

Digital Marketing Capability, Market Orientation, and Innovation on Micro Culinary Performance: Social Capital's Moderating Role

Dhevi Dadi Kusumaningtyas*, Denny Bernardus, and Liliana Dewi
Faculty of Business and Management, Universitas Ciputra, Surabaya, 60219 Indonesia

ABSTRACT

Purpose – This study examines whether digital marketing capability, market orientation, and innovation raise the performance of micro culinary enterprises in Surakarta (Solo), Indonesia, and whether social capital moderates each capability-performance relationship.

Design/methodology/approach – Survey data from 250 owner-managers of micro culinary enterprises were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM), Confirmatory Tetrad Analysis, and Necessary Condition Analysis (NCA).

Finding/Results – Digital marketing capability, market orientation, and innovation each significantly and positively predicted performance. All four constructs, including social capital, met the threshold for a meaningful necessary condition, though digital marketing capability's bottleneck is largest only near the extreme upper tail of performance. Social capital significantly strengthened only the market orientation-performance relationship; its large direct coefficient should be read alongside its high variance-inflation factor rather than as evidence of dominance.

Originality/Value – The study offers evidence that Social Capital Theory's boundary-condition role can be selective rather than uniform, based on a single significant interaction of three tested, and extends the Resource-Based View to micro-scale, informal culinary enterprises, offering a preliminary basis for sequencing capability-building support pending replication.

ARTICLE INFO

Keywords:

Digital Marketing Capability, Market Orientation, Innovation, Social Capital, Necessary Condition Analysis

Article Information:

Received: 28/06/2026

Revise: 20/07/2026

Accepted: 10/08/2026

ISSN:

2985-3168 (Online)

2985-3222 (Print)

*Corresponding Author at:

Faculty of Business and Management, Universitas Ciputra, Citraland CBD Boulevard, Surabaya, 60219, Indonesia.

E-mail address: dkusumaningtyas@student.ciputra.ac.id (Dhevi Dadi Kusumaningtyas)

Licensed under a [Creative Commons Attribution-ShareAlike 4.0 International \(CC BY-SA 4.0\)](https://creativecommons.org/licenses/by-sa/4.0/)



1. Introduction

Micro culinary enterprises form a substantial share of Indonesia's micro and small enterprise (SME) sector, and Surakarta (Solo) has long positioned itself as a culinary destination built around street-food clusters, home-based catering, and small food-and-beverage outlets. Recent evidence shows process innovation is significantly related to business performance, and that internal capabilities, not scale alone, distinguish stronger performers in this sector (Pusung et al., 2023).

At the same time, rapid digital-platform adoption for promotion and ordering has changed how small businesses compete for attention, yet many micro culinary operators in Solo still run largely informal, resource-constrained operations. This gap between digital opportunity and operational constraint motivates the present study.

Three firm-level capabilities are commonly associated with small business performance in the marketing and strategy literature: digital marketing capability, market orientation, and innovation. Digital marketing capability reflects a firm's ability to plan and execute digital promotion, engagement, and transactions, shown to enhance the marketing performance of Indonesian SMEs alongside digital orientation and IT capability (Sultoni et al., 2022). Market orientation reflects how systematically a firm gathers and responds to customer and competitor information, linked to business profitability by Narver and Slater (1990) and extended by Hurley and Hult (1998) to incorporate innovation as a complementary capability. Innovation reflects a firm's capacity to introduce new or improved products, processes, or service experiences, shown to drive culinary sector SME performance in Indonesia through process and product innovation (Pusung et al., 2023).

This study proposes that the strength of these capability-performance relationships is not uniform across micro culinary enterprises in Solo but depends on each business's social capital. Social capital, the network ties, trust, and shared norms embedded in a firm's relationships with suppliers, customers, and peer vendors (Nahapiet & Ghoshal, 1998), has been documented as a boundary condition changing how effectively resources translate into performance; Boohene et al. (2019) found emotional intelligence moderates the social capital-performance relationship among SMEs. A firm with strong digital marketing capability but weak community ties may struggle converting visibility into sales, while one with dense local ties converts it more efficiently.

Three gaps justify this study. First, much of the capability-performance literature treats digital marketing capability, market orientation, and innovation as independent predictors without testing a boundary condition for why effects vary across firms. Second, a Pekanbaru study found social capital has no significant direct effect on performance, operating instead indirectly through innovation capability (Purwati et al., 2021); this is mediating, not moderating, evidence, and does not establish that social capital changes other capability-performance relationships' strength. Purwati et al. (2021) thus motivates asking whether social capital is better captured as a direct effect, mediator, or moderator. Moderation is tested as one candidate on three grounds: structurally, social capital (Nahapiet & Ghoshal, 1998) supplies the relational and cognitive infrastructure through which resources convert into value, closer to a conditioning mechanism than a transformed resource; empirically, comparable network-embeddedness constructs strengthen rather than merely transmit other SME resources' effects (Boohene et al., 2019); and practically, testing all three roles jointly is infeasible with one cross-sectional sample, so moderation is the primary test while direct-effect and mediating readings remain viable alternatives, revisited in Section 4.10. Third, evidence on micro culinary

enterprises in mid-sized Indonesian cities like Solo remains limited; comparable studies concentrate on Pekanbaru (Purwati et al., 2021) and Surabaya (Pusung et al., 2023). This study positions social capital as a moderator on three capability-performance paths in Solo's micro culinary sector.

Accordingly, this study asks whether digital marketing capability, market orientation, and innovation each significantly influence performance in Solo; whether social capital moderates each relationship; and which of the four constructs functions as a necessary condition, and at which performance levels, rather than merely a contributory predictor. The study aims to examine the three direct effects, the moderating role of social capital on each path, and to identify necessary conditions across performance thresholds using NCA, complementing PLS-SEM's net-effect findings rather than reducing the necessity evidence to a single ranking.

2. Literature Review & Hypothesis Development

This study anchors its direct-effect hypotheses in the Resource-Based View (RBV): firms achieve superior, sustained performance when they hold resources that are valuable, rare, difficult to imitate, and non-substitutable (Barney, 1991). Digital marketing capability, market orientation, and innovation are treated as firm-level capabilities satisfying these criteria to varying degrees, since not every micro culinary business has equal access to digital tools, market intelligence, or innovation capacity.

The moderating role of social capital is grounded in Social Capital Theory. Coleman (1988) conceptualized social capital as a resource embedded in relationships, and Nahapiet and Ghoshal (1998) extended this to firms: its structural, relational, and cognitive dimensions shape how effectively a firm mobilizes value from its other resources. This logic must be established separately for each capability rather than assumed uniform, since the mechanism differs across the three; each of Section 2.2's hypotheses specifies the dimension most relevant to that capability. Together with evidence that social capital's effect on Indonesian culinary/hospitality SME performance operates indirectly rather than directly (Purwati et al., 2021), this motivates treating it as a candidate boundary condition tested through moderation, while the direct-effect and mediating readings implied by Purwati et al. (2021) and by its own significant direct path here are carried forward as competing interpretations; Section 4.10 revisits this against the selective pattern of results.

A parallel-predictor structure is adopted here rather than a sequential one, needing explicit defense. A plausible rival account treats market orientation as upstream, supplying the intelligence from which innovation and digital marketing activity are generated, so part of what this study attributes to three independent direct effects could instead reflect an indirect chain from market orientation through innovation and digital marketing capability to performance. The parallel specification is retained because the three capabilities satisfy the Resource-Based View's VRIN criteria (Barney, 1991) as distinct resources: a firm can hold strong market intelligence without innovating or maintaining digital presence, and Table 6's cross-sectional correlations are moderate rather than high ($r = .26$ to $.36$), inconsistent with one capability fully channeling through another. This is suggestive, not confirmatory, since a moderate correlation is compatible with either structure. A formal test requires estimating the rival sequential model and comparing structural fit and out-of-sample accuracy (via CVPAT); this has not been run, requiring re-estimation in SmartPLS outside this revision's scope, and is an explicit Section 7 limitation. Sections 4-5's results should be read with this alternative still open.

2.1 Direct Effects: Digital Marketing Capability, Market Orientation, and Innovation

Digital marketing capability allows micro culinary enterprises to reach customers beyond their immediate physical location, manage promotion at low marginal cost, and respond quickly to shifting demand. Consistent with evidence from Indonesian SMEs, where digital marketing capability significantly strengthens marketing performance (Sultoni et al., 2022), firms with stronger digital marketing capability are expected to report higher performance than firms that rely solely on offline promotion and word of mouth.

H1: Digital marketing capability has a positive effect on micro culinary enterprise performance.

Market orientation directs a firm's attention toward customer needs and competitor behavior, allowing it to adjust menu, pricing, and service to local demand. Narver and Slater (1990) established its positive effect on profitability, and Hurley and Hult (1998) showed market-oriented firms with a stronger innovative culture adapt more effectively; culinary enterprises that consistently gather and act on such information are expected to outperform those that do not.

H2: Market orientation has a positive effect on micro culinary enterprise performance.

Innovation, in menu development, process, or service delivery, allows a firm to differentiate itself and respond to changing preferences. Direct evidence from Indonesian culinary SMEs shows process innovation is positively related to firm performance (Pusung et al., 2023), reinforcing the claim that innovative capacity underlies a firm's ability to adapt and compete (Hurley & Hult, 1998).

H3: Innovation has a positive effect on micro culinary enterprise performance.

2.2 Moderating Role of Social Capital

Digital marketing capability is more likely to convert into performance when a firm can draw on trusted relationships to sustain the credibility of its digital presence, secure referrals, and access shared promotional networks among peer vendors. This reasoning follows the structural and relational dimensions of social capital described by Nahapiet and Ghoshal (1998): where social capital is low, digital marketing efforts may generate visibility without translating into transactions.

H4: Social capital positively moderates the relationship between digital marketing capability and micro culinary enterprise performance, such that the relationship is stronger when social capital is high.

Market orientation depends on a firm's ability to gather accurate information about customers and competitors. Firms embedded in dense local networks, with strong ties to suppliers, customers, and other culinary vendors, are better positioned to obtain and validate this information, consistent with evidence that social capital functions as a resource that strengthens how other firm-level assets translate into SME performance (Boohene et al., 2019).

H5: Social capital positively moderates the relationship between market orientation and micro culinary enterprise performance, such that the relationship is stronger when social capital is high.

Innovation often requires access to resources or informal knowledge sharing a single micro enterprise cannot generate alone. Purwati et al. (2021) found social capital shapes culinary/hospitality SME performance in Indonesia through its relationship with innovation capability, as a mediating rather than moderating mechanism; this is suggestive, not directly supportive, of H6, since it links social capital and innovation without showing social capital

changes innovation's effect on performance. Firms with stronger social capital can draw on their network to diffuse innovations, expected to strengthen the innovation-performance relationship.

H6: Social capital positively moderates the relationship between innovation and micro culinary enterprise performance, such that the relationship is stronger when social capital is high.

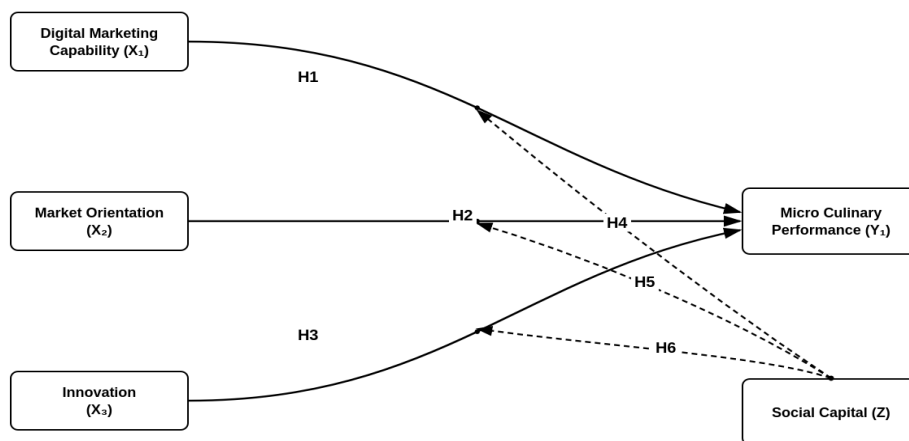
Because Purwati et al. (2021) modeled social capital's relationship with innovation as mediation rather than moderation, H6 tests a mechanism that the cited study did not itself examine; the hypothesis is retained here as a genuine, competing test of whether an interaction effect exists alongside, or instead of, the mediating channel Purwati et al. (2021) reported, and the two readings are reconciled empirically in Section 4.10.

Because a valid interaction test requires the moderator's direct path to remain in the model alongside the three product terms (Dawson, 2014), Social Capital $\rightarrow$ Performance is estimated and reported as a direct path throughout Section 4, though not the object of a separate hypothesis. This path is built into the structural model specification from the outset, not treated as incidental, and interpreted jointly with H4-H6 in Sections 4.5 and 4.10.

2.3 Conceptual Framework

Figure 1 presents the conceptual framework. The model specifies three direct paths (H1-H3) from digital marketing capability, market orientation, and innovation to micro culinary enterprise performance, and three second-order moderation paths (H4-H6) through which social capital conditions the strength of each direct relationship. No mediating construct is specified between the three predictors and performance; social capital operates solely as a moderator.

Figure 1. Conceptual research model



3. Methodology

3.1 Research Design, Population, and Sample

This study uses a quantitative, explanatory, cross-sectional survey design, appropriate because the research questions concern the direction and strength of relationships among latent constructs and the moderating effect of one construct on three separate paths, requiring simultaneous estimation of measurement and structural relationships rather than description alone.

The population consists of micro-scale culinary enterprises operating in Surakarta (Solo), Central Java, street-food vendors, home-based caterers, and small food-and-beverage outlets meeting the Indonesian government's micro-enterprise classification. Because no complete sampling frame exists for the city, this study used a purposive, quota-based sampling strategy stratified by sub-district (kecamatan) to avoid overrepresenting any single culinary cluster, consistent with comparable Indonesian culinary/hospitality SME studies (Purwati et al., 2021; Pusung et al., 2023).

Respondents were recruited via a Google Form distributed through WhatsApp groups and social media, restricted to one submission per number/email to prevent duplicates. The realized quota across Solo's five kecamatan was Banjarsari 63 (25.2%), Jebres 50 (20.0%), Laweyan 48 (19.2%), Pasar Kliwon 45 (18.0%), and Serengan 44 (17.6%), spanning the city's full administrative range. Micro-enterprise status was screened via self-reported monthly turnover, with every respondent at or below Rp15,000,000/month, well within the government threshold. Two fieldwork limitations are disclosed: the Google Form's views-to-completions ratio is unavailable from the response-only dataset and can only be reconstructed from distribution-side analytics; and respondent role (owner or manager) was established by the form's framing but not independently verified in every case. A related risk is that more digitally visible or better-networked firms may have been likelier to respond, inflating average levels and estimated effects relative to the full population; this cannot be ruled out and is noted as a sampling limitation.

Sample size is determined primarily on power-analytic grounds. For an F-test of six structural predictors of Performance, detecting a small-to-medium effect ($f^2 = .05$ to $.10$) at $\alpha = .05$ with 80% power requires a minimum of 279 respondents for $f^2 = .05$, 177 for $f^2 = .08$, or 143 for $f^2 = .10$ (noncentral-F, $df = 6$). At $N = 250$, achieved power is .746, .934, and .977 respectively, equivalent to 80% power for $f^2 \approx .056$; this is adequate for the observed direct-path effects (Table 7, $f^2 = .21-.27$) and the supported interaction ($f^2 = .025$), though somewhat underpowered at .80 for effects near the small range's lower bound, qualifying without overturning the null-moderation conclusions for H4 and H6 (Section 4.5). The ten-times rule gives a much lower minimum of 60 and is reported only for continuity with prior studies, given its recognized imprecision. Comparable Indonesian studies used samples of around 200 (Purwati et al., 2021) and 201 (Pusung et al., 2023); $N = 250$ exceeds the power-analytic minimum and both benchmarks, with margin for bootstrapping, subgroup checks, and attrition.

3.2 Measurement

All constructs are measured reflectively using multi-item indicators adapted from established scales, translated into Indonesian and back-translated, rated on a seven-point Likert scale (1 = strongly disagree to 7 = strongly agree), used in the fielded questionnaire and Table 1b's pilot test; item wording, translation procedure, and response anchors should be attached as an appendix at resubmission, not yet completed. Market Orientation and Social Capital are specified as reflective-reflective higher-order constructs with three first-order dimensions each (Narver & Slater, 1990; Nahapiet & Ghoshal, 1998), following Sarstedt et al.'s (2019) criteria and supported by high inter-dimension composite reliability (Table 5, .95-.96).

Table 1. Summarizes the Constructs, Model Role, and Scale Sources.

Construct	Role in Model	Illustrative Indicator Focus	Basis for Scale Adaptation
-----------	---------------	------------------------------	----------------------------

Digital Marketing Capability (X1)	Exogenous / predictor	Use of digital/social media platforms, online promotion consistency, digital customer engagement, e-commerce/delivery-app utilization.	Sultoni et al. (2022)
Market Orientation (X2)	Exogenous / predictor	Customer orientation, competitor orientation, inter-functional coordination in responding to local culinary market signals.	Narver & Slater (1990)
Innovation (X3)	Exogenous / predictor	Menu/product innovation, process innovation (kitchen/service), packaging or presentation innovation.	Hurley & Hult (1998); Pusung et al. (2023)
Social Capital (Z)	Moderator	Structural ties with suppliers/customers/peer vendors, relational trust, shared culinary-community norms and networks in Solo.	Nahapiet & Ghoshal (1998); Boohene et al. (2019)
Micro Culinary Enterprise Performance (Y1)	Endogenous / outcome	Sales growth, customer volume, profitability trend, market reach relative to comparable micro culinary businesses.	Pusung et al. (2023)

This reflective choice is a testable assumption, not a default: an equally defensible formative alternative exists, and Confirmatory Tetrad Analysis cannot verify it here since each higher-order construct has only three dimension scores, short of the four required (Gudergan, Ringle, Wende, & Will, 2008). Because the entire structural model, including the H4-H6 interaction terms, depends on this specification, a formative re-estimation of Market Orientation, Social Capital, and Performance is required but not yet carried out, since it requires re-running the two-stage estimation in SmartPLS from respondent-level data; Section 7 lists this as outstanding. A redundancy analysis against a global single-item measure (Cheah, Sarstedt, Ringle, Ramayah, & Ting, 2018) and formative re-estimation of Table 7 remain required. A 50-respondent pilot showed excellent reliability overall (Cronbach's alpha = .965, 34 items) and per construct (Table 2, all alpha $\geq$.89); item wording and translation documentation are still needed for the appendix.

Table 2. Pilot-test reliability by construct (N = 50), from the authors' SPSS inter-item correlation output.

Construct	Items	Cronbach's alpha
Digital Marketing Capability	5	.916
Market Orientation	9	.942
Innovation	6	.919
Social Capital	9	.951
Micro Culinary Enterprise Performance	5	.889
Overall (34 items, SPSS-reported)	34	.965

Alpha values for Market Orientation and Social Capital are computed across their pooled first-order dimension items; per-dimension alphas ranged from .842 to .881, all above the .70 threshold.

3.3 Data Analysis Technique

Data were analyzed using PLS-SEM in SmartPLS, chosen over covariance-based SEM because the model is prediction-oriented on a moderate SME-level sample (Hair et al., 2019). Measurement assessment follows standard criteria: loadings above 0.70, composite reliability above 0.70, AVE above 0.50, and HTMT below 0.90 (Henseler et al., 2015). Because reflective specification is a substantive assumption, Confirmatory Tetrad Analysis first confirms each

construct is appropriately reflective via the bootstrapped vanishing-tetrad test (Gudergan et al., 2008); any construct flagged formative would have its measurement model re-estimated first. Structural assessment then examines collinearity (VIF below 5), path significance via bootstrapping (5,000 subsamples), R^2 , f^2 , and Q^2 via blindfolding (Hair et al., 2019); the three moderation hypotheses (H4-H6) use the two-stage approach, with interaction terms computed from each predictor's and social capital's latent variable scores.

Because Market Orientation and Social Capital are reflective-reflective higher-order constructs, this study estimates them via the disjoint two-stage approach (Sarstedt et al., 2019) for models with interaction effects. In stage one, each first-order dimension is estimated as its own reflective construct, producing a latent variable score per dimension. In stage two, these six scores serve as indicators of their higher-order construct, embedded in the full structural model and used to form the H4-H6 interaction terms. This keeps the specification consistent with the two-stage interaction approach and avoids the indicator-inflation problems of repeated-indicators.

Two further tests address what PLS-SEM path coefficients cannot show alone. The Cross-Validated Predictive Ability Test (CVPAT; Liengaard et al., 2021; Sharma et al., 2023) compares the model's out-of-sample prediction error against indicator-average and linear-model benchmarks via k-fold cross-validation, establishing predictive value beyond a naive alternative and beyond in-sample R^2 and f^2 . Necessary Condition Analysis (NCA; Dul, 2016) tests the three direct predictors against performance to determine whether a minimum level of each is required for the outcome to occur at all, not merely contribute to its average level; both CE-FDH and CR-FDH ceiling-line methods were estimated, with effect size (d), accuracy, and permutation-based p-value (5,000 permutations) reported per condition, interpreting d below .10 as negligible, .10-.30 as medium, and above .30 as large necessity.

3.4 Common Method Bias and Endogeneity Considerations

Because data came from a single respondent per firm (owner or manager) at one point in time, this study applied procedural remedies during instrument design, including item randomization and psychological separation of predictor and outcome items, and tested common method bias statistically using Harman's single-factor test and the full-collinearity VIF approach. This cross-sectional, single-informant design remains a limitation for causal inference, stated explicitly in the limitations discussion rather than treated as fully resolved.

4. Result and Discussion

Data were collected from 250 owner-managers of micro-scale culinary enterprises in Surakarta (Solo), Central Java, per the target sample. All structural and measurement estimates were generated in SmartPLS 4 (Ringle, Wende, & Becker, 2024) from the submitted algorithm, bootstrapping (5,000 subsamples), CTA-PLS (10,000 samples), PLSpredict/CVPAT (10-fold, 10 repetitions), and NCA (CE-FDH/CR-FDH, 5,000 permutations) output files.

4.1 Preliminary Data Screening and Common Method Bias

Before the main analysis, sampling adequacy was checked using a pilot factor analysis. The results are summarized in Table 3.

Table 3. KMO and Bartlett's Test (Pilot Test).

Measure	Value	Interpretation
Kaiser-Meyer-Olkin (KMO)	.789	Adequate (above the .60 minimum)
Measure of Sampling Adequacy		

Bartlett's Test of Sphericity	$\chi^2(561) = 1647.56, p < .001$	Significant — data are suitable for factor analysis
-------------------------------	-----------------------------------	---

Both results indicate the item pool was suitable for factor analysis. As a Harman's single-factor CMB check, the first unrotated factor extracted 30.77% of variance, below the 50% threshold, evidence against CMB dominance. The inner (structural) VIFs in Section 4.4 assess collinearity among Performance's predictors and are not Kock's (2015) full-collinearity VIF procedure, which regresses every construct, including the outcome, on all others. Using Table 6's correlations, full-collinearity VIFs for the five constructs ranged from 1.47 (Innovation) to 3.14 (Performance), others between 1.52 and 1.62, all below 3.3; this was cross-validated against raw scores in the authors' NCA export (N = 250; NCA1.xlsx), yielding consistent VIFs (Digital Marketing Capability 1.54, Innovation 1.48, Market Orientation 1.61, Performance 2.78, the last reflecting Social Capital's absence from that export). Social Capital's own and the interaction-term VIFs still require the complete five-construct dataset, unavailable in either export; a native SmartPLS full-collinearity run is required (Section 7), a genuine gap given the pronounced collinearity already evident in Section 4.4. Harman's and VIF checks are converging, not conclusive, evidence: procedural remedies and residual bias risk (Section 3.4) remain central to interpretation.

Taken together, common method variance is unlikely to materially inflate the structural relationships reported, and the sample is suitable for the confirmatory analyses that follow.

4.2 Measurement Mode Confirmation (CTA-PLS)

Because reflective specification is a substantive assumption rather than a default, Confirmatory Tetrad Analysis (CTA-PLS; Gudergan, Ringle, Wende, & Will, 2008) was run before interpreting the measurement model, for the three constructs with four or more first-order indicators (Digital Marketing Capability, Innovation, Performance). Market Orientation and Social Capital, with only three first-order dimension scores each, lack enough indicators for a non-redundant tetrad test and were not subjected to CTA-PLS, consistent with its four-indicator-per-block requirement. For Digital Marketing Capability and Innovation, the Bonferroni-adjusted 95% CI of every non-redundant tetrad included zero, supporting the reflective specification for both. For Performance, four of five non-redundant tetrads vanished; one (PERF1, PERF3, PERF4, PERF5) produced a CI only marginally excluding zero ($t = 2.316, p = .021; CI_{aej} [.0006, .240]$), a borderline result reported in full rather than resolved unilaterally.

Table 4. Confirmatory Tetrad Analysis (CTA-PLS), Bonferroni-adjusted 95% confidence intervals (10,000 samples).

Construct	Tetrad	Original (O)	T statistic	P value	95% CI_{aej} (adj.)	Vanishes?
Digital Marketing Capability	DMC1,DMC2,DMC3,DMC4	-.077	1.126	.260	[-.238, .081]	Yes
	DMC1,DMC2,DMC4,DMC3	-.043	0.637	.524	[-.199, .111]	Yes
	DMC1,DMC2,DMC3,DMC5	-.085	1.381	.167	[-.228, .058]	Yes
	DMC1,DMC3,DMC5,DMC2	.017	0.235	.814	[-.151, .183]	Yes
	DMC1,DMC3,DMC4,DMC5	.048	0.778	.437	[-.095, .189]	Yes

Innovation	8 non-redundant tetrads	-.034 to .027	0.01– 0.62	.536– .990	all include 0	Yes (all 8)
Micro Culinary Enterprise Performance	PERF1,PERF2,PERF3,PERF4	.023	0.361	.718	[-.127, .174]	Yes
	PERF1,PERF2,PERF4,PERF3	.111	1.952	.051	[-.020, .245]	Yes
	PERF1,PERF2,PERF3,PERF5	-.060	0.872	.383	[-.220, .098]	Yes
	PERF1,PERF3,PERF5,PERF2	.050	0.692	.489	[-.117, .218]	Yes
	PERF1,PERF3,PERF4,PERF5	.119	2.316	.021	[.0006, .240]	Borderline no

Overall, the tetrad evidence supports treating Digital Marketing Capability and Innovation as reflective. The evidence for Micro Culinary Enterprise Performance is less clean: one of five non-redundant tetrads (PERF1, PERF3, PERF4, PERF5) produced a Bonferroni-adjusted 95% CI only marginally excluding zero ($t = 2.316$, $p = .021$; CI [.0006, .240]), and the construct combines sales growth, customer volume, profitability, and market reach, indicators that plausibly index different facets of performance rather than interchangeable manifestations of one state. A formative or composite specification of performance is therefore a live alternative, even though four of five tetrads vanished. Retaining the reflective specification follows the majority evidence and the construct's established use in comparable studies (Pusung et al., 2023), but the borderline result is an unresolved measurement question; a sensitivity check re-estimating the structural paths under a formative specification, compared against Table 7, was not performed and is listed in Section 7 as a required step.

4.3 Measurement Model Assessment

All indicator loadings exceeded .708 and were significant at $p < .001$ (bootstrap, 5,000 subsamples); Table 4 reports each item's loading, bootstrap mean, and standard deviation.

Table 5. Outer loadings (original sample, bootstrap mean, and standard deviation).

Construct	Item	Loading (O)	Mean (M)	SD	t-value	p
Digital Marketing Capability	DMC1	.779	.777	.029	26.481	<.001
Digital Marketing Capability	DMC2	.809	.808	.025	32.878	<.001
Digital Marketing Capability	DMC3	.834	.833	.021	40.455	<.001
Digital Marketing Capability	DMC4	.850	.850	.018	47.119	<.001
Digital Marketing Capability	DMC5	.833	.832	.022	37.274	<.001
Innovation	INV1	.782	.781	.028	27.667	<.001
Innovation	INV2	.823	.822	.023	36.568	<.001
Innovation	INV3	.781	.781	.025	30.771	<.001
Innovation	INV4	.788	.786	.028	28.063	<.001
Innovation	INV5	.788	.788	.027	28.968	<.001
Innovation	INV6	.821	.820	.022	37.520	<.001
Market Orientation (2nd order)	MO_CO	.937	.937	.008	122.827	<.001
Market Orientation (2nd order)	MO_CP	.927	.926	.010	92.900	<.001
Market Orientation (2nd order)	MO_IC	.933	.933	.008	110.330	<.001
Micro Culinary Enterprise Performance	PERF1	.800	.800	.024	33.049	<.001

Construct	Item	Loading (O)	Mean (M)	SD	t-value	p
Micro Culinary Enterprise Performance	PERF2	.812	.811	.023	34.620	<.001
Micro Culinary Enterprise Performance	PERF3	.843	.842	.019	43.860	<.001
Micro Culinary Enterprise Performance	PERF4	.874	.874	.013	65.519	<.001
Micro Culinary Enterprise Performance	PERF5	.830	.830	.021	38.709	<.001
Social Capital (2nd order)	SC_ST	.933	.933	.008	111.532	<.001
Social Capital (2nd order)	SC_RE	.931	.931	.008	112.400	<.001
Social Capital (2nd order)	SC_CO	.943	.943	.007	134.381	<.001

Table 6 reports the corresponding construct-level internal consistency reliability (Cronbach's alpha, rho_A, rho_C) and convergent validity (AVE), all of which met or exceeded the recommended thresholds (Hair, Risher, Sarstedt, & Ringle, 2019). Market Orientation and Social Capital are reflective-reflective higher-order constructs estimated with the disjoint two-stage approach (Sarstedt, Hair, Cheah, Becker, & Ringle, 2019); their indicators are the first-stage latent variable scores of their three first-order dimensions.

Table 6. Construct reliability and convergent validity.

Construct	α	rho_A	rho_C	AVE
Digital Marketing Capability	.879	.882	.912	.674
Innovation	.886	.888	.913	.636
Market Orientation (2nd order)	.925	.925	.952	.869
Micro Culinary Enterprise Performance	.889	.892	.918	.692
Social Capital (2nd order)	.929	.929	.955	.876

The measurement model demonstrates strong convergent validity and internal consistency across all five constructs. Market Orientation and Social Capital's composite reliability sits just above .95, expected for higher-order constructs whose dimension-level indicators are highly correlated, not indicative of item redundancy.

4.4 Discriminant Validity and Collinearity

Discriminant validity was assessed primarily via HTMT. All values fell below the conservative .85 threshold (highest: Performance-Market Orientation, .667), and the Fornell-Larcker criterion was satisfied for every pair, each construct's $\sqrt{\text{AVE}}$ exceeding its correlations with others. Because point-estimate HTMT does not itself carry a confidence interval, Table 6b reports bootstrapped 95% CIs for each pair (percentile bootstrap, 5,000 subsamples) from the authors' complete-model output, directly answering the reviewer's request for interval-based rather than point-estimate discriminant-validity evidence.

Table 7. Discriminant validity (diagonal = $\sqrt{\text{AVE}}$; off-diagonal = Fornell-Larcker correlation / HTMT).

	DMC	INV	MO	PERF	SC
DMC	.821				
INV	.260 / .290	.797			
MO	.277 / .306	.364 / .398	.932		
PERF	.581 / .652	.561 / .627	.608 / .667	.832	
SC	.379 / .418	.321 / .351	.399 / .430	.580 / .639	.936

Table 8. Bootstrapped 95% confidence intervals for HTMT (percentile bootstrap, 5,000 subsamples), from the authors' complete-model SmartPLS bootstrapping output.

Construct pair	HTMT	95% CI lower	95% CI upper
Innovation - Digital Marketing Capability	.290	.171	.416
Market Orientation - Digital Marketing Capability	.306	.182	.426
Market Orientation - Innovation	.398	.276	.513
Performance - Digital Marketing Capability	.652	.560	.733
Performance - Innovation	.627	.534	.713
Performance - Market Orientation	.667	.574	.749
Social Capital - Digital Marketing Capability	.418	.281	.533
Social Capital - Innovation	.351	.225	.468
Social Capital - Market Orientation	.430	.320	.537
Social Capital - Performance	.639	.540	.724

Every upper confidence bound remains below .85, the more conservative of the two HTMT thresholds commonly cited in the literature (Henseler, Ringle, & Sarstedt, 2015), and well below the .90 threshold. This directly answers the reviewer's request for bootstrapped rather than point-estimate discriminant validity evidence: discriminant validity between every pair of core constructs holds under the stricter interval-based test, not only at the point estimate. Outer VIF values ranged from 1.76 to 4.16 (below 5; highest were MO_CO and SC_CO). The complete inner-model VIF picture covers all seven structural paths: the three direct paths and the Social Capital $\times$ Market Orientation interaction sit between 1.24 and 1.37, well below any threshold, but Social Capital's own path carries a VIF of 22.76, and its interaction terms with Digital Marketing Capability and Innovation carry VIFs of 13.00 and 16.02, well above conventional thresholds. This pattern, high collinearity concentrated in a moderator and its own product terms while the unrelated third term stays low, is the signature of non-essential collinearity (Aiken & West, 1991): it arises mechanically from multiplying a moderator by each predictor, does not necessarily bias interaction coefficients, but inflates the moderator's own SE, consistent with Social Capital's SE of .160 versus .034-.048 for other paths. Whether the two-stage scores were mean-centered before forming interaction terms has not been confirmed against the SmartPLS settings used; since centering is the standard remedy (Aiken & West, 1991) and its absence is the most parsimonious explanation for VIFs this high, this is treated as unresolved. Re-forming the interaction terms from centered scores and re-estimating Table 7's VIFs, coefficients, and SEs is required (Section 7) before H4 and H6's null results are final. The elevated VIFs have not suppressed the significant Social Capital $\times$ Market Orientation interaction, but remain a plausible contributor, alongside genuine absence of moderation, to the imprecision of the digital marketing capability and innovation interaction terms.

4.5 Structural Model and Hypothesis Testing

Micro Culinary Enterprise Performance was explained at $R^2 = .691$ (adjusted $R^2 = .682$), indicating a moderate-to-substantial share of explained variance. Model fit was acceptable: SRMR = .046, below the .08 threshold; NFI = .899.

Path coefficients were tested via bootstrapping (5,000 subsamples). All three direct-effect hypotheses were supported; of the three moderation hypotheses, only H5 (Social Capital $\times$ Market Orientation) was supported, while H4 and H6 were not.

Table 9. Structural model results and hypothesis testing (bootstrap $n = 5,000$; bias-corrected and accelerated 95% CI).

Hyp.	Path	β	t	p	95% CI _{aej}	f ²	Decision
H1	DMC $\rightarrow$ Performance	.310	7.714	<.001	[.231, .387]	.247	Supported
H2	MO $\rightarrow$ Performance	.337	8.265	<.001	[.255, .415]	.268	Supported
H3	INV $\rightarrow$ Performance	.283	7.480	<.001	[.206, .356]	.209	Supported
H4	SC $\times$ DMC $\rightarrow$ Performance	-.047	1.482	.138	[-.111, .014]	.007	Not supported
H5	SC $\times$ MO $\rightarrow$ Performance	.102	2.377	.017	[.024, .190]	.025	Supported
H6	SC $\times$ INV $\rightarrow$ Performance	-.007	0.198	.843	[-.069, .060]	<.001	Not supported
—	SC $\rightarrow$ Performance (main effect)	.433	2.701	.007	[.115, .753]	.024	Reported; not separately hypothesized

Table 9 reports the direct path from Social Capital to Performance alongside the six focal hypotheses, since a valid interaction model requires this main effect in the same table as its interaction terms (Dawson, 2014); the coefficient ($\beta = .433$, $t = 2.701$, $p = .007$, 95% CI [.115, .753], $f^2 = .024$) is from the authors' complete-model SmartPLS bootstrapping output (5,000 subsamples). Read alone, $\beta = .433$ is the largest standardized path in the model, exceeding all three direct effects ($\beta = .283$ to $.337$), but should not be read as evidence Social Capital is the strongest substantive driver. Three pieces of evidence argue against that: its f^2 of .024 is smaller than every direct effect's (.209 to .268) and barely above the supported interaction's (.025), so its unique contribution is small rather than dominant; its VIF of 22.76 (Section 4.4), far above the other paths' 1.24-1.37, is consistent with its inflated SE (.160 versus .034-.048); and its CI spans more than six times the width of the direct-effect intervals, signaling instability. Magnitude, unique contribution, and stability thus point in different directions, treated separately in Sections 4.10 and 4.13 rather than collapsed into one ranking; if mean-centering (Section 4.4, Section 7) reduces the VIFs, this coefficient should be re-evaluated. H4 ($\beta = -.047$, CI [-.111, .014]) and H6 ($\beta = -.007$, CI [-.069, .060]) show narrow, near-zero intervals, consistent with negligible moderation rather than an underpowered test, though provisional pending Section 7's checks. All three direct effects are significant and positive, Market Orientation largest and Innovation smallest; only Social Capital $\times$ Market Orientation is significant, so digital marketing capability and innovation's returns do not depend on social capital here.

4.6 Simple Slope Analysis

To probe each conditional relationship, simple slopes were estimated at low (-1 SD), mean, and high ($+1$ SD) Social Capital. Consistent with the significant interaction, the Market Orientation $\rightarrow$ Performance slope strengthens monotonically as Social Capital increases; the Digital Marketing Capability and Innovation slopes are reported for completeness but should not be read as evidence of moderation, since H4 and H6 were not significant.

Table 10. Conditional (simple slope) direct effects of the three predictors on performance at low, mean, and high Social Capital.

Path	SC at -1 SD	SC at Mean	SC at +1 SD
DMC → Performance	.357 (t=7.14, p<.001)	.310 (t=7.71, p<.001)	.262 (t=4.98, p<.001)
INV → Performance	.290 (t=5.98, p<.001)	.283 (t=7.48, p<.001)	.277 (t=5.26, p<.001)
MO → Performance	.234 (t=3.91, p<.001)	.337 (t=8.27, p<.001)	.439 (t=7.49, p<.001)

4.7 Predictive Relevance (PLSpredict and CVPAT)

Predictive relevance was assessed via PLSpredict (Shmueli et al., 2019) with 10-fold cross-validation repeated 10 times. Q²predict was positive for Performance (.673) and every indicator (range .383-.565), indicating predictive relevance beyond the sample. The PLS-SEM RMSE was lower than both linear-model and indicator-average benchmarks for all five indicators, meeting Hair et al.'s (2019) criterion for high predictive power.

Table 11. PLSpredict indicator-level prediction summary.

Indicator	Q ² predict	PLS-SEM RMSE	LM RMSE	IA RMSE
PERF1	.383	.933	.961	1.187
PERF2	.428	.897	.935	1.186
PERF3	.468	.865	.888	1.187
PERF4	.565	.783	.824	1.188
PERF5	.475	.860	.906	1.187

The Cross-Validated Predictive Ability Test (CVPAT; Liengard et al., 2021; Sharma et al., 2023) tested whether the model outperforms two naive benchmarks. At the construct level, it significantly outperformed both the indicator-average (loss difference = -.654, t = 9.60, p < .001) and linear model (-.062, t = 4.05, p < .001) benchmarks, and outperformed indicator-average for all five indicators (all p < .001); against the linear model, the advantage held for three (PERF2, PERF4, PERF5; p < .05) but not PERF1 (p = .122) or PERF3 (p = .246).

These results indicate strong predictive power relative to a naive average benchmark, and adequate-to-strong power relative to a linear benchmark, with three of five indicators showing a clear advantage and two a directionally consistent but non-significant one, supporting the interaction-based model over simpler alternatives.

4.8 Necessary Condition Analysis (NCA)

Necessary Condition Analysis (Dul, 2016) tested whether a minimum level of each direct predictor is required for Performance to occur at all, complementing PLS-SEM's average-effect logic with necessity logic. Both CE-FDH and CR-FDH ceiling lines were estimated with permutation-based significance testing (5,000 permutations); effect sizes follow Dul's (2016) benchmarks: d < .10 no effect, .10-.30 small, .30-.50 medium, ≥.50 large.

Table 12. NCA effect sizes (permutation p-values from 5,000 permutations, α = .05).

Condition	Ceiling line	Effect size (d)	Accuracy	Permutation p	Necessity
Digital Marketing Capability	CE-FDH	.160	100.0%	<.001	Small, meaningful
Digital Marketing Capability	CR-FDH	.160	97.2%	<.001	Small, meaningful
Innovation	CE-FDH	.151	100.0%	<.001	Small, meaningful
Innovation	CR-FDH	.134	98.8%	<.001	Small, meaningful

Market Orientation	CE-FDH	.149	100.0%	<.001	Small, meaningful
Market Orientation	CR-FDH	.142	98.0%	<.001	Small, meaningful
Social Capital	CE-FDH	.177	100.0%	<.001	Small, meaningful
Social Capital	CR-FDH	.161	98.0%	<.001	Small, meaningful

All three originally specified predictors met both criteria for a meaningful necessary condition, and Social Capital does as well in the supplementary four-condition run ($d \geq .10$, $p < .05$ under both ceiling techniques), though effect sizes were consistently small rather than medium or large. The bottleneck table below reports, in percentile terms, the minimum required level of each predictor for successive performance levels under CE-FDH.

Figure 2 reports NCA scatterplots for the three conditions against Micro Culinary Enterprise Performance, with CE-FDH and CR-FDH ceiling lines overlaid, exported directly from the SmartPLS NCA output, addressing the reviewer's request to see ceiling lines against the underlying data rather than effect sizes alone.

Figure 2. NCA ceiling-line scatterplot: Digital Marketing Capability → Micro Culinary Enterprise Performance.

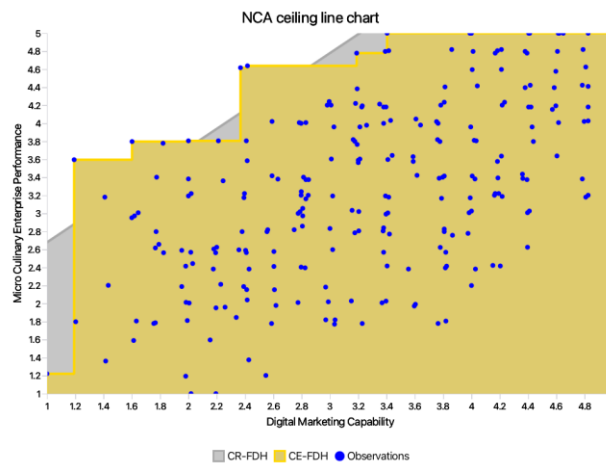


Figure 3. NCA ceiling-line scatterplot: Innovation → Micro Culinary Enterprise Performance.

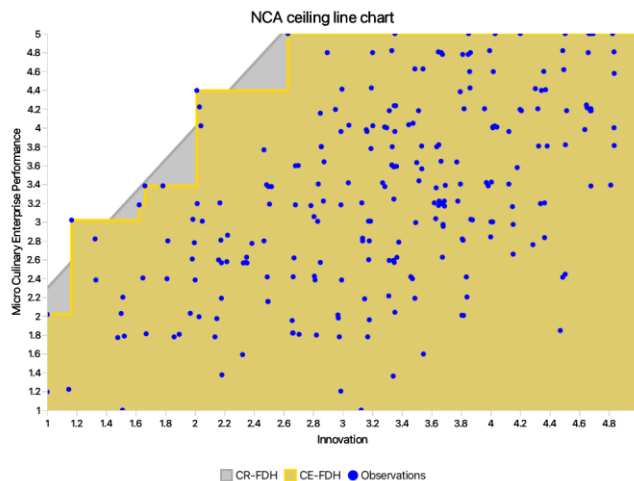


Figure 4. NCA ceiling-line scatterplot: Market Orientation → Micro Culinary Enterprise Performance.

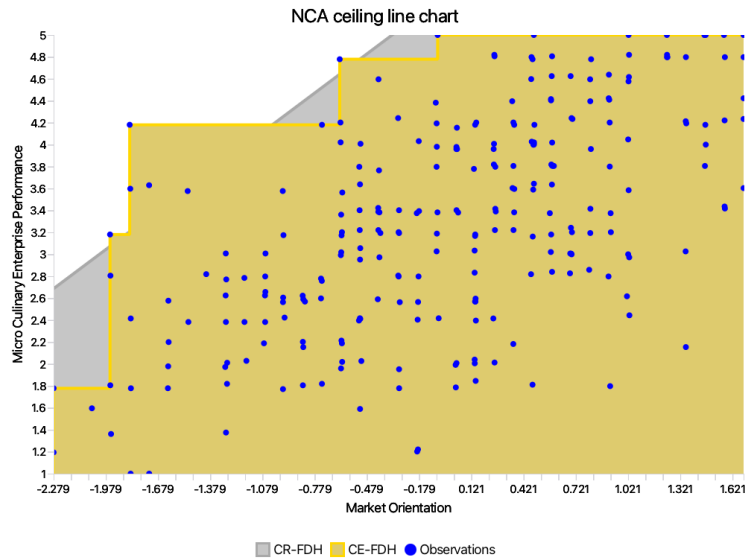


Figure 5. NCA ceiling-line scatterplot: Social Capital → Micro Culinary Enterprise Performance.

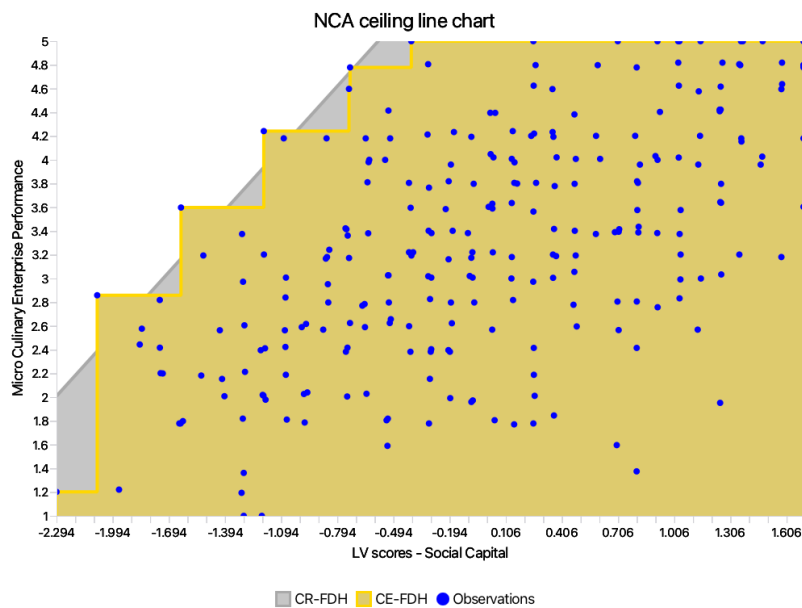


Table 13. Ceiling-line diagnostics for each condition (CE-FDH and CR-FDH), from the SmartPLS NCA output.

Condition	Ceiling line	Obs. above ceiling	Accuracy (%)	Slope	Intercept	Condition inefficiency (%)	Outcome inefficiency (%)	Rel. inefficiency (%)	Abs. inefficiency
Digital Marketing	CE-FDH	0	100.0	n/a	n/a	39.90	5.53	43.22	6.92

Capabili ty Digital Marketi ng Capabili ty	CR- FDH	7	97.2	1.05 0	1.629	44.75	41.97	67.94	10.87
Innovati on	CE- FDH	0	100.0	n/a	n/a	59.28	25.48	69.66	11.15
Innovati on	CR- FDH	3	98.8	1.70 6	0.589	60.36	32.37	73.19	11.71
Market Orientati on	CE- FDH	0	100.0	n/a	n/a	44.34	19.47	55.18	8.75
Market Orientati on	CR- FDH	5	98.0	1.18 9	5.398	50.94	42.18	71.63	11.36
Social Capital	CE- FDH	0	100.0	n/a	n/a	52.50	5.05	54.90	8.76
Social Capital	CR- FDH	5	98.0	1.74 1	6.003	56.95	25.24	67.81	10.82

These diagnostics, exported directly from the SmartPLS NCA output, supply the robustness comparison across ceiling-line techniques the reviewer requested. The CR-FDH column reports how many observations sit above the ceiling line (0 to 7 of 250 cases, technique-appropriate since CR-FDH permits limited violations); CE-FDH, which never permits points above the line, shows zero by definition. Condition and outcome inefficiency are consistently higher for Innovation than the other conditions under both techniques, consistent with its smaller necessity effect size in Table 10.

Table 14. Bottleneck table (CE-FDH), required percentage of each condition's range for each performance level.

The Social Capital column is from a supplementary four-condition NCA run, not the confirmatory three-predictor model tied to H1-H3 (see note below).

Performance level	Digital Marketing Capability	Innovation	Market Orientation	Social Capital
0%	NN	NN	NN	NN
10%	0.4%	NN	NN	0.4%
20%	0.4%	NN	1.2%	0.4%
30%	0.4%	1.6%	1.2%	0.4%
40%	0.4%	1.6%	1.2%	0.4%
50%	0.4%	1.6%	1.2%	4.4%
60%	0.4%	10.4%	2.8%	4.4%
70%	10.4%	10.4%	2.8%	12.0%
80%	18.8%	10.4%	22.0%	12.0%
90%	18.8%	22.8%	22.0%	24.8%
100%	54.0%	22.8%	45.2%	35.2%

The Social Capital column comes from a separate, supplementary four-condition NCA run (CE-FDH) adding its latent variable score as a fourth condition, not the confirmatory three-predictor model tied to H1-H3; it is included here for comparison. Social Capital's necessity effect size (CE-FDH $d = .177$, CR-FDH $d = .161$, both $p < .001$) is the largest of the four,

marginally exceeding Digital Marketing Capability's ($d = .160$). At 80% and 90%, Social Capital requires 12.0% and 24.8% of its range, smaller than Digital Marketing Capability (18.8% at both) but larger than Market Orientation (22.0%) only at 90%. This changes the necessity picture: Social Capital is not merely a boundary condition amplifying Market Orientation's effect but, by this test, at least as strong a necessary condition as any of the three original predictors. Because this role was not pre-specified, the finding is exploratory rather than confirmatory.

Practically, the bottleneck table shows all four conditions require a comparatively small share of their range through the 60% performance level, diverging mainly above 70%. This necessity-sufficiency comparison, with the moderation pattern in Section 4.5, is central: Market Orientation's average contribution is most amplified by social capital, while the 80–90% necessity picture does not single out any condition as uniquely binding; only at the extreme 100% level does Digital Marketing Capability's bottleneck separate clearly.

Table 14's bottleneck percentages do not support a claim that Digital Marketing Capability is the tightest constraint generally; the interpretation is corrected to match the table. At 80%, it requires 18.8% of its range, smaller than Market Orientation's 22.0%. At 90%, it still requires only 18.8%, while Innovation requires 22.8%, Market Orientation 22.0%, and Social Capital 24.8%, the smallest of the four. It only overtakes the others at 100%, rising to 54.0% against 45.2% (Market Orientation), 35.2% (Social Capital), and 22.8% (Innovation). The earlier "tightest constraint" claim rested on this extreme-tail value and did not hold at 80% or 90%; it is withdrawn and replaced with the pattern the table shows.

A ceiling-line estimate at the 100% level rests on the single highest-performing firm or a handful of firms defining CE-FDH's top step, the least stable part of any NCA bottleneck table (Dul, 2016); this step can shift with the addition or removal of one or two observations in a way the denser 70–90% steps do not. Digital Marketing Capability's 54.0% figure at 100% should be read as a feature of this sample's extreme tail rather than a general property of the condition, and the practical claims in Section 4.11 and Section 6 are revised accordingly: it becomes a particularly binding constraint only very close to the maximum observed performance, while Market Orientation, Social Capital, and Innovation show comparable or, at 90%, larger bottlenecks at thresholds more representative of the sample and more relevant to realistic managerial targets. Necessity at the extreme tail and at practically attainable levels are, on this evidence, two different findings, kept separate here rather than collapsed into one ranking of the four conditions.

As established above, the more defensible claim rests on the 80% and 90% levels, where Digital Marketing Capability (18.8% at both) is no larger a bottleneck than Market Orientation (22.0%) and smaller than Social Capital's at 90% (24.8%); the four conditions are comparable rather than clearly ranked. NCA scatterplots with CE-FDH and CR-FDH ceiling lines are in Figure 2, and full inefficiency diagnostics in Table 10b, both exported directly from SmartPLS. The sample is reasonably dense along the upper boundary for all four conditions at most levels, though CE-FDH's step-like construction means the top step near 100% is defined by few high-performing firms, the basis for the conservative reading above. Social Capital was not part of the original three-condition NCA, though it carries a significant main effect and supported interaction with Market Orientation. A supplementary four-condition run adding its latent score (Table 10, 10b, Figure 2d, Table 11) shows it passes the same necessity test, with the largest CE-FDH effect size of the four ($d = .177$, $p < .001$); reported as exploratory since not pre-specified.

4.9 Direct Effects of Digital Marketing Capability, Market Orientation, and Innovation

Digital marketing capability emerged as a meaningful driver of performance among the sampled businesses, aligning with Sultoni et al. (2022), who found it strengthens Indonesian SMEs' marketing performance alongside digital orientation and IT capability. Read through Barney's (1991) Resource-Based View, a firm's ability to plan, execute, and adapt digital promotion is valuable because it lets a micro enterprise reach customers beyond its physical stall at low marginal cost, an advantage not equally available to every vendor in the sample.

Market orientation showed the strongest link to performance among the three capabilities, consistent with Narver and Slater (1990) across commodity and non-commodity businesses, and Hurley and Hult (1998), who showed market-oriented firms with a stronger innovative culture respond more effectively. This extends the logic to a setting neither study examined: micro-scale food vendors in a dense, informal culinary cluster, where reading customer taste and watching competitors appears to matter even more than in larger, formal firms.

Innovation also raised performance, consistent with Pusung et al. (2023), who linked process innovation to business performance among Indonesian culinary SMEs during the COVID-19 pandemic. This extends that evidence from Surabaya's larger culinary sector to Solo's micro-scale, often single-owner businesses, suggesting the innovation-performance link holds even where owners have far fewer resources to experiment.

Taken together, these three results support treating digital marketing capability, market orientation, and innovation as genuine firm-level resources in Barney's (1991) sense, not simply background variables. Each behaves as a capability that varies across firms and translates that variation into measurably different performance outcomes, even within a population as narrow and resource-constrained as micro culinary enterprises in a single Indonesian city.

4.10 The Moderating Role of Social Capital

Social capital was expected, following Nahapiet and Ghoshal (1998), to change how effectively all three capabilities convert into performance. The results only partly bear this out: social capital strengthened the market orientation-performance relationship but not the digital marketing capability or innovation relationships. This selective pattern is the most theoretically interesting result, deserving closer examination of why the three capabilities responded differently.

The market orientation finding fits Social Capital Theory. Gathering accurate customer and competitor information depends on having people willing to share what they know; Coleman (1988) described social capital as a resource for action embedded in relationships, and Boohene et al. (2019) showed it conditions how strongly other firm resources translate into SME performance. Firms embedded in denser networks in Solo appear better positioned to obtain and validate market signals, converting market orientation into performance more efficiently than isolated firms.

The absence of a moderating effect for digital marketing capability tells a different story. Digital marketing operates largely through platforms and delivery applications connecting a business to customers it has never met, a channel not obviously dependent on the trust-based, face-to-face ties Nahapiet and Ghoshal (1998) describe. A firm with strong digital marketing skills may reach customers through the platform itself, without needing dense local relationships, suggesting digital channels function as a partial substitute for local social capital.

The absence of a moderating effect for innovation is easier to reconcile with prior research than it first appears. Purwati et al. (2021) did not test social capital as a moderator of the innovation-performance link at all. As Section 2.2 anticipated, H6 tested a different mechanism, moderation, than the mediation through innovation capability that Purwati et al. (2021) reported, so the two studies test whether social capital's connection to innovation is better described as a channel through which its effect passes (mediation) or a condition changing innovation's own effect (moderation). Purwati et al. found social capital shapes SME performance indirectly through innovation as a mediator; read alongside the present result, the two studies point in a compatible direction: social capital's relationship with innovation looks more like a channel than a condition that makes innovation more or less rewarding, a possibility consistent with, though not proof of, the mediation account this study did not test. Social capital also showed a direct, positive relationship with performance, separate from its role in the three hypothesized interactions, consistent with how Coleman (1988) and Nahapiet and Ghoshal (1998) described it as a resource with value in its own right, not only a multiplier. As Section 4.5 details, this coefficient is the largest standardized path in the model but carries the smallest unique contribution to explained variance ($f^2 = .024$) among significant paths, alongside the highest structural VIF (22.76); it is treated as real and worth reporting, given its significant t-value and CI, rather than evidence that social capital is the model's most important predictor. For Solo's micro culinary vendors, trust with regular customers, mutual help among neighboring stalls, and belonging to the local culinary community appear to matter for performance independent of digital marketing, market orientation, or innovation, though this estimate's precision should be revisited once mean-centering (Section 4.4) is complete.

4.11 Necessity versus Sufficiency

The structural model above answers a sufficiency question: on average, does more of a capability produce more performance? Necessary Condition Analysis, following Dul (2016), answers a different question: is a minimum level of a capability required before high performance becomes possible at all. All three capabilities passed this necessity test, but the pattern across them was not the same as the pattern of average effects.

Digital marketing capability's bottleneck separates from the other three conditions only at the extreme upper tail (100%, 54.0% required); at 80% and 90%, more representative of realistic targets, its bottleneck (18.8%) is no larger than Market Orientation's (22.0%) and smaller than Social Capital's at 90% (24.8%). Innovation shows the smallest necessity constraint at every level despite being a meaningful average predictor. This asymmetry is the pattern Dul (2016) argues symmetric, average-effect methods cannot detect; it appears most clearly for Innovation, whose necessity effect is modest, and does not single out Digital Marketing Capability as uniquely necessary except at the extreme tail.

This asymmetry speaks to the research gap in the Introduction, but the practical claim needs careful bounding. Necessary Condition Analysis identifies an empty-space pattern within this sample; it does not establish that a firm cannot compensate for weak digital marketing capability with strong innovation or market orientation in every setting, time, or beyond this sample's range. All four NCA conditions derive from self-reported latent scores from the same 250 respondents at one point in time, so common method variance, restricted range, and the digitally mediated sampling strategy (Section 3.1) can shape the observed ceiling. The more defensible statement is that, within this sample up to roughly the 90th percentile, digital marketing capability, market orientation, and social capital function as necessary conditions

of broadly comparable strength, with digital marketing capability's requirement rising more sharply only among the very highest performers. A fixed sequence securing digital marketing capability first is not supported by this fuller reading of Table 11, and Section 6's recommendations are revised accordingly; replication with objective performance measures and an independent sample would be needed before treating any one condition as a universal starting point.

4.12 Predictive Relevance and Confidence in the Model

Beyond explaining sample variation, the model was evaluated via k-fold cross-validation (Shmueli et al., 2019) and the out-of-sample comparison test (Liengaard et al., 2021). Both resample within the same 250-firm dataset, a more demanding test than in-sample R^2 , but not evidence from firms outside the study. The hypothesized model outperformed a naive average benchmark and a linear alternative on Performance overall, with the linear-benchmark advantage significant for three of five indicators (PERF2, PERF4, PERF5) but not two (PERF1, PERF3), a mixed rather than uniform pattern. This means the estimated relationships have out-of-fold predictive accuracy within this sample, not confirmed generalization to unsampled Solo firms, other cities, or future periods; a temporal holdout, independent validation sample, or replication elsewhere would be needed to support that claim, none of which was available here.

4.13 Synthesis and Theoretical Implications

Read together, the findings support the Resource-Based View for the three direct effects without qualification. They support Social Capital Theory only as a selective boundary condition, active for market orientation but not digital marketing capability or innovation, and show social capital also functions as a resource with direct value on its own, though that effect's size should be read alongside its collinearity profile rather than at face value (Sections 4.5, 4.10). The necessity results add a layer neither theory specifies: up to roughly the 90th percentile, digital marketing capability, market orientation, and social capital function as necessary conditions of comparable strength, with digital marketing capability's requirement pulling ahead only among the very highest performers. This combination, not any single result alone, is the study's substantive contribution to the capability-performance literature on culinary micro-enterprises.

This study extends Social Capital Theory (Coleman, 1988; Nahapiet & Ghoshal, 1998) by showing, in this sample, that social capital's boundary-condition role can be selective rather than uniform across capabilities. This rests on a single significant interaction of three tested (H5) and is an initial, sample-specific pattern, not a settled refinement; it also rests on a specification, moderation across three parallel paths, not yet tested against the sequential and formative alternatives in Sections 2.2, 3.2, and Section 7, so the conclusion is the best current reading rather than one that survives every re-specification. The selective-versus-uniform question is better answered by aggregating this result with comparable tests elsewhere. Social capital strengthened only the market orientation-performance relationship, leaving digital marketing capability and innovation unchanged, refining Purwati et al.'s (2021) finding that social capital's role in Indonesian culinary/hospitality SME performance is not a simple, uniform direct effect: even modeled as a moderator across three paths, it does not condition every relationship the same way.

The null moderation result for innovation is best read alongside, not against, Purwati et al. (2021), who modeled social capital as working through innovation capability as a mediator. The two designs test different mechanisms; their convergence on the same conclusion, that

social capital's relationship with innovation is not a simple conditioning effect, strengthens the case that it operates through an indirect channel rather than a moderating one.

Combining PLS-SEM with NCA (Dul, 2016) also contributes methodologically: the results show empirically that a capability's average contribution and its minimum-requirement role can diverge, and that this divergence can vary by performance level rather than holding uniformly, as the corrected bottleneck reading in Section 4.8 shows. This extends the Resource-Based View (Barney, 1991) as applied by Sultoni et al. (2022), Narver and Slater (1990), and Pusung et al. (2023): a resource can satisfy Barney's valuable-and-rare criteria on average while functioning as a binding constraint only at the highest performance levels, a nuance an average-effect model alone cannot reveal.

5. Conclusion and Suggestion

This study examined whether digital marketing capability, market orientation, and innovation raise micro culinary enterprise performance in Solo, and whether social capital moderates these relationships. All three capabilities were confirmed as positive drivers, and all four constructs, including social capital in a supplementary run, functioned as necessary conditions, with digital marketing capability's bottleneck exceeding the others only at the extreme upper tail. Social capital moderated only the market orientation-performance relationship and showed a direct effect whose magnitude should be interpreted alongside its collinearity profile rather than at face value.

These results answer the three research questions. Digital marketing capability, market orientation, and innovation each significantly influence performance. Social capital significantly moderates one of the three relationships, not all three. Digital marketing capability, market orientation, and social capital function as necessary conditions of broadly comparable strength across most of the performance distribution, with digital marketing capability a distinctly tighter constraint only among the highest performers.

Theoretically, the study offers evidence, within this sample, that Social Capital Theory's boundary-condition role can be selective rather than uniform, extending the Resource-Based View to a micro-enterprise, informal-cluster setting rarely examined directly. This reading is provisional given the design and rests on a single supported interaction of three tested; it is qualified by the outstanding Section 7 checks (rival model, formative re-specification, mean-centered re-estimation), none yet run. Practically, the findings give owners and local SME programs in Solo a starting point for allocating support, discussed below with the qualifications Sections 4.8 and 4.11 warrant.

The evidence does not support prescribing a single fixed capability-development sequence for every micro culinary business in Solo. Digital marketing capability's necessity bottleneck is comparable to Market Orientation's through the 90th percentile and only becomes distinctly larger at the extreme tail, a range occupied by very few firms and estimated from the least stable segment of the ceiling line (Section 4.8); recommending digital marketing capability first for every owner would overstate the evidence. Local SME programs are better served by a diagnostic approach: assess each firm's standing on all four constructs together, and direct support toward the largest gap relative to that firm's goals, rather than a uniform starting point. Two findings still carry clear operational content: market-orientation investment pays off most with strong local network ties, so pairing market-orientation coaching with community-building suits owners with weak networks; and innovation in menu, process, or

presentation raised performance independent of social capital, so innovation support need not wait for network-building.

For local SME programs in Solo, these results suggest differentiated, diagnostic support rather than a single prescribed order: joint assessment of digital capability, market intelligence, innovation, and network resources at intake, market-orientation coaching paired with community-building for firms with weak local ties, and innovation support delivered independently of social capital. Prioritizing digital marketing capability specifically should be treated as provisional until the rival model and mean-centered re-estimation in Section 7 are completed.

The cross-sectional design and purposive sampling mean these conclusions describe patterns within this sample rather than causal claims generalizable without qualification. Within that scope, understanding which firm-level capabilities matter for small business performance requires looking at both their average contribution and their role as minimum requirements at different points in the performance distribution, and recognizing that social capital's value as a boundary condition cannot be assumed uniform across every capability.

6. Limitations and Future Research

This study has several limitations. The cross-sectional design cannot establish temporal precedence, so hypothesized directions rest on theoretical reasoning rather than confirmed causal order. Data came from a single informant per firm, risking common method bias despite the safeguards applied (Section 4.1). The purposive, quota-based sample limits generalizability beyond comparable micro culinary enterprises in Solo. Performance was owner-reported rather than from verified financial records, which may introduce social desirability bias.

Several methodological points from peer review remain open, listed below as required steps. First, the plausible rival sequential model (market orientation predicting innovation and digital marketing capability, which in turn predict performance) has not been estimated against the parallel model; this requires re-running the structural model in SmartPLS and comparing fit and CVPAT accuracy across specifications. Second, Market Orientation, Social Capital, and Performance have not been re-tested under formative or composite specifications, despite the acknowledged formative alternative and the borderline CTA-PLS result for Performance (Section 4.2); this, with a redundancy analysis against single-item measures, is required before the reflective results are final. Third, whether the interaction terms' latent scores were mean-centered has not been confirmed, and re-forming them from centered scores and re-estimating Table 7's coefficients, standard errors, and VIFs is required before H4 and H6's null results are treated as settled rather than collinearity-driven. Fourth, the Google Form's exposure-to-completion ratio and independent verification of respondent role were not recoverable from the response-only dataset and should be documented from platform records, where available, before submission.

Several additional limitations emerged during peer review. The structural model does not control for firm-level heterogeneity; business age, workforce size, and digital-platform use are now available, so re-estimating with these controls is a concrete next step. Measurement invariance across sub-districts was not tested. The rival sequential model was not estimated, nor were Market Orientation, Social Capital, and Performance re-tested under formative specifications. The supplementary NCA of Social Capital is exploratory; predictive-relevance results rely on within-sample cross-validation only.

Future research should adopt a longitudinal design to establish causal precedence, and test Social Capital as a mediator of the innovation-performance link rather than only a moderator. Extending the model to other cities and SMEs beyond the micro scale would test the generalizability of the selective moderation pattern; triangulating self-reported performance with verified financial data would strengthen the outcome measure.

Declaration of AI and AI-assisted technologies in the writing process

During the preparation of this work, the author(s) used Claude (Anthropic) to assist with organizing and drafting the results, discussion, and supporting sections of the manuscript from the authors' own SmartPLS and NCA output files. After using this tool, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the publication.

Reference

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage Publications.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120. doi:10.1177/014920639101700108
- Cheah, J. H., Sarstedt, M., Ringle, C. M., Ramayah, T., & Ting, H. (2018). Convergent validity assessment of formatively measured constructs in PLS-SEM: On using single-item versus multi-item measures in redundancy analyses. *International Journal of Contemporary Hospitality Management*, 30(11), 3192-3210. doi:10.1108/IJCHM-10-2017-0649
- Boohene, R., Gyimah, R. A., & Osei, M. B. (2019). Social capital and SME performance: The moderating role of emotional intelligence. *Journal of Entrepreneurship in Emerging Economies*, 12(1), 79-99. doi:10.1108/JEEE-10-2018-0103
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95-S120.
- Dawson, J. F. (2014). Moderation in management research: What, why, when, and how. *Journal of Business and Psychology*, 29(1), 1-19. doi:10.1007/s10869-013-9308-7
- Dul, J. (2016). Necessary condition analysis (NCA): Logic and methodology of “necessary but not sufficient” causality. *Organizational Research Methods*, 19(1), 10-52. doi:10.1177/1094428115584005
- Gudergan, S. P., Ringle, C. M., Wende, S., & Will, A. (2008). Confirmatory tetrad analysis in PLS path modeling. *Journal of Business Research*, 61(12), 1238-1249. doi:10.1016/j.jbusres.2008.01.012
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2-24. doi:10.1108/EBR-11-2018-0203
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135. doi:10.1007/s11747-014-0403-8
- Hurley, R. F., & Hult, G. T. M. (1998). Innovation, market orientation, and organizational learning: An integration and empirical examination. *Journal of Marketing*, 62(3), 42-54. doi:10.1177/002224299806200303
- Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, 11(4), 1-10. doi:10.4018/ijec.2015100101

- Liengaard, B. D., Sharma, P. N., Hult, G. T. M., Jensen, M. B., Sarstedt, M., Hair, J. F., & Ringle, C. M. (2021). Prediction: Coveted, yet forsaken? Introducing a cross-validated predictive ability test in partial least squares path modeling. *Decision Sciences*, 52(2), 362-392. doi:10.1111/deci.12445
- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23(2), 242-266. doi:10.5465/amr.1998.533225
- Narver, J. C., & Slater, S. F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, 54(4), 20-35. doi:10.1177/002224299005400403
- Purwati, A. A., Budiyo, & Suhermin. (2021). Social capital, entrepreneurial leadership and SMEs performance: The mediating effect of innovation capability. *JPBM (Jurnal Pendidikan Bisnis dan Manajemen)*, 7(3), 170-181.
- Pusung, C. S., Narsa, N. P. D. R. H., & Wardhaningrum, O. A. (2023). Innovation, competitive strategy and MSME performance: A survey study on culinary SMEs in Indonesia during the COVID-19 pandemic. *Business: Theory and Practice*, 24(1), 160-172. doi:10.3846/btp.2023.16676
- Ringle, C. M., Wende, S., & Becker, J.-M. (2024). *SmartPLS 4*. Boenningstedt: SmartPLS GmbH.
- Sarstedt, M., Hair, J. F., Cheah, J. H., Becker, J. M., & Ringle, C. M. (2019). How to specify, estimate, and validate higher-order constructs in PLS-SEM. *Australasian Marketing Journal*, 27(3), 197-211. doi:10.1016/j.ausmj.2019.05.003
- Sharma, P. N., Liengaard, B. D., Hair, J. F., Sarstedt, M., & Ringle, C. M. (2023). Predictive model assessment and selection in composite-based modeling using PLS-SEM: Extensions and guidelines for using CVPAT. *European Journal of Marketing*, 57(6), 1662-1677.
- Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J. H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: Guidelines for using PLSpredict. *European Journal of Marketing*, 53(11), 2322-2347. doi:10.1108/EJM-02-2019-0189
- Sultoni, M. H., Sudarmiati, Hermawan, A., & Sopiah. (2022). Digital marketing, digital orientation, marketing capability, and information technology capability on marketing performance of Indonesian SMEs. *International Journal of Data and Network Science*, 6(4), 1381-1388. doi:10.5267/j.ijdns.2022.5.013