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Abstract

This exploratory study examines two distinct associations at a private medical laboratory in Bordj Bou Arréridj, Algeria : (1) the relationship between perceived services marketing mix elements and overall customer satisfaction, and (2) the relationship between perceptions of short message service (SMS) marketing promoting an advance booking facility and satisfaction with that facility. A descriptive-analytical, cross-sectional design with two independent convenience samples was employed: laboratory social-media followers (n = 67) and registered clients who responded to an SMS-embedded link (n = 61; response rate 20.3%). Data were analysed using descriptive statistics, Cronbach's alpha, Pearson correlation, and simple linear regression.

The marketing mix showed a large positive association with overall satisfaction ($R = 0.72$, 95% CI [0.58, 0.82]; $R^2 = 0.517$, $p < .001$). Perceptions of SMS marketing were positively associated with satisfaction with the booking facility ($r = 0.546$, 95% CI [0.34, 0.70] ; $R^2 = 0.299$, $p < .001$). Mean satisfaction with booking was 2.45 (on a 1–3 scale), yet a descriptive gap emerged between interest in reading messages ($M = 2.49$) and reported benefit from early booking ($M = 1.98$).

These findings are interpreted strictly as associations. The cross-sectional design, non-probability sampling, modest sample sizes, three-point response scale, and limited reliability of the second instrument (overall $\alpha = 0.637$) preclude causal inference and limit generalisability. The study suggests that SMS can serve as a low-cost supportive channel for raising awareness of digital services in small private diagnostic settings, provided that core service quality, message clarity, trust, privacy safeguards, and non-digital alternatives remain central. Results for the SMS–satisfaction link should be regarded as preliminary and exploratory.

Keywords: mobile marketing; short message service (SMS); customer satisfaction; services marketing mix; advance booking; medical laboratories; Algeria; exploratory study.

1. Introduction

The proliferation of mobile telephony has reconfigured the relationship between service organisations and their customers. The mobile phone is no longer merely a channel for voice communication ; it has become a vehicle for delivering text messages, notifications, and links that enable remote completion of transactions. This channel assumes particular significance in health services, where the user experience is bound up with waiting times, travel costs, and informational clarity, and where the sensitivity of the health context imposes additional considerations relating to trust and privacy.

A recent scoping review encompassing 45 studies published between 2010 and 2025 indicates that text messaging is the most extensively studied

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technological reminder modality, and that patients and caregivers report high levels of satisfaction with it, while cautioning that equitable access to digital connectivity requires scrutiny (Rousaki et al., 2026). Nevertheless, the bulk of this literature concentrates on attendance and non-attendance. The relationship between mobile-based promotion of a newly introduced digital service and customer satisfaction with the use of that service remains comparatively underexplored, particularly among small private health organisations in the Algerian and broader Maghrebi context.

This study addresses the case of Al-Biban Medical Analysis Laboratory in central Bordj Bou Arréridj, which employed SMS to raise awareness of an advance booking facility accessible via its website. The case permits examination of two distinct questions : the relationship between services marketing mix elements and overall satisfaction with the laboratory, and the relationship between SMS marketing and satisfaction with the booking facility specifically. Satisfaction with an organisation as a whole is not necessarily equivalent to satisfaction with a particular digital tool.

1.1 Research Problem and Questions

The study proceeds from the principal question : What is the nature of the association between SMS marketing and services marketing mix elements, on the one hand, and the satisfaction of Al-Biban Laboratory's customers, on the other?

Three subsidiary questions follow :

- What is the association between evaluations of services marketing mix elements and overall satisfaction with the laboratory?
- What is the association between perceptions of SMS marketing and satisfaction with the advance booking facility?
- What is the level of satisfaction with advance booking, and is there a descriptive gap between interest in reading messages and reported benefit from the service?

1.2 Objectives and Significance

The study aims to describe customers' evaluations of the marketing mix and their overall satisfaction; to test the association between the mix and overall satisfaction and between SMS marketing perceptions and satisfaction with booking; to identify any descriptive reading–usage gap; and to derive applied recommendations that remain realistic given the study's methodological constraints. Its scholarly significance lies in examining the intersection of mobile communication with the customer experience in a diagnostic service within a Maghrebi context that remains underrepresented in the literature. Practically, it assists small health organisations in evaluating low-cost communication tools as components of the customer journey rather than as substitutes for core service quality.

2. Theoretical Framework and Prior Research

2.1 Mobile Marketing in Health Services

Mobile marketing is understood here as the deployment of the mobile channel, particularly SMS, to convey information about an available service and to invite the user to respond. It is typically asynchronous and concise communication, becoming a source of efficiency when the message is clear and a point of weakness when practical instructions are absent.

Evidence supports the efficacy of SMS in procedural health communication. A Cochrane review concluded that there is moderate-quality evidence that SMS reminders increase attendance relative to no reminder, and that they are equivalent to telephone calls in effect at lower cost (Gurol-Urganci et al., 2013). An extensive narrative review documented ease of use, low cost, and acceptability among most participants (Schwebel & Larimer, 2018). In a recent case study at a general practice in the United Kingdom, the adoption of SMS was associated with a statistically significant reduction in missed appointments of approximately 42.8% (Sides & Kbaier, 2024). Further studies have examined SMS and telephone communication as tools for reducing missed appointments (Brancewicz et al., 2025) and outpatient preferences for personalised reminder content (Hsiao et al., 2026).

These findings necessitate distinguishing among three outcomes: message delivery, service use or attendance, and satisfaction with the experience. Demonstrating the first or second does not automatically establish the third. The World Health Organization emphasises that digital interventions must be adapted to context and evaluated for both benefits and risks (World Health Organization, 2019).

2.2 Electronic Self-Scheduling and the User Experience

A scoping review of automated patient self-scheduling found that its most salient advantage over telephone booking is round-the-clock availability and time savings for the patient; that user awareness of the service is a decisive factor in adoption; that a gap between awareness or interest and actual use recurs; and that heavier users tend to be younger and more highly educated (Woodcock, 2022). These conclusions align with an earlier systematic review of web-based appointment systems (Zhao et al., 2017). SMS is therefore a low-cost channel capable of closing part of the awareness gap, but it neither guarantees the transition from awareness to use nor obviates the need for website ease of use and clarity of booking steps.

2.3 The Services Marketing Mix and Customer Satisfaction

Health services are characterised by intangibility and high credence qualities, so users rely on organisational reputation, staff competence, and communicative clarity (Kotler et al., 2008; Zeithaml et al., 2018). Assessing their quality requires attention to structure, process, and outcome (Donabedian, 1988). The services marketing mix extends the traditional mix (product, price, place, promotion) with three additional elements: people, process, and physical evidence (Booms & Bitner, 1981). In the medical laboratory, these elements translate into the reliability of analyses, price transparency, accessibility, digital channels, reception staff competence, procedural fluidity, and the cleanliness and equipment of the premises.

Recent studies have tested the effect of the seven mix elements on patient satisfaction in hospitals (Budiman & Achmadi, 2023; Pitaloka & Harianto, 2025). The expectancy-disconfirmation model regards satisfaction as a judgement arising from comparing perceived performance with expectations (Oliver, 1980; Parasuraman et al., 1988). This is a subjective perception that does not substitute for technical quality indicators; the means reported here are therefore read as descriptions of sample responses rather than as verdicts on laboratory performance.

2.4 Personal Data Protection

Institutional mobile communication with customers relies on telephone numbers, which constitute personal data that, in a health organisation, are linked to the individual's relationship with the service. Algerian Law No. 18-07 (2018) governs the protection of natural persons in the processing of personal data and was amended by Law No. 25-11 (2025). These rules require attention to purpose, consent, proportionality, and security when using customer numbers. Privacy is therefore treated here as a constituent of service quality and customer trust.

2.5 Knowledge Gap

A closer reading of the literature reveals three distinct strands whose convergence remains incomplete. The first strand has robustly established the behavioural efficacy of SMS reminders in securing attendance; its dependent variable, however, is almost invariably attendance rather than satisfaction with a newly promoted digital service. The second strand has mapped barriers to and facilitators of self-scheduling systems, identifying awareness as a critical antecedent and documenting a persistent awareness–use gap, yet without theorising the promotional channel through which awareness is generated. The third strand has confirmed the explanatory power of the services marketing mix on patient satisfaction, predominantly in hospital settings and at the institutional level.

The present study is positioned at the intersection of these strands. It examines, within a single small private diagnostic laboratory in a North African context, whether and to what degree SMS promotion of a new digital service is associated with satisfaction with that service, and whether the broader service mix is associated with overall satisfaction. The recurring gap between message reading and service utilisation documented across the literature has not been examined in a diagnostic service where the act of booking carries additional privacy salience.

3. Hypotheses

Hypotheses are formulated in correlational terms because the cross-sectional design does not permit causal inference. They are tested at $\alpha = .05$:

- H1: There is a statistically significant positive association between the perceived evaluation of services marketing mix elements and overall satisfaction with Al-Biban Laboratory's services (Sample 1).
- H2: There is a statistically significant positive association between perceptions of SMS marketing for the advance booking facility and

satisfaction with that facility (Sample 2).

- H3: Mean satisfaction with the advance booking facility reaches the 'agree' band (≥ 2.34 on the three-point scale), and a descriptive gap is observed between interest in reading messages and reported benefit from early booking (Sample 2).

4. Methodology

4.1 Design and Samples

A descriptive-analytical approach with a cross-sectional design was adopted at Al-Biban Laboratory (central Bordj Bou Arréridj branch), a private health organisation offering an electronic advance booking facility. The study is classified as cross-sectional with two independent samples rather than a case study in the strict methodological sense, because the case here constitutes a context rather than a unit of analysis drawing on multiple sources (Yin, 2018). The two samples are treated as independent; their data are neither pooled nor their means compared, owing to differences in instrument and access channel.

The first questionnaire was distributed online to followers of the laboratory's Facebook page (67 valid responses) without a sampling frame, constituting a convenience sample. The second questionnaire was sent via a link embedded in an SMS message to 300 clients registered in the laboratory's system; 61 valid responses were received (response rate 20.3%). Both the modest sample sizes and the low response rate in Sample 2 warrant caution regarding non-response bias and limit statistical power and generalisability.

4.2 Instruments and Reliability

The first questionnaire comprised demographic items and two dimensions: the services marketing mix (19 items) and overall satisfaction (6 items). The second questionnaire comprised a dimension measuring perceptions of advance booking and SMS (3 items) and a satisfaction dimension (5 items). Responses were recorded on a three-point Likert-type scale (disagree = 1, neutral = 2, agree = 3). Means were interpreted across three bands: 1.00–1.66 (disagree), 1.67–2.33 (neutral), and 2.34–3.00 (agree). The three-point scale constrains response variance and sensitivity relative to five- or seven-point scales.

Table 1 presents reliability statistics. Values for the first instrument are acceptable to good (Nunnally & Bernstein, 1994). Values for the second instrument are limited (overall $\alpha = 0.637$; perception dimension $\alpha = 0.586$). Consequently, results derived from Sample 2 are interpreted throughout as exploratory and preliminary.

Table 1. Reliability Statistics of the Research Instruments

Instrument / Dimension	No. of items	Cronbach's α	n
First: Marketing mix	19	0.838	67
First: Overall satisfaction	6	0.743	67
First: Overall	25	0.881	67
Second: Perceptions of advance booking	3	0.586	61
Second: Satisfaction with booking	5	0.641	61
Second: Overall	8	0.637	61

4.3 Statistical Treatment and Ethical Considerations

SPSS was used to compute frequencies, means, Cronbach's alpha, Pearson correlation, and simple linear regression. Ninety-five per cent confidence intervals for correlation coefficients were computed via Fisher's transformation. Effect sizes were interpreted according to Cohen's (1988) benchmarks (approximately .10 small, .30 medium, .50 large). Diagnostic tests of regression assumptions were not available for reporting; this constitutes an additional limitation.

The study obtained institutional approval. Participants were informed of the research purpose, the voluntary nature of participation, and data confidentiality. All data analysed are the property of the institution and are not publicly available; access to client-level data requires formal application to the study institution, subject to applicable personal data protection regulations (Law No. 18-07 of 2018, as amended by Law No. 25-11 of 2025).

5. Results

5.1 Sample Characteristics

The first sample comprised 39 women (58.2%) and 28 men (41.8%); the 20–30 age band was the largest (53.7%), and university graduates constituted 61.2%. In the second sample, men represented 54.1% and women 45.9%; the 25–35 age band was the largest (65.6%), followed by 36–46 (23.0%). Both samples skew younger and more highly educated, which limits the generalisation of views on digital services to older or less educated cohorts—the groups that prior literature indicates are less likely to adopt self-scheduling (Woodcock, 2022).

5.2 Descriptive Statistics

First sample (n = 67). The overall mean for the marketing mix was 2.24 (neutral band, close to the agreement threshold). Its highest items were the competence of reception staff in registering data (M = 2.51), followed by website clarity and ease of contact with reception (M = 2.36 each); interior design approached neutrality (M = 2.04). The overall mean for general satisfaction was 2.32; its highest items were confidence in the accuracy of results (M = 2.49), willingness to recommend the laboratory (M = 2.40), and intention to return (M = 2.39).

Second sample (n = 61). The mean for the perception dimension was 2.17 (neutral), and mean satisfaction with booking was 2.45 (agree band). Table 2 presents key indicators.

Table 2. Descriptive Statistics for Booking-Related Indicators and Satisfaction (Sample 2, n = 61)

Indicator	Mean	Band
Interest in reading the laboratory's messages	2.49	Agree
Prior awareness of the booking facility	2.26	Neutral
Learning about the facility via messages	2.10	Neutral
Benefiting from early booking to request an analysis appointment	1.98	Neutral
Sharing service information with a relative	1.77	Neutral
Time saving (satisfaction item)	2.84	Agree
Intention to continue dealing with the laboratory	2.69	Agree
Overall satisfaction with the laboratory's services	2.66	Agree
Overall mean for satisfaction with booking	2.45	Agree

5.3 Hypothesis Testing

H1 (supported correlationally). Simple linear regression of overall satisfaction on the marketing mix yielded a significant model: $F(1, 65) = 69.48$, $p < .001$, $R^2 = 0.517$ ($R = 0.72$, 95% CI [0.58, 0.82]). This represents a large positive association; the mix accounts for approximately 51.7% of the variance in overall satisfaction within the sample (effect size $f^2 \approx 1.07$), leaving roughly 48.3% attributable to factors outside the model. Common-method variance cannot be ruled out, as both constructs were measured in the same self-report instrument.

H2 (supported correlationally; exploratory). Pearson's correlation between perceptions of SMS marketing and satisfaction with booking was $r = .546$ ($p < .001$; 95% CI [0.34, 0.70]), a large positive association by Cohen's convention. Regression yielded a significant model: $F(1, 59) = 25.12$, $p < .001$, $R^2 = 0.299$ (effect size $f^2 \approx 0.43$). Perception of SMS marketing thus accounts for approximately 29.9% of the variance in satisfaction with the booking facility within this sample. Given the limited reliability of the second instrument, these results are treated as exploratory.

H3 (supported descriptively). Mean satisfaction with booking (M = 2.45) fell within the agreement band (≥ 2.34). A descriptive gap of 0.51 points was observed between interest in reading messages (M = 2.49) and reported benefit from early booking (M = 1.98), with the lowest value recorded for information sharing (M = 1.77). Formal inferential tests of this gap (paired-samples t-test or one-sample test against 2.33) were not

conducted on the available data and are therefore not claimed.

Table 3. Summary of Hypothesis Testing Results

Hypothesis	N	R / r	R^2	F (df)	Decision
H1: Marketing mix → overall satisfaction	67	0.72	0.517	69.48 (1,65)	Supported (correlational)
H2: SMS marketing → satisfaction with booking	61	0.546	0.299	25.12 (1,59)	Supported (exploratory)
H3: High satisfaction & reading–usage gap	61	—	—	—	Supported (descriptive)

6. Discussion

Marketing mix and overall satisfaction. The results indicate a moderately positive evaluation of the mix and overall satisfaction tending towards agreement, with the competence of staff and confidence in results standing out. This aligns with the proposition that trust and the human interface are central in high-credence health services (Kotler et al., 2008; Zeithaml et al., 2018). The strength of the association (R = 0.72) warrants caution on two grounds: both variables were measured among the same respondents, so the correlation may be inflated by common-method bias (Podsakoff et al., 2003); and followers of the laboratory's page may be more engaged with it than the broader client base.

Messages between reading and use. The second sample revealed a descriptive gap between interest in reading the message and reported benefit from the service—a pattern documented in the self-scheduling literature (Woodcock, 2022) and consistent with the position that demonstrating message delivery does not establish behavioural change or satisfaction (Gurol-Urganci et al., 2013; Rousaki et al., 2026). Possible explanations include lack of immediate need for an appointment, procedural ambiguity, or preference for conventional contact; the present data do not permit adjudication among these explanations.

Time utility. Time saving was the highest satisfaction item related to booking (M = 2.84), consistent with the relative advantage of self-scheduling lying in flexible availability and time savings (Woodcock, 2022). This remains a subjective perception and offers no evidence of an actual reduction in waiting time, which would require objective before–after measurement.

Magnitude of association and limits to causality. The association between SMS marketing perceptions and satisfaction with booking accounts for approximately 30% of the variance within the sample. The design includes no comparison group that did not receive the message, and reverse causality is plausible: clients already more satisfied with the laboratory may evaluate its messages more favourably. Conclusions are therefore framed strictly in correlational rather than causal language. The limited reliability of the second instrument further qualifies the H2 findings as exploratory.

Equity and privacy. Both samples skew towards younger and more highly educated cohorts—the groups most likely to use self-scheduling (Woodcock, 2022). Recent reviews caution that digital communication may reproduce existing disparities (Rousaki et al., 2026). The digital channel should therefore not be the sole route, and messages should remain concise and should not disclose the type of analysis.

7. Applied Recommendations

The following recommendations are offered as practical suggestions grounded in the observed patterns, while recognising the study's methodological constraints:

- Message design: Include the institutional name, a single core piece of information, a specific benefit, an official link, a clear next step, and an alternative help number; use simplified Arabic and provide an opt-out option.
- Measurement pathway: Move beyond reading rates toward a graduated set of indicators—sending, delivery, click, booking initiation, completed booking, cancellation or non-attendance, and post-service satisfaction.
- Core service quality: Train reception staff to explain booking steps clearly; review items that approached neutrality (service information and interior design); and monitor waiting

time with objective indicators where feasible.

- Privacy and alternative access: Maintain a parallel booking route by telephone or in person; exclude health-related information from messages; protect number lists; and document the lawful basis for processing under applicable data-protection law.

8. Limitations and Avenues for Future Research

Several limitations must be emphasised. Both samples are small and non-probability based. The first relies on social-media followers; the second rests on voluntary response to a text message at a rate of only 20.3%. The three-point scale has limited sensitivity. The second instrument shows low internal consistency (overall $\alpha = 0.637$), particularly the three-item perception dimension; its results are therefore exploratory. There is no comparison group, no pre–post measurement, and no objective booking-usage data. Both constructs in each sample were measured by a single self-report questionnaire, raising the possibility of common-method bias. Diagnostic tests of regression assumptions were unavailable. These constraints render the findings preliminary field evidence from a single organisational case rather than a basis for generalisation to Algerian medical laboratories at large.

Future research should employ larger and more representative samples drawn from multiple laboratories, multi-category response scales with formal construct-validity testing, operational indicators (completed bookings, attendance, waiting time), quasi-experimental or longitudinal designs, and tests of trust, age, and digital experience as potential moderating variables.

9. Conclusion

This exploratory study examined the association between the services marketing mix and overall satisfaction, and between perceptions of SMS marketing and satisfaction with an advance booking facility, at a private medical laboratory in Bordj Bou Arréridj, Algeria. Within the first sample a large positive association was observed between the marketing mix and overall satisfaction ($R^2 = 0.517$). Within the second sample a positive association was observed between SMS marketing perceptions and satisfaction with booking ($r = 0.546$), alongside relatively high satisfaction with time utility and a descriptive gap between interest in reading messages and reported benefit from the service.

Taken together, the findings suggest that the success of a text message is not measured by sending or reading alone, but by the customer's capacity to understand it and complete a booking within a trustworthy core service that protects privacy and provides non-digital alternatives. Because of the cross-sectional design, modest non-probability samples, limited reliability of the second instrument, and absence of objective usage data, the results should be regarded as preliminary and context-specific. They offer useful directional evidence for small private diagnostic organisations considering low-cost mobile communication as one element—rather than a substitute—of a broader service strategy.

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Conflict of Interest and Funding

The author declares no conflict of interest. This research received no external funding.

Data Availability Statement

The data analysed in this study are the property of the study institution. They are not publicly available due to institutional data governance and privacy requirements. Researchers wishing to access client-level data must submit a formal request to Al-Biban Medical Analysis Laboratory and obtain the institution's prior written approval, subject to applicable personal data protection regulations (Law No. 18-07 of 2018, as amended by Law No. 25-11 of 2025).

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