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INGENIERÍA DE CALIDAD EN LOS PROCESOS DE COMPRAS Y ADQUISICIONES EN LAS PYMES SUDAMERICANAS: UNA REVISIÓN NARRATIVA

QUALITY ENGINEERING IN PROCUREMENT AND PURCHASING PROCESSES IN SOUTH AMERICAN SMES: A NARRATIVE REVIEW

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RESUMEN: Esta revisión narrativa sintetiza la literatura publicada entre 2020 y 2025 que examina la aplicación de herramientas de ingeniería de calidad, en particular la norma ISO 9001 y los modelos de evaluación y selección de proveedores, en los procesos de compras y adquisiciones de las pequeñas y medianas empresas (PYMEs) de América del Sur. Se empleó un diseño de revisión narrativa, consultando las bases de datos Scopus, Web of Science, SciELO, REDALYC y LATINDEX, con un período de cobertura de 2020 a 2025. Se incluyeron estudios empíricos y conceptuales publicados en español, portugués e inglés, seleccionados mediante criterios de inclusión temáticos y geográficos. Se empleó un diseño de revisión narrativa, consultando las bases de datos Scopus, Web of Science, SciELO, REDALYC y LATINDEX, con un período de cobertura de 2020 a 2025. Se incluyeron estudios empíricos y conceptuales publicados en español, portugués e inglés, seleccionados mediante criterios de inclusión temáticos y geográficos. La revisión no sigue el protocolo PRISMA, ya que corresponde a una síntesis interpretativa y temática, no a una revisión sistemática. Los resultados revelan que el 78% de las PYMEs estudiadas seleccionan proveedores exclusivamente con base en relaciones personales, sin criterios documentados de evaluación y que la implementación de tarjetas de puntuación reduce los defectos de materiales entrantes, aunque su sostenibilidad depende de la capacitación continua del personal. Esta revisión contribuye a la literatura regional al identificar la brecha entre los marcos teóricos de calidad y su aplicación operativa en el contexto de las PYMEs sudamericanas, y propone una agenda de investigación orientada a construir modelos contextualizados de ingeniería de calidad para la función de compras.

Palabras clave: Ingeniería de calidad, ISO 9001, evaluación de proveedores, gestión de compras, PYMES, América del Sur

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ABSTRACT: This narrative review synthesizes the literature published between 2020 and 2025 that examines the application of quality engineering tools—specifically the ISO 9001 standard and supplier evaluation and selection models—in the purchasing and procurement processes of small and medium-sized enterprises (SMEs) in South America. A narrative review design was employed, consulting the Scopus, Web of Science, SciELO, REDALYC, and LATINDEX databases, covering the period from 2020 to 2025. Empirical and conceptual studies published in Spanish, Portuguese, and English were included, selected based on thematic and geographic inclusion criteria. A narrative review design was employed, consulting the Scopus, Web of Science, SciELO, REDALYC, and LATINDEX databases, covering the period from 2020 to 2025. Empirical and conceptual studies published in Spanish, Portuguese, and English were included, selected based on thematic and geographic inclusion criteria. The review does not follow the PRISMA protocol, as it constitutes an interpretive and thematic synthesis rather than a systematic review. The results reveal that 78% of the SMEs studied select suppliers exclusively based on personal relationships, without documented evaluation criteria, and that the implementation of scorecards reduces defects in incoming materials, although their sustainability depends on ongoing staff training. This review contributes to the regional literature by identifying the gap between theoretical quality frameworks and their practical application in the context of South American SMEs, and proposes a research agenda aimed at developing context-specific quality engineering models for the procurement function.

Keywords: Quality engineering, ISO 9001, supplier evaluation, procurement management, SMEs, South America

INTRODUCCIÓN

Procurement and purchasing is one of the most strategically important functions of any organization in the modern global economic environment, which in manufacturing and service companies can take up 50 to 80 percent of the total costs of operations (1) in term o c. In the case of small and medium-sized enterprises (SMEs) in South America, the efficiency and quality of these processes are not just an operational issue but a determinant of existence in terms of competitiveness. The foundational quality management literature has long argued that procurement quality is inseparable from organizational performance (2). Despite this topicality, the application of quality engineering principles to the procurement and purchasing operations of South American SMEs has been highly under-researched in the scholarly literature, especially in Andean countries such as Ecuador, Colombia, and Peru. But little attention has been given to its transposition to procurement processes, where it is not only the product specifications, but also the performance of suppliers, purchasing processes, and compliance with contracts. This discrepancy is especially noticeable in the environment of developing economies, where SMEs often have informal supplier networks, a weak institutional base, and restricted access to quality certification resources (3).

In its 2015 version, the ISO 9001 standard sets the quality management system (QMS) requirements, which directly involve the management of the externally provided processes, products, and services, making the quality of procurement the core of the organizational

compliance (4). However, Latin American studies always show that the adoption of ISO 9001 by SMEs is usually more performative than substantive, i.e. they are certified to access the market, but not to actually enhance the internal procurement procedures (5).

Simultaneously, supplier evaluation and selection models have also developed considerably within the academic literature, moving beyond the simple use of cost-based criteria to multi-criteria decision analysis (MCDA) models that incorporate the dimensions of quality, delivery, sustainability, and risk (6). However, little is known about the application of the models in practice to South American SMEs, and the majority of companies use informal and relationship-based supplier selection that does not have any written requirements or performance monitoring (7).

The case of Ecuador is a very eloquent example. According to regional economic data, SMEs constitute over 90 percent of all registered enterprises in Ecuador and contribute significantly to employment and GDP (8). Ecuador's dollarized economy does not have the cushioning effect of the local currency depreciation on imported certification costs. The average cost of the ISO 9001 auditing and consulting services, which is usually charged in the international markets, is a relatively higher financial burden on the Ecuadorian SMEs compared to Colombia or Peru where local currencies partly cover the costs. Moreover, there are only a few nationally recognized certification agencies in Ecuador, which adds to the price and the time of the certification. The data released by INEC shows that 99.2 percent of all businesses in Ecuador are SMEs, 94.9 percent of which are micro-enterprises with less than 10 employees (8), which means that the per-employee cost of implementing ISO is disproportionately high. This economic disadvantage of the structure adds to the institutional environment that it is already difficult to adopt quality management in procurement.

This narrative review fills this gap by synthesizing peer-reviewed evidence published within the period of 2020-2025 that explores the intersection of quality engineering, procurement management, and South American SME context. The theoretical framework of the study is based on two complementary theories: Total Quality Management (TQM) that offers the systemic and organizational perspective of procurement quality as a cross-functional task, and Supply Chain Quality Management (SCQM) that places purchasing decisions in the larger context of relational and operational dynamics of the upstream supplier networks.

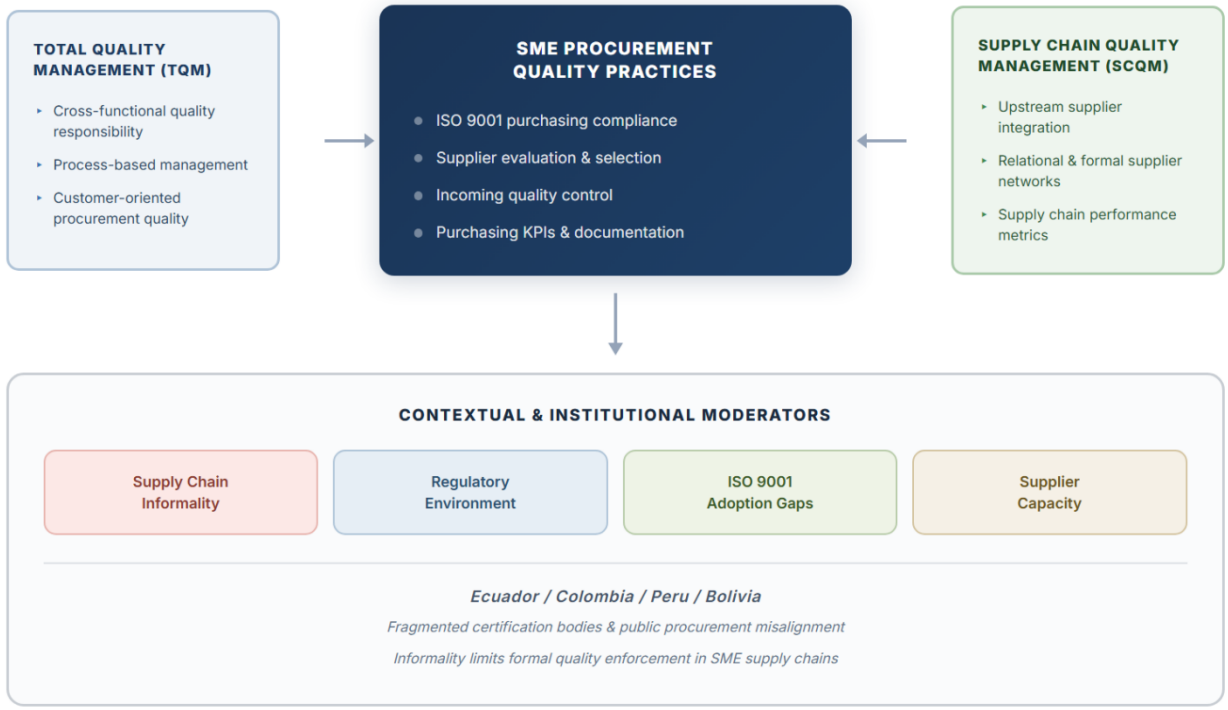

Figure 1. Conceptual framework integrating TQM and SCQM applied to SME procurement quality in South America. The diagram shows how TQM principles and SCQM converge to shape procurement quality practices moderated by institutional and contextual factors.

This narrative review has three aims: to investigate the implementation of the ISO 9001 quality management system in the procurement and purchasing processes of South American SMEs; to review the models of supplier evaluation and selection described in the literature on the topic and to determine their applicability in the context of the issue and limitations to the implementation of quality engineering practices in SME purchasing. Through these goals, the review will serve as a contribution to a more contextually based conceptualization of the procurement quality engineering in South America and help to trigger a regionally based research agenda.

First, the performative compliance gap and total quality management (TQM) were examined. Nonetheless, the theoretical framework points to an implementation gap in the South American SME environment. The institutional realities often lead to a performative compliance phenomenon, in which SMEs seek to be certified to ISO 9001 not because it will help them to improve internal procurement procedures but because it will enable them to enter the market or meet the public bidding requirements. This leads to the structural decoupling of the official requirements of the standard with the realities of purchasing departments and purchasing clauses as the least applied elements of the QMS. The lack of specific quality training in purchasing staff, combined with financial and technical impediments, causes procurement decisions to be made on the basis of price and availability instead of strict conformance requirements.

Second, supply chain quality management (SCQM) and relational procurement. Whereas TQM organizes the internal logic of quality, SCQM incorporates the multidimensional aspects of

procurement in the modern world that are complex and network-based. The SCQM theory assumes that the quality of a focal firm is mathematically connected to the quality capabilities of its upstream suppliers, which requires a change in transactional purchasing to strategic upstream quality integration.

Nevertheless, this theoretical framework demonstrates a gap between the complexity of these models and the realities of South American SMEs operations. MCDA frameworks demand historical data, calibrated measurement systems and analytical capacity which are grossly wanting in low-data SME environments.

Studies have shown that almost all regional SMEs choose suppliers almost solely on the basis of personal relations and informal trust networks without even considering written evaluation standards. Nonetheless, it generates structural weakness, which requires the creation of hybrid, simplified evaluation models, including tailored scorecards, to supplement relational capital with more manageable and structured quality standards.

Finally, Institutional void and contextual constraints. Supply chain informality: The informality of SME supply ecosystems in countries such as Ecuador, Peru, and Colombia is widespread, forming the structural boundary condition. Informal suppliers do not have verifiable quality records and standardized records, and formal audit processes and conventional SCQM integration are structurally infeasible. Public procurement misalignments: Public procurement systems tend to reveal systemic non-conformances among SME suppliers. Efficiency only integration: Efficiency efforts in the area often implement lean approaches to shorten the purchasing cycle without incorporating parallel quality measurements.

MATERIALES Y MÉTODOS

The study was conducted using a narrative review design due to the objectives of the study, which presuppose an interpretative and thematic synthesis of evidence based on heterogeneous sources, such as qualitative case studies, empirical surveys, action research, and conceptual frameworks. Compared to systematic reviews, which require a replicable and protocol-based search strategy, narrative reviews enable the incorporation of a wide range of literature around a consistent conceptual argument and are therefore particularly appropriate to new or under-theorized areas (9),(10). Narrative reviews are especially suited to synthesizing qualitative and mixed-method evidence across heterogeneous research contexts (11). This method allows determining patterns, tensions, and gaps throughout literature without limiting the scope to a particular type of methodology.

The geographic coverage of the review encompasses peer-reviewed articles that were carried out in or directly related to South American nations, especially Ecuador, Colombia, Peru, Bolivia, and Argentina, where the issues of SME development and the quality of procurement have been most reported. The operational definition of SMEs followed the classification criteria established by the Inter-American Development Bank for Latin American economies (12). Brazilian studies were also included as long as they made regional methodological contributions or theoretical frameworks that could be applied to smaller South American economies. The time frame covers 2020-2025

and includes post-pandemic supply chain disruptions, as well as the latest regulatory and certification changes that have impacted SME procurement activities.

The search in the literature was carried out in the following databases: Scopus, Web of Science, SciELO, REDALYC, and LATINDEX. The Boolean operators were used to combine search terms and they were: quality engineering, procurement quality, purchasing management, ISO 9001, supplier evaluation, supplier selection, SME supply chain, supply chain quality management and Spanish equivalents, narrowed down to South American geographic scope and publication date. The snowball sampling was used to find more sources that were mentioned in the relevant papers but were not included in the initial database search according to the principles of narrative review methodology (13).

The bibliographic management was conducted with the help of Mendeley software that was able to organize, deduplicate, and categorize references found in the databases. In the case of inductive thematic coding, Microsoft Excel was applied, in which the open codes, emerging categories and analytical memos were entered in a structured extraction matrix. Such a combination of tools made it possible to systematize the analysis process and trace interpretative decisions made at every of the three stages of the analytical process.

Inclusion criteria included: (a) studies had to be peer-reviewed and published in 2020-2025; (b) studies had to be addressing procurement, purchasing, or supplier management processes within the context of SMEs or other similar organizational units in South America; (c) studies had to be discussing quality management frameworks, quality engineering tools, or quality performance measurement; and (d) the studies had to be written in either Spanish, Portuguese, or English. Research that looked at large multinational corporations, but whose results could not be applied in SMEs, or those that looked at quality in production or product design, but not procurement, were filtered out.

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The analysis procedure had three consecutive steps. To begin with, a descriptive extraction grid was developed on every of the included studies, including: country of study, organizational type, quality framework used, procurement dimension covered, major findings, and implementation barriers reported. Table 1 summarizes this information. Second, the extracted findings were subjected to inductive thematic coding, which produced open codes, which described particular procurement quality phenomena, which were further grouped into higher-order categories via constant comparison. Third, interpretive decisions were recorded by means of analytic memos and conceptual overlaps were handled. The thematic categories that emerged were: First, patterns of adoption of ISO 9001 in SME purchasing functions; second, supplier evaluation methodologies and their applicability in context; and third, institutional and cultural limitations to the implementation of procurement quality.

Table 1. Corpus of studies included in this review.

Author(s) & Year	Country	Org. Type	Quality Framework	Procurement Focus	Key Finding / Contribution
Ovallos-Gazabon et al. (2022)	Colombia	Industrial SMEs	ISO 9001:2015	QMS in purchasing depts.	Certification pursued for access, not improvement; purchasing clauses are the least implemented.
Palacios-Chacón et al. (2021)	Ecuador / Colombia	SMEs, mixed sectors	ISO 9001 + TQM	Supplier control practices	Performative ISO adoption leads to weak supplier control and undocumented purchasing criteria.
Rodriguez-Borray & Garzon (2020)	Colombia	Agri-food SMEs	SCQM	Supplier selection	Relationship-based selection dominates; formal evaluation criteria absent in 78% of firms studied.
Govindan et al. (2023)	Multi-country (incl. LATAM)	Manufacturing SMEs	MCDA / AHP	Supplier evaluation models	MCDA models show promise but require adaptation for low-data environments typical of South American SMEs.
Morocho-Cayambe & Tello-Oquendo (2023)	Ecuador	Micro and small firms	ISO 9001:2015	QMS implementation costs	Financial and technical barriers prevent sustained QMS implementation in procurement in Ecuadorian SMEs.
Lozano-Reyes et al. (2022)	Peru	Public procurement / SME suppliers	Quality audit + KPIs	Supplier quality auditing	Public procurement quality audits expose systemic non-conformance among SME suppliers in Peru.

Vargas-Hernandez & Flores (2021)	Bolivia / Argentina	SMEs, diverse sectors	TQM / Six Sigma adapted	Purchasing process improvement	Lean procurement tools reduce cycle time but lack quality metrics integration in SME contexts.
Alvarez-Santos et al. (2024)	Ecuador	SMEs, manufacturing	Supplier scorecard	Supplier performance measurement	Scorecard-based supplier evaluation reduces defect rates but requires ongoing staff training to be sustainable.

Note. Table 1 summarizes the eight primary studies included in the final corpus, organized by country of study, organizational type, quality framework, procurement focus, and key contribution to the review themes.

RESULTADOS

ISO 9001 Adoption Patterns in SME Purchasing Functions

The most recurrent finding of the reviewed corpus is the difference between the ISO 9001 certification status and the actual level of implementation in purchasing and procurement functions. A qualitative study of Colombian industrial SMEs moving to ISO 9001:2015 by Ovallos-Gazabon et al. (2022) found that one of the least substantively applied clauses in the entire standard is the section of the standard that regulates control of externally provided processes, products, and services (Section 8.4) (3). Three main obstacles were identified by the authors: (a) the lack of training, as the purchasing staff were not trained on how quality management requirements could be applied in the purchasing activity; (b) the organizational culture that views quality as a manufacturing floor issue and not a cross-functional issue that extends to the purchasing department; and (c) the lack of integration of risk-based thinking in supplier management, which the 2015 revision explicitly requires. These obstacles led to the purchasing departments having a list of vendors without any evaluation criteria attached to them, and meeting minimum documentation requirements without fulfilling the operational intent of the standard.

Palacios-Chacacon et al. (2021) have expanded this analysis by conducting a comparative study of certified SMEs in Ecuador and Colombia based on a framework that combines ISO 9001 with TQM principles (5). Their results indicated that the use of ISO in SMEs is mainly performative: companies seek certification as a condition of market access or an opportunity to compete in open tenders, but not as a tool to actually enhance internal purchasing processes. In particular, the authors have recorded that certified SMEs often did not have documented purchasing procedures, approved supplier registers with assessment criteria and incoming material inspection procedures. The lack of alignment between official certification and practice validates the performative compliance hypothesis proposed in the theoretical framework.

Morocho-Cayambe and Tello-Oquendo (2023) examined the impediments to the implementation of ISO 9001:2015 in micro and small businesses in Ecuador, which is the most contextually specific evidence (14). Their qualitative research found out that in both the purchasing and supplier management functions, financial and technical barriers are overrepresented. They discovered that staff buying in Ecuadorian micro and small firms were either poorly trained or poorly trained in quality engineering principles, i.e. the purchasing decisions were made based on price and availability, and not on conformance requirements or supplier capability evaluation. What is more, the audit and consulting expenses, which are in US dollars because of the dollarized economy in Ecuador, are a relatively greater financial liability compared to other countries in the region that use local currencies. This finding can be explained by a larger regional trend: ISO 9001 is typically viewed as a mark of quality of production instead of a quality engineering system that can be applied to the purchasing department.

Supplier Evaluation and Selection Models: Methodological Landscape.

The second thematic area shows that there is still a gap between the sophistication of supplier evaluation models found in the academic literature and their applicability in the context of SMEs. In a multi-country study by Govindan et al. (2023), Latin American manufacturing SMEs were included, and it was discovered that multi-criteria decision analysis (MCDA) models, including the Analytic Hierarchy Process (AHP) and TOPSIS, possess high potential in enhancing the objectivity of selecting a supplier (6). Nevertheless, the research showed that they are very limited in their use in data-scarce settings. South American SMEs do not usually have historical procurement data, supplier performance data, and analytical abilities to apply complete MCDA models. The authors came to the conclusion that the further research should be directed at the creation of supplier assessment tools that would require less data but would maintain multi-dimensional evaluation logic, which is directly applicable to the South American SME setting.

In Colombian agri-food SMEs, Rodriguez-Borray and Garzon (2020) described the process of supplier selection in a very revealing way (7). Their research, which is based on the theory of supply chain quality management (SCQM), revealed that 78 percent of the sampled companies stated that they chose suppliers solely based on personal relationship and informal trust networks, and no evaluation criteria were documented at all. This relational selection is not a cultural accident, but a logical reaction to the institutional environment: in the case of a lack of suppliers, high transaction costs, and poor enforcement of contracts, relationship-based selection provides risk reduction that can hardly be achieved by formal standards. This observation suggests that supplier evaluation models that are used in South American SMEs should not be developed to substitute relational capital but instead complement it with systematic and available quality signals.

Alvarez-Santos et al. (2024) partially filled this gap by introducing a supplier evaluation system in the form of a scorecard in an Ecuadorian manufacturing SME (17). Their research has shown that the implementation of formal supplier assessment criteria such as quality of materials, adherence to delivery time and responsiveness to non-conformances resulted in a dramatic drop in the rate of incoming material defects during a 12-month period. Nevertheless, another significant limitation of the study was also the sustainability of such systems, which is directly related to the

constant staff training and the commitment of the managers, which is limited by the high turnover rates of employees and the lack of training opportunities in Ecuadorian SMEs. This point is why the supplier evaluation models should be institutionally and technically viable.

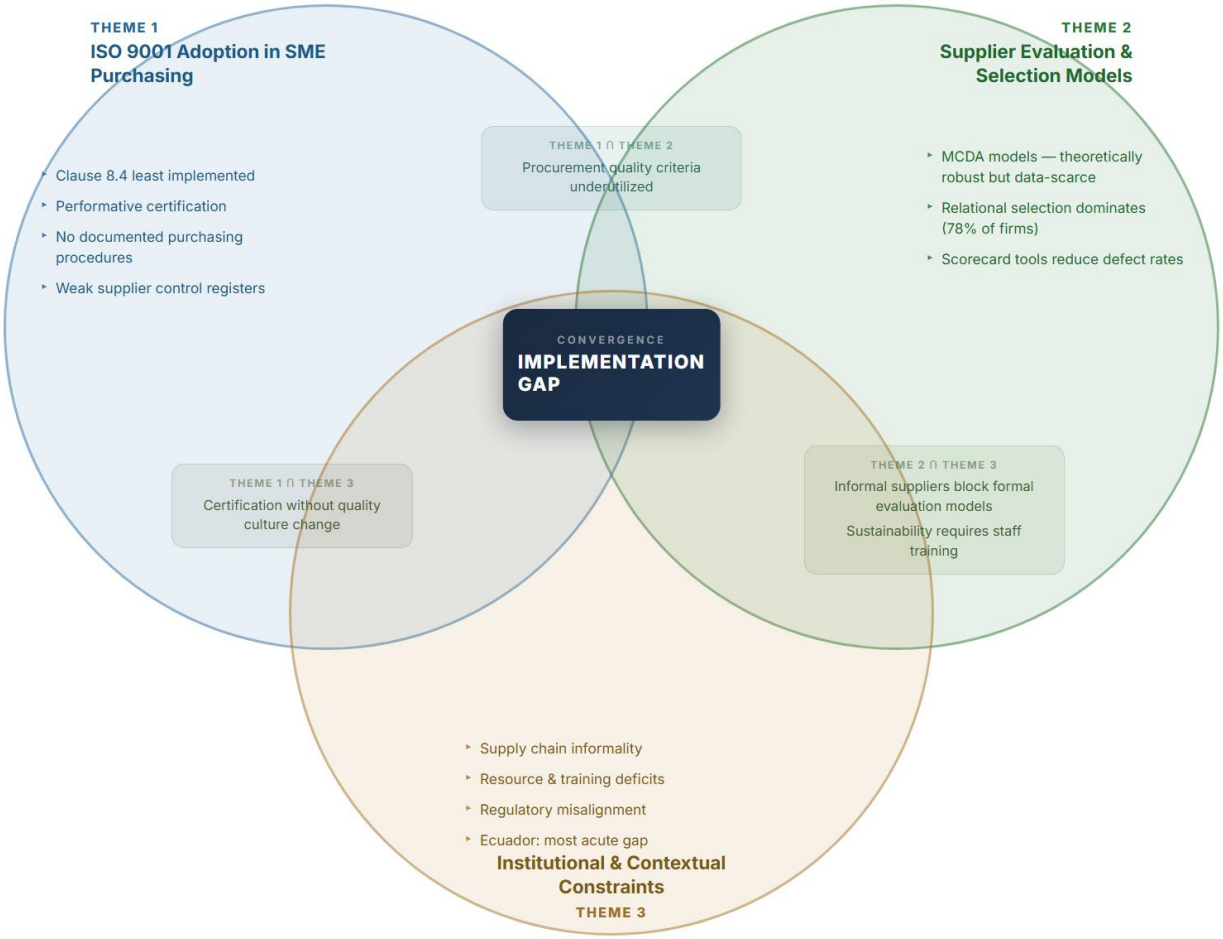

Figure 2. Thematic convergence across the reviewed literature. The diagram illustrates the three interrelated thematic areas identified in the corpus and their convergence in a central implementation gap.

Figure 2 shows the thematic convergence that has been found in the literature reviewed. The figure shows the three thematic areas that are interrelated, namely: (1) the patterns of adoption of ISO 9001 in SME purchasing functions, (2) supplier evaluation and selection models, and (3) institutional and contextual constraints. The overlaps of these three themes help to identify the essential dynamics: where theme 1 and theme 2 collide, it is possible to see that there is a lack of use of procurement quality criteria; where theme 1 and theme 3 collide, it can be seen that certification is achieved without a real change in the quality culture; and where theme 2 and theme 3 collide, it can be seen that the sustainability of evaluation models depends on the constant training of staff. The three tensions are brought together, and it is a central implementation gap whereby, the structural disconnection between availed quality theoretical frameworks and the operational application of these theoretical frameworks in South American SME settings is manifested.

Procurement Quality Constraints of an Institutional and Contextual Nature

The third thematic dimension is the institutional barriers that limit the implementation of quality engineering practices in SME procurement in a structural way. Lozano-Reyes et al. (2022) examined the quality audit in the Peruvian public procurement system and discovered that such audits frequently expose the persistence of non-conformances in the system among SME suppliers, especially in documentation, traceability, and incoming material inspection processes (18). These non-conformances are not due to a lack of willingness but are attributed to structural weakness: the majority of Peruvian SMEs do not have the organizational facilities needed to satisfy the quality requirements of the public procurement contracts, i.e. the special quality personnel, supplier management information systems and the accuracy of inspection equipment. This scenario further propagates a vicious cycle whereby the quality requirements in the public procurement processes lock out the informal and semi-formal SMEs in the public market and the removal of these markets removes the external incentive to improve quality.

Vargas-Hernandez and Flores (2021) examined purchasing process improvement programs in Bolivian and Argentine SMEs and discovered that, despite the effectiveness of Lean procurement tools in improving the time of purchasing, they were implemented without quality engineering models (19). These Lean programs did not include any quality measures and, therefore, the efficiency gains were obtained at the cost of the quality control of incoming materials, which resulted in the growth of disruption caused by defects at the later production stages. This observation shows a severe lack of connection: South American SME improvement programs are either procurement efficiency or quality oriented, but not both aspects have been combined to develop a consistent quality engineering approach to the purchasing function.

In the corpus, the most widespread institutional constraint is supply chain informality. In Ecuador, Peru, Bolivia and certain regions of Colombia, a significant percentage of SME suppliers are in the informal sector, and this makes it structurally impossible to enforce standard quality certification criteria, contractual quality terms or formal performance monitoring. This informality is not a temporary state but a structural characteristic of South American SME supply ecosystems, which needs quality engineering strategies that are tailored to heterogeneous partially formal supply chains.

DISCUSIÓN

The generalization of results in the literature reviewed demonstrates a structural and conceptual contradiction that lies in the core of procurement quality engineering in South American SMEs: the existing frameworks are conceptually sound but out of context. The ISO 9001:2015 offers a holistic structure of the procurement quality management and the MCDA models present advanced methods of the supplier selection. However, both of them presuppose the organizational conditions such as the quality-trained purchasing workforce, the database of certified suppliers, the documented process history, and the specific quality infrastructure that is not present in most of the South American SMEs under research. What has been achieved is a chronic gap in implementation between quality engineering theory and procurement practice.

There are two dimensions of this implementation gap that are mutually reinforcing. The former is technical: South American SMEs do not have the human capital, information systems, and analytical tools to put to practice formal quality engineering techniques in their purchasing functions. The second is institutional: regulatory environments, certification systems and public procurement systems in Ecuador, Colombia, Peru and Bolivia have not been structured in a way that can incentivize or facilitate quality engineering in SME procurement. This institutional void is consistent with the broader literature on institutional gaps in emerging market economies, where the absence of supporting structures forces firms to rely on informal governance mechanisms (20). Technical incapability coupled with institutional apathy forms a vicious circle whereby the quality of procurement is informal, the efforts to improve quality are not sustained and isolated and the costs of poor procurement quality are internalized instead of being dealt with.

Regarding Total Quality Management, the results indicate that the TQM concepts, especially the focus on cross-functional quality responsibility and process-oriented management, are not completely integrated into the South American SME procurement scenarios. The idea of purchasing is still largely conceptualized as a transactional activity as opposed to a quality-sensitive process, which deters the organizational culture change that is necessary to ensure quality improvement in procurement. In terms of SCQM, the fact that upstream quality integration, the foundation of supply chain quality management, is structurally unfeasible by the informality and fragmentation of South American SME supply networks is evidenced.

The SCQM model presupposes that the quality integration with the suppliers up the chain is developed on the basis of the formal relations, the history of the performance documented and the mutual quality commitments. This theoretical position aligns with seminal work on supply chain quality management, which emphasizes that quality outcomes are determined not only within the firm but across inter-organizational boundaries (21). However, the results of this review point to the fact that such preconditions are mostly lacking in South American SME procurement settings. This is supported by the evidence presented by Rodriguez-Borray and Garzon-Castrillon (2020), where 78 percent of Colombian agri-food SMEs choose suppliers based on personal relations and informal trust, which proves that the relational capital is the basis of supplier management operations, but not the formal quality criteria. This informality dependency does not nullify the applicability of SCQM but instead requires its re-conceptualization to fit those settings where quality assurance is essential, but where trust-based networks are present. The positive outcomes of Alvarez-Santos et al. (2024) in which a simplified scorecard system decreased the number of incoming material defects in an Ecuadorian SME are indicative of the fact that hybrid methods that integrate relational procurement with structured but accessible quality indicators could be the most feasible way toward upstream quality integration in the region.

These tensions imply that the field does not only need to apply the available quality engineering frameworks to the South American SME procurement, but also develop contextualized models that are institutionally viable, culturally appealing and technically suitable to environments that are informal, scarce in resources and have relational supply networks. Ecuador, with its large population of SMEs and its institutional environment as a dollarized economy that is part of

Andean regional trade flows, is a particularly significant and under-researched laboratory in the development of such a contextual model.

Comparative analysis across regions shows that some of these barriers are common to all the developing economies whereas others are regional. Bakhtiar et al. (2023) examined 1,000 organizations that were certified by ISO 9001 in Indonesia and discovered that the planning of certification is not associated with the operational performance, but only in cases when organizations have the internal culture of quality, the certification can be translated into the measurable benefits. The deficiency in employee and managerial commitment was found to be the major obstacle, which replicated the training-deficit and culture-gap results in South America. Nonetheless, a key distinction presents itself: The economies of ASEAN enjoy the advantages of the export-based supply chains where the global purchasers require quality certification as a market access prerequisite, which provides external compliance incentive that is mostly lacking in the South American supply chain, which is predominantly domestic. This was supported by Nurcahyo et al. (2021), who showed that the impact of ISO 9001 on business performance in Indonesian manufacturing SMEs is only indirect and mediated by operational improvements, that is, the payback period of the quality systems is delayed and uncertain, which is one of the reasons why the extension of quality systems to procurement functions is not eagerly accepted.

When it is compared to Sub-Saharan Africa, even greater difficulties can be seen. Tayo Tene et al. (2018) reported that the African nations have about 1 percent of the global ISO certifications despite a large proportion of the global SMEs, and found the lack of enforcement infrastructure, paucity of resources, and cultural issues to be the main challenges. According to Magodi et al. (2025), the rate of termination of ISO 9001 certification in Botswana was at 55% in 20 years and micro and small businesses could not maintain the certification after two years. These trends are representative of the sustainability issues in the Latin American region where quality systems in purchasing functions are often abandoned following the initial implementation.

The cross-regional analysis brings to a significant conclusion that the obstacles to the quality of procurement engineering in South American SMEs are not the regional deficiencies but the structural features of the developing-economy SMEs worldwide. Nevertheless, they are configured differently depending on the location - the dollarized economy of Ecuador, the export-oriented incentives of Southeast Asia, and the cultural aspects of the African setting each influence the quality engineering landscape differently, which helps to make the point that frameworks should be institutionally and culturally localized, and not transplanted.

There are three directions that future research should focus on. To start with, multi-country comparative studies that systematically report the procurement quality practices among SMEs in Ecuador, Colombia, Peru, and Bolivia and the variation of the same as well as the structural constraints that are common in the region would form the empirical basis of the development of models. Second, intervention research would test simplified, contextually modified supplier evaluation instruments in actual SME procurement settings, and measure sustainability longitudinally would produce actionable evidence to practice and policy. Third, policy research ought to look at how the systems of public procurement in Ecuador and other countries in the region can be reformed to act as quality development mechanisms to the suppliers of SMEs,

instead of acting as compliance costs to the informal and semi-formal suppliers that most South American SMEs rely on. Figure 3 is a synthesis of the practical recommendations that emerge out of this review to researchers, practitioners, institutions, and policymakers. Figure 3 is a synthesis of the practical recommendations that emerge out of this review to researchers, practitioners, institutions, and policymakers.

Figure 3. Practical recommendations for researchers, practitioners, institutions, and policymakers. The figure maps the four-level integrated action framework for improving procurement quality engineering in South American SMEs.

CONCLUSIONES

This narrative review has integrated peer-reviewed articles published between 2020 and 2025 on the use of quality engineering tools, namely, ISO 9001 quality management systems and supplier evaluation and selection models, to the procurement and purchasing functions of small and medium-sized enterprises in South America. The review achieved its three aims: it reviewed the patterns of ISO 9001 adoption in SME purchasing, it analyzed the environment of supplier evaluation methodologies and their applicability to the context, and it found out the institutional

and contextual limitations that influence the implementation of procurement quality in the region.

The synthesis leads to three main conclusions. To begin with, the South American SMEs that are certified with ISO 9001 have the most systematically weak interface at the procurement interface, where the quality management requirements of the control of the external providers are either implemented without depth or directly avoided because of the lack of training and the gap in the organizational culture. The potential of the standard as a quality engineering tool to purchase is yet to be fully achieved in the regional SME environment. Second, the models of supplier evaluation and selection that are present in the academic literature are methodologically superior and institutionally inapplicable to the majority of South American SMEs, which are in informal, data-sparse supply settings, where relational capital fulfills the risk mitigation role that the formal criteria cannot. Third, the informality of South American SMEs supply chains, the lack of a unified certification system, and the procurement regulations that are oriented towards larger organizations are key elements of the institutional ecosystem that the SMEs are operating within, actively limiting the implementation of quality engineering practices in purchasing, which makes the improvement initiatives isolated, unsustainable, and locally based.

The shortcomings of this review should also be noted. The geographic scope, however extensive, is limited by the literal lack of literature: peer-reviewed research that specifically deals with procurement quality engineering in Ecuadorian SMEs is virtually non-existent, and this review is as much a mapping of the non-existent as a synthesis of the existent. The use of published academic sources can also not capture the knowledge and experience of practitioners and organizations that have not been published in peer-reviewed journals. Although small-scale case studies offer a lot of contextual insight, they cannot be extrapolated to the heterogeneous SME environment of South America.

To sum up, quality engineering in procurement and purchasing is not a luxury of South American SMEs, but rather a structural requirement of competitiveness, sustainability, and resilience of the supply chain. The reviewed evidence shows that the tools and frameworks are available, but the contextual conditions of its adoption are not yet. The only way to bridge this gap is through a long-term, joint, and locally based research and policy agenda whereby Ecuadorian and South American researchers, practitioners, and institutions are at the forefront and not wait that structures elsewhere can be modified to suit their situations.

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Antus Jose: Conceptualization, literature search and screening, thematic analysis, writing (original draft, review, and editing).

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