

“The effect of social CRM capability components on service innovation in Vietnamese commercial banks: The mediating role of customer knowledge”

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THE EFFECT OF SOCIAL CRM CAPABILITY COMPONENTS ON SERVICE INNOVATION IN VIETNAMESE COMMERCIAL BANKS: THE MEDIATING ROLE OF CUSTOMER KNOWLEDGE

Abstract

Commercial banks invest heavily in social media to manage customer relationships; however, it remains unclear which components of social CRM capability drive service innovation and through what mechanism. This study aims to determine how each component of social CRM capability – information generation, information dissemination, and market responsiveness – affects service innovation in Vietnamese commercial banks, and to what extent customer knowledge mediates these effects. In May 2026, an online questionnaire was distributed among 800 managers and specialists who operate social media channels and develop services at Vietnamese commercial banks; 372 valid responses were analyzed by partial least squares structural equation modeling. Market responsiveness has the largest direct effect on service innovation ($\beta = 0.225$, $p < 0.001$); information dissemination has a weaker direct effect ($\beta = 0.146$, $p = 0.010$), whereas information generation has no direct effect ($\beta = 0.043$, $p = 0.418$) and operates entirely through customer knowledge (indirect effect = 0.084). Information dissemination carries the largest coefficient on customer knowledge ($\beta = 0.310$, $p < 0.001$), and customer knowledge in turn positively affects service innovation ($\beta = 0.362$, $p < 0.001$). The model explains 35.4% of the variance in customer knowledge and 40.1% of the variance in service innovation. Bootstrap tests show only the advantage of market responsiveness over information generation to be significant. Banks should therefore treat responsiveness and cross-functional dissemination as complements rather than alternatives.

Keywords

banking, customer knowledge management, information sharing, organizational learning, service innovation, social media, Vietnam

JEL Classification

D83, G21, M31, O31, Z13

INTRODUCTION

Over the past decade, social media has moved from a peripheral communication channel to one of the main interfaces through which banks interact with their customers. Commercial banks today run brand communities and social listening systems and commit substantial resources to technologies that capture and analyze data from these platforms. The pressure to innovate has risen in parallel: digital transformation and the rise of financial technology firms have shortened product life cycles and forced banks to keep reworking how they serve customers. In emerging markets such as Vietnam, where social media penetration is among the highest in the region, and the central bank's digitalization agenda is reshaping the industry, investment in social media capability is widely assumed to translate into service innovation.

That assumption rests on thin empirical ground. The link between a bank's ability to exploit social media and its innovation outcomes has more often been presumed than demonstrated, and even where the link holds, how it works remains poorly understood. The scientific question is therefore not whether social media promotes innovation, but which component of this capability creates value, and through what mechanism.

The first part of the problem stems from the multi-component nature of social CRM capability. The capability bundles together several distinct behaviors-generating information through market listening, disseminating it across functions, and responding to the moves of customers and competitors-that sit at different points along the chain from data to action. Yet most existing studies collapse these behaviors into a single aggregate construct and estimate only their combined effect. This leaves a question of immediate practical relevance unanswered: when the digital-transformation budget is finite, which component should a bank strengthen first to obtain the greatest return in innovation? As long as social CRM capability is treated as a monolithic block, the evidence cannot guide concrete allocation decisions.

The second part concerns the transformation mechanism. However rich it may be, customer data drawn from social media does not turn into new services on its own, and the intermediate process between raw information and innovation outcomes has yet to be clarified. Does social media information feed directly into new services, or must it first be filtered, shared, and accumulated into shared customer knowledge before it yields value? This question is rarely tested explicitly, and almost never in banking in emerging economies, where channel structures and customer behavior differ from those in developed markets that supply most of the current evidence.

The Vietnamese banking context makes both parts especially pressing. Banking is an information-intensive service industry, and social media in Vietnam carries a larger share of customer interaction than in most other markets. Concentrating investment on data-collection tools while neglecting the mechanism that converts data into knowledge is therefore costly and hard to reverse. This paper accordingly asks how each component of social CRM capability is converted into service innovation in banking, and what role customer knowledge plays as the intermediate link.

1. LITERATURE REVIEW

This section reviews three streams of research that bear directly on the problem: service innovation in banking, the evolution from traditional CRM to social CRM capability, and the role of customer knowledge. On this basis, the research gap, study aim, and hypotheses are set out.

Under a service-dominant logic, service innovation is understood as the reconfiguration and integration of resources to create new value for customers, with knowledge as the central resource (Lusch & Nambisan, 2015). The concept spans both the development of new services and significant improvements to the processes and delivery of existing ones (Witell et al., 2016). In financial services, digital technologies have restructured the value chain and turned service innovation into a core competitive lever rather than a peripheral

activity (Broby, 2021; Naimi-Sadigh et al., 2022). Recent evidence from commercial banks shows that service innovation performance depends on how effectively a bank co-creates knowledge with the actors around it (Zhang & Yi, 2024). Customer involvement is itself a driver of service innovation performance, but its effect is realized through relationship learning and absorptive capacity rather than directly (Xie et al., 2021). Artificial intelligence and digital platforms open further opportunities, but these become outcomes only when a firm has the capabilities to exploit them (Haefner et al., 2021; Kumar et al., 2023).

The second stream examines the relationship between CRM and innovation. The evidence leans positive but remains fragmented: CRM improves business performance through innovation capability, although the strength of the link depends on environmental turbulence (Qalati et al., 2024),

relational information processes raise relationship quality (Jayachandran et al., 2005), and CRM is linked to innovation capability through knowledge management (Migdadi, 2021). A systematic review by Guerola-Navarro et al. (2021) nonetheless concludes that the evidence is still scattered and that the underlying mechanism has not been tested explicitly. Social media then reshaped CRM itself, pushing firms from managing transactions to managing conversations and engagement with customers (Arora et al., 2021). The integration of these customer-facing activities with social media technologies and analytics has been conceptualized as social CRM (Lamrhari et al., 2022). Building on the capabilities perspective (Teece, 2007), Trainor et al. (2014) were the first to conceptualize and measure social CRM capability at the firm level—the capability to generate, integrate, and respond to information obtained from customer interactions through social media technologies—operationalizing it through three components: information generation, information dissemination, and market responsiveness, inherited from the relational information-processing tradition. At root, these three components are the market-orientation behaviors established by Kohli and Jaworski (1990) and measured by Kohli et al. (1993), now relocated to the social media channel. Later studies confirm that the strategic use of social media strengthens market-sensing and customer-linking capabilities and, through them, firm performance (Cao & Weerawardena, 2023; Qalati et al., 2024), while work on social media as an environmental-scanning instrument stresses that this informational potential is realized only to the extent that the firm can absorb what it senses (Song et al., 2022).

The decomposition adopted here follows directly from this market-orientation origin. From an organizational information-processing view, the three information behaviors occupy three different positions along the chain from data to action: generation is the input, dissemination is the conduit, and responsiveness is the action; the evidence that market sensing translates into performance only through downstream customer-linking capabilities supports this sequencing (Cao & Weerawardena, 2023; Song et al., 2022). The dynamic-capabilities perspective likewise treats the microfoundations of a capability as no less

important than the capability as a whole (Teece, 2007), and market-orientation research has shown that distinct orientation dimensions drive innovation through different routes and with unequal strength (Schulze et al., 2022; Zhao et al., 2023). There is thus no basis for assuming that the three components contribute equally to any given outcome. Trainor et al. (2014) modeled social CRM capability as a second-order construct whose three components load between 0.889 and 0.915 and demonstrated its aggregate effect on customer-relationship performance. That aggregation suits their research question, but it says nothing about whether the components behave differently with respect to more distal outcomes such as service innovation. Recent social CRM studies in Vietnamese banking have likewise treated the construct in aggregate form and focused on marketing outcomes such as customer acquisition, retention, expansion, and lifetime value (Nguyen et al., 2025a, 2025b). To the best of the authors' knowledge, no study has decomposed social CRM capability to identify which component drives service innovation.

The third stream concerns the transformation mechanism. From a knowledge-based view, innovation is at heart the integration of the specialized knowledge of individuals and units, and it presupposes shared knowledge within the organization (Xin et al., 2022). Customer information drawn from social media becomes organizational customer knowledge only once it has been distributed, jointly interpreted, and stored for use. Empirical evidence supports this bridging role: customer knowledge management mediates the path from knowledge-oriented leadership to innovation quality and firm performance (Chaithanapat et al., 2022); it also mediates the relationship between innovative work behavior and the product innovation process (Bratianu et al., 2023); and customer knowledge management capability conditions how effectively firms convert collaborative innovation and absorptive capacity into performance (Mata et al., 2024). In the service context, knowledge management capability mediates the effect of user participation on service innovation performance (Xin et al., 2022). Notably, Kumar et al. (2023) found that AI-enabled CRM capability in healthcare has no direct effect on service innovation but operates

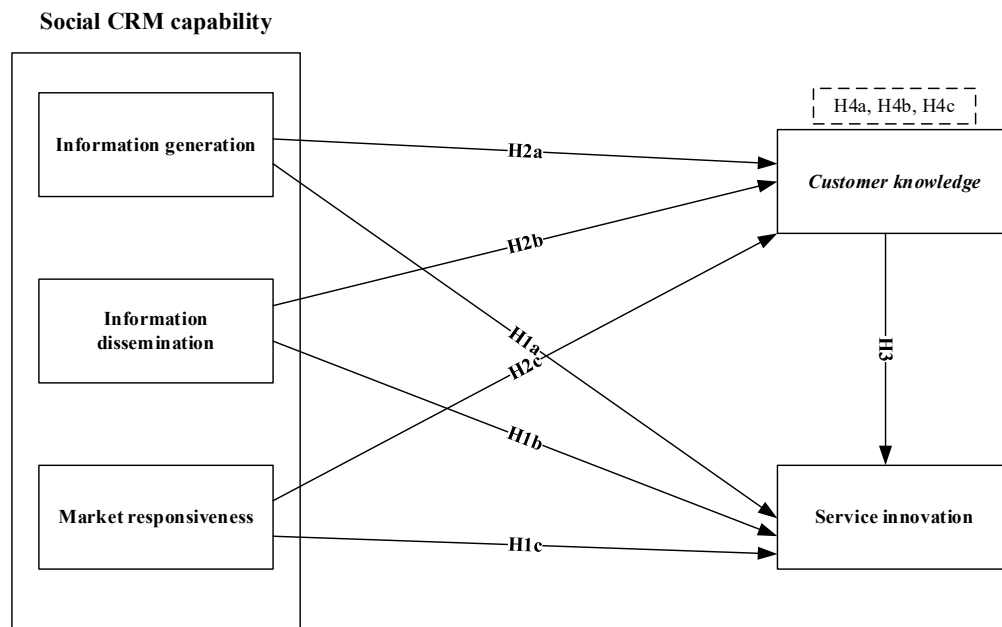


Figure 1. Proposed research model

entirely through an intermediate organizational mechanism. This suggests that the relationship may be indirect in nature.

Bringing the three streams together, there is reason to expect the three components of social CRM capability to contribute differently to service innovation according to their position on the information-knowledge-action chain. Market responsiveness is the behavior closest to the output, since it involves adjusting services and reacting to competitive moves, and is therefore expected to have a pronounced direct effect on service innovation. Information generation supplies the raw market data on which the other two behaviors operate; because it stands furthest from the point of action, its direct contribution to service innovation is expected to be positive but the weakest of the three, with most of its value travelling through customer knowledge. Information dissemination creates shared knowledge across functions, matching the knowledge-integration condition that information becomes organizational knowledge only when it is shared and jointly interpreted across units (Xin et al., 2022), and is therefore expected to be the strongest driver of customer knowledge. Market responsiveness also feeds the knowledge base, because acting on customer and competitor signals generates feedback that the organization interprets and stores as experiential learning (Xie

et al., 2021), although its contribution to customer knowledge is expected to be smaller than that of dissemination. Customer knowledge, in turn, provides the direct raw material for reconfiguring resources into new services (Lusch & Nambisan, 2015), and is therefore expected to mediate the relationships between the social CRM capability components and service innovation.

Against this background, the purpose of the study is to determine how each component of social CRM capability – information generation, information dissemination, and market responsiveness – affects service innovation in Vietnamese commercial banks, and to what extent customer knowledge mediates these effects. Based on the arguments above, the following hypotheses are proposed:

H1a: Information generation has a positive effect on service innovation.

H1b: Information dissemination has a positive effect on service innovation.

H1c: Market responsiveness has a positive effect on service innovation.

H2a: Information generation has a positive effect on customer knowledge.

- H2b: Information dissemination has a positive effect on customer knowledge.*
- H2c: Market responsiveness has a positive effect on customer knowledge.*
- H3: Customer knowledge has a positive effect on service innovation.*
- H4a: Customer knowledge mediates the relationship between information generation and service innovation.*
- H4b: Customer knowledge mediates the relationship between information dissemination and service innovation.*
- H4c: Customer knowledge mediates the relationship between market responsiveness and service innovation.*

Figure 1 summarizes the proposed research model and the hypothesized relationships.

2. METHOD

The study used a single-wave survey design. The questionnaire was compiled from published, validated scales, translated and back-translated (Brislin, 1970), and reviewed by a panel of three academics and three bank executives.

The survey was administered in Vietnam in May 2026. Respondents were managers and specialists in the customer relationship, marketing, digital banking, and product and service development units of domestic commercial banks. They operate social media channels, receive customer information, and take part in service development, and are therefore able to assess the practices the instrument measures; each respondent evaluated the bank at which they worked. A bank qualified if it had operated an official social media channel for at least 24 months and had launched at least one new financial service in the previous three years; a respondent qualified with at least three years of relevant experience. Bank-level eligibility was verified against official social media accounts and annual reports, and individual eligibility through screening questions at the start of

the questionnaire. The questionnaire was hosted on an online survey platform and sent to 800 eligible staff through the banks' official contact points; each link was unique, so that each person could respond only once. The system recorded 436 completed responses (54.5%), and because every item required an answer, there were no missing data. Sixty-four responses were removed for failing the screening criteria, for careless responding (near-identical answers across items), or for implausibly short completion times, leaving 372 valid cases. The sample of 372 exceeds the minimum required for the model and provides adequate statistical power for PLS-SEM (Kock & Hadaya, 2018). The dataset is new, was collected specifically for this study, and has not been used in any previous or concurrent publication. Participation was voluntary and informed; the data were collected anonymously and analyzed only in aggregate. In line with applicable regulations, anonymous and non-interventional survey research of this kind does not require approval from a research ethics committee; the study was nonetheless conducted in accordance with the principles of the Declaration of Helsinki. Table 1 reports the sample profile.

Table 1. Profile of the 372 survey respondents

Characteristic	Frequency	Percentage (%)
Job position		
Director or deputy director (branch or division)	16	4.3
Department head or deputy head	40	10.8
Specialist	316	84.9
Tenure in the banking industry		
3 to under 5 years	48	12.9
5 to under 10 years	154	41.4
Over 10 years	170	45.7
Education level		
Bachelor's degree	156	41.9
Master's degree	190	51.1
Doctorate	26	7.0

The sample is dominated by specialists (84.9%) and department-level managers (10.8%), while directors and deputy directors (4.3%) add an executive perspective. In terms of tenure, 87.1% of respondents have at least five years of experience in banking, and 58.1% hold a postgraduate degree. The items ask about observable practices rather than about strategic intent, so this profile is consistent with the key-informant logic. Two features of the sample bound the generalizability

of the results. Eligibility requires an official social media channel of at least 24 months and at least one new service within three years, so the sample represents banks that already operate social CRM practices rather than the sector. In addition, 428 of the 800 invited staff did not return a usable response, so nonresponse bias cannot be excluded (Armstrong & Overton, 1977).

All constructs were adapted from published, validated sources and measured on a common five-point Likert scale (1 = strongly disagree; 5 = strongly agree). The three social CRM capability components were measured with the 13 items of Trainor et al. (2014) and adapted to the banking context: information generation (IGE1 to IGE3), information dissemination (IDS1 to IDS4), and market responsiveness (RES1 to RES6). Customer knowledge was measured with four items (CKN1 to CKN4) adapted from the knowledge management scale of Choi et al. (2020). Service innovation was measured with four items (SIN1 to SIN4) from Kumar et al. (2023), adapted for financial services. The full wording of all 21 items is reported in Table A1 (Appendix A).

Job position, tenure, and education were collected to describe the sample (Table 1). The structural model was estimated with five focal constructs only. No control variables were entered, first, to keep the coefficients comparable with those of Trainor et al. (2014), and second, because the eligibility criteria already restrict the sample to domestic commercial banks with an established social media channel and a recent service launch, which narrows the variation in size, digital maturity, and market presence that bank-level controls would absorb. The three predictors are also reported by the same respondents and entered simultaneously. A bank characteristic that raises all of them together therefore shifts their coefficients in the same direction and leaves the ordering among them largely unchanged, although it may inflate their absolute size. The estimates should be read as associations within a comparable set of banks, and the absence of controls for ownership type, size, and digital maturity is acknowledged in the limitations.

The data are also hierarchical. The constructs refer to bank-level practices, but the responses were

given by individuals, and several respondents may describe the same bank, so the observations are not necessarily independent. The analysis does not model this clustering, and PLS-SEM provides no adjustment of standard errors for it. The bootstrap standard errors reported in Section 3 may therefore be too small and the corresponding p-values too favorable. The consequence differs across the results: paths estimated at $p < 0.001$ keep a wide margin over the conventional threshold and would remain significant under a substantial inflation of the standard errors, whereas the path from information dissemination to service innovation ($p = 0.010$) lies close to it and is interpreted with caution below. The pairwise comparisons are likely to be less affected, because the difference between two coefficients is computed within the same bootstrap sample and therefore reflects their covariance: a bank-level effect that raises both moves their difference far less than it moves either coefficient. A multilevel design that records bank identity and covers a larger number of banks would allow between-bank and within-bank variance to be separated and is recommended for future work.

Common method bias was addressed first through procedural remedies (Podsakoff et al., 2003, 2024): full anonymity, an explicit statement that there were no right or wrong answers, separate measurement blocks with their own instructions and pages, randomized item order within each block, and placement of the service innovation block after the predictor blocks. Statistically, Harman's single-factor test and the construct-level (full collinearity) VIF were computed. Both are diagnostics of limited sensitivity to the design features that generate method bias (Podsakoff et al., 2024), so the procedural design carries the main weight of the assessment; the absence of an ideal marker variable in the instrument is acknowledged in the limitations. Since neither test can establish that method variance is absent, the residual risk is assessed by considering the direction in which such variance would operate. Common method variance inflates observed relationships between constructs measured in the same instrument. It would therefore work against the null direct effect of information generation reported below and would compress rather than create the differences between the three components. Residual bias is thus

more likely to overstate the size of the significant paths than to produce the pattern on which the conclusions rest.

Data were analyzed with PLS-SEM in SmartPLS 4, assessing the measurement model and then the structural model, with bootstrapping based on 5,000 subsamples (Hair et al., 2019; Guenther et al., 2023). The specific indirect effects through customer knowledge were tested with percentile bootstrap confidence intervals (Becker et al., 2023), and the type of mediation was classified following Zhao et al. (2010). Because the central claims concern the relative size of the three components' effects, the difference between each pair of path coefficients and between each pair of total effects was computed within every bootstrap sample, which yields percentile confidence intervals and two-tailed p-values for these differences. In-sample predictive relevance was assessed by blindfolding with an omission distance of seven (Stone-Geisser Q^2 ; Hair et al., 2019). Out-of-sample predictive power was assessed with the PLSpredict procedure using ten folds and ten repetitions, comparing the root mean squared error of the PLS-SEM predictions of the service innovation indicators with that of a linear-model benchmark (Shmueli et al., 2019), and with the cross-validated predictive ability test against both the indicator-average and the linear-model benchmark (Sharma et al., 2023).

3. RESULTS

Table 2 reports the means, standard deviations, and correlations among the study constructs. Construct means range from 3.32 to 3.58 on a five-point scale. The correlations among the three social CRM capability components are high (0.496 to 0.532), in line with their conceptual proximity, but well below the level of 0.80 that would raise

concern. The correlations of the components with customer knowledge and service innovation are all positive, in the direction predicted by theory.

The measurement model met all recommended thresholds (Table 3). The outer loadings of the 21 items range from 0.726 to 0.862, all above 0.708; Cronbach's alpha ranges from 0.817 to 0.861 and ρ_A from 0.819 to 0.865; composite reliability (ρ_C) ranges from 0.889 to 0.905; and AVE ranges from 0.591 to 0.731, above the 0.50 threshold, while the highest item VIF is 2.19. The reliability and convergent validity of the scales are therefore supported (Hair et al., 2019).

Discriminant validity is a key condition for the decomposed model and was confirmed against the pre-specified criteria (Table 4). All HTMT ratios fall between 0.480 and 0.661, below the 0.90 threshold and even below the more conservative 0.85 (Henseler et al., 2015); the highest value is for the customer knowledge-service innovation pair (0.661). The Fornell and Larcker (1981) criterion is also satisfied: the square root of AVE for each construct exceeds all its correlations with the other constructs (Table 2). The construct-level VIFs of the predictors in the two structural equations range from 1.50 to 1.72, below the 3.3 threshold. The three components therefore qualify to be estimated as three distinct constructs in the structural model.

The structural model results (Table 5, Figure 2) reveal a clear differentiation among the three components. For service innovation, market responsiveness has the largest direct effect ($\beta = 0.225$, $p < 0.001$) and information dissemination a weaker direct effect ($\beta = 0.146$, $p = 0.010$), supporting *H1c* and *H1b*; by contrast, information generation has no statistically significant direct effect ($\beta = 0.043$, $p = 0.418$; 95% CI $[-0.062, 0.148]$), so *H1a* is not

Table 2. Means, standard deviations, and correlation matrix of the study constructs (n = 372)

Construct	Mean	SD	1	2	3	4	5
Information generation	3.38	0.81	(0.855)				
Information dissemination	3.32	0.81	0.512**	(0.827)			
Market responsiveness	3.47	0.74	0.496**	0.532**	(0.769)		
Customer knowledge	3.58	0.81	0.479**	0.523**	0.457**	(0.817)	
Service innovation	3.55	0.83	0.403**	0.477**	0.490**	0.562**	(0.839)

Note: off-diagonal values are latent-variable correlations estimated in SmartPLS; the parenthesized values on the diagonal are the square root of the average variance extracted (AVE). ** $p < 0.01$.

Table 3. Measurement model assessment

Construct	Item	Outer loading	Cronbach's alpha	CR	AVE	VIF
Information generation	IGE1	0.852	0.817	0.891	0.731	1.868
	IGE2	0.862				1.790
	IGE3	0.851				1.777
Information dissemination	IDS1	0.827	0.846	0.896	0.684	1.829
	IDS2	0.818				1.849
	IDS3	0.841				1.982
	IDS4	0.821				1.848
Market responsiveness	RES1	0.750	0.861	0.896	0.591	1.687
	RES2	0.801				1.915
	RES3	0.810				1.966
	RES4	0.781				1.816
	RES5	0.726				1.609
	RES6	0.739				1.633
Customer knowledge	CKN1	0.816	0.834	0.889	0.667	1.747
	CKN2	0.808				1.777
	CKN3	0.831				1.948
	CKN4	0.812				1.751
Service innovation	SIN1	0.832	0.860	0.905	0.705	1.927
	SIN2	0.862				2.191
	SIN3	0.806				1.813
	SIN4	0.857				2.156

Table 4. Discriminant validity assessment using the HTMT criterion

Construct	1	2	3	4
Information generation				
Information dissemination	0.616			
Market responsiveness	0.590	0.622		
Customer knowledge	0.576	0.622	0.538	
Service innovation	0.480	0.557	0.566	0.661

supported. For customer knowledge, all three components have positive effects: information dissemination has the largest coefficient ($\beta = 0.310$, $p < 0.001$), followed by information generation ($\beta = 0.232$, $p < 0.001$) and market responsiveness ($\beta = 0.177$, $p < 0.001$), supporting *H2a*, *H2b*, and *H2c*. Customer knowledge has a positive effect on service innovation ($\beta = 0.362$, $p < 0.001$), supporting *H3*. The model explains 35.4% of the variance in customer knowledge and 40.1% of the variance in service innovation. These values are moderate by the standards of organizational research (Hair et al., 2019): about two-thirds of the variance in customer knowledge and three-fifths of the variance in service innovation lie outside the model, so the model identifies a mechanism and the relative position of its components rather than accounting for most of the variance in service innovation. The blindfolding Q^2 values are 0.230 and 0.277, both above zero, confirming the model's in-sample predictive relevance. PLSpredict shows that the PLS-

SEM estimates return a lower root mean squared error than the linear-model benchmark for all four service innovation indicators, with Q^2 predict between 0.176 and 0.235, which indicates high out-of-sample predictive power (Shmueli et al., 2019); the cross-validated predictive ability test confirms that the model outperforms both the indicator-average benchmark (average loss difference = -0.210 , $p < 0.001$) and the linear-model benchmark (average loss difference = -0.031 , $p < 0.001$) (Sharma et al., 2023).

Three further points qualify the claims made above. First, because the argument rests on the relative size of the effects, the difference between each pair of coefficients was tested on the bootstrap distribution of the differences. Only the contrasts involving information generation are statistically significant: the direct effect of market responsiveness exceeds that of information generation by 0.184 (95% CI [0.025, 0.344], $p = 0.026$),

and its total effect exceeds it by 0.165 (95% CI [0.002, 0.325], $p = 0.048$). The direct effect of market responsiveness exceeds that of information dissemination by 0.081 ($p = 0.305$) and its total effect by 0.033 ($p = 0.678$), neither of which is distinguishable from zero. On the customer knowledge side, information dissemination carries the largest coefficient, but its advantage over information generation (0.079, $p = 0.377$) and over market responsiveness (0.131, $p = 0.126$) is not statistically significant. The ordering of the three components is therefore descriptive rather than an established difference, with the single exception that market responsiveness is a stronger direct and total driver of service innovation than information generation. Second, the confidence interval of the direct effect of information generation includes zero but is not tight around it, so the result should be read as an absence of evidence for a direct effect rather than as evidence that no direct effect exists. Third, the effect sizes qualify these results. The f^2 values of the direct paths on service innovation are small in Cohen's terms (0.002 for information generation, 0.021 for information dissemination, and 0.053 for market responsiveness), and only customer knowledge approaches a medium value (0.142). Statistical significance therefore shows that the paths exist and in what sequence they operate, not that the components differ greatly in practical terms. The reported p -values are also unadjusted for the clustering of respondents within banks (Section 2), which is a further reason for caution about the path from information dissemination to

service innovation.

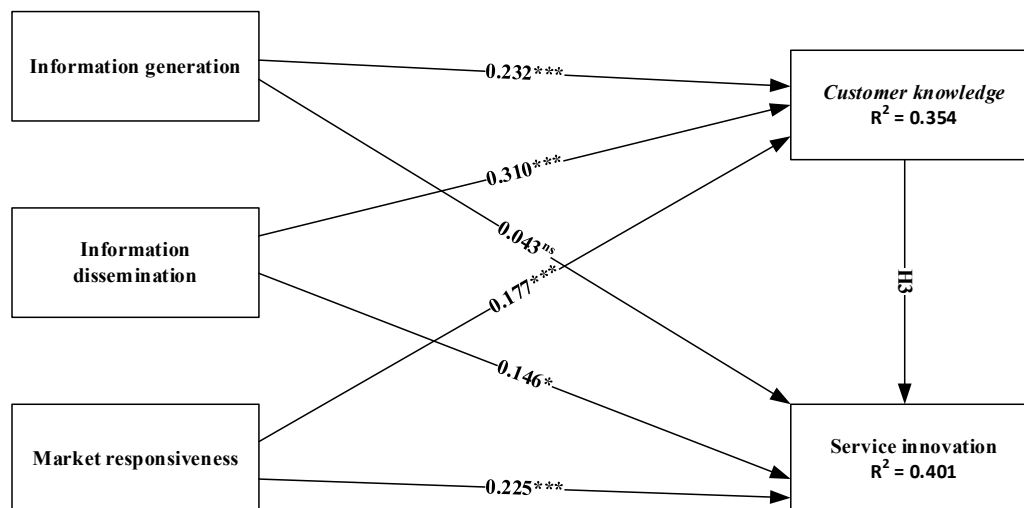
Table 5 also reports the specific indirect effects through customer knowledge. All three are statistically significant, with bootstrap confidence intervals that exclude zero, supporting *H4a*, *H4b*, and *H4c*. Read together with the direct paths, the pattern of mediation differs across the three components in the sense of Zhao et al. (2010). For information generation, the direct effect is nonsignificant while the indirect effect is significant, so customer knowledge fully mediates the relationship. For information dissemination and market responsiveness, both the direct and indirect effects are positive and significant, corresponding to complementary mediation. In terms of total effects, market responsiveness has the largest point estimate (0.289), followed by information dissemination (0.258) and information generation (0.127); of these gaps, only the one between market responsiveness and information generation is statistically significant.

Several additional tests bear on the robustness of the results. Harman's single factor accounts for only 39.8% of the total variance, below the 50% threshold, and the highest construct-level (full collinearity) VIF is 1.72, well below 3.3 (Hair et al., 2019); because these tests are of limited diagnostic value on their own (Podsakoff et al., 2024), the procedural remedies described in Section 2 carry the main weight of the assessment. The standardized root mean square residual of the saturated

Table 5. Hypothesis testing results

Hypothesis and path	β	SE	t	p	Result
Direct effects					
H1a. Information generation → Service innovation	0.043	0.053	0.809	0.418	Not supported
H1b. Information dissemination → Service innovation	0.146	0.056	2.587	0.010	Supported
H1c. Market responsiveness → Service innovation	0.225	0.049	4.561	< 0.001	Supported
H2a. Information generation → Customer knowledge	0.232	0.051	4.540	< 0.001	Supported
H2b. Information dissemination → Customer knowledge	0.310	0.052	5.986	< 0.001	Supported
H2c. Market responsiveness → Customer knowledge	0.177	0.049	3.636	< 0.001	Supported
H3. Customer knowledge → Service innovation	0.362	0.053	6.868	< 0.001	Supported
Indirect effects through customer knowledge					
H4a. Information generation → Customer knowledge → Service innovation	0.084	0.022	3.818	< 0.001	Supported
H4b. Information dissemination → Customer knowledge → Service innovation	0.112	0.025	4.487	< 0.001	Supported
H4c. Market responsiveness → Customer knowledge → Service innovation	0.064	0.020	3.179	0.002	Supported

R^2 (adjusted R^2): customer knowledge = 0.354 (0.349); service innovation = 0.401 (0.394)
 f^2 : paths to customer knowledge from 0.031 to 0.094; to service innovation: information generation 0.002; information dissemination 0.021; market responsiveness 0.053; customer knowledge 0.142
 Q^2 (blindfolding): customer knowledge = 0.230; service innovation = 0.277



Note: *** $p < 0.001$; * $p < 0.05$; ns: not significant.

Figure 2. Structural model results

model is 0.049, below the 0.08 threshold. Neither of the two method-bias diagnostics indicates a problem, but neither can establish the absence of one, and no marker variable was available, so residual method variance cannot be ruled out; as noted in Section 2, its likely effect is on the size of the significant paths rather than on the pattern of differences between the components.

4. DISCUSSION

The main finding is that the three components of social CRM capability contribute to service innovation along different pathways. This finding should be read against the original study. Trainor et al. (2014) combined the three components into a second-order construct and confirmed its aggregate effect on customer-relationship performance ($\beta = 0.352$). That aggregation answers whether social CRM capability creates value, but not which component creates value for which outcome. The decomposed results here show that estimating social CRM capability only in aggregate form would let a positive overall result obscure an important point: generating information from social media has no direct effect on service innovation, whereas market responsiveness contributes mainly through the direct path. Aggregation would therefore discard information that is valuable for both theory and practice. This difference matches the distinct positions of the three behaviors along the information-to-action chain in the organizational in-

formation-processing view (Cao & Weerawardena, 2023), and it shows the value of returning to the original behavioral structure of the market-orientation stream (Kohli & Jaworski, 1990; Kohli et al., 1993) when examining outcomes more distal than customer-relationship performance.

The finding that information generation affects service innovation only indirectly through customer knowledge – full mediation in the sense of Zhao et al. (2010) – parallels the result of Kumar et al. (2023) directly. In healthcare, they likewise found that AI-enabled CRM capability has no direct effect on service innovation but operates entirely through an intermediate organizational mechanism, namely customer service flexibility. The present study reproduces that pattern at a finer, component-level resolution and with a different mechanism, customer knowledge. Two independent results in different industries point to the same conclusion: data produced by technology does not generate innovation on its own but must be transformed through an organization's knowledge mechanisms, as the environmental-scanning literature anticipated (Song et al., 2022). On the knowledge-accumulation side, the fact that information dissemination carries the largest coefficient on customer knowledge ($\beta = 0.310$), even though its advantage over the other two components is not statistically significant, fits the knowledge-integration condition (Xin et al., 2022): information becomes organizational knowledge only when it is shared and jointly interpreted across

functions. This is also consistent with the mediating role of customer knowledge management between organizational antecedents and innovation outcomes (Bratianu et al., 2023; Chaithanapat et al., 2022) and with evidence that customer knowledge management capability conditions how firms convert collaboration and absorptive capacity into performance (Mata et al., 2024).

Two qualifications temper this reading. First, as reported in Section 3, the effect sizes of the direct paths are small, and the pairwise differences between components are not statistically significant except between market responsiveness and information generation. Second, the null direct effect of information generation admits explanations other than the theoretical one. Social listening is comparatively recent in Vietnamese banking, so generation may not yet be intense enough for a direct effect to emerge; and the information generation scale is the shortest of the three (three items) and is confined to listening rather than to analytics, which may under-represent the construct. Studies that do report a direct effect of social media information on innovation typically measure generation jointly with analytical capability (Cao & Weerawardena, 2023; Song et al., 2022), suggesting that the boundary condition lies in a bank's analytic capacity rather than in listening as such. This reading is consistent with the present results but cannot be adjudicated by them, and it defines a clear task for future work.

Relative to the traditional CRM-and-innovation stream, which records a positive relationship but lacks an explicit mechanism (Qalati et al., 2024; Migdadi, 2021; Guerola-Navarro et al., 2021), this study's contribution is to identify a concrete mechanism, customer knowledge, and to quantify how much of each component's value passes through it. Relative to social CRM studies in Vietnamese

banking that stop at marketing outcomes (Nguyen et al., 2025a, 2025b), it extends the outcome chain to service innovation, while showing that the condition for that extension is a working cross-functional customer knowledge process. The results also add to international evidence on the value of social CRM capability (Cao & Weerawardena, 2023; Ferm & Thaichon, 2021) by making clear that this value is not distributed evenly across components.

For management practice, the results point to complementary rather than competing investments, in place of spreading resources thinly across social media capability in general. Market responsiveness – the process for handling customer feedback through social media, the mechanism for tracking competitive moves, and the authority given to digital-channel teams to adjust services – is the only component with a demonstrably larger contribution to service innovation than information generation, and it delivers that contribution mainly through the direct path. Information dissemination, for example through regular cross-functional meetings on trends detected in social media or a shared customer information repository linking the customer relationship and product development units, is the principal route by which customer knowledge accumulates; its total contribution (0.258) cannot be distinguished statistically from that of market responsiveness (0.289), so the two should be developed together rather than sequenced. Finally, acquiring social listening and analytics tools, which falls under information generation, creates innovation value only when accompanied by the two capabilities above, which helps explain why investment in social media technology often fails to deliver innovation. These implications follow from a cross-sectional model with modest effect sizes and should be read as an ordering of expected returns rather than as a guarantee of them.

CONCLUSIONS

The purpose of the study was to determine how each component of social CRM capability – information generation, information dissemination, and market responsiveness – affects service innovation in Vietnamese commercial banks, and to what extent customer knowledge mediates these effects. Tested on 372 responses from specialists and managers in Vietnamese commercial banks, the model supports nine of the ten hypotheses and traces a clear division of roles among the three components: market responsiveness shapes new services directly, information dissemination

builds the customer knowledge base, and information generation takes effect only once it passes through that knowledge base (total effects 0.289, 0.258, and 0.127 respectively; $R^2 = 0.401$ for service innovation).

The ordering of these total effects is descriptive: only the gap between market responsiveness and information generation is statistically significant, and most of the variance in service innovation remains unexplained. Within these limits, three conclusions follow. First, social CRM capability is not a homogeneous block: its components sit at different points on the information-knowledge-action chain and therefore create innovation value through different mechanisms. Second, customer knowledge is the central transformation mechanism—the condition under which social media data becomes new services rather than a by-product of digital communication. Third, the innovation value of investments in social media data-collection and analytics tools is conditional: without cross-functional processes for disseminating and accumulating knowledge, such investments are unlikely to produce innovation on their own.

Several limitations point to directions for future work. First, the cross-sectional design with a single wave of self-reported data does not allow causal claims and leaves open the risk of common method bias; multi-source or multi-wave designs, together with a marker variable in the instrument, would strengthen causal inference. Second, as discussed in Section 2, respondents are nested within banks, and the model carries no bank-level controls; a multilevel design that records bank identity and covers more banks would separate between-bank from within-bank variance and would accommodate controls such as ownership type and size. The study also measured service innovation through managers' perceptions, so adding objective indicators such as the number of new services launched would make the conclusions more robust. Third, the sampling frame was assembled with the cooperation of the participating banks, which may have favored banks that are more advanced in social media practice, and nonresponse bias cannot be entirely ruled out (Armstrong & Overton, 1977). In addition, the model does not include the resource antecedents of social CRM capability and the complementarities among them that Trainor et al. (2014) documented; integrating this antecedent layer with the decomposed model is a natural extension. Finally, the results reflect the Vietnamese banking context, where social media dominates customer interaction more than in most other markets, and should be retested where channel structures differ before being generalized.

More broadly, decomposing social CRM capability opens a wider research agenda on the microfoundations of digital marketing capabilities. Comparing the differentiated structure of the three components between traditional and digital-only banks, or between banking and other information-intensive service industries, would show how general the pattern found here is. Answering that question would bring researchers and managers closer to a theory of the conditions under which investment in customer technology is converted into innovation.

AUTHOR CONTRIBUTIONS

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APPENDIX A

Table A1. Measurement items

Code	Item
Information generation (adapted from Trainor et al., 2014)	
IGE1	Our bank uses social media to conduct market research
IGE2	Our bank uses social media to detect changes in customer preferences for products and services
IGE3	Our bank uses social media to identify fundamental shifts in the banking industry (e.g., competitive moves, financial technology)
Information dissemination (adapted from Trainor et al., 2014)	
IDS1	Our bank regularly holds cross-functional meetings to discuss market trends identified through social media
IDS2	Our marketing department spends time discussing customers' future needs identified on social media with other departments
IDS3	Data on customer satisfaction collected through social media is disseminated regularly to all levels of our bank
IDS4	When one department discovers important information about competitors through social media, it quickly informs the other departments
Market responsiveness (adapted from Trainor et al., 2014)	
RES1	Our bank uses social media to respond to competitors' changes in interest rates and fees
RES2	Our bank closely monitors changes in customers' product and service needs through social media
RES3	If a major competitor launches an intensive campaign targeting our customers, our bank responds quickly on social media
RES4	The social media activities of the departments in our bank are closely coordinated
RES5	In our bank, customer complaints can be received and tracked through social media
RES6	When customers want a product or service to be adjusted, our bank announces the change through social media
Customer knowledge (adapted from Choi et al., 2020)	
CKN1	Our bank quickly transfers important customer information to the relevant departments
CKN2	Our bank shares in-depth customer knowledge among staff to improve overall work effectiveness
CKN3	Our bank keeps its knowledge of market trends and of customer needs for new products and services up to date
CKN4	Our bank applies customer insights and best practices in its day-to-day work
Service innovation (adapted from Kumar et al., 2023)	
SIN1	Our bank regularly improves existing financial services to better meet customer needs
SIN2	Our bank develops new financial services that meet customers' changing needs
SIN3	Our bank innovates the way existing services are delivered (distribution channels, processes, service models)
SIN4	Our bank integrates resources (technology, data, partners) to create new financial service models