

The Mediating Effect of Customer Experience on the Relationship Between E-CRM and Service Quality in Telecommunications

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Abstract: This study investigates the impact of electronic Customer Relationship Management (e-CRM) on Customer Experience and Service Quality in the Algerian telecommunications sector, with a specific focus on the mediating role of Customer Experience. A quantitative research design was adopted whereby data were collected using survey procedures and subsequently analyzed using Partial Least Squares Structural Equation Modeling with Smart-PLS software. The results indicate that e-CRM significantly enhances the level of Customer Experience and Service Quality. Furthermore, it is found that Customer Experience directly influences Service Quality and mediates the relationship between e-CRM and Customer Experience, which holds the key to achieving the highest level of service quality.

Keywords: Electronic Customer Relationship Management (E-CRM) ; Service Quality ; Customer Experience ; Telecommunications sector ; Partial Least Squares Structural Equation Modeling (PLS-SEM).

Jel Classification Codes : L96 ; M31

Introduction

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In the modern digital landscape, customer experience has become a key differentiator for businesses, especially in service-intensive industries like telecommunications. As markets grow increasingly competitive, businesses are under constant pressure to adopt innovative strategies to meet evolving customer expectations and ensure high-quality service delivery (Chen and Popovich, 2003). One of the most effective tools in this regard is Electronic Customer Relationship Management (e-CRM). E-CRM systems can enhance the levels of interaction, effectiveness of service delivery, and development of stronger relationships by applying technology in organizations for enhanced customer satisfaction and loyalty (Choudhury and Harrigan, 2014; Wang and Feng, 2012).

E-CRM has emerged as the backbone of digital connectivity for superior service quality in the telecommunications sector. The rapid expansion of digital platforms and increased dependence of customers on telecommunications services have only signaled an enhanced need for systems that can deliver seamless, personalized experiences with high quality. Previous studies have highlighted that e-CRM systems not only improve operational efficiency but also positively impact key performance indicators such as customer experience and service quality (Harrigan et al., 2020; Eid, 2007). Despite the global recognition of e-CRM's benefits, limited studies have been conducted on its implementation and impact in the context of developing economies, particularly in Algeria (Malki et al., 2023). Gaining an understanding of the e-CRM dynamics in the context of the Algerian telecommunications sector is important; this would provide insights into how technological adoption addresses local challenges in pursuit of improved service outcomes. This paper bridges this gap by analyzing the relationship between e-CRM, customer experience, and service quality. Particularly, the study has focused on the mediating role of customer experience in translating the capabilities of e-CRM into tangible improvements in service quality.

I. Literature Review

E-CRM merges technology with traditional CRM to boost customer engagement and organizational outcomes. E-CRM thus enables businesses, through the use of digital tools in the collection, management, and analysis of customer data, to offer personalized and timely services that make a great difference in the realization of better service quality and customer satisfaction (Chen and Popovich, 2003; Rahimi and Gunlu, 2016). In the context of the telecommunications industry, e-CRM is crucial in terms of process efficiency and the improvement of customer touch points in view of changing customer expectations. Some research has shown that e-CRM systems directly impact customer experience, which is defined as the total perception that customers have of their interactions with a company (Choudhury and Harrigan, 2014; Wang and Feng, 2012). Positive experiences are closely linked to e-CRM's capacity to provide convenience, responsiveness, and personalization, which are key factors influencing customer satisfaction and loyalty (Lemon and Verhoef, 2016).

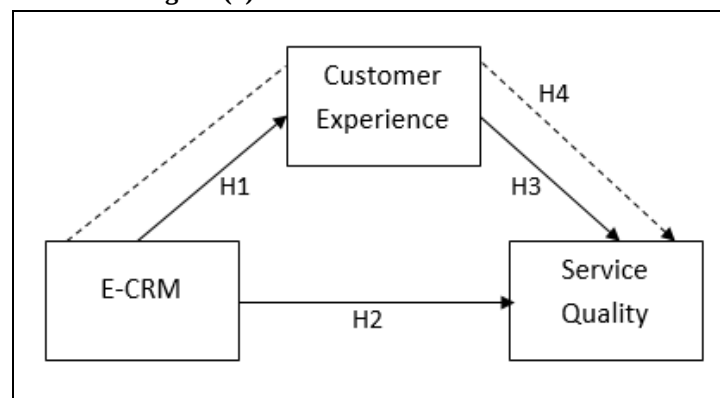
Another aspect where e-CRM highly impacts service quality is that of critical determinants for customer satisfaction and loyalty: how well or to what extent services meet customer expectations (Parasuraman et al., 1988). In the same context, process automation, with less errors, real-time support, and efficient service quality measures like responsiveness and reliability can be improved (Harrigan et al., 2020). In the telecommunications sector, this can be seen through improved complaint management and customized service delivery, which bolster perceptions of service quality (Eid, 2007). Furthermore, customer experience can play the role of a mediator in the relationship between e-CRM and service quality, as the value created by e-CRM systems is realized through the positive interactions they facilitate (Lemon and Verhoef, 2016; Harrigan et al., 2020). Indeed, research has shown that companies that use e-CRM to create experiences have an improved service quality and customer satisfaction level (Eid, 2007; Wang and Feng, 2012).

Although the relationships between e-CRM, customer experience, and service quality at an individual level are clearly documented, very few studies have tested these constructs within an integrated framework, especially in emerging economies such as Algeria. The present study attempts to fill this gap by examining how these factors interact within the Algerian telecommunication industry and specifically how customer experience mediates the relationship between e-CRM and service quality.

II. Theoretical Framework and Hypotheses Development

To investigate the relationships among e-CRM, customer experience, and service quality, a theoretical framework was developed based on previous studies. As shown in Figure 1, the framework posits that e-CRM affects both customer experience and service quality. Additionally, it proposes that customer experience mediates the relationship between e-CRM and service quality.

Figure (1) Theoretical Framework



II. 1. Electronic Customer Relationship Management (e-CRM)

E-CRM is defined as the technology integration with customer relationship management processes for more advanced interaction and building customer relationships. Organizations apply e-CRM to automate and personalize communications via digital channels, including websites, emails, and mobile applications (Mendoza et al., 2007). An e-CRM system enhances the delivery of service by offering convenient, efficient, and responsive services, hence a better experience for customers and increased service quality (Strauss and Frost, 2012).

In the telecommunications, research has demonstrated that e-CRM practices boost customer satisfaction and improve service quality by streamlining operations and delivering tailored services (Eid, 2011). Awasthi and Sangle (2013) emphasized that e-CRM implementations in the telecom sector significantly enhance customer satisfaction due to better service delivery and personalization. Similarly, Kumar and Mokha (2021) highlighted that e-CRM positively affects customer experience by creating unique, value-driven interactions. Also, Sin et al. (2005) have indicated that the e-CRM system enhances the service quality and customer experience of all industries, through efficient and personalized service. Thus, the following hypotheses are proposed:

H1: E-CRM positively affects customer experience.

H2: E-CRM positively affects service quality.

II. 2. Customer Experience

Customer experience refers to the perception and feelings that customers develop about the company along the path of pre-purchasing, purchasing, and post-purchasing stages (Forrester, 2011). It encompasses dimensions such as service quality, ease of access, responsiveness, and emotional engagement with the brand (Lemon and Verhoef, 2016).

Research has consistently pointed out that through customer experience, service quality is improved. The positive experiences bring satisfaction and develop an overall perception of service excellence among customers (Verhoef et al., 2009). Additionally, Reichheld and Schefer (2000) have stated that to exceed customer expectations by personalizing and seamless interaction can improve service quality perception. Furthermore, customer experience has increasingly been recognized as a critical mediating factor in the relationship between technological systems, such as e-CRM, and perceived service quality. Companies can thus use e-CRM technologies to enhance touchpoints in ways that will deliver superior customer experiences, which in turn positively affect customers' perceptions of service quality (Harrigan et al., 2020).

For instance, when telecom operators use e-CRM to provide personalized support and efficient service delivery, customers perceive an overall superior experience, which translates into higher satisfaction with the quality of the service (Kumar and Mokha, 2021). Research into the benefits of e-CRM responsiveness and personalization by Eid (2011) in the telecom industry showed that these benefits are fully realized when they lead to a positive customer experience. Moreover, Lemon and Verhoef (2016) highlighted that organizations should consider customer experience a priority channel through which e-CRM initiatives improve operational performance. Therefore, the following hypotheses are suggested:

H3: Customer experience positively affects service quality.

H4: Customer experience mediates the relationship between e-CRM and service quality.

II. 3. Service Quality

Service quality represents the degree to which a delivered service meets customer expectations. It has been regarded as one of the most critical factors in determining customer satisfaction and loyalty and, for that matter, long-term success for organizations (Parasuraman et al., 1988). E-CRM systems, in facilitating efficient and customized service delivery, would thus be expected to enhance service quality. Oliver (1999) stated that reliable delivery of high-quality service develops trust, leading to strong customer relationships over time.

This study hypothesizes that e-CRM systems impact service quality both directly and indirectly through their effect on customer experience, providing valuable insights into how telecommunications companies can optimize their service delivery strategies.

III. Methodology

A quantitative research design has been adopted for this study through survey procedures, followed by data analysis using Partial Least Squares Structural Equation Modeling (PLS-SEM) with Smart-PLS software. Descriptive analysis provides a general overview of the dataset, while appropriate measurement models within the PLS-SEM framework ensure the validity and reliability of the survey items. The hypotheses are tested through structural equation modeling to examine the relationships among the variables, and mediation effect is tested by bootstrapping techniques.

III. 1. Variable Measurement

A survey tool is used for data collection, and its appropriateness is determined by the fact that it can serve the purpose of this study effectively by being aligned with the research objectives. The instrument is assessed the influence of independent variables on dependent variables. The instrument is developed using the principles of developing a reliable measurement tool as outlined by Groves et al. (2009), and all the variables with their respective items are shown in Table 1. These items are those already approved in previous studies and applied in a trusted manner in the testing questionnaires from various national contexts.

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Table (1) Measurement scales

Construct	Number of items	Reference
E-CRM	8	Kumar and Mokha (2021)
Customer Experience	4	Lacej and Kalaj (2015)
Service Quality	6	Akroush et al. (2011)

Source: Authors' own work based on previous studies

III. 2. Sample Characteristics

An electronic questionnaire was used to collect data using Google Forms, which were shared on social media platforms. This approach facilitated the collection of responses among customers of mobile telecom operators in Algeria. In total, 193 responses were collected and analyzed.

Table 2 presents the distribution of the respondents according to demographic characteristics and GSM used. Of all participants, 52.3% were female ($n = 101$) and 47.7% were male ($n = 92$). Thus, there are slightly more women than men in the sample. By age, 52.3% were between 25–34 years of age and 25.4% between 35–44 years. This preponderance of the age bracket shows the prevalence of young adults in the sample, belonging to Algeria's tech-savvy generation. The growing-up period of this group coincided with the era of ICT diffusion and internet connectivity; hence, they have a higher propensity to engage with brands through e-CRM platforms than other groups (Agrawal, 2022; Boukhelkhal, 2022). Additionally, as detailed in Table 2, 52.3% of respondents had university level, 43% had post-graduate, and 4.7% had high school. These results reveal that the sample population under study is well-educated; this is in agreement with the argument that the more educated the individuals are, the more the use of technology-based CRM tools (Khan, 2022).

Regarding the GSM operators used by respondents, Mobilis was the most popular choice to use among the sample with 47.2%, followed by Djezzy with 36.3%, and Ooredoo with 16.5%. This shows the competitive situation between the telecom providers in Algeria and indicates that the importance of these operators' role in shaping customer perceptions and satisfaction through e-CRM strategies is considered to be very high (Boukhelkhal, 2022).

Table (2) Demographics analysis

Variable	Responses choice	Frequency	Percentage (%)
Gender	Female	101	52.3
	Male	92	47.7
Age	Less than 25 years old	37	19.2
	25 – 34 years old	101	52.3
	35 – 44 years old	49	25.4
	45 – 54 years old	5	2.6
	More than 55 years old	1	0.5
Education Level	High school	9	4.7
	University	101	52.3
	Postgraduate	83	43

GSM	Djezzy	70	36.3
	Mobilis	91	47.2
	Ooredoo	32	16.5

Source: Authors' own work based on SPSS output

III. 3. Validity and reliability of the constructs

To assess the convergent validity and reliability of the constructs, key metrics such as standardized outer loadings, Cronbach's alpha (α), composite reliability (CR), and average variance extracted (AVE) were calculated for each construct. According to standard guidelines, the outer loadings should be higher than 0.70 (Hair et al., 2021), even as loadings above 0.60 are considered acceptable in exploratory research (Kline, 2011). Notably, all the retained items for analysis were above 0.60, hence considered suitable to retain in the model.

For the construct E-CRM, the outer loadings ranged from 0.678 to 0.780, and the AVE was 0.534, above the threshold of 0.50 (Kline, 2011). Similarly, the Cronbach's alpha and composite reliability were 0.876 and 0.883, respectively, all above the minimum recommended value of 0.70 as suggested by Hair et al. (2021). The outer loadings for the Customer Experience (CE) construct were immensely strong, ranging from 0.856 to 0.932, while the AVE was 0.787, thus indicating excellent convergent validity. The Cronbach's alpha and composite reliability values were also high, standing at 0.909 and 0.917, respectively, hence further justifying the reliability of the construct. Lastly, the Service Quality construct showed acceptable outer loadings that ranged between 0.708 and 0.837, with an AVE of 0.601. The Cronbach's alpha of 0.867 and composite reliability of 0.876 both had values greater than 0.70, establishing reliability and consistency within the construct.

As shown in Table 3, all evaluated metrics met or exceeded the recommended thresholds for validity and reliability. Consequently, the convergent validity and reliability of the measurement model were confirmed without the need to exclude any items.

Table (3) Convergent Validity and Reliability of the Measurement Model

Variable	Items	Outer loading	VIF	(α) Cronbach	CR	AVE
E-CRM (ECRM)	ECRM 1	0.678	1.612	0.876	0.883	0.534
	ECRM 2	0.757	1.943			
	ECRM 3	0.721	1.771			
	ECRM 4	0.682	1.679			
	ECRM 5	0.729	1.974			
	ECRM 6	0.766	2.725			
	ECRM 7	0.780	3.025			
	ECRM 8	0.724	2.366			
Customer Experience (CE)	CE 1	0.856	2.878	0.909	0.917	0.787
	CE 2	0.932	4.363			
	CE 3	0.869	2.607			
	CE 4	0.888	2.884			
Service	SQ 1	0.744	2.178	0.867	0.876	0.601

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Quality (SQ)	SQ 2	0.805	1.953			
	SQ 3	0.811	2.448			
	SQ 4	0.708	1.891			
	SQ 5	0.739	1.988			
	SQ 6	0.837	2.456			

Source: Authors' own work based on Smart-PLS output

The Fornell-Larcker criterion has been used in order to test the discriminant validity by comparing the square root of the variance-extracted estimates with the correlations among constructs. Accordingly, as shown in Table 4, values on the diagonal, which show the square root of the AVEs, were higher than all other values relating to their respective rows and columns, proving that each construct shared more variances with their indicators rather than sharing with other constructs. This result confirms the discriminant validity of the model (Fornell and Larcker, 1981). Besides, as a complementary measure for discriminant validity, the HTMT ratio analysis was conducted. Table 5 shows that all HTMT values are below the threshold of 0.90 (Henseler et al., 2015), which is further support for good discriminant validity. These findings ensure that the constructs are distinct and adequately measure their intended variables.

Table (4) Discriminant Validity (Fornell–Larcker criterion)

	ECRM	CE	SQ
ECRM	0.731		
CE	0.628	0.887	
SQ	0.585	0.663	0.775

Source: Authors' own work based on Smart-PLS output

Table (5) Heterotrait–monotrait ratio (HTMT)

	ECRM	CE	SQ
ECRM			0.651
CE	0.683		
SQ		0.700	

Source: Authors' own work based on Smart-PLS output

IV. Results

The results in Table 6 reveal that all the hypothesized relationships are supported, meaning there are significant and positive effects among e-CRM (ECRM), Customer Experience (CE), and Service Quality (SQ). E-CRM has a significantly positive effect on CE ($\beta = 0.048$, $T = 13.147$, $p < 0.001$) and SQ ($\beta = 0.055$, $T = 10.609$, $p < 0.001$), while, CE significantly enhances SQ ($\beta = 0.072$, $T = 6.126$, $p < 0.001$). Moreover, the relationship between ECRM and SQ is mediated by CE ($\beta = 0.048$, $T = 5.793$, $p < 0.001$), confirming that it is an important intermediary. The model explains 45.9% of the variance in SQ ($R^2 = 45.9\%$), indicating a high importance of e-CRM and customer experience in the improvement of service quality. The findings, therefore, confirm the integration of e-CRM to effectively and efficiently enhance customer experience and service quality.

Table (6) Hypotheses Test Results

Hypothesis		Beta	T Statistics	Result
H1	ECRM → CE	0.048***	13.147	Supported
H2	ECRM → SQ	0.055***	10.609	Supported
H3	CE → SQ	0.072***	6.126	Supported
H4	ECRM → CE → SQ	0.048***	5.793	Supported
***: $p < 0.001$		$R^2 = 45.9\%$		

Source: Authors' own work based on Smart-PLS output

IV. 1. Discussion of Results

The evidence of the e-CRM impact on customer experience and service quality in the context of the Algerian telecommunication industry is crucial. It was found that e-CRM positively influences CE ($\beta = 0.048$ at $p < 0.001$), and also positively influences SQ ($\beta = 0.055$ at $p < 0.001$), hence it is an important foundational strategy for the improvement of customer perceptions. Additionally, CE also has a direct positive impact on SQ ($\beta = 0.072$, $p < 0.001$), thus confirming its crucial role as an antecedent to higher service quality. Most importantly, the mediation analysis shows that CE significantly mediates the relationship between e-CRM and SQ ($\beta = 0.048$, $p < 0.001$), which points to the importance of CE in businesses when implementing e-CRM systems. These results align with prior research, which emphasizes e-CRM's ability to enhance customer interactions, deliver personalized services, and enhance customer satisfaction and loyalty (Rapp et al., 2010; Alshawhi et al., 2011).

These results indicate that effective e-CRM implementation will ensure significant enhancement of service quality through the improvement of customer experience. Indeed, personalized communication, rapid response time, and tailored service offerings may lead to a good customer experience and thus enhance perceived service quality. The results also find general support from the literature, which indicates that positive customer experience results in greater customer satisfaction and long-term loyalty (Lemon and Verhoef, 2016; Homburg et al., 2017). Finally, the high explanatory power of the model is further supported by the R^2 value of 45.9%, which confirms the relevance of e-CRM and customer experience as strategic drivers for improving service quality in the telecommunications sector.

Conclusion

In conclusion, this study underscores the importance of e-CRM and customer experience as critical factors for improving service quality in the Algerian telecommunications sector. The findings indicate that e-CRM not only has a direct effect on customer experience and service quality, however, it also indirectly has an effect on the service quality through customer experience. These findings highlight credence to the fact that telecommunications organizations should embrace highly developed e-CRM systems that ensure timely, effective, and seamless customer interactions. Continuous investment in technology, employee training, and customer feedback mechanisms should be integral to the strategic plans of companies aiming to enhance customer experience and achieve high service quality. Ultimately, the research emphasized that leveraging e-CRM effectively and delivering exceptional customer experiences are key to maintaining competitive advantage and realizing long-term customer loyalty (Bolton et al., 2014; Verhoef et al., 2009).

Although this study has contributed meaningfully to understanding the impact of e-CRM on customer experience and service quality in the context of the Algerian telecommunications sector,

a number of limitations have to take into consideration. First, the study was restricted to one sector and a specific geographic region; thus, it may be impossible to generalize these findings across industries or geographic boundaries. Future studies should examine these relationships in other industries and across different geographical and cultural contexts to enhance the generalizability of results. Additionally, data analysis in this study relies on the PLS-SEM method, which is appropriate to conduct exploratory analysis of relationships but possesses some limitations regarding hypothesis testing compared with other approaches. Other approaches to SEM, like covariance-based, might also be used in the future for supporting these results through the procedure of robustness.

By addressing these limitations, future studies can build on the findings of this research and contribute to a deeper understanding of the strategic role of e-CRM in customer relationship management.

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