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BI IN SMES BOOSTS COMPETITIVENESS AND DECISION-MAKING

ABSTRACT

Small and medium-sized enterprises (SMEs) face increasing pressure to enhance competitiveness through data-informed strategies in the digital economy. Business Intelligence (BI) has emerged as a critical enabler, yet the mechanisms linking its adoption to performance outcomes in resource-constrained environments remain underexplored. This qualitative systematic review synthesizes the literature on BI applications in SMEs to examine how these tools reconfigure decision-making processes, contribute to competitiveness, and generate economic value, while critically analyzing implementation realities specific to the SME context. Following the PRISMA 2020 statement, a systematic search of the Scopus database (2018–2021) yielded 2,130 records. After a dual-independent screening process, 68 studies met the inclusion criteria and were subjected to Reflexive Thematic Analysis, enabling an interpretive synthesis of the literature. The analysis reveals three overarching themes. Strategic Reconstitution of Decision-Making describes a shift from intuition to evidence-based managerial cognition, alongside a persistent perception gap where leaders underestimate their existing data assets. Duality of BI Implementation captures the tension between idealized architectural models and the pragmatic reality of SMEs, which employ entrepreneurial bricolage—using low-cost, accessible tools—a strategy that enables accessibility but risks creating competency traps. Multidimensional Impact on SME Economic Vitality encompasses quantifiable financial gains, such as cost reductions and improved financial health, and intangible strategic capabilities, including organizational agility and enhanced dynamic capabilities that underpin sustained competitive advantage. BI enables SMEs to enhance strategic decision-making and profitability; however, value realization is contingent upon the interplay between resource configurations, capability development, and managerial cognition. The integration of PRISMA with Thematic Analysis demonstrates how procedural rigor and interpretative depth can be synergistically combined in qualitative evidence synthesis.

Keywords

Business intelligence; Competitive advantage; Qualitative systematic review; Small and medium-sized enterprises; Strategic decision-making.

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1. Introduction

The year 2020 marked the history of humanity since the pandemic generated by COVID-19, which, according to Hossain et al. (2022) has left in its wake millions of people dead and thousands of companies in economic insolvency. In this context, Small and Medium-sized Enterprises (SMEs) worldwide are fighting for a market segment that every day demands greater competitive capabilities. The concepts of competitiveness and decision-making are complex and multifaceted, encompassing a range of definitions from various authors and academic fields. In that sense, Hurdawaty and Tukiran (2024) and Umana et al. (2022) both state that competitiveness is the link between analytical capacity and the ability to adapt to the constant fluctuations of local, national and international markets to which SMEs are exposed.

Globally, SMEs are companies that play a leading role in society due to their power to generate many formal and informal jobs, not to mention that they have a significant annual contribution to the Gross Domestic Product (GDP) of Latin American countries (Kurmann et al., 2021). In Colombia, for example, SMEs are considered the pillar of the national economy, as they generate 80% of the country's employment and account for 90% of the national productive sector (Prasannath et al., 2024)

SMEs are no strangers to challenges in developing their economic activities, whether in production, commercial operations, or administrative decision-making. In fact, the difficulties are such that in Latin American countries like Colombia, eight out of ten micro, small and medium-sized enterprises cease operations within the first five years (Molina-García et al., 2023).

This systematic literature review is therefore justified. It aims to examine the technologies used in implementing Business Intelligence (BI) models in SMEs worldwide, to identify the gaps and opportunities for improving competitiveness and decision-making in the sector, and to understand how a competitive advantage can be obtained in the digital era.

This literature review uses PRISMA methodology, in five phases: definition of research objectives, formulation of the review protocol, search, literature extraction, and finally, information analysis. This methodology is ideal for conducting original and relevant reviews of current topics. It helps to avoid biases that could compromise the research by establishing standardized protocols that guide the researcher, based on the evidence generated during the analysis process (Urrútia et al., 2021).

Consequently, this study employs a qualitative systematic review methodology. Unlike a simply quantitative overview, this method allows for an interpretative synthesis of the literature, with the goal of identifying the underlying themes, contextual problems, and complex processes by which BI impacts SMEs' competitiveness and decision-making.

Finally, the systematic literature review revealed that the BI models used by diverse firms often rely on spreadsheets or free relational database management systems as low-cost data layer technologies. This allows small businesses to analyze sales trends over time and develop smart strategies to outperform the competition.

2. Theoretical Framework

This study is situated at the intersection of three interconnected theoretical domains: the conceptualization of competitiveness and strategic decision-making in SMEs, the role of BI as a socio-technical phenomenon, and the theoretical lenses that explain value realization in resource-constrained organizational contexts. The integration of these theoretical foundations with the methodological approach adopted in this qualitative systematic review provides the conceptual scaffolding necessary for a rigorous interpretive synthesis.

Competitiveness in the SME context has been theorized as the nexus between analytical capacity and the ability to adapt to constant market fluctuations (Hurdawaty & Tukiran, 2024; Umana et al., 2022). This conceptualization moves beyond static notions of competitive advantage, emphasizing dynamic adaptability as central to SME survival and growth. In Latin America, where SMEs generate substantial employment and constitute the majority of the productive sector (Prasannath et al., 2024), competitiveness carries particular urgency. The challenges are substantial, with Molina-García et al. (2023) documenting that eight out of ten micro, small, and medium-sized enterprises in Colombia cease operations within their first five years. This context underscores the need for theoretical frameworks capable of explaining how firms navigate uncertainty and leverage information assets to enhance competitive positioning.

Decision-making in SMEs has traditionally been characterized as intuitive and experience-based, a pattern attributed to resource constraints and centralized authority in owner-managers. However, the digital economy has introduced new imperatives for data-informed decision-making. Theoretical perspectives have evolved from rational actor models toward situated cognition approaches that recognize decision quality as contingent on information availability, analytical capabilities, and organizational routines. While SMEs possess significant data assets generated through digital marketing, supply chain interactions, and operational processes, managerial perceptions often underestimate the value and sufficiency of these assets (Dymitrowski & Mielcarek, 2021; Sjödin et al., 2021).

Business Intelligence as a phenomenon of study has been theorized from multiple perspectives. From a technological determinist perspective, BI is understood as a set of tools, architectures, and processes that transform raw data into actionable insights, emphasizing technical dimensions including data warehousing, extract-transform-load processes, and visualization capabilities (Coffie et al., 2022; Weerakkody et al., 2021). However, the socio-technical perspective offers a more adequate framework for understanding BI in SMEs, recognizing that technology and social systems are mutually constitutive. From this vantage point, BI is understood as an ensemble of technical artifacts, organizational practices, managerial cognition, and cultural norms that collectively shape how information is produced, interpreted, and acted upon. This perspective is particularly relevant for SMEs, where the absence of specialized IT personnel necessitates integration of BI tools into existing workflows with minimal disruption.

Resource-based and capability-based theories provide essential lenses for understanding BI value realization in SMEs. The Resource-Based View posits that sustainable competitive advantage derives from resources that are valuable, rare, inimitable, and non-substitutable. Within this framework, data assets and analytical capabilities constitute potentially valuable resources. The Dynamic Capabilities framework addresses limitations of the Resource-Based View by conceptualizing capabilities as organizational routines through which firms sense opportunities, seize them, and transform resource configurations in response to environmental change. In the context of BI, dynamic capabilities are manifested in capacities to sense relevant data, seize analytical opportunities, and transform insights into strategic action.

Entrepreneurial Bricolage Theory offers an additional lens particularly germane to BI implementation in resource-constrained SME contexts. Bricolage refers to the process of making do with resources at hand to address challenges and pursue opportunities. This theoretical perspective challenges the assumption that effective BI implementation requires sophisticated, enterprise-grade architectures, suggesting instead that SMEs employ creative combinations of low-cost, accessible tools to approximate BI functionality. This bricolage approach represents a pragmatic response to resource constraints, though it carries inherent risks, including competency traps wherein reliance on familiar tools inhibits development of more advanced analytical capabilities.

The integration of these theoretical perspectives with the methodological approach reflects a deliberate epistemological choice. The interpretivist-constructivist paradigm underpinning this research recognizes that competitiveness, decision-making, and BI implementation are not objectively given but socially constructed through practices and interactions of organizational actors. Consequently, the methodological approach prioritizes interpretive synthesis over quantitative aggregation, aiming to identify patterns of meaning, points of tension, and underlying mechanisms across the literature. The combination of PRISMA-guided systematic searching with Reflexive Thematic Analysis represents a methodological configuration designed to leverage strengths of both approaches while acknowledging respective limitations. PRISMA provides procedural transparency necessary for assembling a defensible corpus, while Reflexive Thematic Analysis enables deep engagement with literature required for generating novel theoretical insights.

The theoretical contributions anticipated from this review extend beyond synthesizing existing knowledge to advancing theoretical understanding in three respects. First, the review aims to integrate insights from resource-based theory, dynamic capabilities, and entrepreneurial bricolage to develop a nuanced understanding of how BI creates value in resource-constrained contexts. Second, it seeks to illuminate mechanisms linking BI adoption to enhanced competitiveness and decision-making, addressing the black box problem characterizing much existing literature. Third, it endeavors to identify contextual factors moderating the relationship between BI investment and performance outcomes.

These theoretical ambitions are pursued through interpretive synthesis of 68 studies, with findings organized around three overarching themes presented in subsequent sections. This theoretical–methodological framework positions the study to contribute meaningful insights to both scholarly literature on BI in SMEs and broader discourse on digital transformation in resource-constrained organizational contexts.

3. Methodology

A Qualitative Systematic Review (QSR) was employed as the methodological framework for this study, guided by the PRISMA 2020 statement (Page et al., 2021) to ensure transparency, reproducibility, and methodological accountability. The study was grounded in an interpretivist–constructivist paradigm, recognizing that knowledge is socially constructed and that synthesis requires active interpretation. The methodological design comprised five interconnected phases, executed sequentially yet permitting iterative refinement as analytical insights emerged, enabling the research to generate novel theoretical insights into the mechanisms by which BI influences competitiveness and decision-making within SMEs.

The first phase involved pre-defining the review protocol and developing the research questions. Prior to initiating the literature search, a comprehensive protocol was established to minimize bias and ensure consistency. The protocol formally positioned the study within a qualitative-exploratory paradigm, prioritizing depth of understanding over quantitative measurement. Three research questions were formulated to guide the thematic synthesis: (1) Through what mechanisms does BI adoption transform strategic decision-making processes and contribute to competitive advantage in SMEs? (2) How does the actual utilization of BI tools by SMEs diverge from idealized conceptualizations, and what factors account for these divergences? (3) What is the nature and magnitude of BI's impact on the economic vitality of SMEs, encompassing both tangible financial outcomes and intangible strategic benefits?

The second phase consisted of a systematic search strategy with documented reproducibility. On December 15, 2021, a comprehensive search was executed in the Scopus database, selected for its extensive indexing of high-impact, peer-reviewed literature across business, management, and information systems disciplines. The search string was developed through an iterative, multi-stage process, beginning with keyword identification from seminal articles and the UNESCO Thesaurus, followed by Boolean combination to align with the study's Population, Intervention, Context, Outcome (PICO) structure. The final reproducible search string was: (TITLE-ABS-KEY ("business intelligence" OR "bi" OR "data analytics" OR "data-driven decision" OR "decision support system") AND TITLE-ABS-KEY ("small and medium* enterprise" OR "sme" OR "small business" OR "micro enterprise") AND TITLE-ABS-KEY ("competitiveness" OR "competitive advantage" OR "strategic decision*" OR "performance" OR "profitability" OR "economic impact") AND PUBYEAR > 2018). No language filters were initially applied to avoid introducing bias, yielding 2,130 records.

The third phase involved dual-independent screening and selection, executed with rigorous adherence to the PRISMA 2020 flow model. Clear, pre-defined inclusion and exclusion criteria were established across seven categories: population, concept, context, language, document type, access, and time frame (see Table 1). A dual-independent review method was implemented at both the title/abstract and full-text screening stages to enhance dependability and mitigate individual bias. Two researchers independently assessed all records, documenting decisions and justifications. Disagreements, occurring in approximately 5% of cases, were resolved through structured discussion facilitated by a third senior researcher. The final corpus comprised 68 studies that met all inclusion criteria. Figure 1 presents the complete PRISMA 2020 flow diagram, illustrating the flow of records through each screening stage.

Table 1. Inclusion and Exclusion Criteria for Study Selection

Criterion Category	Inclusion Criteria	Exclusion Criteria	Rationale
Population	SMEs, including micro-enterprises (MSMEs), as the subject of study.	Studies focused exclusively on large corporations, multinationals, or the public sector.	Population
Concept	Studies addressing BI, data analytics, data-driven decision-making, or competitive intelligence.	Studies mentioning related IT without a focus on data analysis for decision support.	Concept
Context	Studies investigating BI implementation, usage, benefits, challenges, or effects within a business setting.	Studies from non-business fields (e.g., healthcare BI applications unrelated to management).	Context
Language	Articles written in English or Spanish.	Articles in all other languages.	Language
Document Type	Peer-reviewed journal articles, systematic literature reviews, conference proceedings, books, and book chapters.	Editorials, prefaces, conference abstracts, patents, and non-academic magazine articles.	Document Type
Access	Open-access articles or articles accessible through institutional subscriptions.	Articles behind a paywall that were inaccessible.	Access
Time Frame	Studies published between 2019 and 2021.	Studies published before 2019.	Time Frame

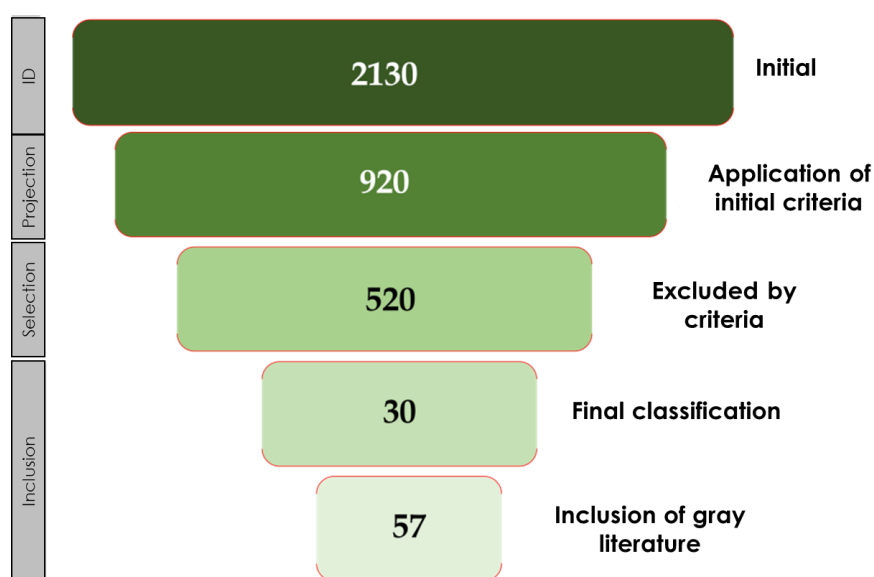


Figure 1. PRISMA 2020 Flow Diagram for Study Selection

The fourth phase comprised structured data extraction and management. A standardized data extraction form was developed in Excel and piloted on a sample of 10 studies to assess its utility. Extracted data were subsequently imported into NVivo 12 qualitative data analysis software. The extraction captured descriptive data (author, year, title, geographical context, study methodology), background information (SME sector, sample size, stated objectives), and analytical data (BI tools and technologies discussed, theoretical frameworks employed, reported challenges, perceived benefits, and key findings). One researcher conducted the extraction, while a second verified a random 20% sample, achieving 94% inter-coder agreement through consensus-based resolution.

The fifth and core analytical phase employed an inductive-deductive Reflexive Thematic Analysis following Braun and Clarke (2022) contemporary six-step framework, selected for its explicit alignment with qualitative research values and its emphasis on researcher reflexivity. The six-step process was executed with methodological rigor and iterative refinement, as visualized in Figure 2.

The process began with familiarization, during which both researchers engaged in repeated, close reading of all 68 full-text studies, documenting initial impressions in a shared analytical journal. The second step involved systematic coding, wherein both researchers independently coded the data using NVivo 12, identifying and labeling meaningful segments of text. The initial codebook captured emergent concepts such as “Excel as primary tool,” “ROI pressure,” “perceived data inadequacy,” and “managerial skepticism.” The third step focused on theme development, wherein codes were collated, grouped, and visually mapped to explore relationships and form potential themes.

The fourth step involved theme review and refinement, wherein candidate themes were iteratively reviewed against the coded data and the entire dataset, ensuring internal coherence and external distinctiveness. The fifth step involved theme naming and definition, wherein themes were formally named to be both informative and evocative, such as “The Duality of BI Implementation: Architectural Ideal vs. Pragmatic Reality.” The final step consisted of producing the analytical narrative, weaving together the developed themes into a coherent account illustrated with compelling excerpts from the source studies.

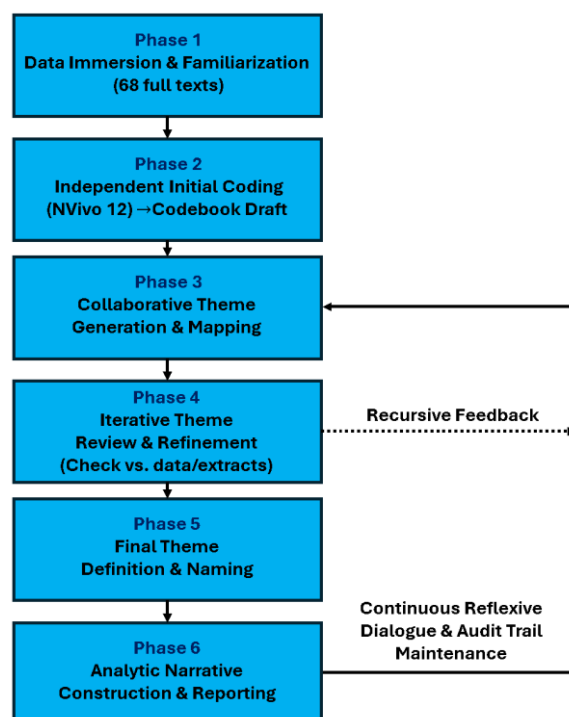


Figure 2. Diagram of the Iterative Process of Reflexive Thematic Analysis (adapted from Braun & Clarke, 2022)

To ensure trustworthiness, the study addressed credibility, dependability, confirmability, and transferability. Credibility was enhanced through prolonged engagement with the data, persistent observation, and peer debriefing via weekly research team meetings. Dependability was established through maintenance of a comprehensive audit trail documenting all methodological decisions. Confirmability was ensured through explicit acknowledgment of researcher positionality and ongoing reflexive practice, with both principal investigators holding doctoral degrees in Business Information Systems and maintaining no commercial affiliations with BI vendors. Transferability was addressed through thick description, providing sufficient contextual detail to enable readers to assess applicability to their own contexts.

The methodological design employed represents a distinctive contribution to qualitative systematic reviews, integrating the procedural rigor of PRISMA with the interpretive depth of Reflexive Thematic Analysis.

This integration, documented in detail within this section, offers a replicable model for researchers seeking to conduct qualitative evidence syntheses that are simultaneously systematic, transparent, interpretively rich, and theoretically generative.

4. Empirical Analysis

Following Braun and Clarke (2022) research framework for qualitative theme analysis allowed for a thorough and analytical summary of the 68 studies that were included.

This process began with initial coding and progressed to the identification of deeper patterns and tensions within the literature. It led to three strong themes that are based on evidence and fully answer the research questions. Table 2 presents the resulting thematic framework, detailing the overarching themes, their constitutive sub-themes, and their correspondence with the research questions.

Table 2. Qualitative Synthesis Leads to a Thematic Framework

Overarching Theme	Constitutive Sub-Themes	Primary Research Question Addressed
Theme 1: <i>The Strategic Reconstitution of Decision-Making</i>	1.1 From Intuition to Evidence: The Paradigm Shift 1.2 The Managerial Perception Gap	Question 1: Competitiveness and Decision-Making
Theme 2: <i>The Duality of BI Implementation: Architectural Ideal vs. Pragmatic Reality</i>	2.1 The Theoretical Technology Stack 2.2 The Pragmatism of Resource Constraints	Question 2: Technologies Integrated
Theme 3: <i>The Multidimensional Impact on SME Economic Vitality</i>	3.1 Quantifiable Financial Metrics 3.2 Intangible Strategic Capabilities	Question 3: Economic Impact

The first theme, The Strategic Reconstitution of Decision-Making, illustrates that BI's primary benefit lies in its potential to transform managerial cognition within SMEs. The synthesis reveals that BI tools enable a shift from intuitive, experience-based decision-making to evidence-based paradigms. The findings indicate that SMEs utilizing BI can analyze sales channels and customer lifetime value, enabling them to segment markets and allocate resources more effectively

This enhanced analytical capability directly contributes to competitiveness by enabling firms to anticipate market shifts. But a significant sub-theme regarding a common managerial perception gap emerged. Several studies (Dymitrowski & Mielcarek, 2021; Sjödin et al., 2021) have revealed that SME leaders often perceive their data as 'insufficient for BI, despite the abundance of data generated from digital marketing, supply chain interactions, and even IoT devices. This discrepancy between the objective potential of available data and managerial perceptions of it constitutes a significant barrier to adoption and a critical lever for intervention.

The second theme, The Duality of BI Implementation: Architectural Ideal vs. Pragmatic Reality, highlights the significant divergence between the sophisticated BI architectures depicted in the literature and the reality of BI practice within SMEs. Figure 3 presents an example of a full-stack BI architecture, comprising distinct layers for data warehousing, online analytical processing (OLAP), advanced visualization, and extract, transform, load (ETL) processes.

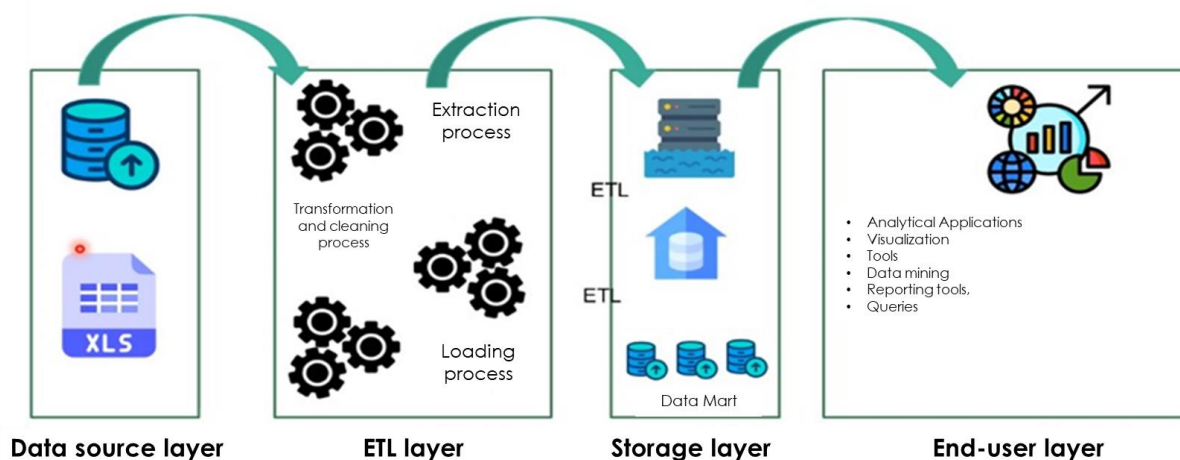


Figure 3. BI Architecture (Coffie et al., 2022; Weerakkody et al., 2021)

The thematic analysis, however, reveals how the pragmatism of resource constraints shapes the technological landscape for SMEs. A typical technological stack for an SME comprises a patchwork of low-cost tools. Spreadsheets like Microsoft Excel and Google Sheets are used for data manipulation and basic analysis. These are often supplemented by free, open-source or cloud-based database management systems, such as PostgreSQL and MySQL. This preference arises because enterprise-level BI software entails prohibitive costs, and the limited availability of specialized IT personnel within SMEs precludes the deployment and maintenance of complex systems.

Consequently, SMEs often rely on familiar, accessible tools. This duality demonstrates that the SME technology stack is not merely a scaled-down version of a corporate model, but rather a distinct configuration born of necessity, prioritizing pragmatism and affordability over architectural idealism.

The final theme, The Multidimensional Impact on SME Economic Vitality, synthesizes quantifiable and qualitative economic benefits of BI. Table 3 synthesizes the reported financial metrics, illustrating the direct economic impact of BI implementation. The synthesis reveals that intangible strategic capabilities are at least as important as quantifiable metrics.

Table 3. BI implementation effects on SMEs

Impact Category	Reported Metric Range	Key Supporting References
Cost Reduction	Production cost reduction: 3.5% - 5.0% Order processing cost reduction: up to 1.0%	Antonelli et al. (2022); Yiu et al. (2021)
Financial Health	Reduction in indebtedness: up to 3.0% Contraction of overdue portfolio: ~0.5%	Antonelli et al. (2022)
Operational Efficiency	Inventory change rates have gone up a lot.	Ragazou et al. (2023); Strakova et al. (2021)

The synthesis reveals that intangible strategic capabilities are at least as important as quantifiable metrics. These include enhanced strategic planning, organizational agility (i.e., the capacity to rapidly adapt operations in response to market shifts), and granular customer behavioral analytics. The findings suggest that these intangible assets, while not reflected on a balance sheet, provide the foundational resilience and adaptability necessary for sustained growth and survival in dynamic and competitive environments. The true value of BI, therefore, lies in its capacity to simultaneously generate short-term gains and cultivate a long-term competitive edge.

Figure 4 presents a cyclical model illustrating the dynamic and iterative relationship between the three themes. Instead, it happens repeatedly.

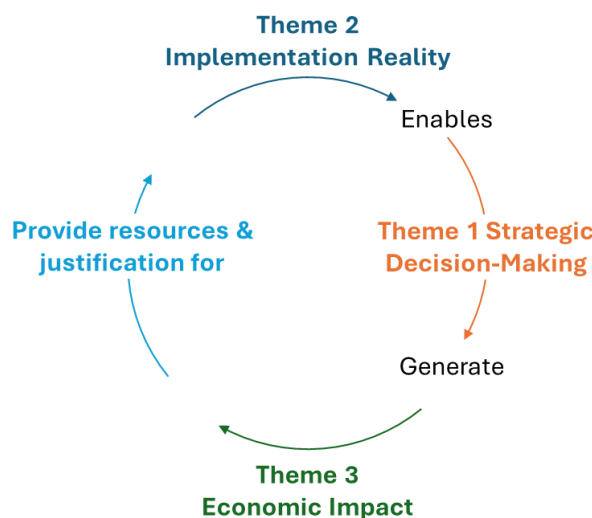


Figure 4. Cyclical Model of BI Implementation, Utilization, and Impact in SMEs

Figure 4 encapsulates the core dynamic of BI value creation in SMEs. The model posits that effective implementation (Theme 2) leads to enhanced decision-making (Theme 1), which in turn generates multidimensional impact (Theme 3). This impact then loops back to inform and refine the implementation process, creating a virtuous cycle of learning and improvement.

5. Methodological Reflection

The distinctive research design employed in this qualitative systematic review represents a deliberate integration of the procedural rigor embedded within the PRISMA 2020 statement (Page et al., 2021) and the interpretive depth afforded by Reflexive Thematic Analysis (Braun & Clarke, 2022). While the Methodology section detailed the procedural execution of this integration, the present reflection addresses the epistemological foundations, methodological insights derived from navigating the integration, and the transferability of this design to other research contexts.

This reflection is situated within the broader discourse on qualitative evidence synthesis, contributing to ongoing conversations about how systematic rigor and interpretive richness can be productively combined rather than positioned as mutually exclusive.

A central challenge in integrating PRISMA and Reflexive Thematic Analysis lies in their seemingly divergent epistemological foundations. PRISMA emerged from the evidence-based medicine movement, which emphasizes protocol registration, systematic searching, and transparent reporting, reflecting positivist assumptions about objectivity and replicability. In contrast, Reflexive Thematic Analysis is grounded in an interpretivist-constructivist paradigm, recognizing that knowledge is socially situated and that researchers actively co-construct themes through engagement with data (Braun & Clarke, 2022). This study does not conceptualize this tension as an irreconcilable conflict but rather as a productive tension that, when carefully navigated, yields a synthesis that is both defensible and analytically generative. PRISMA was not deployed as a positivistic straitjacket but as rigorous scaffolding for assembling the literature corpus. Its function was to ensure that the 68 studies constituting the synthesis were identified and selected through a transparent, auditable, and reproducible process, thereby mitigating selection bias—a threat to trustworthiness regardless of epistemological orientation. Reflexive Thematic Analysis then provided the interpretive architecture for knowledge synthesis, enabling the research team to move beyond aggregating findings toward identifying latent meanings, points of tension, and patterns of meaning across the included studies. This positioning enabled the study to leverage interpretivism as a lens for addressing not only what the literature states about BI in SMEs but also how and why BI affects decision-making and performance—questions fundamentally qualitative in nature and demanding interpretive synthesis.

The process of conducting this integrated review yielded several methodological insights that contribute to the practice of qualitative systematic reviews. First, the integration necessitated iterative interaction between screening and interpretation, challenging the linear progression often assumed in systematic review methodologies. During the PRISMA screening phase, both researchers maintained reflexive journals, documenting emerging patterns, provocative ideas, and potential gaps in the literature. These initial reflections, recorded as memos, were not permitted to influence inclusion or exclusion decisions, thereby safeguarding the integrity of the PRISMA process. However, they were subsequently revisited during the familiarization and coding stages of thematic analysis, creating a connective thread between the technical and interpretive dimensions of the study. This practice strengthened the final analysis by ensuring that early observations were systematically incorporated into the interpretive framework rather than lost in procedural transitions.

Second, the structured data extraction form, a conventional requirement of the PRISMA protocol, was deliberately designed to serve a dual purpose. In addition to descriptive fields capturing author, year, methodology, and geographical context, the form incorporated analytical fields for recording researcher annotations—succinct notes on study context, methodological particularities, and potential relevance to the research questions.

This hybrid form functioned as a crucial bridge, transforming raw study characteristics into analyzable data units ready for thematic coding. This approach maintained interpretive momentum throughout the extraction process, preventing the loss of critical insight that can occur when an overly rigid extraction form discourages analytical thinking. The piloting of this form on a sample of studies proved essential, revealing the need to balance structure with flexibility to accommodate the heterogeneity of qualitative, quantitative, and mixed-methods studies included in the final corpus.

Third, the methodological diversity of the 68 included studies—encompassing qualitative case studies, quantitative surveys, mixed-methods designs, conceptual papers, and systematic reviews—presented a significant analytical challenge. Ensuring the consistent application of thematic analysis across this methodologically heterogeneous corpus required prioritizing the meaning conveyed by the findings over the specific methods employed in the source studies. A statistical finding regarding cost reduction (Antonelli et al., 2022) and a manager's qualitative reflection about organizational control (Coffie et al., 2022) were both considered valid contributions to understanding the multidimensional impact theme. This approach required constant reflexivity to ensure that qualitative insights were not overshadowed by quantitative data, but ultimately strengthened the thematic framework by grounding it in both measurable outcomes and lived experiences. The analytical decision to treat all included studies as contributing equally to the interpretive synthesis, irrespective of methodological orientation, aligns with best practices in qualitative evidence synthesis that prioritize conceptual richness over methodological homogeneity (Braun & Clarke, 2022).

The transferability of this integrated research design extends beyond the SME-BI domain and is potentially applicable across diverse fields, including business, management, education, and health services research. The design is particularly well-suited to research areas characterized by three features. First, epistemological diversity: fields such as innovation studies, organizational behavior, and information systems, where positivist, interpretivist, and critical studies coexist, benefit from a synthesis approach that can accommodate multiple epistemological traditions without privileging one over another. Second, complex, context-dependent phenomena: topics such as digital transformation, strategy implementation, and organizational change, where understanding process and meaning is as crucial as measuring outcomes, require interpretive synthesis capable of capturing contextual nuance. Third, emerging or fragmented research areas: domains where the literature is nascent or dispersed, and where simple aggregation would obscure more than it reveals, benefit from the integrative capacity of thematic analysis to identify patterns across diverse methodological approaches.

For researchers seeking to adopt this integrated approach, several practical recommendations emerge from the experience of conducting this study. Investment in team reflexivity is essential, as this design requires a research team adept at both adhering to structured protocols and engaging in flexible, interpretive thinking.

Regular reflexive dialogues, documented in the audit trail, proved essential for identifying and navigating the philosophical tensions inherent in integrating positivist and interpretivist methodological traditions. The development of hybrid data extraction tools, capturing both descriptive metadata and analytical annotations, serves as a critical bridge between the procedural and interpretive dimensions of the review. Piloting these forms ensures they serve both PRISMA's requirement for structure and thematic analysis's need for interpretive richness. Finally, maintenance of a dual audit trail—documenting not only search terms and screening decisions but also the evolution of codes, the emergence of themes, and reflexive notes—is fundamental to the trustworthiness of an integrated design. This dual documentation enables external audit of both the procedural and interpretive dimensions of the research, enhancing transparency and reproducibility.

This study advances the practice of qualitative systematic reviews by demonstrating that PRISMA and Reflexive Thematic Analysis can be integrated synergistically. It challenges the false dichotomy between rigor, often associated with quantitative, procedural approaches, and depth, often associated with qualitative, interpretive approaches. The integration offers a model for researchers seeking to conduct literature reviews that are simultaneously systematic, transparent, interpretively rich, and theoretically generative. When synthesized in this manner, studies can generate new knowledge that transcends the sum of their parts. The three themes presented in this review—the Strategic Reconstitution of Decision-Making, the Duality of BI Implementation, and the Multidimensional Impact on SME Economic Vitality—exemplify this generative capacity, offering novel theoretical insights into complex organizational phenomena that would not have emerged from a conventional literature review or bibliometric analysis alone. The methodological reflection provided here contributes to the evolving discourse on qualitative evidence synthesis, offering both epistemological justification and practical guidance for researchers navigating similar integrations in their own work.

6. Final Considerations

This qualitative systematic review has synthesized and critically analyzed prior research to illuminate the interconnectedness of BI, strategic decision-making, and competitiveness within SMEs. Grounded in the PRISMA 2020 framework and a reflexive thematic analysis, it has identified three data-driven themes that enhance the understanding of BI in the SME context. This final section moves beyond a mere summary of results to reflect on the evolution of key ideas, their practical implications, and the most promising avenues for future research.

A key finding is that the usefulness of BI for SMEs is contingent not on technological sophistication alone, but on its accessibility and the users' confidence in engaging with it. The synthesis reveals a frequent misalignment between idealized BI models and the realities of practice, underscoring that BI adoption is fundamentally a socio-technical process.

The theme results showed three things: The Strategic Reconstitution of Decision-Making, The Duality of BI Implementation, and The Multidimensional Impact on Economic Vitality (Bousdekis & Mentzas, 2021; Coffie et al., 2022; Shah, 2022).

Theoretically, this review connects and builds upon existing frameworks. For instance, Resource Bricolage Theory helps explain that the non-adoption of advanced technologies by SMEs is not necessarily a failure, but often a strategic choice shaped by the resources at hand. Simultaneously, it demonstrates that effective BI use fosters Dynamic Capabilities—specifically, enhanced sensing and seizing capacities—which are crucial for long-term competitiveness.

The findings offer several actionable implications for practitioners. For SME managers and owners, the primary barrier is often not cost, but the 'Managerial Perception Gap.' Leaders must therefore champion a cultural shift from intuition-based to evidence-based decision-making. Adopting 'low-threshold, high-ceiling' tools can generate quick wins and facilitate the development of data literacy without significant upfront investment. For BI vendors and developers, the imperative is to design software tailored to the SME context. This requires solutions that are flexible, scalable, interoperable with common low-cost tools, and require minimal support from specialized IT personnel. The "pragmatic stack" found in this overview should be used to help plan the creation of new products.

For policymakers and support institutions, financial subsidies for software procurement are insufficient. Effective support should prioritize building human and organizational capital through data literacy training, funding process consulting to identify valuable data sources, and establishing peer-learning networks for SME leaders (Zhang et al., 2022).

While this review was conducted with rigor, it is important to acknowledge its limitations. These should be considered when interpreting the findings and can help inform the direction of future research. First, the search was limited to Scopus-indexed literature published before December 2021. While this ensures a baseline of quality, it may have excluded relevant studies indexed in other databases or published in the grey literature. Second, as a qualitative synthesis, this review provides depth and insight but does not offer statistical generalizability regarding the prevalence or magnitude of the identified themes across the broader SME population. Finally, while the thematic analysis was grounded in a systematic and reflexive process, it is inherently interpretative, and other researchers might plausibly derive different nuances or emphases from the same material.

This review does not conclude the discussion but rather identifies priority areas for further investigation. Longitudinal case studies and quasi-experimental designs are urgently needed to trace the causal pathways suggested in the SME BI Value Realization Framework. Comparative studies across national cultures and industrial sectors could illuminate how contextual factors shape the challenges and perceived value of BI adoption. As AI becomes more accessible, Research is needed to explore its integration with conventional BI tools in the SME sector.

Future research should investigate the evolution of the 'pragmatic stack' and its broader implications. Furthermore, developing and validating metrics to capture the 'intangible strategic capabilities' fostered by BI use would significantly enhance the field's ability to assess the true return on investment.

Ethical Approval: This study involved a bibliometric review and thematic synthesis of previously published literature. No primary data collection from human participants or animals was conducted. Therefore, formal ethical approval from an institutional review board was not required. All sources of data were publicly available or accessible through academic databases, and the analysis adhered to standard ethical principles of scientific integrity, including accurate citation, avoidance of plagiarism, and transparent reporting of methods and findings.

Informed Consent: This work did not involve human participants or identifiable data; therefore, informed consent was not applicable.

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