ISSN 2409-2665
Journal of Logistics, Informatics and Service Science
Vol. 12 (2025) No. 11, pp. 22-35
DOI:10.33168/JLISS.2025.1102

Technological Capability Specialization in Social Service Enterprises Under Resource Constraints

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Abstract. This study addresses the lack of empirical evidence about how social enterprises develop technological capabilities in resource-constrained emerging markets. While conventional management theory advocates balanced technological capabilities, we investigate whether social enterprises in Peru exhibit distinct patterns due to dual-mission constraints and resource limitations. We collected survey data from 215 social entrepreneurs across Peru in late 2024. Using exploratory factor analysis, we identified underlying dimensions of technological capabilities from eight survey items measuring technology management competencies. We employed regression with interaction terms to examine relationships among capability dimensions, organizational characteristics, and perceived importance of technology management. Factor analysis revealed two distinct technological capability dimensions: strategic-analytical (37.6% variance) and implementation-focused (24.7% variance). Ordered logistic regression showed a significant negative interaction between these capabilities ($\beta = -0.86$, $p < 0.001$), indicating specialization rather than simultaneous development. Organizational age negatively predicted the importance of technology management ($\beta = -0.05$, $p < 0.05$), with younger enterprises prioritizing technology more than established ones. A cross-sectional design limits causal inference, and convenience sampling may limit generalizability beyond Peru. Social enterprise leaders should conduct capability assessments to identify natural strengths and focus technological investments accordingly, rather than pursuing comprehensive development across all domains. Support organizations should design differentiated interventions based on organizational age and existing capability profiles. This research provides the first large-sample quantitative evidence of technological capability specialization in social enterprises from an emerging market, challenging fundamental assumptions about balanced capability development and offering evidence-based guidelines for strategic technology management in resource-constrained hybrid organizations.

Keywords: technology management, service innovation, technological capabilities, social service enterprises, emerging markets

1. Introduction

Social enterprises (SEs) are unique hybrid organizations that navigate a dual mission: achieving both social impact and financial viability (Mair & Martí, 2006; Ratten, 2020). This dual objective poses a distinct challenge, forcing these firms to make difficult resource-allocation decisions, particularly regarding technology. While conventional management theory suggests organizations should strive for a balanced set of technological capabilities, the reality for resource-constrained SEs in emerging markets appears to be different. They operate in environments characterized by limited access to capital, infrastructure, and skilled labor, which complicates the development of comprehensive technological expertise (Sengupta et al., 2018).

This study investigates a specific strategic paradox observed in social enterprises: rather than developing a full spectrum of technological capabilities, they tend to specialize in a narrow subset. We explore whether SEs are compelled to choose between developing strategic-analytical capabilities (e.g., using data to identify new opportunities) and implementation-focused capabilities (e.g., efficiently adopting new technologies). This research provides the first large-sample quantitative evidence of this phenomenon in an emerging market context, using data from over 200 social entrepreneurs in Peru.

Drawing on the Resource-Based View (RBV), this specialization is not a failure of strategy but an efficient, and perhaps necessary, response to resource constraints and the pressures of a dual mission. Our empirical findings show how limited resources compel SEs to develop specific, valuable technological capabilities that are difficult for competitors to imitate. This paper's contribution lies in providing robust empirical evidence that challenges the conventional "balanced capabilities" ideal and offers a more nuanced understanding of technology management for hybrid organizations in resource-scarce environments. Our work also complements recent studies on social entrepreneurial intentions toward technology management (Hussain & Li, 2022) by providing quantitative evidence of the outcomes of those intentions. (George et al., 2012).

2. Theoretical Framework

2.1. Technology Management in Social Enterprises

Technological capabilities, the skills, knowledge, and resources required to effectively adopt, utilize, and innovate with technology, are increasingly recognized as vital for social enterprises (SEs) to enhance innovation, scale their impact, and ensure sustainability (Guatemala & Martínez, 2023). Operating in dynamic, often resource-scarce environments, SEs leverage technology to overcome limitations and address social problems more effectively, enabling them to "do more with less" (Yáñez-Valdés et al., 2023; Chiodo et al., 2024; García-González & Ramírez-Montoya, 2023). This involves adopting off-the-shelf solutions and developing internal capacity to manage, adapt, and integrate technology into operations and service delivery.

Prior research suggests that building technological capabilities in SEs is influenced by both individual and contextual factors. Individual entrepreneurial characteristics, such as proactiveness and openness to innovation, along with supportive external ecosystems (e.g., networks, incubators, and policy support), have been found to foster innovativeness (Del Giudice et al., 2019; Zahra et al., 2009; Tran & Nhung, 2025). However, a significant gap remains in our understanding of the patterns of capability development within SEs. It is unclear whether they tend to develop broad digital competencies or specialize in technologies aligned with their mission. Furthermore, the precise process by which SEs accumulate technological know-how, manage inherent trade-offs, and how their hybrid social-commercial orientation shapes this evolution, especially in resource-constrained emerging markets, is under-researched. Dutrénit et al. (2019) emphasize that technological capability accumulation in Latin America requires understanding both techno-economic and socio-political spheres, particularly relevant for social enterprises operating in these complex institutional environments (Calderini et al., 2023; Chiodo et al., 2024).

Recent developments in institutional theory offer essential insights into technology management for social enterprises operating in emerging markets. Institutional voids, which refer to the lack of market-supporting institutions such as regulatory frameworks, skilled labor markets, and financial intermediaries, present unique challenges and opportunities for technology adoption (Mair et al., 2012; Zahra et al., 2019). Das & Drine (2020) provide additional evidence for the importance of socio-institutional factors in technology development within emerging economies. Their analysis of technology gaps between African countries and advanced economies demonstrates that distance from the technology frontier is significantly influenced by institutional quality, human capital development, and openness to knowledge transfer. Furthermore, studies on technology adoption in Latin American SMEs highlight that perceived risks and social trust are critical factors influencing investment decisions, even when environmental benefits are clear (Lopez-Burga et al., 2024).

This perspective is particularly relevant for understanding how social enterprises in Peru navigate technological development, as they must overcome similar institutional constraints while building internal capabilities to close technology gaps in their specific social domains. Social enterprises frequently act as institutional entrepreneurs, creating innovative solutions to address institutional deficiencies while building technological capabilities (Fu & Yan, 2024; Liedong et al., 2020). This dual role demands advanced resource orchestration abilities that allow organizations to navigate institutional constraints and leverage technology for social impact. Additionally, the legitimacy requirements set by various stakeholder groups—including beneficiaries, donors, government agencies, and commercial partners—add further complexity to technology investment decisions, as each group may hold different expectations regarding technological sophistication and resource allocation priorities (Battilana et al., 2022; Kroeger & Weber, 2018).

2.2. Resource-Based View and Specialization

Barney (1991) posits that a firm's sustained competitive advantage stems from its unique resources and capabilities that are Valuable, Rare, Inimitable, and Non-substitutable (VRIN). In the SE context, resources extend beyond tangible assets to include social and reputational capital (Ávila et al., 2021). Technological capabilities, such as proficiency in specific software for impact measurement or the development of bespoke digital platforms, can be considered strategic resources. When these capabilities are tightly aligned with the social mission and are difficult for others to replicate, they can become a source of mission advantage or even a competitive edge against other organizations vying for funding or talent. The observed tendency for SEs to specialize in some technological regions rather than excelling across the board can be interpreted through an RBV lens as optimizing limited resources to build distinctive, valuable capabilities (Barney, 1991).

2.3. Research Gaps

Building on the preceding review, it looks evident that while the importance of technology in SEs is acknowledged, a comprehensive understanding of capability development, trade-offs, and contextual influences, particularly in emerging markets, is still developing. Specifically, this study addresses the following research gaps.

Regarding empirical evidence in Emerging Markets, there is a clear call for more quantitative research on technology management in SEs, particularly in Latin America. While Dutrénit et al. (2019) provide crucial insights into technological capability accumulation patterns across Latin American countries, their focus on traditional firms leaves significant gaps in understanding how social enterprises specifically navigate these processes (Guatemala & Martínez, 2023). Our study provides large-sample empirical evidence from Peru, offering insights into a phenomenon characterized by unique challenges and opportunities.

Prior research often examines determinants in isolation (Del Giudice et al., 2019; Chiodo et al., 2024). This study analyzes the simultaneous influence of various organizational, resource, and

contextual factors on technology management perceptions and capabilities to provide a more integrated understanding. Although the concept of trade-offs due to the dual mission is discussed qualitatively (Kotiranta et al., 2024; Chiodo et al., 2024), there is limited quantitative analysis of how these trade-offs manifest in technology management decisions. Our study explicitly investigates the interactions between different technological capability dimensions as reflections of these strategic choices. Research in resource-rich settings links digital literacy and open innovation to service performance (Sun, 2024). It remains unclear whether this applies to resource-constrained dual-mission organizations in emerging markets—highlighting the need to study not only capabilities but also the strategic trade-offs in their development.

The literature is unclear about whether SEs tend to specialize or generalize their technological capabilities over time and how organizational lifecycle (age) influences this relationship. We explored these patterns by analyzing data from a diverse sample. By addressing these gaps through a quantitative study in the Peruvian context and employing the RBV lens, this study aims to advance scholarly understanding and practical guidance for effective global technology management in social enterprises.

3. Methodology

Our study employs a quantitative, cross-sectional research design to investigate the determinants of technology management capabilities and the trade-offs social enterprises perceive in Peru. Data were collected through a survey administered to social entrepreneurs across various sectors in the country towards the end of 2024. This approach allows for analyzing the relationships between independent variables and the perceived importance of technology management within these organizations, offering valuable insights from a previously under-researched context, particularly in Latin America.

3.1. Sample and Data Collection

The target population of this study was social enterprises operating in Peru. Due to challenges in identifying and accessing a comprehensive sampling frame for social enterprises in Peru, a convenience sampling approach was employed. Data were collected via a survey instrument distributed through collaborations with existing associations and networks of social entrepreneurs, in which participants self-identified as social enterprises and often aligned with characteristics similar to those of "B Corps" in their dual focus on social/environmental impact and financial sustainability. While this method does not allow for broad generalizability to the entire population of Peruvian social enterprises, it provided access to a relevant group of practitioners deeply involved in this ecosystem. Over 200 complete responses were obtained, forming the basis of the empirical analysis. Data collection took place in the 4Q of 2024.

3.2. Measures

The study features a dependent variable measuring the perceived importance of technology management, along with several independent variables, including organizational characteristics and technological capability dimensions. All variables, except for firmographic data, were collected using items from a survey instrument originally developed for a doctoral thesis investigating different competencies in social enterprises.

The dependent variable, Perceived Importance of Technology Management (IMP), was assessed using a single-item, five-point ordinal scale. Participants were asked, *"What level of importance do you assign to each skill for your business's survival?"* with responses from 1 (low importance) to 5 (indispensable). The independent variables are detailed in Annex 1. Responses to these eight questions contributed to the factor analysis that identified the core constructs reflecting technological capabilities. Factor loadings determined how each question related to the identified factors, namely Strategic, Analytical, and Implementation.

Although single-item measures have inherent limitations compared to multi-item scales, research indicates they are suitable for concrete, clear-cut constructs where respondents can easily make evaluative judgments (Wanous et al., 1997; Gardner et al., 1998). Our measure focuses on a specific evaluation of the importance of technology management rather than a complex underlying factor, rendering the single-item approach appropriate for this study.

3.3. Data Analysis

The empirical analysis proceeded in multiple stages using RStudio. Initially, an exploratory Factor Analysis was conducted to uncover the core dimensions of technological capabilities captured by eight survey items. The data's appropriateness for factor analysis was confirmed through the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (overall KMO = 0.88, individual KMOs > 0.80) and Bartlett's Test of Sphericity ($\chi^2 = 1097.218$, $df = 28$, $p < 0.001$), both indicating suitability. The Principal Axis Factoring (PAF) method was used to extract latent factors from the observed correlations, consistent with the theoretical view of technological capabilities as unobserved constructs.

Robustness of Factor Structure: To confirm the statistical validity of our decision to retain factors, we conducted parallel analysis (Horn, 1965). This method compares eigenvalues from the actual dataset with those from randomly generated data. The results supported a two-factor solution, providing strong empirical evidence for retaining the second factor, even though its eigenvalue (0.81) is slightly below the typical cutoff of 1.0. This analysis substantiates our theoretical distinction between strategic-analytical and implementation-focused capabilities, beyond mere interpretability.

To determine the number of factors to retain, we used a combined approach: Kaiser's criterion (eigenvalues > 1) suggested one primary factor (eigenvalue = 4.99). In contrast, the second factor (eigenvalue = 0.81) was borderline but included due to other criteria. The scree plot showed a clear bend after the second factor. The two-factor solution explained 62.3% of the total variance (Factor 1: 37.6%, Factor 2: 24.7%), which was suitable for an exploratory study. Notably, the two-factor solution provided a conceptually consistent structure that aligned with the theoretical distinctions in technological capabilities. After extraction, we applied a Varimax rotation to improve separation and clarify the two orthogonal factors: "Strategic-Analytical Capability" (mainly loading on items related to foresight, uncertainty management, data analytics, and strategic planning) and "Technological Implementation and Adaptation" (loading more strongly on items related to ease of technology adoption and update frequency). Factor scores for these two factors were then computed as independent variables.

We used an Ordinal Logistic Regression (OLR) model with the *polr* package in R to examine relationships among variables, including Lifetime, Workforce, and capability scores, and the ordinal dependent variable (Perceived Importance of Technology Management). An interaction between the capability scores was included to explore trade-offs. The proportional odds assumption was assessed with the Brant test (p=0.30), which indicated no significant violation; however, the Lifetime variable was marginal (p=0.07), prompting sensitivity analyses that confirmed robustness. Model fit was assessed via residual deviation and AIC, with the interaction improving fit. Average Marginal Effects helped interpret variable impacts. Additional robustness checks, including partial proportional odds and binary logistic regression, supported the findings. Missing data were handled by removing incomplete responses.

We conducted comprehensive diagnostic testing of our regression models. Variance Inflation Factors (VIFs) were used to assess multicollinearity; all values were below 2.5, indicating no problematic multicollinearity among predictors. Cross-loading analysis showed that although *Tech_solutions* and *Tech_readiness* had moderate loadings on both factors, their primary loadings aligned with our theoretical framework, and sensitivity analysis verified the stability of the factor structure.

4. Results

4.1. Descriptive Analysis

Correlation analysis uncovered interesting patterns among the variables studied. The correlation between the eight technological variables ranged from moderate to strong, with *r* values between 0.40 and 0.73. This indicates that, although related, these variables represent different aspects of technological capabilities in social enterprises. The strongest correlations were found between *Tech_readiness* and *Sales_tech* ($r \approx 0.73$), *Data_Analytics* and *Tech_solutions* ($r \approx 0.73$), and *Tech_readiness* and *uncertainty* ($r \approx 0.72$).

By contrast, the correlations with the dependent variable (*IMP*) were generally weak, with all below 0.3, and the highest was *Tec_Adoption* ($r \approx 0.26$). Notably, *Lifetime* (firm age) showed a weak negative correlation with *IMP* ($r = -0.18$), suggesting that older firms may value technology management less. Conversely, *Workforce* (firm size) showed a near-zero correlation with *IMP* ($r \approx 0.03$), implying that organizational size does not significantly impact perceptions of technology importance. Among the structural variables, *Lifetime* and *Workforce* displayed a weak positive correlation ($r \approx 0.24$). Both also showed weak or negative correlations with technological variables, suggesting that the structural features of social enterprises may relate differently to their technological capabilities.

4.2. Factor Analysis

We performed an exploratory factor analysis to identify the underlying dimensions of technological capabilities. Preliminary tests verified that the data were suitable for this method: the overall Kaiser-Meyer-Olkin (KMO) index was 0.88, deemed meritorious, with individual KMO values above 0.80 for all variables. Bartlett's test of sphericity was highly significant ($\chi^2 = 1097.218$, df = 28, $p < 0.001$), rejecting the null hypothesis of an identity matrix and confirming sufficient intercorrelations among the variables. The eigenvalue analysis revealed a dominant value for the first factor (4.99), whereas the second factor (0.81) was close to the conventional threshold of 1.0. Using Principal Axis Factoring (PAF) with Varimax rotation, the two-factor solution explained 62.3% of the total variance, distributed as follows:

Factor 1 ("Strategic-Analytical Capability") explained 37.6% of the variance, with high loadings (>0.7) for *Sales_tech* (0.757), *Foresight* (0.735), and *Data_Analytics* (0.718), and moderate loadings for *Tech_readiness* (0.688), *Uncertainty* (0.628), and *Tech_solutions* (0.592). Factor 2 ("Technological Implementation and Adaptation") accounted for 24.7% of the variance, with higher loadings on *Tec_Adoption* (0.664) and *Tech_update* (0.635), and moderate loadings on *Tech_solutions* (0.535) and *Tech_readiness* (0.524).

This bifactorial structure was conceptually coherent, distinguishing between capabilities oriented toward strategic analysis and those focused on practical strategy implementation. Notably, *Tech_solutions* and *Tech_readiness* loaded significantly on both factors, suggesting that these aspects may be relevant to both dimensions of technological capabilities. We also conducted parallel analysis (Horn, 1965) comparing eigenvalues from real and random data. The analysis supported a two-factor solution, justifying retaining the second factor (eigenvalue = 0.81), even though it's below 1.0. This confirms our distinction between strategic-analytical and implementation capabilities.

Combining multiple retention criteria (Kaiser's criterion, scree plot inflection, parallel analysis, and theoretical interpretability) offers strong support for the two-factor structure. The 62.3% variance explained, while moderate, is acceptable for exploratory factor analysis in social science research, especially when studying complex organizational constructs (Hair et al., 2019). Although the second factor's eigenvalue (0.81) is below 1.0, relying only on Kaiser's criterion is increasingly viewed as too conservative (Glorfeld, 1995). The agreement among parallel analysis, scree plot, and theoretical interpretability provides multiple sources of evidence backing our factor structure.

4.3. Regression Model

We estimated an OLR model to examine how the dimensions of technological capabilities and structural variables influence the perceived importance of technology management. The OLR is suitable for analyzing ordinal dependent variables like IMP, as it models the log-odds of being in a higher importance category without assuming equal distances between response levels (Brant, 1990). Therefore, the model is as follows:

$$IMP_i = b_1 * Lifetime + b_2 * Workforce + b_3 * Strategic\_Analytical + b_4 * Tech\_Implementation + e_i$$

Table 1. Coefficients

	Value	Std. Error	t value
Lifetime	-0.0441	0.0216	-2.041
Workforce	0.1127	0.1258	0.896
Strategic_Analytical	0.3147	0.1682	1.871
Tech_Implementation	0.2174	0.1735	1.253
Residual Deviance: 567.074			
AIC: 538.074			

Results show that firm age (*lifetime*) has a significant negative effect ($\beta = -0.044$, $t = -2.041$, $p < 0.05$), indicating that each additional year reduces the likelihood of being in a higher IMP category by about 4.3% (OR = 0.957, 95% CI [0.914, 0.996]). The *Strategic_Analytical* factor showed a marginally significant positive effect ($\beta = 0.315$, $t = 1.871$, $p < 0.10$), suggesting a 37% increase in the odds of being in a higher category for each unit increase in this factor (OR = 1.370, 95% CI [0.990, 1.916]).

In contrast, neither firm size (*workforce*, $\beta = 0.113$, $t = 0.896$, $p > 0.10$) nor the *Tech_Implementation* factor ($\beta = 0.217$, $t = 1.253$, $p > 0.10$) showed significant effects, although both coefficients were positive. The Brant test (omnibus test $p = 0.30$) did not indicate substantial violations of the proportional odds assumption for the overall model. However, *Lifetime* showed a marginal effect ($p = 0.07$), suggesting that its impact might vary slightly across the dependent variable categories.

4.4. Model with Interaction and Visualization

To better understand the potential nonlinear effects and trade-offs among the various dimensions of technological capabilities, we incorporated an interaction term into the model.

$$IMP_i = b_1 * Lifetime + b_2 * Workforce + b_3 * Strategic\_Analytical * Tech\_Implementation + e_i$$

Table 2. Coefficients

	Value	Std. Error	t value
Lifetime	-0.0506	0.0242	-2.090
Workforce	0.1301	0.1259	1.034
Strategic_Analytical	0.2501	0.1611	1.552
Tech_Implementation	-0.0625	0.1896	-0.330
Strategic_Analytical:Tech_Implementation	-0.8634	0.2062	-4.187
Residual Deviance: 549.0042			
AIC: 567.0042			

This model found a key result: the interaction between *Strategic_Analytical* and *Tech_Implementation* was negative and significant (β = -0.863, t = -4.187, p < 0.001). This strong adverse effect indicates a substitution relationship, suggesting that social enterprises specialize in one capability rather than in both. *Lifetime* retained its significant adverse effect (β = -0.051, t = -2.090, p < 0.05), confirming that older firms prioritize less on technology management. The main impact of *Strategic_Analytical*, *Tech_Implementation*, and *Workforce* was not statistically significant in this model.

Our model fit improved, with the AIC dropping from 583.07 to 567.00 and the residual deviance from 567.07 to 549.00, indicating a more accurate fit. The contour plot (Figure 1) shows this interaction: highest perceived importance (yellow, 4.5–5.0) occurs when one capability is strong and the other moderate. Green areas (4.0–4.5) indicate of moderate significance, with diagonal patterns, supporting the substitution effect: social enterprises can achieve high perceived importance by focusing on one capability rather than both.

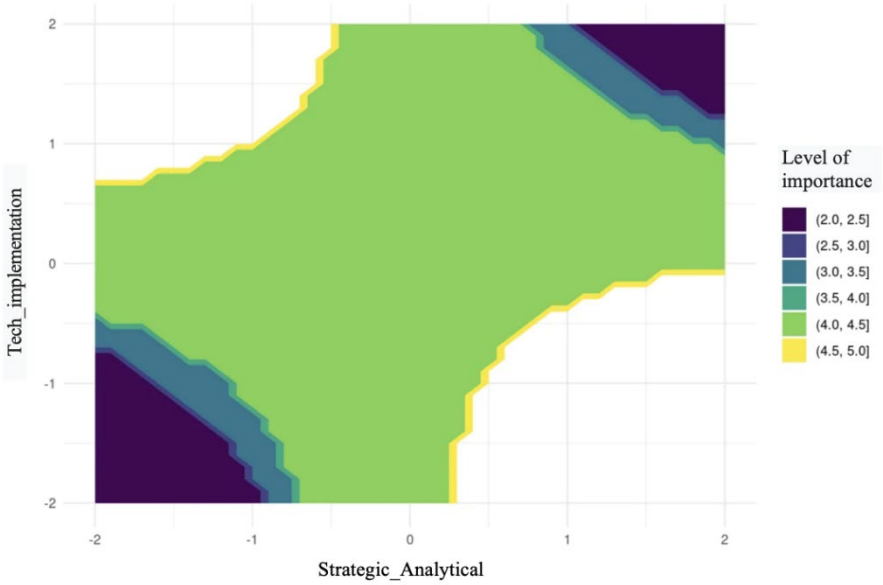

Fig. 1: Contour plot

The average marginal effects (AME) estimated from the interaction model indicated that the Strategic_Analytical dimension exerted the most substantial influence (AME = –0.0054), with marginal statistical significance (p = 0.094). In contrast, the remaining predictors demonstrated weaker and statistically nonsignificant effects. These results further underscore the importance of the interaction term, consolidating its role as the model's primary explanatory mechanism.

5. Discussion

The study provides empirical evidence of the technological capability development patterns of social enterprises operating in emerging markets. The key finding, a significant negative interaction between strategic-analytical and technological implementation capabilities, reveals a specialization phenomenon that challenges the conventional wisdom that organizations should develop a balanced set of technological capabilities.

5.1. Key Findings and Implications

The empirical results reveal a significant negative interaction (β = -0.86, p < 0.001) between strategic-analytical and implementation-focused technological capabilities. This indicates that social enterprises in our Peruvian sample tend to develop one type of capability at the expense of the other,

supporting a specialization pattern rather than balanced development. Results align with the Resource-Based View (Barney, 1991), which suggests that limited resources lead organizations to focus on building distinctive capabilities rather than spreading across multiple areas. Our finding of technological specialization aligns with evidence from other sectors in the region, where resource-constrained firms make targeted, risk-aware technology choices rather than broad investments (Lopez-Burga et al., 2024).

This pattern reflects adaptive strategies under dual-mission pressures and institutional constraints common in emerging markets (Mair et al., 2012). Social enterprises with strategic-analytical capabilities may attract venture capital or foundations that value measurement and planning (Cavallo et al., 2019), while those focusing on implementation may appeal to angel or impact investors who emphasize operational and community outcomes. This alignment reinforces specialization and sustainable competitiveness.

Older social enterprises ($\beta = -0.05$, $p < 0.05$) tend to de-emphasize technology management, likely due to inertia and routine-based hindrances to renewal (Barbero et al., 2024). This relates to 'core rigidities' (Leonard-Barton, 1992; Battilana & Lee, 2014), where once-advantageous capabilities hinder adaptation. Younger enterprises are more open to digital innovation, with fewer legacy issues and more digitally native teams (Ahmed & Brennan, 2019).

These patterns are especially evident in emerging markets like Peru, where institutional voids and resource limits challenge technology development (Das & Drine, 2020; Dutrénit et al., 2019). Social enterprises navigate these hurdles while building capabilities to bridge technology gaps in their social domains, often acting as institutional entrepreneurs creating innovative solutions (Fu & Yan, 2024; Liedong et al., 2020).

5.2. Practical Implications

We suggest social enterprise leaders: (1) Conduct initial assessments to identify if the organization's strengths lie in strategic-analytical or implementation-oriented technological capabilities. (2) Develop a technology plan aligned with these strengths and social mission demands. (3) Implement specialized training for prioritized technological areas, avoiding broad approaches. (4) Establish metrics to monitor technological progress and social impact. (5) Form strategic partnerships with entities that have complementary technological strengths. (6) For mature enterprises, institutionalize regular review and updates of technological strategy to prevent neglect. (7) Align financing strategies with technological focus; venture capital or institutional funding for strategic-analytical capabilities, diverse community-based funding for implementation, guided by Cavallo et al. (2019).

These recommendations take into account the unique conditions in emerging markets, supported by empirical evidence on technological specialization. The trade-off pattern influences social enterprise support, especially in resource-limited settings, where focusing on a specific capability may outperform broad development efforts. Support should help organizations identify optimal specialization based on mission, resources, and competition, aligning with research (Sirmon et al., 2019; Wales et al., 2021). Smaller, younger social enterprises often have advantages in technology adoption, while mature organizations may require targeted strategies and leadership development to overcome barriers and update capabilities.

5.3. Limitations and Future Research

Our study has limitations, like cross-sectional data, so future research should use longitudinal designs to study how technological capabilities evolve. Though our sample of over 200 Peruvian social enterprises offers insights, caution is needed when generalizing to other contexts. Comparative studies in emerging countries could reveal how institutional and cultural factors impact technological development. Future research might explore regional innovation networks and public R&D investment patterns, as noted by Min et al. (2020), and how proximity to the technology frontier affects strategies in emerging markets, as defined by Das & Drine (2020). It's also important to understand how

specialization patterns form and what might weaken or reverse them. Examining how technological capabilities influence organizational outcomes like financial performance and social impact would be valuable.

Further, longitudinal studies could reveal if social enterprises sustain their specialization or develop new capabilities as they grow. Comparing emerging markets can clarify how institutional and cultural factors moderate trade-offs. Developing measurement tools for technological capabilities in hybrid organizations is crucial, as existing scales may not capture the dual-mission constraints. Additionally, investigating how financing and funding sources, as in Cavallo et al. (2019), affect technological patterns during growth phases is promising.

Our cross-sectional design limits causal inferences. While the negative interaction between capabilities (β = -0.86) shows an association, it doesn't clarify whether this results from strategic choices, organizational traits, environmental constraints, or measurement issues. Longitudinal research is needed to understand the causal mechanisms behind these patterns.

6. Conclusions

This study provides new evidence of how social enterprises in emerging markets develop technological capabilities, based on data from over 200 Peruvian organizations. It finds that resource-limited social enterprises tend to focus on either strategic-analytical or implementation capabilities, rather than both, to adapt to resource constraints. Older enterprises place less importance on technology management, highlighting differences across organizational stages.

The research combines insights from the Resource-Based View, Dynamic Capabilities, and Knowledge-Based View to offer a nuanced understanding of technology development in hybrid organizations. Practically, social enterprises should focus their technological efforts on their strengths rather than pursuing broad development, as this is more resource-efficient.

Tailored support for organizations at different ages and capabilities is essential, and future research is needed on how these patterns evolve and impact performance across sectors. Overall, the study advances strategic technology management in social enterprises by making theoretical and practical contributions.

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