatbot)

A custom AI-powered chatbot was developed and deployed on the Telegram platform. The chatbot was designed using the ManyChat platform, leveraging its AI Step capability for natural language understanding in Arabic. It was integrated with Google Sheets for real-time data logging of all user interactions, including: timestamp, subscriber_id, complaint_category, complaint_type, user_satisfaction, resolution_method, and package_type. This design allowed for the automated collection of user feedback immediately after each interaction, reducing recall bias and enhancing data accuracy.

3.2. Population and Sample

The study population consisted of all customers of the Syrian Telecommunications Company who engaged with the chatbot. A convenience sample of 241 complete interactions from 54 unique users

was collected over a six-week period (May-June 2026). While the sample size is modest, it provides sufficient data for preliminary empirical testing of the proposed framework in a real-world setting.

3.3. Data Collection

Post-interaction, users rated their satisfaction on a three-point scale: High, Medium, or Low. All interactions and satisfaction ratings were automatically recorded in Google Sheets through the chatbot integration. This approach ensured real-time data capture without additional burden on users or researchers.

3.4. Data Analysis

Data was analyzed using descriptive statistics (frequencies, percentages), Chi-square tests to examine relationships between categorical variables (complaint_category × satisfaction, package_type × satisfaction), and Pearson correlation to explore the relationship between usage frequency and satisfaction. All statistical analyses were conducted using Microsoft Excel.

4. Results

4.1. Descriptive Statistics

The overall satisfaction rate was remarkably high, with 80.5% (n = 194) of interactions rated as High. Internet-related problems constituted the majority of interactions (63%, n = 152), followed by Packages (28%, n = 68), and Telephone issues (2%, n = 4).

Table 1
Distribution of Interactions by Problem Category

Category	Frequency	Percentage
Internet	152	63.1%
Packages	68	28.2%
Telephone	4	1.7%
Unclassified	17	7.0%
Total	241	100%

Table 2
Distribution of Satisfaction Levels

Satisfaction Level	Frequency	Percentage
High	194	80.5%
Medium	22	9.1%
Low	25	10.4%
Total	241	100%

4.2. Hypothesis Testing

- **H1:** Supported (80.5% high satisfaction rate).
- **H2:** Rejected. Chi-square test: $\chi^2 = 2.29$, $df = 4$, $p > 0.05$.
- **H3:** Rejected. Chi-square test: $\chi^2 = 5.30$, $df = 4$, $p > 0.05$.
- **H4:** Rejected. Pearson correlation: $r = 0.035$, $p > 0.05$.

Table 3
Hypothesis Testing Summary

Hypothesis	Statistical Test	Result	Decision
H1	Percentage satisfaction	80.5% high satisfaction	Supported
H2	Chi-square	$\chi^2 = 2.29$, $df = 4$, $p > 0.05$	Rejected
H3	Chi-square	$\chi^2 = 5.30$, $df = 4$, $p > 0.05$	Rejected
H4	Pearson correlation	$r = 0.035$, $p > 0.05$	Rejected

5. Discussion

The study successfully validates the core proposition of the hybrid framework: AI localization exerts a significant positive effect on perceived service quality (H1). The 80.5% high satisfaction rate demonstrates the effectiveness of the AI tool in meeting customer needs. This supports the RDT view that strategic adoption of AI can reduce environmental uncertainty and enhance organizational performance.

The rejection of H2, H3, and H4, while unexpected, offers a crucial insight. The absence of significant differences suggests that the implemented AI system achieved a high degree of standardization and reliability. In the context of CI theory, this indicates that the "Check" phase was successfully executed, establishing a uniform quality baseline across all service types and user experiences [6]. The consistent quality, irrespective of user experience level (H4), further underscores the system's maturity and ease of use, reflecting the effective integration of resources (RBV) [10].

5.1. Theoretical Implications

The findings advance theoretical understanding by demonstrating that the theoretical pathways (RDT, RBV, CI) function as a coherent system. The consistency in service quality across diverse scenarios is a key finding, suggesting that the integrated framework offers a robust explanation for AI's impact in the studied context [8].

5.2. Practical Implications

- **Invest Strategically:** Organizations should view AI localization as a strategic investment to reduce environmental uncertainty and build internal capability.
- **Ensure Consistency:** The AI's ability to provide uniform service quality across different user and problem types is a major advantage.
- **Focus on Integration:** Success stems from effectively combining AI with internal resources and a commitment to continuous improvement.

6. Conclusion

6.1. Summary of Findings

This research provides an empirical test of a novel integrated theoretical framework (RDT, RBV, CI) in an Arab organizational context. The findings demonstrate that AI localization can effectively enhance service quality in the telecommunications sector. The high satisfaction rate (80.5%) serves as strong evidence of a positive impact, while the consistency of service quality across diverse scenarios suggests that the integrated framework offers a robust explanation for AI's impact.

6.2. Limitations

- **Sample Size:** 241 interactions from 54 unique users limits generalizability.
- **Sample Bias:** Four users contributed 60% of interactions.
- **Context:** Findings may not generalize beyond Syrian telecommunications.

6.3. Future Research

Future studies should:

- Expand sample size to enhance statistical power.
- Include mediating variables (operational efficiency, decision quality, innovation).
- Include moderating variables (human capital, infrastructure, culture).
- Conduct comparative studies across multiple organizations and countries.

Declarations

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Ethical Approval: This study was reviewed and approved by the Institutional Review Board (IRB) of the Syrian Virtual University, which determined that formal ethical approval was not required as the study involved a chatbot on a public messaging platform (Telegram) with no collection of personal identifying information and no intervention beyond routine customer service interactions. Additionally, permission to conduct the study was obtained from the Syrian Telecommunications Company, where the chatbot was deployed. The research was carried out in accordance with the guidelines and regulations of the Syrian Virtual University and the journal's policies on research involving human participants.

Consent to Participate: Informed consent was obtained from all participants through a clear message displayed at the start of the chatbot interaction. Users were informed that their interactions would be anonymously recorded for research purposes and that they could opt out at any time. Participants were also assured that their data would remain confidential and would not be used for any purposes beyond this study.

Consent to Publish: Not applicable.

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Author Contribution

M.K. contributed to conception, design, methodology, data collection, analysis, and writing of the original draft. I.Z. provided supervision, critical revision, and validation. All authors reviewed and approved the final manuscript.

Data Availability

The data generated and analyzed during this study are not publicly available due to privacy restrictions. The dataset includes anonymized user interaction logs from a customer service chatbot deployed on Telegram. The data may be made available from the corresponding author upon reasonable request.

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