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Structural Social Capital, Practical Learning, and the Curvilinear Path to Frugal Innovation among Female Entrepreneurs

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ABSTRACT

This study investigates how structural social capital and practical learning contribute to the achievement of frugal innovation, while also assessing the nonlinear influence of structural capital on frugality outcomes. Innovation within the SME sector is often constrained by limited resources, making the pursuit of value creation through frugal approaches both challenging and essential. In this context, recognizing the forms of resource capital available and ensuring their effective management become critical for enabling firms to generate added value despite environmental constraints. The research focuses on 209 female entrepreneurs operating within traditional textile industries, a sector characterized by its dual challenge of preserving cultural heritage while simultaneously responding to pressures for operational modernization and evolving consumer preferences. Employing a variance-based SEM approach, this study examines both the direct effects and quadratic relationships among the key variables. The findings are expected to offer insights for entrepreneurs and stakeholders regarding the strategic importance of social resources as a foundation for competitive advantage in resource limited environments. At the same time, the study highlights the nonlinear nature of social capital, emphasizing that only a certain degree of social embeddedness within the community optimally enhances organizational productivity.

Keywords: Structural social capital, Practical SMEs learning, Frugal innovation, Female entrepreneurs, Emerging economies.

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INTRODUCTION

The heritage fashion sector in Indonesia has been in existence for over a century and has been a community-driven sector that has been able to balance economic development and the preservation of heritage. Despite the impressive performance of the textile sector in the country, with exports reaching 14.22 billion USD in 2023 and employing 4.5 million workers in the same year (Indotextiles, 2023), the heritage sector is being threatened by structural inefficiencies. This is attributed to the persistent decline in asset turnover ratios, indicating that SMEs in the sector have yet to fully leverage the resources they

have access to. In the same vein, the unsustainable use of water resources is threatening the sustainability of businesses in the sector and the environment as a whole. For instance, the production of textiles is estimated to require 25 million cubic meters of water annually, with the liquid waste being dumped into the environment without any form of treatment (Center for Crafts and Batik (BBKB), 2022). This condition underscores the need to identify robust antecedents of frugality, enabling SMEs to mobilize strategic resources that match their capabilities while still generating meaningful value.

The studies on female entrepreneurship have also evolved in parallel with the international discourse on inclusiveness, which has been fueled by the development of the economy, changing social dynamics, and the expansion of educational opportunities, thereby empowering women. Such trends have also been witnessed in the context of the growing economies of Indonesia and other countries that are characterized by the Eastern culture, in which paternalistic values are inherent (Vadnjal, 2020). In the context of the heritage fashion industry, the position of women has been crucial, both in business and in the preservation of knowledge. However, despite the strategic position of the female entrepreneur, the business has faced challenges in the form of a lack of resources and the ability to innovate internally (Setini et al., 2020). Given these constraints, women entrepreneurs require access to affordable resources that can stimulate the development of effective business strategies and operational improvements. Within this context, social capital and experiential learning emerge as critical drivers that enable SMEs to strengthen their capabilities and maintain competitiveness amid evolving market conditions.

Empirical studies examining the antecedents of frugality in resource limited organizational contexts remain scarce. Existing research predominantly links frugality driven innovation to managerial processes—such as knowledge management practices (AlMulhim, 2021), leadership approaches (Berndt et al., 2024), and entrepreneurs' decision-making tendencies—rather than to the foundational resources that enable such behaviors (Gao et al., 2013). Although these process-oriented mechanisms offer valuable insight, they do not fully address how constrained organizations can access or cultivate the resources necessary to strengthen their autonomy and adaptive capacity. The absence of clarity regarding these resource-based drivers can lead SMEs, particularly those led by women, to misdirect their efforts and overlook critical assets that could meaningfully support frugal innovation (Albert, 2019). Identifying the core contributors to frugality is therefore essential for helping SMEs focus their strategic initiatives on areas aligned with their actual capabilities, rather than implementing approaches misaligned with their internal conditions (Soni & T. Krishnan, 2014).

Social resources represent one of the most accessible and low-cost forms of strategic capital for organizations operating with limited means. Their value primarily derives from the interactions that occur within SME networks, which facilitate the exchange of information, broaden decision making perspectives, and open pathways to new business opportunities (Zheng, 2010). Rather than relying on internal assets, this form of capital enables firms to tap into external support and knowledge that they may not possess internally. Although these resources are intangible, the benefits they generate—such as enhanced cognitive capacity, improved skills, and more informed judgments—can substantially strengthen organizational capability (Kim & Shim, 2018). Moreover, active engagement within social networks can stimulate more creative problem solving, allowing SMEs to address operational and input related challenges without increasing their physical resource base. Under such conditions, the pursuit of frugal practices—maximizing outcomes with constrained resources—becomes more attainable.

Recognizing the benefits of social interaction, this study also considers the potential nonlinear consequences of excessive relational closeness among SMEs within a network. I propose that the link between structural social capital and frugality does not follow a simple positive linear pattern but instead reflects an inverted U-shaped relationship. In this view, a moderate degree of network embeddedness provides the most favorable conditions for enhancing open innovation capabilities. At very low levels of social connectedness, interactions remain insufficient to meaningfully support frugal practices, as firms rely primarily on their own limited internal resources and gain little access to external knowledge (Wang

et al., 2021). Conversely, when social ties become overly strong, relational constraints and cognitive biases may emerge, encouraging entrepreneurs to depend too heavily on peer firms and thereby diminishing their motivation to develop internal strengths or pursue distinctive competitive advantages (Jin et al., 2024).

Networking activities allow SMEs to share information and exchange tacit knowledge that supports higher level cognitive processing and creative problem solving. Through these interactions, learning is distributed across firms, enabling each enterprise to acquire not only substantive knowledge but also an understanding of how such knowledge is communicated and applied in operational settings (Khan et al., 2020). Learning dynamics in resource constrained SMEs differ markedly from those in larger, more established organizations; instead of relying on structured routines, SMEs engage in iterative learning by diagnosing operational issues and experimenting with immediate solutions. The experiential insights accumulated through these cycles of trial-and-error help firms refine approaches to complex challenges. Although this process requires time to consolidate, practice-based learning tends to be more closely aligned with the actual constraints SMEs face (Gomes et al., 2026). Consequently, such learning mechanisms contribute positively to frugal innovation efforts, as they enable the development of products and services with minimal resource expenditure through knowledge gained within the SME social environment.

Drawing on social exchange theory, this study investigates two key drivers of frugal innovation: structural social capital and practical learning. In addition to assessing their direct contributions, the research evaluates whether structural social capital exhibits a curvilinear influence on frugality outcomes among female entrepreneurs in traditional textile enterprises. To the best of our knowledge, this work represents the first empirical examination of how structural network ties interact with experiential learning to support frugal innovation in organizations operating under resource constraints. The results are expected to inform female entrepreneurs and practitioners that, within limited environments, strategic emphasis should shift from expanding physical resources to strengthening intangible capacities. For policymakers and supporting institutions, the findings underscore the importance of fostering knowledge-oriented SME ecosystems capable of navigating increasingly dynamic and uncertain external conditions.

LITERATURE REVIEW

Social Exchange Theory

This study employs social exchange theory as the conceptual foundation for explaining the proposed research model. At its core, social exchange theory emphasizes reciprocal interactions among organizations embedded within a network, where actors continuously exchange intangible yet strategically valuable resources. These inter-organizational relationships are characterized by mutually beneficial transactions that not only generate social benefits but also collectively lower the costs associated with acquiring scarce and expensive resources, thereby supporting the creation of frugal value-added outcomes (Mitchell et al., 2012). Within such networked arrangements, organizational limitations are no longer faced in isolation; instead, they are mitigated through complementarities among network members. The effectiveness of these exchanges relies heavily on key relational principles, including trust, dependence, and long-term commitment (Cropanzano & Mitchell, 2005). When trust is established and sustained, interactions among SMEs are more likely to endure, as participants are confident that network members will act in good faith and avoid opportunistic behavior. In resource-constrained contexts, this relational dynamic is particularly relevant to frugality, as it enables organizations to deliver quality outputs while maintaining affordability. Constructive and reciprocal interactions within the network facilitate more efficient access to external resources and, at the same time, enhance organizational cognitive capabilities (Mitchell et al., 2012). Through continuous social engagement, SMEs are better positioned to broaden their perspectives, stimulate creative problem-solving, and develop innovative solutions despite operating under significant resource limitations.

Curvilinear Effect of Structural Social Capital

Structural social capital reflects the density and configuration of network ties through which SMEs interact and exchange resources. Increasing levels of structural connectedness initially enhance access to information, shared experiences, and collective problem-solving capabilities that support frugal innovation. However, the benefits of structural social capital are unlikely to increase indefinitely (Yu, 2013). When network embeddedness is weak, firms tend to operate in isolation, limiting knowledge flows and constraining their ability to develop cost-efficient innovations. In contrast, excessive network closeness may produce negative social dynamics, including conformity pressures, cognitive lock-in, and over-reliance on peer norms, which reduce critical evaluation and constrain adaptive innovation. These opposing effects suggest that structural social capital yields optimal frugal outcomes only at moderate levels of embeddedness, where SMEs can balance openness to external insights with strategic autonomy (Jayabalan & Dorasamy, 2024). Accordingly, this study argues that the relationship between structural social capital and frugal innovation follows an inverted U-shaped pattern, such that both insufficient and excessive network connectedness weaken frugal innovation performance.

Hypothesis 1: *Structural social capital has a nonlinear (inverted U-shaped) relationship with frugal innovation.*

Structural Social Capital and Practical Learning

Practical learning in SMEs refers to experiential learning processes that emerge from routine problem-solving activities embedded in inter-firm networks. Rather than accumulating knowledge through formalized systems, this form of learning is grounded in practical challenges that require immediate and context-specific responses (Berndt et al., 2023). Through repeated interactions within SME networks, firms gain access to actionable insights, observe alternative practices, and translate shared experiences into concrete operational adjustments. Social interactions within the network simultaneously facilitate knowledge exchange and learning activation, enabling firms to internalize observed practices and adapt them to their own organizational conditions. As interaction intensity increases, opportunities for imitation, experimentation, and mutual assistance become more pronounced, reinforcing learning both within and across organizational boundaries (Khan et al., 2020). Accordingly, structural social capital serves as a key enabling mechanism that strengthens practical learning by expanding access to shared experiences and collective problem-solving resources.

Hypothesis 2: *Structural social capital positively influences practical learning within SMEs.*

Practical Learning and Frugal Innovation

Frugal innovation refers to the development of products, services, or solutions by firms operating under conditions that restrict access to costly external resources commonly available to large and established organizations. For resource-constrained SMEs, frugality provides a viable innovation pathway by prioritizing internal capabilities while selectively leveraging affordable external resources, such as community-based SME networks (Jayabalan et al., 2022). However, innovation cannot emerge solely from resource constraints; it requires an appropriate configuration of knowledge that enables firms to generate offerings that are both distinctive and valuable to the market. Within such limited contexts, practical learning plays a critical role. This form of contextual learning is rooted in real problems and concrete actions, encouraging entrepreneurs to explore unconventional solutions to contradictory challenges. Through iterative trial-and-error processes, SMEs accumulate experiential knowledge that refines decision-making and enhances adaptability (López-Sánchez & Santos-Vijande, 2022). Although this learning trajectory is often nonlinear and demanding, sustained engagement in practical learning enables firms to identify feasible solutions that underpin frugal innovation outcomes.

Hypothesis 3: *Practical learning has a positive effect on frugal innovation.*

METHOD

Sample and Data Collection

This research is empirically focused on female entrepreneurs working in the heritage fashion industry in Indonesia. The industry was selected because it is not only plagued by resource constraints, but it is also one with significant growth potential in both the domestic and global markets. Even with this growth potential, performance trends over time show structural weaknesses, including the efficiency with which the organization is using its assets to achieve sales turnover. These conditions point to the fact that the current business model is not effectively translating the resources into the best possible economic performance. It is these inefficiencies that underscore the need to utilize frugal approaches to ensure the creation of value in the business. Within this context, the improvement of social networking structures and practice-based learning approaches is highlighted as one means through which SMEs can improve their adaptability.

From a population of approximately 700 female entrepreneurs, this study determined a minimum sample size of 150 respondents based on the ten-times rule relative to the number of indicators (Kock, 2018). Data were collected over a two-month period using structured questionnaires distributed through both offline channels and online WhatsApp groups. The unit of analysis comprises SMEs owned or directly managed by female entrepreneurs affiliated with independent associations or government-supported SME programs, allowing the study to capture the dynamics of social interaction within entrepreneurial networks. Given the self-reported nature of the data, potential common method bias was addressed through both statistical procedures (Kock, 2017), including VIF assessment, and procedural remedies, such as anonymity assurance, multi-stage data collection, and voluntary participation disclosure.

Measurement

All constructs in this study were operationalized using a five-point Likert scale ranging from *"disagree"* to *"strongly agree."* Structural social capital (SSC) captures the configuration of relational ties within SME networks, emphasizing members' involvement and contributions, and is measured using four indicators (Clarke et al., 2016). Practical learning (PL) is assessed through six items reflecting experiential and problem-oriented learning processes that evolve through repeated interaction among network members (Beltramino et al., 2020). Frugal innovation (FI) is measured with five indicators representing firms' capacity to generate products, services, or solutions under conditions of limited access to external resources (Shibin et al., 2018; Thirkell, 2026).

Table 1. Statement of Measurement Items

Latent constructs	Item codes	Descriptions
Structural social capital	SSC1	I consistently foster good relations with other SME actors within the network.
	SSC2	Close relational ties exist among SME members within the community.
	SSC3	Regular interactions take place between myself and other SME members.
	SSC4	Productive cooperation exists between SMEs and relevant stakeholders.
Practical learning	PL1	New ideas are developed by attentively learning from business experiences exchanged within the entrepreneurial community.
	PL2	Managers effectively synthesize information from multiple sources into meaningful knowledge.
	PL3	Relevant information is carefully selected by SME owners to guide business development.

Latent constructs	Item codes	Descriptions
	PL4	The firm is effective in converting promising ideas into tangible business initiatives.
	PL5	Business owners rely on experience-based learning to address operational challenges.
	PL6	SME owners draw on accumulated experience as a source of innovative development.
Frugal innovation	FI1	The firm emphasizes value creation by ensuring that product quality remains accessible at a reasonable cost.
	FI2	The company emphasizes efficiency by continuously managing and reducing operating costs.
	FI3	The firm emphasizes practical functionality rather than unnecessary product features.
	FI4	Attention to user comfort is embedded in the development of all products.
	FI5	The firm integrates social and environmental considerations into the solutions it provides.

Data Analysis

This study employs a variance-based structural equation modeling (SEM) technique using SmartPLS as the analytical tool. The estimation procedure is performed through a two-step evaluation process comprising the measurement model and the structural model (Hair et al., 2019). Assessment of the measurement model focuses on examining indicator and construct reliability, as well as establishing convergent and discriminant validity to ensure measurement adequacy. Subsequently, the structural model is evaluated to test the proposed hypotheses by analyzing the magnitude and direction of path coefficients. In addition, several diagnostic assessments are conducted at this stage, including evaluations of multicollinearity, predictive relevance, and the explanatory power of the model (Hair et al., 2019).

RESULTS

Description of the Respondents

The profile of female entrepreneurs in this study encompasses business age, ownership structure, market orientation, and firm size. Most respondents have operated their ventures for 3–10 years (67.9%), followed by firms younger than three years (18.7%), indicating that the heritage fashion sector remains relatively young, with early-stage firms exhibiting resilience and substantial learning potential despite resource constraints. Ownership is predominantly in the form of sole proprietorships (71.3%), while the remainder consists of collective arrangements such as cooperatives, foundations, and legally registered enterprises, reflecting high managerial autonomy and strategic flexibility. In terms of market orientation, firms primarily serve local (49.8%) and national markets (43.5%), with limited participation in international markets, which nonetheless represents a significant opportunity for expanding the global visibility and competitiveness of Indonesian heritage fashion products such as batik and traditional textiles. Finally, the firms are largely categorized as small and medium-sized enterprises, as evidenced by the predominance of businesses employing four or fewer workers (47.8%) and those with five to nineteen employees (30.6%), aligning with the study's focus on resource-constrained organizations that must rely on alternative resource configurations rather than scale expansion to develop frugal innovation capabilities.

Outer Model

Item reliability was assessed using factor loadings with a recommended threshold of 0.70. The results show that all indicators exceeded this cutoff, except for FI2, which recorded a loading of 0.643; nevertheless, this indicator was retained because other evaluation criteria, particularly discriminant validity and the Average Variance Extracted (AVE), were satisfactorily fulfilled (Hair et al., 2019). Construct reliability was further examined using Cronbach's Alpha (CA) and Composite Reliability (CR), where values above 0.60 indicate adequate reliability (Hair et al., 2019); the findings confirm that all constructs met this criterion, demonstrating acceptable internal consistency. In addition, convergent validity was assessed to verify whether the measurement items adequately represent their respective theoretical constructs, using AVE as the evaluation metric with a minimum threshold of 0.50 (Hair et al., 2019). The AVE values obtained in this study exceeded the recommended level, namely 0.553 for frugal innovation, 0.651 for practical learning, and 0.684 for structural social capital, indicating satisfactory convergent validity. A more detailed assessment of the outer measurement model is presented in Table 2.

Table 2. Measurement Model Assessment

Constructs	Indicator	Loadings	CA	CR (rho_c)	AVE
Structural social capital	SSC1	0.769	0.845	0.896	0.684
	SSC2	0.875			
	SSC3	0.854			
	SSC4	0.805			
Practical learning of SMEs	PL1	0.764	0.892	0.918	0.651
	PL2	0.794			
	PL3	0.866			
	PL4	0.793			
	PL5	0.786			
	PL6	0.833			
Frugal innovation	FI1	0.728	0.799	0.860	0.553
	FI2	0.643			
	FI3	0.703			
	FI4	0.811			
	FI5	0.819			

Discriminant validity was also assessed to ensure that each latent construct is empirically distinct from the others in the model. The Fornell–Larcker criterion was applied by comparing the square root of the AVE with inter-construct correlations (Henseler et al., 2016), where discriminant validity is confirmed when the former exceeds the latter (see Table 3). In addition, cross-loadings obtained from the SmartPLS 4 output were examined to reinforce this assessment. The results show that all indicators loaded more strongly on their respective constructs than on other latent constructs (Henseler et al., 2016). Overall, these findings confirm that the measurement model demonstrates adequate discriminant validity, with each construct being both reliable and conceptually distinct.

Table 3. Discriminant Validity

	SSC	FI	PL
Structural social capital	0.827		
Frugal innovation	0.719	0.744	
Practical learning	0.728	0.786	0.807

Inner Model

To ensure the robustness of the structural model assessment, several preliminary analyses were conducted, including evaluations of collinearity, explanatory power (R^2), and predictive relevance (Q^2). Collinearity was examined to verify whether each exogenous construct contributes a unique effect to its endogenous variable, as high collinearity would indicate overlapping influences among exogenous constructs and potentially render one or more predictors redundant. Variance Inflation Factor (VIF) values were used to assess collinearity, with values exceeding 3 indicating potential concern (Hair et al., 2019). The results show that the VIF values across the four structural paths ranged from 1.000 to 2.429, remaining well below the critical threshold. These findings indicate the absence of multicollinearity issues, suggesting that the exogenous constructs exert distinct and meaningful influences within the PLS structural model.

The explanatory power of the model refers to the extent to which the variance of each endogenous construct can be accounted for by the independent variables included in the model, which is assessed using the coefficient of determination (R^2). The results indicate that the R^2 values for frugal innovation and practical learning are 0.664 and 0.530, respectively. This implies that 66.4% of the variance in frugal innovation and 53.0% of the variance in practical learning are explained by the exogenous constructs in the model, while the remaining 33.6% and 47.0% are attributable to other factors not captured in the model. Within behavioral research, R^2 values exceeding 0.40 are commonly regarded as indicating a substantial level of explanatory power (Henseler et al., 2016), suggesting that the model demonstrates a satisfactory ability to explain the endogenous constructs.

Predictive relevance was evaluated using the Q^2, RMSE, and MAE indicators, which are particularly suitable for assessing model quality in PLS-SEM as they compare predicted values with observed data. A model is considered to exhibit predictive relevance when Q^2 values exceed zero, indicating meaningful predictive accuracy, while lower RMSE and MAE values reflect smaller prediction errors and closer alignment between predicted and actual values (Hair et al., 2019). The results show that the Q^2 values for frugal innovation (0.279) and practical learning (0.348) are both above zero, suggesting that the model demonstrates satisfactory predictive relevance and that the differences between predicted and observed values are relatively small. A detailed summary of the predictive relevance assessment is provided in Table 4.

Table 4. Goodness of Fit for PLS Model—PLSPredict

	Q^2predict	RMSE	MAE
Frugal innovation	0.279	0.881	0.587
Practical learning of SMEs	0.348	0.839	0.594

Path Analysis Evaluation

Path analysis produced standardized beta coefficients and two-tailed t-statistics at the 95% confidence level, as commonly applied in behavioral research. As reported in Table 5, the quadratic effect of structural social capital on frugal innovation was not statistically significant ($\beta = -0.013$, $t = 0.328$, $p > 0.05$), leading to the rejection of Hypothesis 1. However, PLS bootstrapping results indicate that the direct effect of structural social capital on frugal innovation remains positive and significant ($\beta = 0.296$, $t = 4.191$, $p < 0.05$), suggesting a positive linear relationship between the two constructs. Furthermore, structural social capital has a positive and significant effect on practical learning ($\beta = 0.728$, $t = 11.792$, $p < 0.05$), thereby supporting Hypothesis 2. Finally, practical learning among SMEs exerts a positive and significant influence on frugal innovation ($\beta = 0.551$, $t = 8.820$, $p < 0.05$), providing statistical support for Hypothesis 3. A visualization of the structural path model is presented in Figure 1.

Table 5. Hypothesis Testing

Hyp.	Path	Beta	Error	t-statistics	p-value	Decision
1	Structural capital → frugal innovation (quadratic effect)	-0.013	0.039	0.328	0.748	Not quadratic relationship
2	Structural capital → practical learning	0.728	0.062	11.792	0.000*	Sig.
3	Practical learning → frugal innovation	0.551	0.062	8.820	0.000*	Sig.

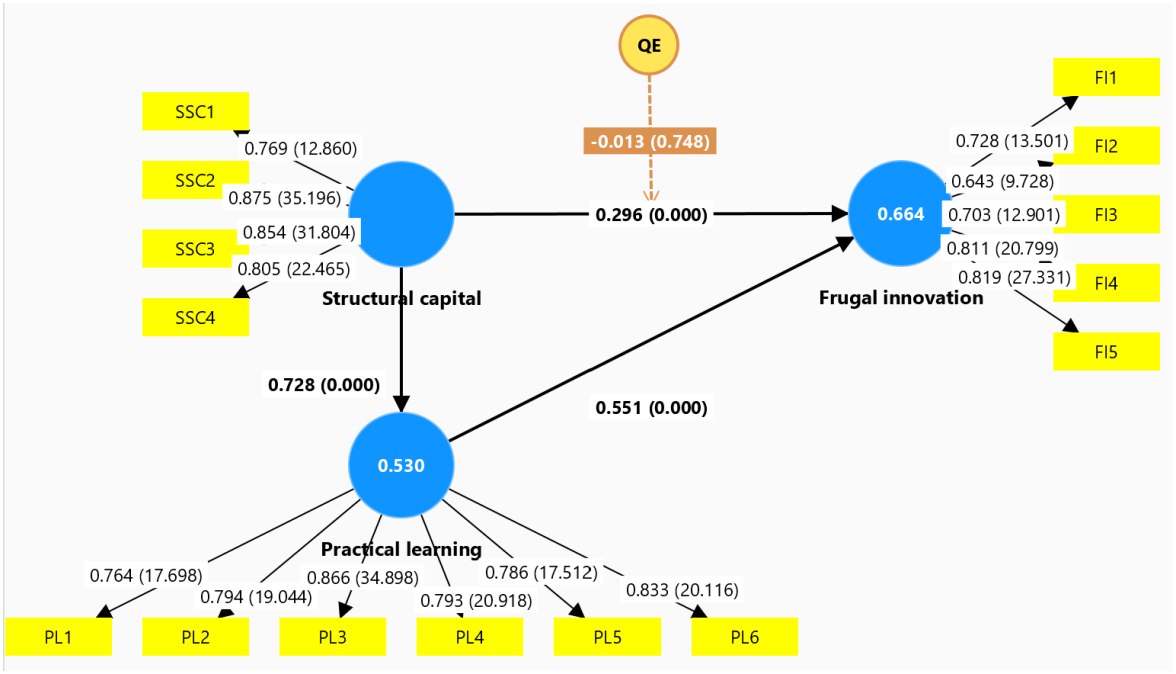


Figure 1. Structural Model—Bootstrapping with 10,000 samples

Discussion

This study aimed to address an underexplored issue by examining the potential quadratic effects of structural social capital on frugal innovation among women entrepreneurs in the heritage fashion sector. The findings contribute to the frugal innovation literature by reaffirming the importance of social capital resources and practice-based learning as key antecedents of frugality in resource-constrained organizational environments. Empirical results indicate that structural embeddedness and experiential learning significantly support frugal innovation practices, highlighting the social and learning-based nature of innovation under conditions of scarcity.

Contrary to theoretical expectations, however, the hypothesized quadratic relationship between structural social capital and frugal innovation was not statistically supported, although the negative sign of the squared beta coefficient suggests a theoretically plausible inverted U-shaped pattern. This non-confirmation implies that increasing levels of structural social capital do not necessarily generate diminishing or adverse returns in this context. Instead, structural social capital appears to exert a predominantly linear and positive influence, as broader and denser network connections continue to facilitate access to information, mutual support, and collaborative learning that are critical for sustaining frugal innovation efforts (Adler & Kwon, 2002; Williams et al., 2017). These findings point to the importance of contextual factors—such as persistent resource scarcity, sectoral characteristics, and gendered entrepreneurial conditions—in shaping the nature of social capital effects.

Two interrelated explanations help illuminate this result. First, for women entrepreneurs in SMEs operating under chronic resource constraints, social networks function as a vital compensatory

mechanism rather than a source of redundancy. Active and sustained engagement in networks enables access to high-quality intangible resources—such as tacit knowledge and collective problem-solving—that enhance organizational capabilities and productivity without reaching a saturation point (Xavier Molina-Morales et al., 2011). Second, beyond instrumental benefits, social networks provide crucial psychological and emotional support, fostering resilience, optimism, and organizational efficacy amid competitive pressures and uncertain frugal opportunity recognition processes (Ruth Eikhof et al., 2013; Williams et al., 2017). Taken together, these resource-based and psychosocial mechanisms help explain why the nonlinear effect of structural social capital may be less salient in women-led, heritage-based enterprises, underscoring the need for more context-sensitive theorization of social capital–innovation relationships.

Practical learning emerges as another critical determinant of frugal innovation, particularly in resource-constrained organizational contexts. This learning mode is highly problem-driven and therefore well aligned with the realities faced by women entrepreneurs, whose learning motivation is rooted in addressing immediate operational challenges rather than engaging in formal, systematic training that demands substantial time, financial resources, and cognitive investment. Learning grounded in concrete problems and lived experience enhances absorptive capacity by enabling entrepreneurs to internalize context-relevant knowledge more effectively, which in turn improves the precision and effectiveness of subsequent business decisions. Prior research suggests that experience-based and action-oriented learning is especially effective for SMEs, as it allows knowledge development to remain closely tied to organizational needs and constraints (Lafuente et al., 2025; Sosna et al., 2010).

At the same time, practical learning is inherently iterative and often manifests as trial-and-error experimentation, requiring high levels of perseverance and resilience from entrepreneurs. Although such experimentation can be repetitive and mentally demanding, it enables firms to identify frugal opportunities, recombine limited resources creatively, and challenge established managerial logics that may be ill suited to scarcity-driven environments. Recent studies confirm that learning by doing and experiential problem-solving stimulate more context-appropriate strategic choices, support product and business model innovation, and help organizations generate frugal value while maintaining operational efficiency (Escudero-Cipriani et al., 2024). Thus, practical learning not only facilitates tangible frugal innovation outcomes but also nurtures adaptive mindsets that are essential for sustaining innovation under prolonged resource constraints.

In this study, structural social capital and practical learning are not independent predictors of frugal innovation but are inherently intertwined within network-based interactions. Learning activities and social interactions occur in parallel and mutually reinforcing ways inside SME networks. In the context of women entrepreneurs in the heritage fashion sector, practice-based learning largely emerges from the exchange of information, lived experiences, and operational practices embedded in community interactions. Social ties transmit exemplars of practices that are subsequently imitated, adapted, and internalized within firm-level routines. Moreover, exposure to successful peer practices within the network provides both cognitive benchmarks and material learning inputs, enabling entrepreneurs to translate collective experiences into frugal innovation outcomes. Accordingly, the generation of practical learning outputs is deeply rooted in ongoing social interaction, consistent with recent evidence that social capital facilitates experiential and collaborative learning in SMEs by enabling access to diverse knowledge sources and accelerating learning diffusion (Chierici et al., 2021).

This interdependence aligns with social exchange theory, which posits that long-term relationships are sustained through reciprocal and mutually beneficial interactions. Trust developed within entrepreneurial networks lowers barriers to sharing and mobilizing strategic external resources, thereby strengthening firms' learning processes and innovation capacities. Recent empirical studies demonstrate that strong social capital fosters collaborative learning among business partners, enhances the effectiveness of knowledge recombination, and ultimately contributes to the development of product and process advantages under constrained conditions (Hutton et al., 2021; Lyons et al., 2012). By enabling

learning to occur organically through direct interaction and shared developmental aspirations, social capital encourages more natural, need-driven learning patterns that translate into higher organizational productivity and sustained frugal innovation performance. These findings suggest that the impact of social capital on frugal innovation is partly indirect, operating through socially embedded practical learning mechanisms that jointly shape adaptive capabilities in resource-limited environments.

CONCLUSION

This study extends social exchange theory by situating it within a frugality-based innovation model in resource-constrained organizational contexts, specifically among women entrepreneurs operating small and medium-sized enterprises (SMEs). The findings demonstrate that social exchange processes and their associated benefits are embedded within SME communities, where information, assistance, best practices, experiential knowledge, and problem-solving approaches are collectively shared. These community-based exchanges form a critical foundation for frugal innovation, particularly under conditions of limited financial and material resources.

The results highlight the pivotal role of structural capital and practical learning as mutually reinforcing determinants of frugal innovation. Social networks function not merely as relational assets but as compensatory and affordable alternatives to conventional external resources that are often inaccessible to SMEs. In this regard, social resources act as catalysts that enable firms to remain adaptive, competitive, and relevant amid evolving market dynamics. Sustained engagement within entrepreneurial communities also strengthens organizational efficacy, fostering optimism among women entrepreneurs that frugality-related challenges—such as delivering acceptable product quality while maintaining cost efficiency—can be effectively addressed.

Importantly, the findings confirm that structural capital and practical learning operate in parallel rather than through linear or sequential processes. As social exchange intensifies, learning unfolds through continuous observation, absorption, interpretation, filtering, and experimentation with the distributed advantages present within the community. These insights are subsequently internalized into everyday organizational practices. This study further underscores the relevance of a learning style tailored to resource-scarce environments—one that prioritizes problem-driven learning, experimentation, and pragmatic solution development over highly formalized or systematic learning structures. Such adaptive and non-linear learning patterns appear consistent with the limited capacities of SMEs, yet sufficiently robust to support ongoing innovation and business impact.

Although this research does not provide empirical support for a quadratic effect of social resources on frugality within the heritage fashion industry managed by women entrepreneurs, it nevertheless reinforces the centrality of social capital—both structural and relational—as a primary and reliable source of external support. From a rational perspective, networks emerge as irreplaceable assets for SMEs, offering dual benefits: access to low-cost external resources and immediate learning outcomes. These combined benefits serve as essential capitals enabling women entrepreneurs to sustain, stabilize, and prolong the viability of their enterprises in resource-limited contexts.

Recommendations

From an applied perspective, the findings offer practical insight for women entrepreneurs operating under resource constraints, particularly on the value of deepening and sustaining network-based interactions within SME communities. Frequent and meaningful social engagement expands access to low-cost resources and reciprocal benefits that collectively strengthen firms' ability to adapt and remain competitive. Rather than replicating the formalized R&D routines of large corporations, SMEs are better served by learning approaches grounded in community observation, problem-centered inquiry, and pragmatic experimentation with tangible outcomes. While this mode of learning often entails repeated

trial-and-error, the resulting capability to generate frugal innovations is viewed as a reasonable and worthwhile trade-off. These outcomes may be further reinforced through public and institutional support programs—such as business incubation, innovation contests, targeted workshops, and continuous outreach—that are designed to enhance SME independence and competitiveness.

Notwithstanding these contributions, the study has several limitations that suggest directions for future research. Further inquiry is needed to examine how external contingencies and internal organizational conditions may either enable or constrain the pursuit of frugal innovation. In addition, future studies should consider integrating secondary or objective data sources to complement self-reported measures and strengthen the assessment of frugality-related outcomes. Finally, because this study focuses on social interactions at the organizational level, subsequent research adopting a network-level perspective could offer richer insights into how information and strategic resources are unevenly distributed among different network actors. Such an approach may help explain variations in knowledge depth, solution quality, and learning intensity derived from participation in entrepreneurial communities.

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