

Service Quality and Digital Interface and Customer Loyalty in Saturated Mobile Markets: Multivariate Evidence from Mobilis -Algeria

جودة الخدمة والواجهة الرقمية و ولاء العملاء في أسواق اتصالات الهاتف النقال المشبعة:
شواهد من موبيليس-الجزائر

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Abstract

Algeria's saturated mobile market - 116.5% penetration, minimal switching costs - forces operators to earn loyalty through service quality rather than promotional volume. This exploratory study tests seven e-marketing mix dimensions against a seven-item loyalty composite (Cronbach's $\alpha = .868$) operationalising behavioural, attitudinal, and cognitive sub-dimensions. Following Oliver's (1999) framework, which positions satisfaction as an antecedent rather than a component of loyalty, a satisfaction item was excluded on conceptual grounds. Among 95 digitally active Mobilis subscribers, three dimensions predict loyalty independently: Product quality ($\beta = .287, p = .018$), Website Design ($\beta = .250, p = .050$), and After-Sales service ($\beta = .236, p = .046$). Promotion is non-significant despite a strong bivariate correlation, consistent with a perceptual integration effect. Price is non-significant throughout. Findings are bounded to young, educated, digitally active subscribers; they should not be generalised to the full Mobilis subscriber base. Future work should replicate with PLS-SEM.

Keywords: E-Marketing Mix, Customer Loyalty, Service Quality, Digital Interface, Mobile Telecommunications.

JEL Classification: M31, L96, O33, C83.

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ملخص

في ظل تشبع سوق اتصالات الهاتف النقال في الجزائر (نسبة انتشار 116.5%)، أصبح الاحتفاظ بالعملاء أولوية استراتيجية تفوق اكتساب عملاء جدد. تهدف هذه الدراسة الاستكشافية إلى اختبار تأثير سبعة أبعاد من المزيج التسويقي الإلكتروني على ولاء عملاء موبيليس، بالاعتماد على استبيان إلكتروني مقطعي موجه لعينة من المشتركين النشطين رقميا. وقد تم بناء مؤشر مركب من سبعة بنود ($\alpha = 0.868$) لقياس الأبعاد السلوكية والاتجاهية والمعرفية للولاء. واستنادا إلى إطار Oliver (1999)، تم استبعاد الرضا كمكون من الولاء.

أظهر تحليل الانحدار أن جودة المنتج ($\beta = 0.287$)، ($p = 0.018$)، وتصميم الموقع الإلكتروني ($\beta = 0.250$)، ($p = 0.050$)، وخدمات ما بعد البيع ($\beta = 0.236$)، ($p = 0.046$) تؤثر بشكل معنوي على الولاء، بينما لم يظهر كل من الترويج والسعر أي دلالة إحصائية. وتظل النتائج مقيدة بخصائص العينة المدروسة. كلمات مفتاحية: مزيج تسويقي إلكتروني، ولاء العملاء، جودة الخدمة، واجهة رقمية، اتصالات الهاتف النقال.

تصنيف JEL: M31, L96, O33, C83

Introduction

At 116.5% mobile penetration (SAMENA Council, 2024), Algeria's mobile market has stopped growing in any meaningful sense. Every subscriber one operator gains is another operator's loss. Mobilis - the state-owned incumbent, with 22.51 million subscribers and a 43.7% market share as of December 2023 (ARPCE, 2025)- is not immune to this arithmetic. The question is no longer how to win new users, but how to keep the ones already on the network.

The study's own survey data put a human face on the retention problem. Among the 165 respondents who had used a Mobilis SIM at some point, 73 - that is 44.2% - had since moved to a competitor. When asked why, they were surprisingly reluctant to blame price: only 6 out of 72 who gave a reason (8.3%) cited cost. Far more common were complaints about insufficient promotional offers (38.9%) and poor network quality (26.4%). These are two very different kinds of problems, and they point in different strategic directions. This paper focuses on a third lever that sits between them: the quality of the digital interface through which subscribers actually experience the brand day to day.

Algeria counted roughly 32.5 million internet users in 2023 - 72.9% penetration (ITU, 2023)- and Facebook's advertising platform reached an estimated 24.85 million Algerian accounts in early 2024 (DataReportal, 2024). The Mobilis website and app are not peripheral; they are the principal non-physical touchpoint for account management, bill payment, and promotional offer browsing. Whether that touchpoint builds commitment or erodes it is, as far as the Algerian literature is concerned, still an open question.

Two prior studies are relevant. (Yakhlef & Saoudi, 2017) documented positive associations between the traditional marketing mix and loyalty at Mobilis. (Malki & Zeddoun, 2025) found that e-CRM interface quality independently predicts loyalty. Neither, however, estimated a full multivariate e-marketing mix model that could separate each dimension's independent contribution from the variance it shares with other dimensions. That separation matters greatly for the promotion dimension, as this paper shows.

Three hypotheses structure the analysis. H1 predicts positive bivariate correlations between six e-marketing dimensions and loyalty (H1b is a null test for price). H2 is treated as exploratory rather than confirmatory. It predicts that service-quality dimensions (Product, Website Design, After-Sales) will emerge as the dominant independent predictors in the multivariate model - a

prediction grounded in the theoretical framework developed in Section 1.3. Because H2 is derived from the same framework that motivates H3, rather than from an independent body of prior evidence, it cannot serve as a validated a priori prediction. Its function here is to organise the analysis and generate a testable proposition for future independent replication. H3 proposes that Promotion's strong bivariate association with loyalty will dissolve once interface quality dimensions are simultaneously controlled, consistent with the perceptual integration logic developed in Section 1.3.

1. Theoretical Framework and Literature Review

1.1 The E-Marketing Mix

(McCarthy, 1960) 4P model - product, price, place, promotion - has guided marketing strategy for over sixty years, and it has aged better than many of its critics admit. But it was designed for physical products sold through physical channels. Applied to a mobile telecom operator whose primary customer interaction happens through an app or website, the original framework misses some important dynamics. (Mohammed et al., 2003) and (Chaffey, 2019) each proposed digital extensions; what they have in common is the recognition that the digital interface is simultaneously a distribution channel, a service quality signal, and a marketing communication vehicle. It does three things at once, which the 4P model separates.

This study operation alises a seven-dimension e-marketing mix: e-product (service variety and currency); e-price (transparency and payment flexibility); e-promotion (multi-channel digital advertising); e-distribution (24/7 access); website design (visual appeal); after-sales e-service (digital complaint handling); and privacy/security - data protection and perceived transactional safety; (Malhotra et al., 2004)-. The 7P baseline is deliberately chosen over richer single-dimension instruments such as WebQual (Loiacono et al., 2007). The logic is one of diagnostic sequencing: before deciding which dimension to invest in measuring deeply, it is useful to know which dimensions carry independent loyalty signal in the first place. That is what this study establishes.

1.2 Customer Loyalty in Digital Telecom Contexts

(Oliver, 1999) defines loyalty as 'a deeply held commitment to rebuy or repatronize a preferred product/service consistently in the future, despite situational influences and marketing

efforts having the potential to cause switching behaviour.' In Algeria's prepaid market - where 95.15% of Mobilis subscribers can change operator by simply buying a new SIM card - this definition has immediate practical meaning. Loyalty is not contractual inertia here. (Dick & Basu, 1994) distinguish between behavioural loyalty (repeat purchase) and attitudinal loyalty (genuine preference), arguing that durable loyalty requires both. In Algeria's prepaid market, only the attitudinal form is meaningful; behavioural continuity without positive affect is fragile and will not survive a better competitor offer.

One measurement decision follows directly from Oliver's framework and shapes the loyalty composite used throughout this analysis. Satisfaction, in Oliver's (1999) model, is an antecedent of loyalty - a precondition that feeds into it - not a component of it. Including a satisfaction item within a loyalty scale conflates the predictor with the outcome and inflates the apparent relationship between loyalty and everything that also predicts satisfaction. The loyalty composite used here is therefore restricted to seven items (L1, L3, L4, L5, L6, L7, L8; Cronbach's $\alpha = .868$) covering behavioural (regular use, continuity, recommendation), attitudinal (positive affect, pride), and cognitive (brand knowledge) sub-dimensions. Item L2 ("I am satisfied with Mobilis e-services") is retained in Appendix A for instrument transparency but excluded from all composite scores and analyses.

1.3 Theoretical Rationale for H3: Perceptual Integration

Three theoretical mechanisms ground H3's prediction that Promotion's loyalty effect will dissolve once interface quality dimensions are simultaneously controlled.

The first is Oliver's (1999) expectation-disconfirmation logic. When a subscriber uses the Mobilis website and the experience confirms - or disconfirms - prior expectations, that direct encounter leaves a stronger evaluative trace than any advertisement. (Petty & Cacioppo, 1986)'s Elaboration Likelihood Model formalises this asymmetry: direct product or service experience constitutes a central-route input that generates strong, persistent attitude change, whereas advertising constitutes a peripheral cue whose influence is shallower and more easily displaced. A promotion tells you what the operator wants you to think; the interface shows you what the operator actually delivers.

The second mechanism is Chaffey's (2019) integrated digital experience. Digitally engaged users do not decompose their experience of a brand into separate marketing mix elements. They encounter the website as a whole. The visual design, the promotional offers listed on it, the ease of accessing services, and the quality of the after-sales support channel are experienced simultaneously. Holding interface quality constant therefore removes the primary environment through which promotional signals reach the subscriber. The promotion loses its independent channel.

The third mechanism is Service-Dominant Logic (Vargo & Lusch, 2004). SDL argues that value is created in the service encounter, not in the product or the promotional message. A promotional campaign that directs a subscriber to a frustrating digital interface does not add value - it subtracts it, by making the gap between promise and delivery salient. Under SDL, promotional effectiveness is downstream of interface quality, not upstream.

H3 (Perceptual Integration): In a digitally active telecom market, the quality of the digital interface functions as the primary loyalty heuristic, such that promotional signals carry no independent loyalty weight once interface quality is controlled for. This hypothesis would be falsified if Promotion retained a statistically significant coefficient in a full model including Website Design, Product, and After-Sales as simultaneous predictors.

1.4 Hypothesis Summary

H1 (main): The six non-price e-marketing dimensions will correlate positively with loyalty (H1a); price will show no significant positive correlation (H1b, null).

H2 (exploratory): It predicts that service-quality dimensions - Product, Website Design, and After-Sales - will emerge as the dominant independent predictors in the multivariate model, a prediction grounded in the theoretical framework developed in Section 1.3. Because H2 is derived from the same framework that motivates H3, rather than from an independent body of prior evidence, it cannot serve as a validated a priori prediction. Its function here is to organise the analysis and generate a testable proposition for future independent replication.

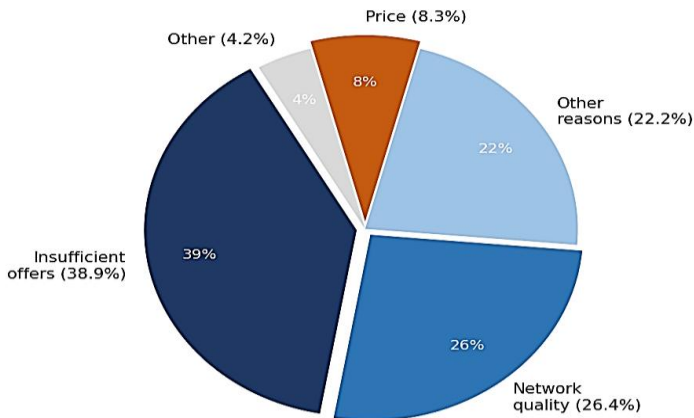
H3: Promotion will lose independent predictive power once interface quality dimensions are simultaneously controlled (see Section 1.3).

2. The Algerian Mobile Market

Three structural features of the Algerian mobile market define the competitive environment in which this study's findings should be situated. First, saturation: ARPCE (2025) reported 51.52 million active subscriptions in a country of roughly 44 million people at end-2023. The market has nowhere left to grow except by taking customers from competitors. Second, prepaid dominance: approximately 95.15% of Mobilis subscribers are on prepaid plans, meaning they can - and regularly do - change operator without any contractual penalty. Loyalty cannot be taken for granted. Third, digital growth with demographic skew: 32.5 million internet users (ITU, 2023), but penetration is concentrated among younger, urban, and educated populations - precisely the group overrepresented in this study's convenience sample, as acknowledged in Section 6.

Mobilis operates in a regulated oligopoly alongside Djazzy (Veon) and Ooredoo (Qatar). As the state-owned incumbent, it benefits from brand associations linked to national infrastructure and institutional reliability - but this also means it is held to a higher standard when service quality falls short. Its Mobilis Store app and main website are the primary non-physical channels for the account management and promotional offer browsing that this study examines.

Fig .1 . Primary Reasons for Switching Away from Mobilis (n = 72 former users).



Source: Authors' calculations from raw survey dataset.

3. Data and Methodology

3.1 Research Design and Sample

A cross-sectional electronic survey was administered via Google Forms in Constantine, Algeria, during April–May 2025. Respondents were recruited through social media and university networks. Participation was voluntary and uncompensated. The questionnaire's branching logic routed respondents without Mobilis experience past the Likert sections, so analytic sample sizes vary by analysis: N = 221 for demographic frequencies; n = 95 complete cases for the full regression.

The regression sample is determined by listwise deletion applied across all seven construct scores and the loyalty composite simultaneously. Within each construct, scores were computed as the person-level mean of answered items, meaning a respondent needed to answer at least one item per construct to contribute a construct score; Cronbach's alpha for the loyalty composite was computed on the 88 respondents who answered all seven loyalty items. The missing data mechanism is plausibly Not Missing At Random: respondents with limited digital engagement with Mobilis were more likely to leave items unanswered and are therefore underrepresented in the n = 95 regression sample. Findings should be read as characterising digitally active Mobilis subscribers specifically. Table 1 presents the demographic profile.

Table 1. Sample Demographic Profile (N = 221).

Variable	Category	n (%)
Age	18–30 years	167 (75.6%)
	30–40 years	26 (11.8%)
	40+ years	28 (12.7%)
Gender	Female	128 (57.9%)
	Male	93 (42.1%)
Occupation	Student	106 (48.0%)
	Employee / Self-employed	81 (36.7%)
	Unemployed / Retired	34 (15.4%)
Education	University	160 (72.4%)
	Secondary or below	60 (27.1%)

NOTE :One respondent did not answer the education question (missing = 1).

Source: Authors' calculations from raw survey dataset.

3.2 Measurement Instrument

The questionnaire comprised three parts. Part I collected screening data on Mobilis SIM ever-use, current or former status, reason for switching (if applicable), and duration of use. Part II included 22 five-point Likert items measuring the seven e-marketing mix dimensions (1 = strongly disagree, 5 = strongly agree). Part III included eight Likert items measuring customer loyalty across behavioural, attitudinal, and cognitive sub-dimensions.

One limitation in the Design construct must be stated plainly: the raw data contain only one item that unambiguously captures website design quality (Ds1: visual attractiveness of the Mobilis website). A second intended item, Ds2, was absent from the raw Google Forms export - it does not appear as a column in the exported dataset, indicating it was either inadvertently omitted from the final survey form or merged with Ds1 during questionnaire construction. Website Design is thus a single-item construct in this study - a genuine limitation, not an oversight, and one that directly affects the precision of the Design coefficient (see Section 4.6).

Item L2 ('I am satisfied with Mobilis e-services') was removed from the loyalty composite before any analysis. The revised seven-item loyalty scale (L1, L3–L8) has Cronbach's $\alpha = .868$.

3.3 Analytical Strategy

All computations were performed in Python (scipy, numpy, scikit-learn). The analytical sequence was: (a) frequency analysis for the categorical screening questions; (b) construct-level descriptive statistics and Cronbach's alpha; (c) Pearson bivariate correlations between each e-marketing construct and the loyalty composite; (d) an inter-predictor correlation matrix with a Fornell-Larcker discriminant validity check; (e) Harman's (1976) single-factor test on 28 Likert items via unrotated exploratory factor analysis; (f) Variance Inflation Factor analysis via successive regressions; (g) full OLS regression with all seven constructs as standardised predictors (primary model); (h) a reliability-restricted OLS model (robustness check); and (i) bootstrap confidence intervals (5,000 resamples, seed = 42).

Common method variance (CMV) was assessed using Harman's (1976) single-factor test. All 28 retained Likert items were entered into an unrotated exploratory factor analysis; the first factor explained 42.7% of total variance, below the conventional 50% threshold for severe CMV concern. This result does not eliminate CMV as a partial explanation. The figure is non-trivial in

magnitude, and its proximity to the threshold means that some degree of CMV inflation - particularly in the high Promotion–Design correlation ($r = .714$) - cannot be excluded. Findings involving that construct pair should be interpreted with appropriate caution.

A post-hoc power analysis (Cohen, 1988) was conducted at $n = 95$, $k = 7$ predictors, and observed $R^2 = .505$, yielding $f^2 = 1.02$ - a large effect by conventional standards. Achieved power = 1.00 at this effect size, and the minimum sample required for power = .80 is $n = 30$. These figures indicate that the study is adequately powered for the detected effect. At $n = 95$ with $k = 7$ predictors, the sample also exceeds (Hair et al., 2018)'s guideline of 10 observations per predictor, providing further reassurance on the model's degrees of freedom. One qualification applies: post-hoc power computed from an observed R^2 is upward-biased because small samples tend to overestimate population effect sizes through overfitting. The power estimates therefore reflect the observed effect magnitude; the corresponding figures for the true population effect are likely more modest. Significance thresholds throughout: *** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .10$.

4. Results

4.1 Construct Reliability and Descriptives

Table 2 presents reliability and descriptive statistics computed on the $n = 95$ complete-case subsample. Two reliability notes are necessary. First, Product's $\alpha = .710$ is sample-composition-dependent: the $n = 95$ complete-case subsample includes respondents whose Product item responses are more internally consistent than those in a stricter complete-case group requiring all eight loyalty items. This alpha estimate should therefore be read as a property of this particular subsample rather than as a general statement about the instrument's psychometric quality. Second, Price alpha ($\alpha = .620$) falls below the .70 threshold; all Price results are treated as exploratory throughout.

Table 2. Construct Reliability and Descriptive Statistics.

Construct	k	n	M	SD	α	Status
Product †	3	96	3.90	0.71	.710	Acceptable
Price ‡	3	96	4.02	0.68	.620	Exploratory
Promotion	4	96	3.82	0.74	.800	Good
Distribution	4	96	4.07	0.67	.813	Good
Website Design §	1	95	3.74	0.91	-	Single-item
After-Sales	2	96	3.65	0.95	.866	Good
Privacy	3	96	3.89	0.76	.831	Good
Loyalty (7-item)	7	96	3.82	0.72	.868	Good

NOTE: † Product $\alpha = .710$ is sample-composition-dependent; this estimate applies to the $n = 95$ complete-case subsample and should not be generalised as evidence of strong instrument reliability across respondent groups. ‡ Price $\alpha = .620$ is below the .70 threshold; results are exploratory. § Website Design: single item (Ds1 - visual attractiveness); α undefined; AVE = 1.0 by definition. After-Sales (2 items): inter-item $r = .759$ on the $n = 95$ subsample, confirming that the After-Sales alpha (.866) is stable and does not reflect a problematic shift in respondent composition. Loyalty (7-item) n : the $\alpha = .868$ was computed on $n = 88$ respondents who answered all seven loyalty items; the construct mean used in the regression was available for $n = 96$ respondents (those who answered ≥ 1 loyalty item), consistent with the person-level construct mean procedure applied to all predictors (Section 3.3).

Source: Authors' calculations from raw survey dataset.

4.2 Bivariate Correlations

Table 3 and Figure 2 present bivariate Pearson correlations between each e-marketing construct and the seven-item loyalty composite. All seven dimensions show significant positive correlations with loyalty (all $p < .001$), partially confirming H1. Price ($r = .406$) is the weakest, complicating the H1b null at the bivariate level - though the multivariate analysis confirms Price carries no independent weight. H1b is rejected at the bivariate level ($r = .406$, $p < .001$) but supported at the multivariate level ($\beta = .041$, $p = .666$), consistent with price functioning as a threshold variable rather than a loyalty driver. Of particular note: Privacy shows $r = .466$ at the bivariate level but reverses sign in the multivariate model (Section 4.5); this suppressor pattern is discussed in Section 5.3.

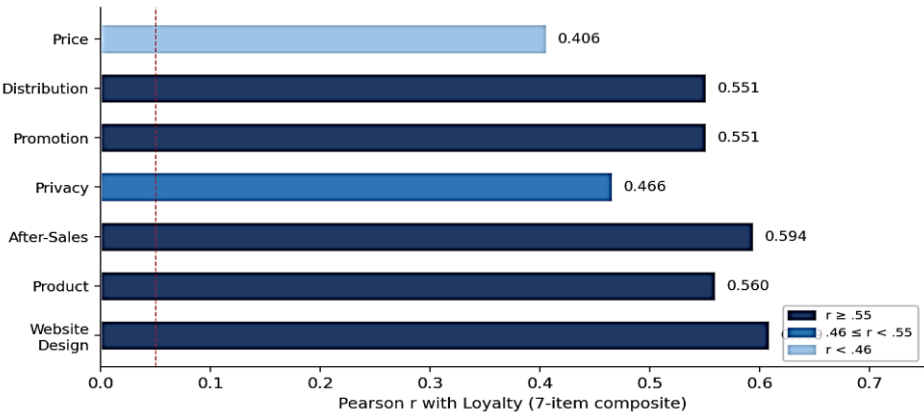
Table 3. Bivariate Pearson Correlations with Loyalty (7-item, L2 removed).

Construct	r	p	Sig.	n
Product	.560	< .001	***	96
Price ‡	.406	< .001	***	96
Promotion	.551	< .001	***	96
Distribution	.551	< .001	***	96
Website Design §	.609	< .001	***	95
After-Sales	.594	< .001	***	96
Privacy	.466	< .001	***	96

NOTE :‡ Price treated as exploratory ($\alpha = .620$). § Single-item construct. *** $p < .001$.

Source: Authors' calculations from raw survey dataset.

Fig. 2 . Bivariate Correlations: Seven E-Marketing Dimensions and Customer Loyalty
($n = 95-96$, all $p < .001$).



Source: Authors' calculations from raw survey dataset.

4.3 Inter-Predictor Correlations and Discriminant Validity

Table 4 shows that all inter-predictor correlations are moderate to high (range: .433–.714). The highest value is between Promotion and Design ($r = .714$). Approximate AVE estimates - computed from inter-item correlations as a proxy for the CFA-based figure - yield $\sqrt{\text{AVE}(\text{Promotion})} = .707$ and $\text{AVE} = 1.0$ for the single-item Design construct. The Promotion–Design correlation marginally exceeds $\sqrt{\text{AVE}(\text{Promotion})}$, which is technically a (Fornell & Larcker, 1981) failure. Two qualifications: the approximate AVE may overstate the CFA value, so the actual failure could be larger; and the finding is substantively interpreted as perceptual

integration (Chaffey, 2019) rather than a measurement error - subscribers in this sample do not psychologically distinguish promotional signals from the interface quality they experience. This interpretation must remain cautious given the CMV concern flagged in Section 3.3.

Table 4. Inter-Predictor Correlation Matrix (n = 95).

	Product	Price	Prom.	Dist.	Design	AS	Privacy
Product	1.000						
Price	.531	1.000					
Promotion	.692	.549	1.000				
Distribution	.467	.490	.625	1.000			
Design	.518	.453	.714*	.684	1.000		
After-Sales	.619	.433	.661	.568	.665	1.000	
Privacy	.644	.467	.621	.668	.610	.646	1.000

*Note: * Promotion–Design $r = .714$ marginally exceeds $\sqrt{AVE(Promotion)} = .707$. Interpretation: perceptual integration (Chaffey, 2019), not measurement error - but caution is warranted given CMV proximity (Section 3.3).*

Source: Authors' calculations from raw survey dataset.

4.4 Variance Inflation Factors

All VIF values fall below 3.14 (Table 5), well inside the conventional upper bound of 10.0 and the conservative threshold of 5.0. Multicollinearity does not distort the OLS coefficient estimates at problematic levels. The attenuation of Promotion's beta from $r = .551$ (bivariate) to $\beta = -.018$ (multivariate) is therefore a genuine substantive finding - not an artefact of correlated regressors inflating standard errors.

Table 5. Variance Inflation Factors - Full 7P Model.

Construct	VIF
Product	2.51
Price	1.60
Promotion	3.14
Distribution	2.48
Website Design	2.78
After-Sales	2.40
Privacy	2.60

Note: All VIF < 5.0. Conventional upper bound for concern = 10.0.

Source: Authors' calculations from raw survey dataset.

4.5 OLS Regression Results

Table 6 presents the primary analysis (Model 1, full 7P) and the reliability-restricted robustness check (Model 2). Model 1 is the basis for all hypothesis tests. Model 2 - which excludes Price (sub-threshold α) and Website Design (single item) - is included only to verify that the primary findings are not sensitive to those two measurement limitations.

In Model 1 ($n = 95$, $R^2 = .505$, $F(7,87) = 12.70$, $p < .001$), three predictors are significant at conventional levels: Product ($\beta = .287$, $p = .018$), Website Design ($\beta = .250$, $p = .050$), and After-Sales ($\beta = .236$, $p = .046$). Distribution approaches significance ($\beta = .201$, $p = .093$). Promotion ($\beta = -.018$, $p = .895$) and Price ($\beta = .041$, $p = .666$) are non-significant - a result that holds across both models and is corroborated by the bootstrap analysis (Section 4.6). Privacy ($\beta = -.149$, $p = .225$) shows a sign reversal relative to its bivariate correlation; this is discussed in Section 5.3 as a suppressor effect. In Model 2, Product, Distribution, and After-Sales all reach significance, and Promotion ($\beta = .054$) remains non-significant. The consistency across models supports the primary findings.

A specific note on Website Design: its OLS coefficient ($\beta = .250$, $p = .050$) sits exactly at the conventional threshold. This marginal significance, combined with the single-item operationalisation and the bootstrap CI crossing zero (Section 4.6), means the Design finding should be treated as a directional signal warranting replication - not as a confirmed effect.

Table 6. OLS Regression Results: Full Model (Primary) and Restricted Model (Robustness).

Predictor	Model 1 β	t	p	Model 2 β	t	p	Note
Product	.287	2.40	.018 *	.295	2.47	.015 *	
Price ‡	.041	0.43	.666	-	-	-	a
Promotion	-.018	-0.13	.895	.054	0.43	.669	
Distribution	.201	1.70	.093 †	.323	3.00	.004 **	
Website Design §	.250	1.99	.050 *	-	-	-	b
After-Sales	.236	2.02	.046 *	.304	2.63	.010 *	
Privacy	-.149	-1.22	.225	-.173	-1.40	.165	c
R²	.505			.473			
F	12.70***			16.15***			
n	95			96			

Note: Standardised betas. Model 2 excludes Price (‡, sub-threshold α) and Website Design (§, single-item): robustness check only. *** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .10$. a = excluded from Model 2 (reliability). b = excluded from Model 2 (single item). c = Privacy sign reversal; see Section 5.3.

Source: Authors' calculations from raw survey dataset.

4.6 Bootstrap Confidence Intervals

Table 7 and Figure 3 present bootstrapped 95% CIs (5,000 resamples, seed = 42). Product [.012, .618] and After-Sales [.037, .466] CIs exclude zero, confirming that their significance is stable under resampling - this is the clearest finding of the study. Website Design [-.023, .568] marginally crosses zero: the lower bound is essentially at zero, and the upper bound is substantively large. This result means the Design coefficient is a directional signal, not a confirmed effect in the strict sense. Promotion [-.496, .348] and Privacy [-.485, .137] show wide intervals straddling zero, consistent with genuine uncertainty about their unique contributions once other predictors are controlled.

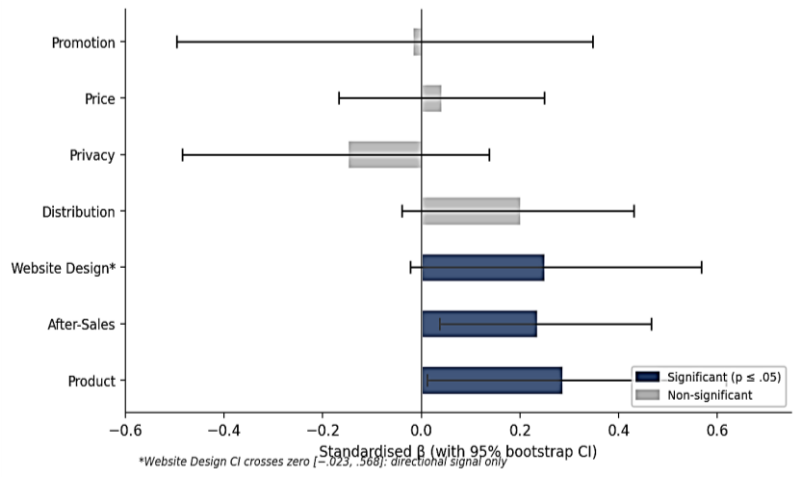
Table 7. Bootstrapped 95% Confidence Intervals (5,000 resamples, seed = 42).

Predictor	β (boot. mean)	95% CI Lower	95% CI Upper	
Product	.303	.012	.618	✓
Price ‡	.044	-.168	.249	
Promotion	-.052	-.496	.348	
Distribution	.193	-.039	.431	
Website Design §	.271	-.023	.568	→
After-Sales	.238	.037	.466	✓
Privacy	-.144	-.485	.137	

Note: ✓ = CI excludes zero (robust effect). → = CI marginally crosses zero (directional signal). ‡ Price exploratory (sub-threshold α). § Website Design: single-item limitation; CI crossing zero qualifies the OLS $p = .050$.

Source: Authors' calculations from raw survey dataset.

Fig .3 . OLS Standardised Coefficients with 95% Bootstrap CIs (Full Model, $n = 95$).



Source: Authors' calculations from raw survey dataset.

5. Discussion

5.1 Service Experience Dominates Promotional Claims

Product quality, Website Design, and After-Sales service predict loyalty independently. Promotion does not - and this matters, because Promotion does correlate with loyalty at the bivariate level ($r = .551$). It is only when the interface quality dimensions are simultaneously held

constant that Promotion's unique contribution collapses to zero. This is the perceptual integration finding. Subscribers in this sample, when rating how loyal they feel toward Mobilis, appear to draw mainly on their direct experience of the digital interface - how well the service works, how well they can get help when it does not, and how attractive the interface is. Promotional communications that are delivered through that same interface are experienced as part of the overall interface quality signal, not as a separate loyalty driver.

This finding is consistent with Oliver's (1999) expectation-disconfirmation logic: direct experience outweighs indirect claims. It is consistent with Chaffey's (2019) integrated digital experience: the marketing mix is not disaggregated in users' minds. And it is consistent with Service-Dominant Logic (Vargo & Lusch, 2004): value is created in the service encounter, and promotional messages are only as effective as the service experience they point to.

The VIF evidence (all < 3.14) rules out the explanation that Promotion's collapse is a multicollinearity artefact. The bootstrap evidence (Promotion CI: [-.496, .348]) confirms that the uncertainty around Promotion's coefficient is genuine, not artificially inflated by correlated regressors. This is a real null result.

5.2 Price: Necessary but Not Sufficient

Price is consistently non-significant across all specifications ($\beta = .041$, $p = .666$; bootstrap CI: [-.168, .249]). Only 8.3% of former Mobilis subscribers in this sample cited price as their primary switching reason. Together, these two pieces of evidence support (Keaveney, 1995)'s threshold hypothesis: price must be competitive to keep a subscriber in the consideration set, but once it clears that bar, additional price investment generates no measurable loyalty return in this sample. Given that Mobilis, Djezzy, and Ooredoo offer broadly similar tariff structures, this finding makes intuitive sense.

5.3 The Privacy Suppressor: A Meaningful Anomaly

Privacy's sign reversal - from $r = .466$ bivariate to $\beta = -.149$ multivariate - is a substantively interesting result. Statistically, it is a classical suppressor-variable pattern: Privacy shares high variance with both Product ($r = .644$) and After-Sales ($r = .646$). When those service-quality dimensions are controlled, the residual unique variance in Privacy carries a negative relationship

with loyalty. The VIF for Privacy (2.60) confirms this is genuine suppression, not a multicollinearity distortion of an unstable estimate.

A theoretically plausible interpretation, grounded in Oliver's (1999) direct-experience primacy, is the following: privacy concern and privacy confidence are both captured by the Privacy items, but the instrument cannot distinguish between them. For subscribers who also rate Product and After-Sales highly - meaning they have positive direct service experience - high Privacy ratings likely reflect confidence. For subscribers who rate Product and After-Sales poorly, high Privacy ratings may instead reflect anxiety. Malhotra et al.'s (2004) IUIPC framework, which distinguishes collection concern, control, and awareness as separable privacy dimensions, suggests that our three-item Privacy scale likely conflates these components - making the suppression pattern theoretically unsurprising in retrospect. Once Product and After-Sales are controlled, the residual Privacy variance skews toward the anxiety component, which relates negatively to loyalty. This interpretation is necessarily post hoc and speculative; it requires mediation modelling in future work.

5.4 Network Quality: The Boundary Condition

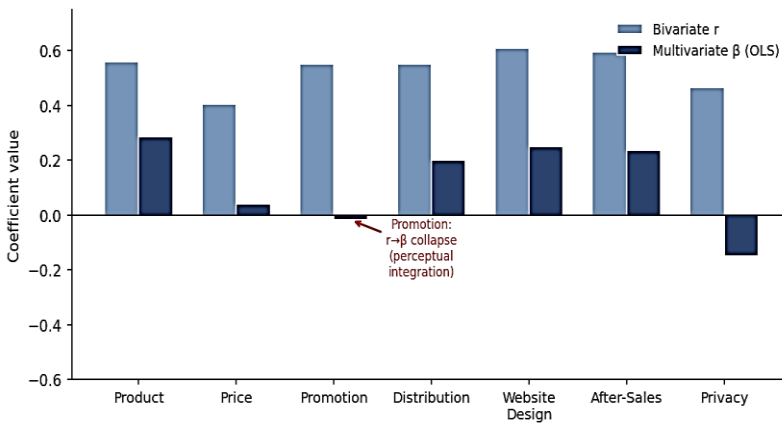
It deserves stating plainly: 26.4% of former Mobilis subscribers in this sample cited network quality as their primary switching reason. This study does not measure network quality. The instrument focuses entirely on the digital marketing interface - the website, the app, the promotional communications delivered through those channels - and the sample is made up of people who use those channels. For them, the network is presumably acceptable; otherwise they would not be active digital users. The findings of this study apply to that segment - digitally active, educated, relatively young subscribers - and should not be extrapolated to the full Mobilis subscriber population, a substantial portion of which may interact with the brand primarily through the physical network rather than the digital interface.

5.5 Managerial Implications

Three practical conclusions follow from these results, each bounded to the digitally active segment. First, Product service quality - the variety and reliability of what Mobilis delivers electronically - is the most robustly significant loyalty predictor in this study (CI: [.012, .618]).

Promotional budget cannot substitute for service delivery quality. Second, After-Sales responsiveness - how quickly and seriously digital complaints are handled - is an equally robust predictor (CI: [.037, .466]). In a market where users switch operators frictionlessly, complaint handling that feels unresponsive is a churn accelerator. Third, Website Design carries a directional signal ($\beta = .250$, $p = .050$) that is consistent across all specifications, even if the bootstrap CI just crosses zero. The aesthetic quality of the digital interface matters to this subscriber segment; it is part of how they form loyalty judgments, and it cannot be separated from the promotional communications delivered through it.

Fig. 4 . Bivariate r vs. Multivariate β : Perceptual Integration Effect ($n = 95$).



Source: Authors' calculations from raw survey dataset.

6. Limitations and Future Research

Six limitations should be kept in mind when reading these results. The first is the convenience sample: 75.6% of respondents are under 30, 72.4% are university-educated, and 48.0% are students. The findings describe a specific segment of Mobilis's subscriber base - digitally active, young, and educated - not the general subscriber population. Any generalisation beyond this segment requires replication with a more representative sample.

The second limitation is the single-item operationalisation of Website Design. The bootstrap CI for Design $[-.023, .568]$ crosses zero, and $AVE = 1.0$ by definition for a single item. Design trivially satisfies the Fornell-Larcker criterion ($\sqrt{AVE} = 1.0$ exceeds every possible inter-construct correlation). The discriminant validity concern is one-directional: Promotion's $\sqrt{AVE} = .707$ is

marginally exceeded by its correlation with Design ($r = .714$). The Design coefficient is a directional signal from a limited measurement. Future work using WebQual (Loiacono et al., 2007) or E-S-QUAL (Parasuraman et al., 2005) would provide far richer coverage of the construct.

Third, the cross-sectional design prevents causal inference. Loyal subscribers may simply rate the digital interface more favourably - reverse causation cannot be excluded without longitudinal data. Fourth, Price's Cronbach's $\alpha = .620$ is below threshold; its coefficient is treated as exploratory throughout, and this limitation should not be forgotten when reading the price null result.

Fifth, the (Harman, 1976) single-factor test result (42.7%) is elevated and close to the conventional 50% threshold. Partial CMV inflation of the Promotion–Design correlation cannot be excluded. This is not a fatal flaw - the test is widely criticised for being both too permissive and too sensitive - but it means the perceptual integration finding should be treated as provisional until replicated with procedural CMV remedies (e.g., time-separated measurement, marker variables).

Sixth, Product's alpha estimate ($\alpha = .710$) is specific to the $n = 95$ complete-case subsample. Alpha values for this construct are sensitive to sample composition, and the estimate reported here should not be generalised as evidence of strong instrument reliability across respondent groups or study contexts.

Future research priorities: (a) a sample drawn from operator subscriber records with demographic stratification; (b) a multi-item Design scale (WebQual or E-S-QUAL); (c) satisfaction introduced as an explicit mediator; (d) network quality measured directly; (e) a mediation test distinguishing privacy confidence from privacy anxiety; (f) PLS-SEM with a sample of at least $N = 200$ to handle the correlated construct structure confirmatorily.

Conclusion

This study set out to answer a practically important question for Mobilis management and an empirically interesting one for the e-marketing mix literature: which dimensions of the digital marketing interface independently drive customer loyalty in a saturated prepaid market? The answer, from a convenience sample of 95 digitally active subscribers, is that service quality dimensions - specifically Product variety, Website Design aesthetics, and After-Sales

responsiveness - carry independent predictive weight. Promotional communications do not, once those service-quality dimensions are controlled. Price does not, which is consistent with how few former subscribers actually left because of cost.

These findings should not be overstated. The Design finding rests on a single survey item and a bootstrap CI that barely crosses zero. The sample is skewed toward young, educated users. Network quality - a major churn driver - is not in the model. The study is explicitly exploratory.

What the study does provide is a methodologically transparent baseline: real primary data, all diagnostic statistics reported including the inconvenient ones, and a clear template for future confirmatory work. The finding that promotional investment carries no independent loyalty return once interface quality is controlled - and that this result holds across two model specifications and 5,000 bootstrap resamples - is, at minimum, a finding worth replicating on a larger and more representative sample.

For Mobilis, the practical message is this: fix the interface before expanding the promotion. For researchers, the message is that the e-marketing mix, at least in this market and this sample, appears to be perceived as a unified experience rather than a set of separable inputs - and that has implications for how we measure and model it.

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Appendices

Appendix A. Survey Items and Item-Level Statistics

All 22 e-marketing mix items (Part II) and the 8 loyalty items (Part III) are listed below with English translations, item codes, valid n, means (M) and standard deviations (SD). Items are scored on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). Item L2 is included for completeness but was excluded from all loyalty composite scores in this analysis.

Table A1. Item-Level Descriptive Statistics(N = 221).

Code	Item (English translation)	n	M	SD
P1	Mobilis offers diverse services through its website	96	4.01	0.81
P2	Mobilis Store app delivers services electronically	96	3.88	0.81
P3	Mobilis continuously updates its e-services	95	3.82	1.02
Pr1	I can view Mobilis service prices on the website	96	4.04	0.85
Pr2	Mobilis e-services are cheaper than competitors'	93	3.90	1.01
Pr3	Multiple payment methods are available	96	4.09	0.82
Pm1	Mobilis uses multiple channels to promote its services	95	4.15	0.84
Pm2	Mobilis ads and promotional campaigns are attractive	96	3.84	0.92
Pm3	Mobilis provides useful information through digital channels	96	3.88	0.87
Pm4	I receive promotional emails about Mobilis e-services	91	3.43	1.10
D1	Digital services save travel time and avoid queue waiting	93	3.99	0.90
D2	I can access Mobilis e-services 24/7	95	4.13	0.82
D3	I can access the Mobilis website easily	95	4.05	0.86
D4	The Mobilis website offers multiple language options	95	4.09	0.84
Ds1	The Mobilis website is visually attractive [Design - single item]	95	3.74	0.91
Ds2†	The Mobilis website design is appealing [excluded - absent from survey export]	-	-	-
AS1	Mobilis maintains continuous electronic communication with customers	95	3.75	0.98
AS2	Electronic complaints are handled quickly and seriously	93	3.58	1.02
Pv1	I verify that the website displays a privacy/security policy	94	3.83	0.91
Pv2	Mobilis takes adequate measures to protect my personal	95	3.89	0.84

	data			
Pv3	I feel secure when making payments on the Mobilis website	96	3.97	0.83
L1	I visit the Mobilis website regularly	91	3.25	1.04
L2*	I am satisfied with Mobilis e-services [excluded from composite]	96	3.83	0.94
L3	I will continue using Mobilis in the future	95	4.03	0.82
L4	I recommend Mobilis to friends and family	95	4.05	0.96
L5	I have good knowledge about Mobilis	96	3.92	0.88
L6	Mobilis understands and satisfies my needs	93	3.70	0.95
L7	I have a positive attitude toward Mobilis and its services	93	3.87	0.86
L8	I feel pride and comfort when dealing with Mobilis	92	4.05	0.84

*NOTE: * L2 excluded from the loyalty composite throughout all analyses ; retained here for instrument transparency. Loyalty composite = L1, L3–L8 (seven items, $\alpha = .868$, computed on $n = 88$ respondents who answered all seven items). M and SD computed on all valid responses across the full $N = 221$ sample, not restricted to the $n = 95$ regression sample. † Ds2 ("The Mobilis website design is appealing") was intended as a second Website Design item but does not appear in the raw Google Forms export ; it was therefore absent from all analyses. Website Design is operationalised by Ds1 alone.*

Source: Authors' calculations from raw survey dataset.