

Assessing the Influence of Digital Marketing Communications on Customer Loyalty: The Moderating Role of Service Quality: Evidence from Sudanese Companies

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Citation: Helal, T. O. A., Alnor, N. H. A., Benlaria, H., Hamad, A. J. H., Abdelfadel, T. A. A., & Youseif, N. A. I. (2025). Assessing the Influence of Digital Marketing Communications on Customer Loyalty: The Moderating Influence of Service Quality in the Context of Sudan Telecom Company. *Journal of Cultural Analysis and Social Change*, 10(4), 311–324. <https://doi.org/10.64753/jcasc.v10i4.2809>

Published: December 4, 2025

ABSTRACT

The factor of this observe is to inspect how virtual marketing messages have an effect on patron loyalty and the way provider satisfactory influences that courting within the Sudan Telecom Company. Using a quantitative studies method, facts become accumulated from a large institution of clients to investigate how the have a look at's essential variables were related to each other. According to the study, virtual advertising communications play a huge part in making clients extra loyal. This means that good on-line exchanges, promotional messages, and engagement all play a massive component in clients' lengthy-time period dedication to the organization. Additionally, the consequences show that provider quality is a key part of constructing loyalty, each at once and with the aid of making the high-quality consequences of virtual advertising messages even more potent. These phrases imply that digital marketing works even higher at preserving human beings unwavering once they assume the provider is good. Overall, the observe suggests how critical it is for telecom carrier companies to have each nicely-idea-out digital advertising plans and regularly high service requirements. In a completely aggressive market, this may make the consumer revel in better, construct agree with, and cause stronger, longer-lasting client relationships.

Keywords: Customer Experience, Online Communications, Sudan Telecom, Customer Loyalty, Service Quality, Digital Marketing, and the Telecom Sector.

INTRODUCTION

In the fast-developing subject of telecommunications, virtual advertising and advertising communications (DMC) have emerged as important gadgets for the motive of molding consumer relationships and cultivating loyalty (Bavuma, 2018). In order to have interaction customers, increase brand interest, and cultivate lengthy-time period loyalty, organizations like Sudan Telecom, that is the pinnacle agency of telecoms offerings in Sudan, are an increasing number of the use of virtual channels. These digital channels consist of social media, e-mail advertising and marketing, and on-line advertising (Hamza et al., 2024). These strategies have become increasingly important due to the ever-shifting options of customers and the intensifying opposition that exists in the industry.

Over the course of the previous few a few years, there was a tremendous evolution within the link amongst advertising communications and patron loyalty (Alnor et al., 2024). This evolution has happened in tandem with the development of technology and the adjustments in purchaser behavior (Makhrout & Chouhbi, 2024). When it came to accomplishing and preserving clients, businesses had historically relied on conventional advertising and advertising channels inclusive of tv, radio, and print media (Al-Ruwaili et al., 2024). On the opposite hand, the arrival of the virtual age in the latter 1/2 of the 20th century and the early 21st century added approximately a transformation in the advertising landscape (MacRury, 2024). This became done by means of the creation of latest technologies inclusive of on-line marketing, social media, and electronic mail advertising, which authorised extra interactive and personalized customer involvement (Alnor, 2024). These virtual marketing communications (DMC) techniques were in particular important in the telecom's enterprise as the level of opposition accelerated and customers obtained better get admission to information and alternative carrier vendors in their desire. In in advance studies, the number one emphasis turned into located on the direct have an effect on that advertising activities had on consumer loyalty (Othman, Harun, De Almeida, & Sadq, 2021). However, extra recent studies have highlighted the significance of service nice as a considerable moderating factor in this relationship. Having a grasp of the relationship among virtual advertising and marketing and provider first-class is extremely essential for businesses like Sudan Telecom who are trying to hold purchaser loyalty in an environment that is continuously changing (Yunus, 2022). This is in particular actual in growing markets like Sudan, wherein virtual adoption and provider expectations are swiftly increasing (Adam, Eltahir, Alnor, Taha, & Musa, 2025).

A poor cognizance of the factors that decide the efficacy of virtual advertising and marketing maintains to exist, specifically in rising markets consisting of Sudan, despite the sizeable adoption of virtual marketing (Kiarie, 2025). A good-sized number of studies has been conducted to research the direct affect that DMC has on client loyalty in loads of settings; but, the position of service high-quality as a moderating variable has received a completely small amount of attention among this research (Al-Refaei, Ali, Ateeq, & Alzoraiki, 2023). Customer perspectives and responses to virtual advertising activities may be greatly inspired by way of provider great, which has the capability to either decorate or undermine the fulfillment of even the maximum revolutionary marketing tasks (Prakash, Bhardwaj, & Jindal, 2024). There is a possibility that virtual advertising and marketing efforts will no longer result in continuous purchaser loyalty in marketplaces where the fine of service being supplied is variable (Karim, Islam, Ibrahim, Pan, & Rahman, 2023).

It is important to be aware that despite the fact that virtual advertising communications have the capability to significantly effect consumer behavior, their performance is frequently contingent at the perceived nice of the services that are being presented. Customer notion and response to virtual advertising activities are substantially inspired by the excellent of the provider supplied, which serves as a important moderating issue (Almarshad & Al-Matari, 2025). There is an opportunity that even the maximum innovative virtual advertising and marketing will no longer be successful in setting up lengthy-time period purchaser loyalty in areas where the satisfactory of provider is variable (Tariq & Liaqat, 2024).

In light of these gaps, the present day observe makes a speciality of Sudan Telecom to assess the effect of digital advertising communications on purchaser loyalty, with a specific emphasis on the moderating function that carrier nice plays in the courting (Mengjie, 2020). In the Sudanese setting, where there are unique marketplace troubles and possibilities, and in which optimizing customer retention is a main strategic goal, this research is of the utmost significance (Abid, Ben-Salha, Gasmi, & Alnor, 2024b). In order to gain a better know-how of the dynamic dating that exists between advertising and marketing techniques and operational excellence, this observe will look into the methods wherein service satisfactory interacts with virtual marketing communications (Smith & Zook, 2024).

Within Sudan Telecom, the number one research hassle this is being investigated by means of this have a look at is the diploma to which service exceptional acts as a moderator within the dating between DMC and client loyalty. As a result, the essential research questions which are guiding this analysis are as follows: (1) How does the usage of virtual advertising communications have an effect on the loyalty of Sudan Telecom's clients? (2) Does the satisfactory of the service both support or reduce the effect that DMC has at the loyalty of customers? The desires of this studies are to investigate the direct impact that DMC has on patron loyalty and to also investigate the methods in which carrier first-rate moderates the link between the 2.

This study makes a number of widespread contributions all collectively. In the primary region, it contributes to the existing frame of expertise at the effectiveness of virtual advertising and marketing with the aid of engaging in empirical research into the moderating impact that carrier best performs within the putting of growing nations, wherein such research is currently constrained. In a second place, it gives useful records for corporations who're worried in the area of telecommunications, particularly Sudan Telecom. These insights allow these organizations to bolster their virtual advertising campaigns and boom client retention via focusing on unique improvements to the first-rate of their services. Third, the research come up with the money for advice for policymakers and

executives who're looking to cultivate higher purchaser loyalty and hold a competitive advantage in virtual settings that are constantly evolving.

LITERATURE REVIEW

Digital Marketing Communications

The time period "digital advertising communications" refers back to the actions that are done on-line so that it will sell services or products (Mohamed et al., 2024). These sports make use of a whole lot of virtual channels, together with social media, that allows you to efficaciously speak with clients (Alnor et al., 2025; Van Brakel, 2020). In the context of these communications, techniques are hired with the goal of attracting and convincing consumers through tailored and targeted content, thereby building an ongoing dialogue with users (Isibor et al., 2025). Marketing strategies had been converted because of the rapid enlargement of digital technology, which has caused a shift in the direction of individualized interactions and direct reference to person users (Van Veldhoven & Vanthienen, 2022). In order to generate charming messages that engage with the audience and generate favorable responses, effective virtual advertising communications contain a combination of content material advertising, public speaking abilties, and virtual public members of the family (Juska, 2021). Companies have the ability to improve their emblem identification, entice new enterprise, and react to the moving panorama of client conduct inside the digital era through harnessing the opportunities of the net and digital resources (Zaki, 2019).

Customer Loyalty

When it involves corporations, patron loyalty is a critical element because it displays the level of happiness and the quantity of repeat purchases made through clients (Febrianto & Arini, 2022). The principle of advertising and marketing and management locations a sizable quantity of emphasis in this element because it's miles a critical element in assuring a regular and lengthy-time period income for businesses (Kirillova & Zyk, 2023). Customer loyalty is encouraged with the aid of a whole lot of factors, including service exceptional, pricing, region, patron happiness, and accept as true with. Each of those components plays an element in influencing purchaser behavior and decision-making tactics, and all of them contribute to the formation of client loyalty (Rahayu & Harsono, 2023). In order for corporations to build a success loyalty program and improve consumer connections, it's miles crucial for them to understand and manage patron loyalty. This will in the long run cause higher profitability and fulfillment within the marketplace (Ramaratnam, Pachuau, Katiyar, Sundharesalingam, & Chandra, 2025).

Service Quality

It is the efficacy and pride with which a service satisfies the expectations of the customer that is known as service first-rate (Okan & Ağaç, 2023). This time period encompasses a number of factors, such as the technique in which the carrier is brought, the levels of satisfaction, the compliance to the wishes, and the ability to exceed the expectancies (Monica & Yusrizal, 2023). It has a enormous effect on the success of corporations in addition to their backside line, since it plays a vital part in making sure patron satisfaction and loyalty. There are many exclusive fashions that have been hooked up to assess carrier best (Martins, 2020). These models were adapted to diverse industries, which includes fast food restaurants, wherein transformative technologies like synthetic intelligence and automation were proven to improve carrier quality (Sari, 2023). Furthermore, Islamic commercial enterprise ethics are used to govern service pleasant strategies in certain companies. These ethics region an emphasis on ideas such as equilibrium, unfastened will, responsibility, and ihsan (Udayalakshmi & Sridevi, 2023). In the stop, presenting notable provider not handiest adds cost to consumers, encourages reliability, and allows to maintain lengthy-time period connections, but it also impacts the purchasing interest and loyalty of clients, that's a vast contributor to the improvement of a a success business (Akanbi & Obafemi, 2024).

Review of Relevant Prior Research and Scholarly Works

Digital Marketing Communications and Customer Loyalty

The use of digital advertising communications is an important aspect inside the method of cultivating consumer loyalty across quite a few commercial enterprise sectors (Anh, Sang, & Pham, 2023). According to investigate, e-advertising conversation has a favorable affect on purchaser satisfaction and loyalty at Vietnamese industrial banks (Putra, Sanjaya, Wirga, Gede, & Sukarta, 2023). On the opposite hand, digital advertising has a big effect on client loyalty in the instance of Gojek in Denpasar City. Furthermore, the significance of digital advertising within the procedure of building brand loyalty is emphasized, with a selected attention on the role that consider, first-class belief, and competitive gain play inside the procedure of growing patron loyalty (An & Liu, 2025). The case of Kopi Kenangan in Pekanbaru demonstrates that virtual advertising has an awesome have an effect on on both the emblem picture of espresso stores and the loyalty of their customers (Tarigan, Fauzi, Ricy,

Wandhira, & Nofirda, 2023). This is evidenced via the fact that the effect of digital advertising and marketing is seen to be seen. Furthermore, the interconnectivity of virtual customer enjoy, emotional advertising, customer happiness, and loyalty highlights the relevance of a holistic strategy in employing digital techniques to promote customer loyalty (Schmidt, Weber, Müller, Carter, & Hoffmann, 2025).

H1: There is a statistically significant positive correlation between Digital Marketing Communications and Customer Loyalty.

Service Quality and the Relationship of Digital Marketing Communications to Customer Loyalty

Service pleasant is a important thing in promoting client loyalty across companies. Putri and Wiyadi's studies suggests that carrier nice has a full-size effect on consumer loyalty via patron pride (Adhitya, 2025). Furthermore, Dolorosa, Julianti, and Suharyani underline the importance of carrier satisfactory elements which includes simplicity of use and verbal exchange in promoting client retention. Furthermore, Louisa and Simbolon display that the best of e-offerings has a great effect on consumer e-agree with and e-pride, which leads to virtual client loyalty (Dolorosa, Julianti, & Suharyani, 2023). This research spotlights the significance of carrier best in constructing customer loyalty. Furthermore, top virtual advertising and marketing communications, as tested by means of Putro Pamungkas, will have a significant impact on patron pride and loyalty, stressing the significance of carrier satisfactory and digital advertising in increasing purchaser loyalty (Abid, Ben-Salha, Gasmi, & Alnor, 2024a).

H2: Service quality has no meaningful impact on the relationship between digital marketing communications and customer loyalty.

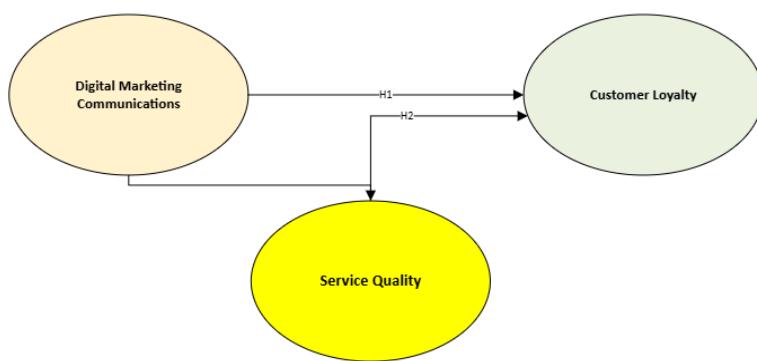


Figure 1. Theoretical framework.

Research Gaps

While the impact of virtual advertising communications on patron loyalty has been extensively explored, there has been little studies into how provider excellent moderates this hyperlink. Most previous research focuses on the direct consequences of DMC or carrier first-rate on purchaser loyalty, with out thinking of any capacity interactions among those variables.

Much of the prevailing literature is both enterprise-huge or region-particular, which include banking or retailing. There is a lack of research targeted at the telecommunications enterprise, in particular in growing international locations like Sudan. This context-particular take a look at is vital for knowledge awesome marketplace dynamics and consumer behavior.

Existing studies frequently cognizance on remoted traits that influence patron loyalty. Comprehensive models that combine severa elements, including as DMC, provider best, and consumer pleasure, are required to offer a greater holistic view of what motivates client loyalty.

Most research use go-sectional designs, which accumulate statistics at a particular point in time. Longitudinal research that music adjustments over time are required to comprehend the changing nature of digital marketing strategies, service high-quality, and purchaser loyalty.

The fast evolution of virtual era and their incorporation into advertising methods want ongoing evaluation. The literature lacks information on the have an impact on of rising virtual equipment and structures on patron loyalty, as well as how those innovations is probably used to maintain or improve provider fine (Al-Dahmashi and Al-Matari, 2025; Alanazi and Al-Matari, 2025).

By filling those gaps, the present day have a look at hopes to offer a more nuanced information of the relationship among digital advertising communications, carrier first-rate, and patron loyalty, specifically inside the context of Sudan Telecom Company.

METHODOLOGY

Research Design and Approach

This takes a look at uses a quantitative studies design to assess the influence of virtual advertising and marketing communications (DMC) on customer loyalty, with service quality acting as a moderating variable, in the context of Sudan Telecom Company. The take a look at employs a move-sectional survey layout, which entails amassing information from a sample of customers at a specific point in time. This approach is appropriate for investigating relationships between variables and comparing hypotheses.

Data Collection Methods Sampling

The folks who use Sudanese telecommunications companies make up the point of interest group or observe population. Out of the four hundred surveys that have been despatched out, 310 were lower back, that's 77.5%. The stratified random choice makes positive that all kinds of clients are represented, which includes residential, commercial, urban, and rural ones.

Data Collection Instrument:

A separate survey changed into made to find out critical things, like how people felt approximately digital advertising messages like social media and e-mail campaigns in phrases of the way frequently they came, what they said, and how powerful they have been visible to be. To find out how unwavering a customer became, they were asked to fee their fashionable pleasure, emblem support, and chance to buy again. The SERVQUAL model become used to rate the excellent of the provider. This model seems at things like dependability, responsiveness, guarantee, empathy, and tangible functions (Setiono & Hidayat, 2022). A small group of customers looked over the form beforehand of time to make sure it changed into clear and accurate. The ballot might be given both on line and in character at Sudan Telecom stores. The ballot might be given out over the route of four to six weeks.

Rational for the Chosen Methods

A quantitative technique lets you objectively scale variables and test your hypotheses statistically. It is likewise easier to apply the consequences to all of Sudan Telecom's clients whilst a big pattern is used. Cross-sectional polls are an excellent way to get a clean photo of what humans suppose and do over a positive term. This technique works whilst resources are confined and results need to be visible fast. Stratified random sampling makes sure that one-of-a-kind organizations of customers are fairly represented, which lets us absolutely recognize how Customer Data Management (DMC) impacts the first-class of provider companies throughout the complete consumer base. A general questionnaire makes it feasible to maintain gathering records from individuals. There is not any doubt that the records are accurate and dependable whilst verified metrics like SERVQUAL are used. The cause of the questionnaire is to keep song of all of the vital variables that people are inquisitive about. This will permit for in-intensity research of the hyperlinks among DMC, provider issuer happiness, and purchaser loyalty. Online and face-to-face manner have been used to gather the facts: Using each on line and face-to-face survey techniques makes them less complicated for individuals who select or can't use digital gear to participate. Direct touch in stores can help get extra responses and make certain that the clients are various. The take a look at's approach is meant to offer beneficial facts about how digital marketing interactions and service fine affect Sudan Telecom clients' loyalty.

DATA PRESENTATION AND ANALYSIS

Assessment of Measurement Model

In this step, the exceptional of the expressions used on this version is assessed using the Smart PLS software program. This evaluation involves figuring out the convergence and consistency of those expressions among themselves. Using the Convergent Validity test, the aim is to ensure that those expressions can well degree the applicable homes as well as the measurement's balance across diverse situations. Furthermore, an evaluation is undertaken to determine the logical strong point and shortage of overlap amongst these statements, using the Discriminate Validity test.

Convergent Validity

Convergent validity is a critical side of structural equation modeling (SEM), specifically Partial Least Squares SEM (PLS-SEM). Convergent validity determines if the indicators (take place variables) of a latent construct (factor) degree the same essential idea. Several metrics are mechanically used to evaluate convergent validity in PLS-SEM, along with component loading, Cronbach's alpha, composite reliability, and common variance extracted (AVE). Here is an cause of every criterion:

Factor Loading

Basis: Factor loading denotes the strength and course of the link between a trademark and its latent assemble. In PLS-SEM, factor loadings ought to be statistically extensive and ideally more than 0.7 to reveal a sturdy affiliation.

Cronbach's Alpha

The foundation for this is that Cronbach's alpha is a measure of the reliability of internal consistency. The quantity to which a group of signs (items) measures a single latent assemble in a steady way is evaluated while using this method. A high Cronbach's alpha (usually greater than 0.7) in PLS-SEM suggests that the statistics has an excessive degree of inner consistency.

Composite Reliability

Composite reliability is an extra measure of reliability that analyzes the consistency of indicators in measuring a latent assemble. This degree is grounded within the idea of reliability. In PLS-SEM, the composite reliability has to ideally be greater than 0.7, which suggests that the signs are dependable tests of the underlying idea.

Average Variance Extracted (AVE)

According to statistical evaluation, convergent validity is proven whilst the Average Variance Extracted (AVE) is bigger than 0.50 (Alnor, 2025; Hair Jr et al., 2021). Additionally, issue loading, Cronbach's Alpha, and composite reliability are applied in the manner of comparing convergent validity in PLS-SEM. According to Amora (2021), element loading is a method that evaluates the connection among the determined variables and the latent constructs that lie beneath them. Cronbach's Alpha and composite reliability are strategies that compare the inner consistency of the size device respectively (Amora, 2021).

Table 1. Results of the Stability and Composite Reliability Test for the Model.

variables	Items	Loadings	Cronbach's Alpha	Composite Reliability	The average variance extracted AVE
Customer Loyalty	CL1	0.841			
	CL2	0.835			
	CL3	0.699	0.777	0.836	0.789
	CL4	0.676			
	CL5	0.620			
Service Quality	SQ1	0.651			
	SQ2	0.729			
	SQ3	0.668	0.761	0.794	0.517
	SQ4	0.653			
	SQ5	0.739			
Digital Marketing Communications	DMC1	0.578			
	DMC2	0.729			
	DMC3	0.652	0.789	0.810	0.531
	DMC4	0.732			
	DMC5	0.727			

Source: Compiled by researchers based on the outputs of Smart PLS4.

The balance and composite reliability checks for the take a look at's classes are shown in Table 1. The effects show that Customer Loyalty, Service Quality, and Digital Marketing Communications all have commonly accurate reliability and validity levels. The high-quality of the measurements for Customer Loyalty is good, with excessive loadings for the first two matters and moderate loadings for the rest. It has corrected internal consistency, as shown via its Cronbach's Alpha and Composite Reliability values, and suitable convergent validity, as proven by means of its AVE value. Service Quality is likewise reliable enough, as proven by means of the fact that object loadings are within ideal stages and reliability indicators meet suggested thresholds. Even though the AVE cost is lower than the Customer Loyalty price, it nevertheless proves the construct's convergent validity. Digital Marketing Communications has a similar stage of measurement electricity, with loadings that range from mild to sturdy and reliability coefficients which might be higher than normal benchmarks. The AVE variety shows that its indicators have enough of the same variant. The general outcomes show that the measurement model is strong, dependable,

and able to nicely capture the underlying constructs that have been studied, despite the fact that a few gadgets across constructs have noticeably lower loadings.

Discriminate Validity

The Fornell-Larcker Criterion evaluates discriminant validity by evaluating the square root of the average variance extracted (AVE) for each construct to its correlations with other constructs. Discriminant validity is established whilst the AVE value for a sure assemble is extra than its correlation with all other constructs (Henseler, Ringle, & Sarstedt, 2015; Hesham et al., 2024).

The Heterotrait-Monotrait Ratio of Correlations (HTMT) Criterion assesses discriminant validity in variance-based structural equation modeling. It empirically assesses how exclusive constructs are from one another. A threshold of 0.85 is proposed for HTMT when the constructs inside the route model are conceptually greater awesome

The Fornell-Larcker Criterion and move-loadings had been the dominant methods for evaluating discriminant validity, but Henseler et al. (2015) proposed the HTMT criterion as an alternative technique, which has shown high sensitivity and specificity in detecting discriminant validity issues (Benzerrouk, Alnor, Al-Matari, Alhebri, & Al-bukhrani, 2023; Cepeda-Carrión, Hair, Ringle, Roldán, & García-Fernández, 2022).

To summarize, while studying the results of the discriminant validity test inside the PLS-SEM technique, researchers must consider using the Fornell-Larcker Criterion, go-loadings, and the HTMT Criterion to make sure the individuality of the constructs in the look at and to locate any troubles with discriminant validity.

Table 2. Fornell-Larcker Criterion.

variables		CL	DMC	SQ
Customer Loyalty	CL	0.837		
Digital Marketing Communications	DMC	0.561	0.686	
Service Quality	SQ	0.516	0.627	0.678

Source: Compiled by researchers based on the outputs of Smart PLS4.

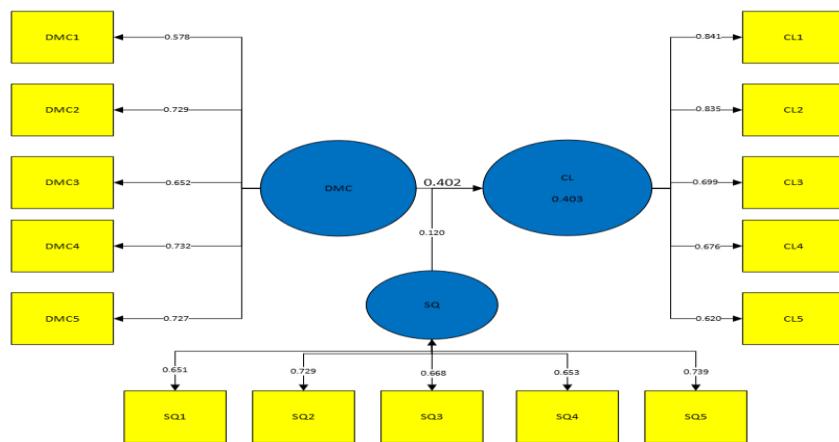
The Fornell-Larcker Criterion outcomes are shown in Table 2. These are used to test the discriminant validity of the look at's classes. The diagonal values display the square roots of the AVE for every variable. To ensure discriminant validity, those values should be better than the institutions with different constructs. It can be visible within the desk that the square root AVE values for Customer Loyalty, Digital Marketing Communications, and Service Quality are all better than their related inter-assemble correlations. As an instance, Customer Loyalty has a better cost than its correlations with each Digital Marketing Communications and Service Quality. This suggests that the assemble is particular and measures a completely unique concept. In the same way, the values for Digital Marketing Communications and Service Quality are better than their correlations with other factors. This suggests that the discriminant validity is good. Overall, the outcomes show that all classes are sufficiently unique from one another, which supports the version's reliability and validity.

Table 3. The heterotrait-monotrait ratio of correlations (HTMT).

variables		CL	DMC	SQ
Customer Loyalty	CL			
Digital Marketing Communications	DMC	0.610		
Service Quality	SQ	0.581	0.716	

Source: Compiled by researchers based on the outputs of Smart PLS4.

The Heterotrait-Monotrait ratio of institutions (HTMT) is shown in Table three. This is a greater accurate manner to test the discriminant validity in structural equation modeling. Accepted thresholds say that HTMT values must be much less than 0.85, but values as much as 0.90 may additionally nevertheless be quality based on the studies state of affairs. Customer Loyalty, Digital Marketing Communications, and Service Quality all have HTMT numbers which are inside ideal degrees, as proven within the table. There is a clear distinction among Customer Loyalty and Digital Marketing Communications, as shown by their modest ratio. In the identical manner, the HTMT range among Customer Loyalty and Service Quality stays below the upper restriction, which supports the idea that the two variables are exclusive. The biggest distinction is seen among Digital Marketing Communications and Service Quality, but it's nonetheless a good amount of distinction. In standard, these results show that the constructs are fairly exceptional from every other, which helps the size model's reliability.

**Figure 2.** General Structural Model for the Study.

Source: Compiled by researchers based on the outputs of Smart PLS4.

Testing the Internal Model (Structural Model)

In this section, we examine the structural version's prediction skills, examine the linkages among constructs, and test the degree of correlation. In addition, we run the appropriate exams to evaluate the model.

Validity of the Structural Model

The recommended standards for inspecting the outcomes of the Validity of the Structural Model check (R^2 , F^2) within the PLS-SEM methodology are as follows:

- Fauzi (2022) defines dimension model evaluation as comparing the hyperlink between a construct and its discovered items, together with reliability, indicator loading, and internal consistency.
- The structural model assessment evaluates course coefficient significance and relevance, as well as the version's explanatory and predictive strength. The coefficient of dedication (R^2), effect length (f^2), and move-validated predictive ability take a look at (CVPAT) are key measures for assessing structural models in PLS-SEM (Hair Jr et al., 2021).
- New hints: In addition to conventional PLS-SEM evaluation criteria, extra guidelines encompass PLS prediction (a novel method for trying out a model's out-of-sample prediction), version contrast metrics, and plenty of complementary methodologies for making sure the robustness of the results (Hair, Risher, Sarstedt, & Ringle, 2019).

Table 4. Validity of the Structural Model.

Variables	Coefficient of Determination (R^2)	Explanatory size (F^2)
Customer Loyalty	CL	0.403
Digital Marketing Communications	DMC	0.167
Service Quality	SQ	0.074

Source: Compiled by researchers based on the outputs of Smart PLS4.

The coefficient of determination (R^2) and the explanatory length (F^2) for the important thing factors are proven in Table 4, which helps the validity of the structural version. The R^2 price for Customer Loyalty shows a mild quantity of defined variance, which means that that the version explains an excellent chunk of adjustments in this outcome variable. More statistics about the consequences sizes introduced about by means of Digital Marketing Communications and Service Quality is proven by using the F^2 numbers. Digital Marketing Communications has a medium explanatory impact, because of this it makes a large difference in predicting Customer Loyalty. Service Quality has a smaller however nonetheless great effect length, which indicates that it's far a further feature that contributes. Overall, Table 4 indicates that the version is a great predictor of Customer Loyalty and that each predictors are important in understanding variations in Customer Loyalty.

Discussion of Testing the Study Hypotheses

When reviewing the effects of testing observe hypotheses using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique, numerous elements must be taken into consideration. These standards are vital to make certain the validity and reliability of the evaluation. The following are the encouraged standards for inspecting the results of trying out this observe's hypotheses using the PLS-SEM methodology:

- Conducted speculation testing the usage of self assurance durations and P-values. In PLS-SEM, researchers generally use P values to evaluate hypotheses, with each hypothesis relating to a direction inside the model. P values may be one or -tailed (Kock, 2016).

- Test the structural model in PLS-SEM to make certain unidimensional assemble assumptions are legitimate within the sample. This includes determining the links among latent variables and their indicators (Benzerrouk et al., 2024; Kock, 2016).

To compare the have a look at hypotheses, we use the Bootstrapping method to estimate the relationships within the structural version. These estimates constitute the predicted institutions between constructs, with course coefficients starting from -1 to 1. Values near 1 imply strong effective relationships, while values close to -1 indicate strong terrible relationships. Typically, statistically great correlations have p-values much less than 5%. Coefficients near 0 in each guidelines imply a weak link (Kock, 2016).

Table 5. Testing the Hypotheses.

Hypothesis	Paths	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Decision
H1	Digital Marketing Communications -> Customer Loyalty	0.402	0.400	0.117	3.056	0.000	Hypothesis Accepted
H2	Service Quality x Digital Marketing Communications -> Customer Loyalty	0.120	0.120	0.055	1.931	0.002	Hypothesis Accepted

Source: Compiled by researchers based on the outputs of Smart PLS4.

The study's hypothesis checking out consequences are proven in Table 5, which shows that there are sizable relationships between the factors. The results display that virtual advertising and marketing communications have an advantageous and statistically full-size impact on consumer loyalty. This is proven by means of the direction coefficient and sturdy t-price, because of this that H1 is frequent. Supporting H2, the relationship between Service Quality and Digital Marketing Communications also has a big high-quality effect on Customer Loyalty. This proves that Service Quality balances the relationship, which makes virtual advertising and marketing greater powerful. Both hypotheses are more often than not proper, which shows how vital it is to combine digital advertising and marketing with appropriate carrier standards.

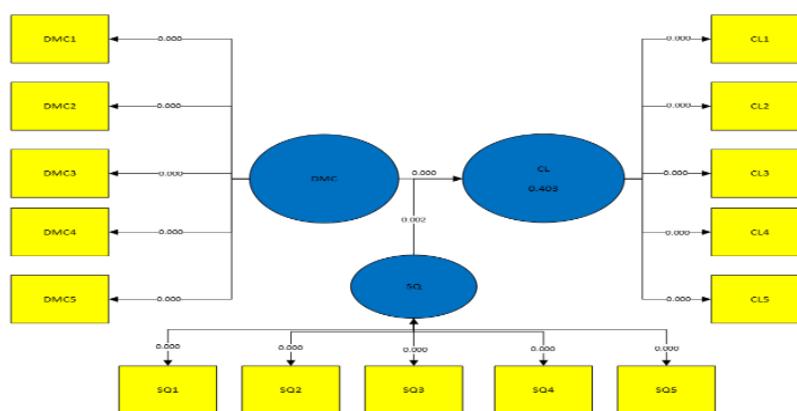


Figure 3. Results of path coefficients.

Source: Compiled by researchers based on the outputs of Smart PLS4.

If you need to peer how nicely a regulating variable works, you must use interaction analysis in regression or structural fashions. This is performed by including the variable that interacts with the impartial and moderating elements to the model after which using the direction coefficient, regression coefficient, and t-cost or P-value to examine how it influences the based variable. If the impact of the interaction variable is massive, it means that the moderating variable changes the scale or direction of the link among the independent and dependent variables. You can also use different strategies, like interaction curve analysis or tests that take a look at the variations in coefficients between groups, to reveal the moderating impact genuinely.

Table 6. Testing the effectiveness of the moderating variable (service fine) in minimizing the impact of digital advertising communications on customer loyalty.

variable -> variable	Path Coefficient	P Values	Hypothesis
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Digital Marketing Communications -> Customer Loyalty	0.402	0.000	Accepted
Service Quality -> Customer Loyalty	0.271	0.000	Accepted
Service Quality x Digital Marketing Communications -> Customer Loyalty	0.120	0.002	Accepted

Source: Compiled by researchers based on the outputs of Smart PLS4.

Service Quality acts as a moderator inside the link among Digital Marketing Communications and Customer Loyalty, as proven in Table 6. The consequences sincerely display that digital marketing communications have a superb impact on consumer loyalty, proving that right digital interactions make customers extra devoted. Service Quality additionally has a large impact on Customer Loyalty, which suggests how important it's miles to keep clients even if you do not do whatever else. Also, there's a statistically sizable dating term among Service Quality and Digital Marketing Communications. This way that Service Quality makes virtual verbal exchange efforts extra powerful. Overall, those consequences show that everyone the suggested connections are valid. This highlights how important service exceptional is for making digital advertising techniques paintings better.

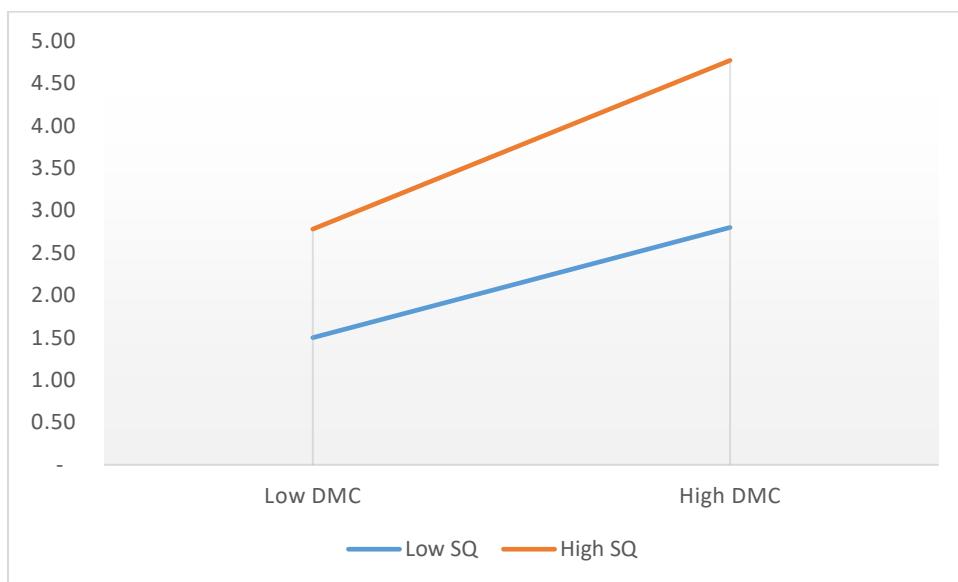


Figure 4. Path coefficients of the interplay (Digital Marketing Communications * Service Quality). Customer Loyalty.
Source: Compiled by researchers based on the outputs of Microsoft Excel.

DISCUSSION

Interpretation of Findings

The findings of this examine provide important insights into the linkages among virtual marketing communications (DMC), provider nice, and consumer loyalty within the context of Sudan Telecom Company. The consequences show that DMC has a good sized and favorable impact on patron loyalty, with a path coefficient of 0.402 and a high statistical importance ($P = 0.000$). This shows that a hit virtual advertising technique, along with focused messaging, tailored content material, and attractive on-line interactions, are crucial for growing consumer loyalty. Furthermore, carrier great become observed to have a considerable advantageous effect on patron loyalty (path coefficient = 0.271, $P = 0.000$), emphasizing the want of continually presenting amazing provider to preserve clients.

The examine additionally investigated the impact of service fine in mediating the connection among DMC and patron loyalty. The findings indicate that service best does mitigate this association, with a course coefficient of 0.120 and statistical importance ($P = 0.002$). This study shows that, whilst DMC alone can boom patron loyalty, the gain is magnified while observed with excellent carrier pleasant. Customers are much more likely to live dependable after they get hold of not best splendid virtual communications but also reliable and first-rate carrier.

Comparison with Prior Research

The findings of this examine are steady with and expand on preceding research. Previous research has emphasized the significance of virtual marketing in growing patron happiness and loyalty throughout a extensive variety of businesses (Al-Ruwaili et al., 2024). Anh et al. (2023) And Putra et al. (2023) found that digital advertising improves patron loyalty inside the banking and ride-hailing industries, respectively. The new observe helps

comparable findings, confirming that virtual advertising is a treasured instrument for selling client loyalty, in particular inside the telecoms quarter.

Prior studies support the look at's locating that service nice has a major impact on customer loyalty. Numerous studies have careworn the relevance of provider first-class as a predictor of purchaser loyalty, with Udayalakshmi and Sridevi (2023) and An and Liu (2025) showing comparable findings in extraordinary situations. The new observe provides to the body of information by using demonstrating the unique importance that carrier pleasant performs inside the telecommunications business.

Furthermore, the observe's examination of carrier great as a moderating element provides a extra nuanced angle of the prevailing literature. While earlier studies have frequently checked out the direct effects of DMC and service exceptional on purchaser loyalty, this observe goes past that to expose how provider best improves DMC efficacy. This locating is regular with Chabachib, Hersugondo, Ardiana, and Pamungkas (2019) research, which emphasized the importance of carrier high-quality and virtual advertising and marketing in riding client pleasure and loyalty. However, the cutting-edge examine is going past and quantifies the moderating impact, giving actual evidence that outstanding service first-rate can extensively improve the loyalty-improving outcomes of DMC.

In end, this study validates and extends on previous research, confirming the importance of virtual advertising and carrier first-class in fostering consumer loyalty. It additionally presents a completely unique attitude by way of highlighting the synergistic influence of those two aspects, recommending that corporations, in particular within the telecoms zone, should attention on each powerful virtual advertising and marketing strategies and keeping true service great to optimize client loyalty.

CONCLUSION

This observe investigated the effect of Digital Marketing Communications (DMC) on Customer Loyalty, with an emphasis on the moderating function of Service Quality at Sudan Telecom Company. The applied look at used quantitative methodologies, and the analysis yielded several noteworthy conclusions. First, Digital Marketing Communications had been found to have a statistically big and tremendous impact on Customer Loyalty, with a course coefficient of 0.402 and a P value of 0.000, implying that powerful DMC strategies are crucial for increasing patron loyalty. Second, service pleasant turned into located to have a sturdy fine impact on purchaser loyalty, with a course coefficient of 0.271 and a P cost of 0.000. Furthermore, the interplay among Service Quality and DMC was statistically widespread (course coefficient = 0.120, P value = 0.002), indicating that Service Quality performs a moderating role in the link between DMC and purchaser loyalty. These findings highlight the significance of each DMC and Service Quality in promoting client loyalty.

This examine's findings underscore the significance of virtual advertising communications and carrier first-rate in riding purchaser loyalty, mainly within the telecoms industry. By offering individualized and applicable records, digital advertising communications assist to interact customers, create brand identity, and foster lengthy-time period loyalty. The study does, however, show that once these digital initiatives are blended with exact Service Quality, their effect is greatly multiplied. Service high-quality not simplest has a right away effect on purchaser loyalty however additionally amplifies the beneficial effects of DMC, making it an essential thing in purchaser retention efforts. For corporations like Sudan Telecom, the mixing of successful virtual advertising with incredible provider shipping is important to maintaining robust client relationships and gaining lasting aggressive gain in a constantly changing marketplace.

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