



## **Digital Leadership in SMEs: A Bibliometric Review of Research Trends, Thematic Evolution, and Emerging Strategic Perspectives**

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### **ABSTRACT**

Digital leadership has become increasingly important in Small and Medium-sized Enterprises (SMEs) as firms face growing pressure to adapt to digital transformation, innovation demands, and changing competitive conditions. However, the literature on digital leadership in SMEs remains fragmented across related themes such as technology adoption, innovation capability, and business performance. This study aims to map the development of research on digital leadership in SMEs through a bibliometric analysis of Scopus-indexed journal articles published between 2021 and 2026. The dataset consisted of 453 English-language journal articles within the Business, Management and Accounting subject area. Descriptive analysis was conducted using Scopus Analyze Search Results, while thematic mapping was performed using VOSviewer through keyword co-occurrence analysis. The findings show that research on digital leadership in SMEs has grown rapidly, particularly after 2023, and has developed as an interdisciplinary and internationally distributed field. The thematic structure remains strongly anchored in digital transformation and digital technologies, while digital leadership appears as an emerging but increasingly strategic theme linked to innovation capability, competitive advantage, and organizational performance. The study suggests that the field is shifting from a focus on operational digital adoption toward a stronger concern with leadership capability and long-term competitiveness. These findings contribute to a clearer understanding of the intellectual structure of the field and provide directions for future research and practice.

**Keywords:** Digital leadership; SMEs; digital transformation; bibliometric analysis; innovation capability

### **INTRODUCTION**

Small and Medium-sized Enterprises (SMEs) play a central role in economic development because they contribute substantially to employment, entrepreneurship, and local resilience (Baloyi & Khanyile, 2022). At the same time, SMEs now operate in a business environment increasingly shaped by digital platforms, data-driven competition, and rapid technological change (Benzakour, Daoud, Jabri, & Bensouda, 2026; Karaboğa & Karaboğa, 2025). In this context, digital transformation is no longer understood only as a technical upgrade, but as a strategic requirement for maintaining competitiveness, adaptability, and long-term survival.

Although digital tools have become more accessible, successful digital transformation in SMEs remains uneven. The main challenge is often not the availability of technology itself, but the ability of organizational leaders to interpret digital opportunities, align them with business objectives, and guide employees through change (Destrian, 2024; Khalayleh, Rohaida, & Al-Khazaleh, 2024). This has increased scholarly attention to digital leadership, which refers broadly to a leader's capacity to use digital technologies strategically, foster innovation, support organizational adaptation, and create value in changing environments (de Marcellis-Warin & Warin, 2025; Kamal et al., 2025).

The SME context makes this issue particularly important. On the one hand, SMEs are often flexible and less bureaucratic, which may support faster decision-making and more agile responses to market change. On the other hand, they frequently face limited financial resources, shortages of digital talent, and a strong dependence on a small number of key decision makers (Baporikar & Fotolela, 2021; Vitor et al., 2018). As a result, leadership in SMEs can have a particularly direct influence on whether digital initiatives remain operational experiments or develop into meaningful organizational transformation.

Despite the growing relevance of this topic, the existing literature remains fragmented. Research on digital leadership in SMEs is spread across related themes such as digital transformation, technology adoption, innovation capability, entrepreneurial orientation, and business performance (Bux, Zhu, & Devi, 2025; Ramos-Vecino, Calzado-Barbero, Almodóvar-González, & Ramos-Mariño, 2026). The field also uses a range of overlapping terms, including digital leadership, e-leadership, and virtual leadership, which complicates conceptual clarity. Consequently, there is still limited integrative understanding of how digital leadership in SMEs is conceptualized, what themes dominate the field, and how the research has evolved over time (Deeb & Aldehayyat, 2025; Karakose et al., 2022; Lin, 2025).

To address this gap, this study employs a bibliometric analysis of Scopus-indexed journal articles on digital leadership in SMEs. Specifically, the study aims to map publication trends, identify the main contributors and publication characteristics of the field, and examine its conceptual structure through keyword co-occurrence analysis. By doing so, the study seeks to provide a clearer overview of how research on digital leadership in SMEs has developed and to indicate promising directions for future scholarship and practice.

## METHOD

This study adopts a bibliometric approach to map the development of research on digital leadership in Small and Medium-sized Enterprises (SMEs). Rather than conducting a full systematic literature review with detailed manual coding of each article, the study focuses on quantitatively and visually examining patterns in the published literature using the Scopus database, Scopus Analyze Search Results, and VOSviewer. This approach is appropriate for identifying publication trends, leading contributors, and the conceptual structure of a growing research field.

The data source for this study was the Scopus database. The search strategy was designed to capture the intersection between leadership-related concepts and the SME context by combining terms such as "digital leadership," "e-leadership," "virtual leadership," and related digital terms with organizational identifiers including "SMEs," "MSMEs," and "small business." The initial search returned 1,587 documents. To improve relevance and consistency, the dataset was then limited to journal articles published in English between 2021 and 2026 and indexed in the Business, Management and Accounting subject area.

After the filtering process, the final dataset comprised 453 documents. A basic screening of titles and abstracts was then conducted to ensure that the retrieved documents were substantively

related to digital leadership and the SME context, rather than addressing digitalization in a very general sense. This step was intended to improve the relevance of the dataset while maintaining transparency in the document selection process.

The analysis was conducted in two stages. First, descriptive insights were generated using Scopus Analyze Search Results to examine publication year, source title, author, affiliation, country, subject area, and funding sponsor. Second, the bibliographic data were exported to VOSviewer to perform a keyword co-occurrence analysis based on all keywords. Full counting was applied, the minimum number of occurrences was set at five, and 101 keywords met the threshold for inclusion in the final map. Together, these procedures enabled the study to identify the main publication patterns and thematic concentrations within the literature on digital leadership in SMEs.

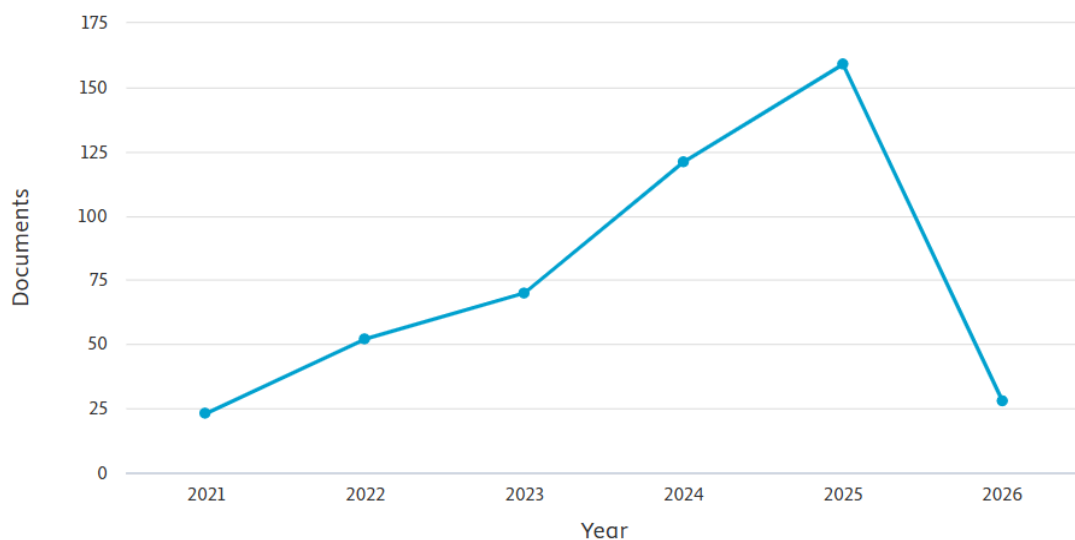
## RESULT AND DISCUSSION

### Result

A total of 453 documents were retrieved from Scopus for the period 2021–2026. The dataset was limited to English-language journal articles within the Business, Management and Accounting subject area. Overall, the results indicate a rapidly expanding body of research on digital leadership and SMEs, characterized by rising publication output, interdisciplinary breadth, international participation, and a thematic structure strongly anchored in digital transformation.

#### 1. Publication trend

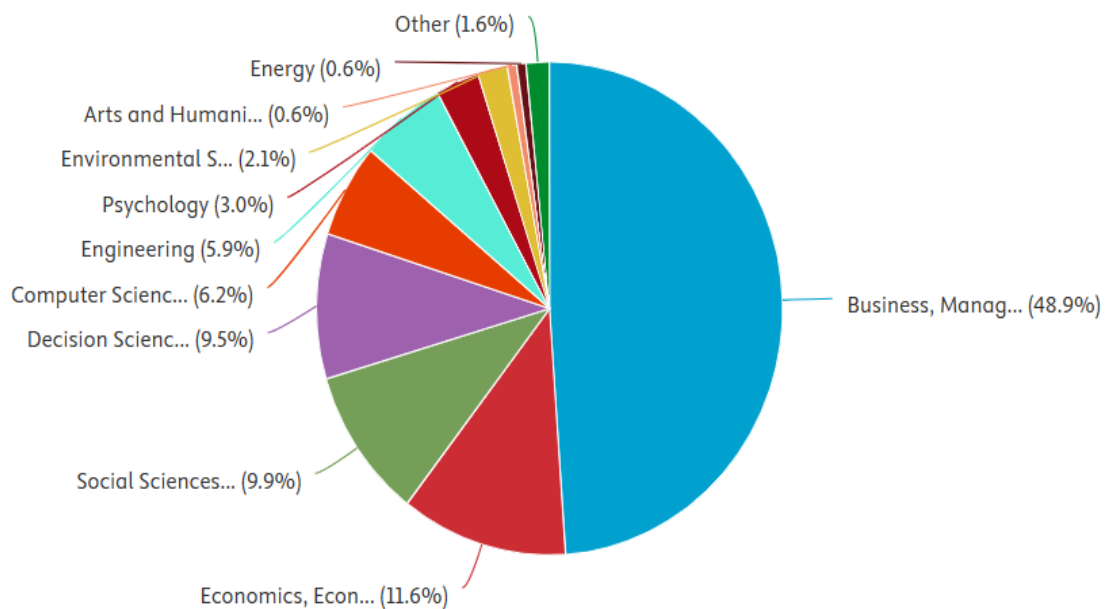
The annual distribution of publications shows a substantial increase over time. The number of documents rose from 23 in 2021 to 52 in 2022 and 70 in 2023, before increasing more sharply to 121 in 2024 and peaking at 159 in 2025. The count for 2026 was 28 documents, which should be interpreted with caution because it likely reflects an incomplete publication year. Taken together, these figures indicate that scholarly interest in digital leadership and SMEs has accelerated considerably, especially from 2023 onward.



**Figure 1**  
**Distribution of Publications (2021-2026)**

## 2. Subject area distribution

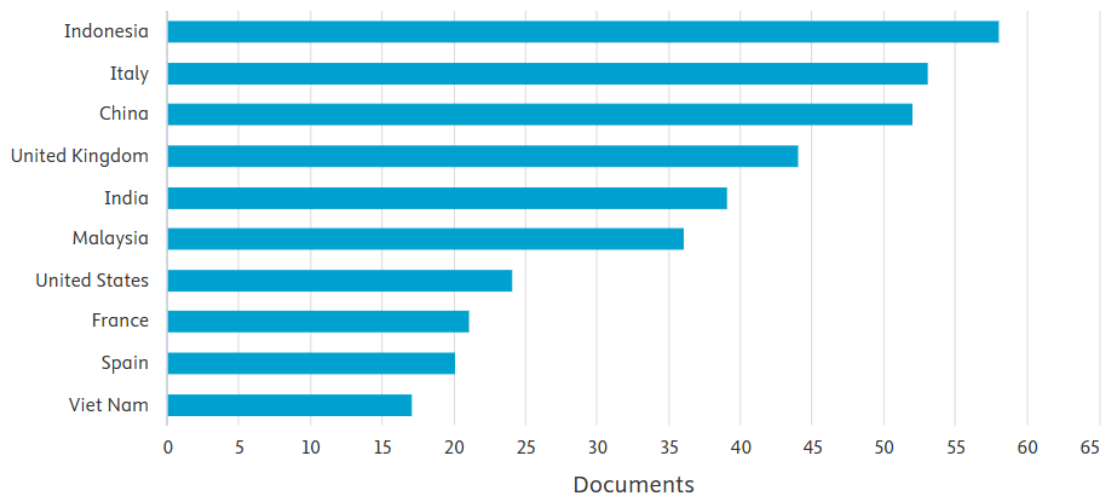
Although the search was restricted to Business, Management and Accounting, the dataset shows a clearly interdisciplinary profile. Business, Management and Accounting remained the dominant category with 453 documents (48.9%), followed by Economics, Econometrics and Finance (107; 11.6%), Social Sciences (92; 9.9%), and Decision Sciences (88; 9.5%). Other relevant areas included Computer Science (57; 6.2%), Engineering (55; 5.9%), and Psychology (28; 3.0%). This pattern suggests that research on digital leadership in SMEs extends beyond management scholarship and increasingly draws from technological, economic, organizational, and behavioral perspectives.



**Figure 2**  
**Subject area distribution**

## 3. Geographic distribution

The country analysis demonstrates broad international participation. Indonesia recorded the highest number of publications (58), followed by Italy (53), China (52), and the United Kingdom (44). Other notable contributors were India (39), Malaysia (36), the United States (24), France (21), Spain (20), and Viet Nam (17). The prominence of both developed and emerging economies indicates that digital leadership in SMEs has become a globally relevant research topic, particularly in contexts where SMEs are central to national competitiveness and digital transformation agendas.

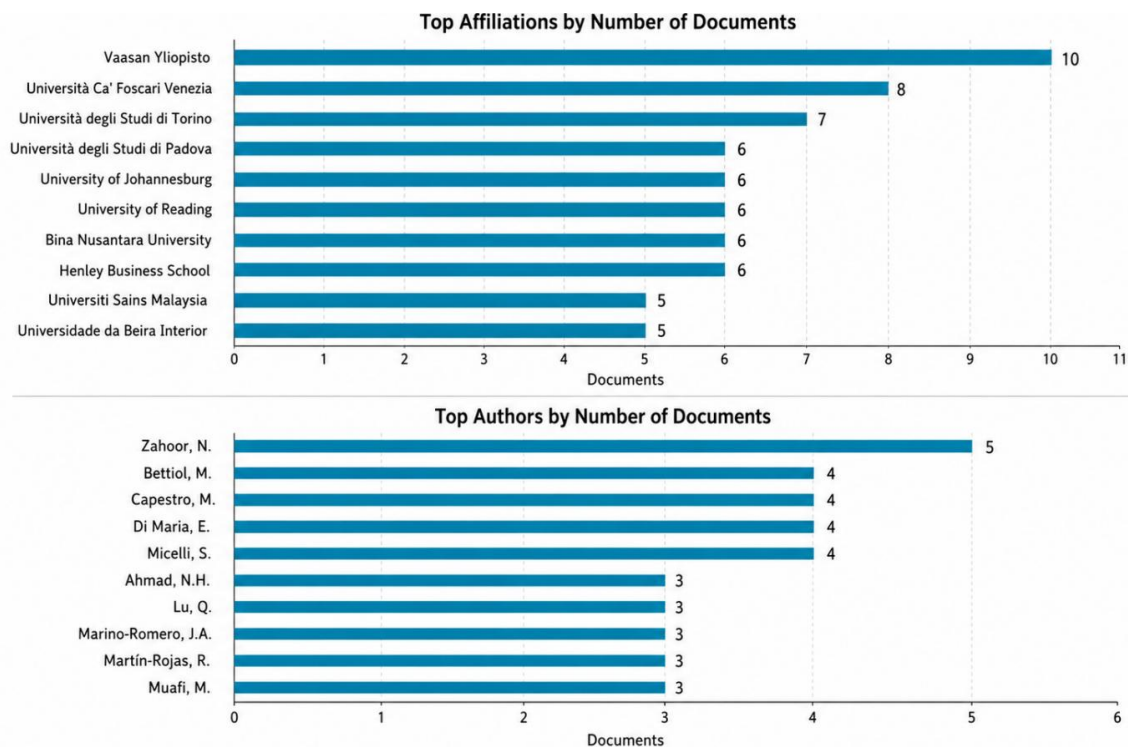


**Figure 3**  
**Geographic Distribution of Publications by Country**

#### 4. Leading affiliations and authors

At the institutional level, Vaasan Yliopisto was the most productive affiliation with 10 documents, followed by Università Ca' Foscari Venezia (8) and Università degli Studi di Torino (7). Several institutions contributed 6 documents each, including Università degli Studi di Padova, University of Johannesburg, University of Reading, Bina Nusantara University, and Henley Business School. This distribution suggests that the field is supported by a dispersed and international network of research institutions.

Author productivity was similarly distributed. Zahoor, N. emerged as the most productive author with 5 documents, followed by Bettiol, M., Capestro, M., Di Maria, E., and Micelli, S., each with 4 documents. The absence of a single dominant author indicates that the field remains relatively open and is still developing through contributions from multiple scholars across different regions.



**Figure 4**  
**Top Productive Affiliations and Authors in Digital Leadership Research**

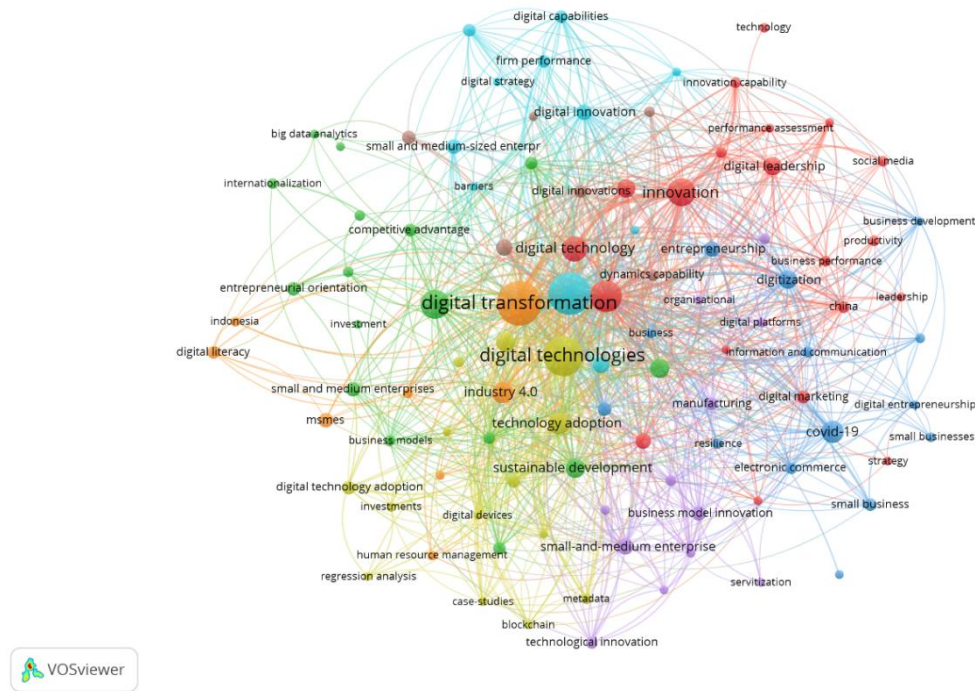
### 5. Keyword co-occurrence structure

To examine the thematic structure of the field, a co-occurrence analysis of all keywords was conducted using VOSviewer. The analysis applied full counting with a minimum occurrence threshold of five, resulting in 101 keywords included in the final map. The network visualization shows that the literature is strongly centered on digital transformation and digital technologies, which appear as the largest and most centrally connected nodes. Their prominence indicates that the field is still primarily organized around the broader discourse of digital change in SMEs. Closely connected terms include digital technology, innovation, technology adoption, industry 4.0, and sustainable development, suggesting that the literature develops at the intersection of technological implementation, innovation processes, and strategic adaptation.

Within this structure, digital leadership appears as an important but not yet singularly dominant theme. It is closely connected to innovation, innovation capability, entrepreneurship, digitization, and business performance, indicating that studies tend to position digital leadership within broader discussions of innovation, competitiveness, and organizational outcomes rather than as a fully independent domain.

The network also suggests several thematic concentrations. One cluster revolves around digital transformation, digital technologies, digital technology, and technology adoption, reflecting the transformation and implementation stream. Another connects digital leadership, innovation, innovation capability, entrepreneurship, and business performance, pointing to a strategic and performance-oriented stream. A further concentration includes competitive advantage, entrepreneurial orientation, digital literacy, and big data analytics, highlighting SME capability development and strategic positioning. Finally, a more application-oriented stream is visible

around electronic commerce, digital marketing, business model innovation, manufacturing, and digital entrepreneurship.



**Figure 5**  
**Keyword Co-Occurrence Network of Digital Leadership in SMEs**

## 6. Density and temporal evolution of keywords

The density visualization reinforces the centrality of digital transformation and digital technologies, followed by digital technology, innovation, technology adoption, industry 4.0, and sustainable development. This confirms that the most frequent and strongly connected themes are still concentrated on the broader digital transformation agenda. In comparison, digital leadership appears as a relevant but still emerging theme embedded within this wider intellectual structure.

The overlay visualization shows a temporal shift in research emphasis. Earlier attention appears to cluster around terms such as covid-19, small business, small businesses, business development, social media, and productivity, suggesting an initial focus on adaptation, continuity, and operational survival. More recent attention is associated with digital leadership, innovation capability, performance assessment, competitive advantage, digital literacy, big data analytics, and technological innovation. This shift suggests that the field is gradually moving from reactive concerns with digitalization toward a more strategic focus on leadership capability, innovation outcomes, and long-term competitiveness.



leadership appears as a visible and strategically important node, but not yet as the dominant center of the field (Tagscherer & Carbon, 2023).

This result has an important conceptual implication. It indicates that the literature is still in a phase of integration rather than consolidation. Digital leadership in SMEs is being shaped at the intersection of several research streams, particularly digital transformation, innovation, entrepreneurship, and business performance. Such a pattern suggests that the concept is still evolving and is often interpreted through adjacent constructs rather than through a stable and unified theoretical foundation. As a consequence, the field may still face challenges in conceptual clarity, especially in distinguishing digital leadership from closely related terms such as digital management, entrepreneurial leadership in digital contexts, or general digital transformation capability (Kim & Jin, 2024).

Another important pattern emerging from the results is the close association between digital leadership, innovation, innovation capability, entrepreneurship, digitization, and business performance. This suggests that the literature increasingly positions digital leadership as a strategic capability linked to organizational renewal and competitiveness. Rather than focusing only on the adoption of digital tools, recent studies appear to emphasize how leadership contributes to innovation processes, capability development, and performance outcomes in SMEs. This is particularly significant because SMEs often operate under resource constraints, meaning that leadership may play a more direct role in prioritizing technology investments, guiding organizational adaptation, and aligning digital initiatives with business strategy.

The overlay visualization further strengthens this interpretation by showing a temporal shift in the focus of the literature. Earlier themes such as covid-19, small business, business development, social media, and productivity indicate that initial research attention was more reactive in nature. At that stage, the literature appears to have been more concerned with how SMEs could survive, maintain continuity, and adapt operationally in disrupted environments. In contrast, more recent themes such as digital leadership, innovation capability, competitive advantage, performance assessment, digital literacy, and big data analytics reflect a more strategic orientation. This suggests that the field is gradually moving from a short-term adaptation logic toward a longer-term capability-building perspective (Tagscherer & Carbon, 2023).

This temporal shift is theoretically meaningful. It implies that research on SMEs has begun to move beyond the question of whether firms should digitalize and toward the more complex question of how they should build the organizational and leadership capabilities needed to benefit from digital transformation. In this sense, digital leadership appears to be emerging not merely as a response to technological change, but as a mechanism through which SMEs can transform digital adoption into innovation, competitiveness, and sustained performance. This interpretation is consistent with the increasing prominence of keywords related to competitive advantage, digital literacy, and innovation capability, all of which suggest a stronger concern with capability development rather than simple technology usage (Held et al., 2025; Imran, Hamid, & Haque, 2025).

The subject area distribution also provides a valuable insight into the nature of the field. Although the literature is anchored in Business, Management and Accounting, it also spans Economics, Social Sciences, Decision Sciences, Computer Science, Engineering, and Psychology. This interdisciplinary profile indicates that digital leadership in SMEs is being studied not only as a managerial issue, but also as a technological, organizational, and behavioral phenomenon. Such a pattern reflects the inherently socio-technical character of digital transformation in SMEs. Leadership in digital environments is not only about strategic direction, but also about how firms organize work, absorb new knowledge, adapt routines, and respond to emerging technological opportunities and pressures (Tagscherer & Carbon, 2023).

The geographic distribution of publications provides an additional point of discussion. The strong contribution from countries such as Indonesia, Italy, China, the United Kingdom, India, and Malaysia suggests that the topic is not confined to one particular economic region. Instead, digital leadership in SMEs appears to be a globally relevant issue, especially in economies where SMEs are central to employment, innovation, and development. The prominence of both developed and emerging economies may indicate that digital leadership is being recognized as important across diverse institutional settings, although the specific drivers and constraints may differ substantially between contexts. This creates a promising opportunity for future comparative studies that examine how digital leadership is shaped by national digital infrastructure, policy support, industry structure, and organizational maturity.

At the same time, the findings also suggest that some areas remain less central within the existing literature. Compared with themes such as digital transformation, innovation, performance, and technology adoption, human-centered themes appear less dominant in the network. This does not mean they are absent, but rather that they are not yet at the core of the field. As a result, there is still room for future research to examine more explicitly how digital leadership in SMEs relates to employee adaptation, work experience, learning, resistance to change, and well-being. Such questions are especially relevant because SMEs often have fewer formal systems and support mechanisms than larger firms, making leadership potentially more influential in shaping how digital change is experienced internally.

Taken together, the findings suggest that the literature on digital leadership in SMEs is entering a more mature phase, but has not yet reached full conceptual stabilization. The field is no longer limited to discussions of digital adoption or crisis-driven adaptation. Instead, it is increasingly oriented toward strategic capability, innovation, and competitive positioning. Nevertheless, digital leadership still appears to function more as an emerging node within the broader SME digital transformation literature than as a fully independent theoretical domain. This means that future scholarship must do more than document digital change; it must also clarify what is distinctive about digital leadership, how it operates in resource-constrained firms, and under what conditions it contributes to meaningful organizational outcomes.

This study offers several theoretical implications for the growing literature on digital leadership in SMEs. First, the findings indicate that digital leadership has not yet fully developed as an independent and conceptually stable research domain. Instead, it remains strongly embedded within broader discussions of digital transformation, digital technologies, innovation, and technology adoption. This suggests that the concept of digital leadership is still being constructed through adjacent streams of research rather than through a unified theoretical foundation. As a result, future scholarship needs to work toward greater conceptual clarification by distinguishing digital leadership from related constructs such as digital capability, digital management, entrepreneurial leadership, and digital transformation readiness.

Second, the bibliometric results suggest that digital leadership in SMEs is increasingly positioned as a strategic capability rather than a purely technical or operational issue. Its close association with innovation, business performance, entrepreneurship, and competitive advantage indicates that the literature is moving toward a more capability-based interpretation of leadership in digitally intensive environments. This implies that digital leadership should be understood not only as the ability to promote technology use, but also as the capacity to align technology with organizational goals, support innovation processes, and enable strategic renewal in resource-constrained firms.

Third, the results highlight the interdisciplinary nature of the field. The presence of subject areas such as Economics, Social Sciences, Computer Science, Engineering, and Psychology suggests that digital leadership in SMEs is inherently socio-technical. This has important implications for theory development. Future research should avoid treating digital leadership

solely as a managerial phenomenon and instead recognize that it is shaped by the interaction of technological systems, organizational structures, human capabilities, and environmental demands. A more integrative theoretical approach would therefore help explain why digital leadership may operate differently across sectors, countries, and levels of organizational maturity.

Finally, the temporal evolution of keywords suggests that the field is moving from an early focus on survival, continuity, and operational adaptation toward a more strategic concern with innovation capability, digital literacy, performance assessment, and long-term competitiveness. This shift implies that future theories of digital leadership in SMEs should pay greater attention to dynamic and developmental processes. Rather than asking only whether digital leadership matters, researchers should increasingly examine how it emerges, under what conditions it becomes effective, and how it contributes to organizational outcomes over time.

The findings also offer practical implications for SME owners, managers, and policymakers. For SME leaders, the results suggest that digital transformation should not be treated merely as a matter of technology acquisition. The prominence of keywords related to innovation, business performance, competitive advantage, and digital literacy indicates that the value of digitalization depends heavily on leadership capability. SME leaders therefore need to move beyond a narrow focus on adopting digital tools and place greater emphasis on building strategic direction, digital awareness, and organizational readiness.

The findings also imply that digital leadership should be developed as a capability that supports innovation and adaptability. Since SMEs often operate with limited financial and human resources, leadership becomes especially important in prioritizing digital investments, coordinating change, encouraging experimentation, and connecting technology initiatives to broader business objectives. In this context, leaders who are able to foster digital literacy, guide employees through change, and create a supportive innovation climate may be better positioned to strengthen firm competitiveness.

For policymakers and support institutions, the results indicate that digital transformation programs for SMEs should not focus only on infrastructure and technology access. While access remains important, the bibliometric patterns suggest that leadership capability, innovation readiness, and strategic use of digital tools are equally critical. This means that public interventions may be more effective when they combine digital adoption support with leadership development, managerial training, and capability-building initiatives tailored to SME conditions.

More broadly, the findings suggest that support for SME digitalization should be designed with a long-term perspective. The shift from reactive themes such as covid-19 and operational survival toward strategic themes such as innovation capability and competitive advantage indicates that SMEs require more than temporary digital solutions. They need sustained support that helps them transform digitalization into lasting organizational value.

This study has several limitations that should be acknowledged. First, the analysis was based solely on the Scopus database. Although Scopus is one of the largest and most widely used sources of peer-reviewed literature, relying on a single database may have excluded relevant studies indexed elsewhere. Second, the study focused only on English-language journal articles within the Business, Management and Accounting subject area. This decision improved consistency, but it may also have reduced the visibility of relevant contributions published in other languages, document types, or disciplinary categories.

Third, the bibliometric analysis was conducted using Scopus Analyze Search Results and VOSviewer, with a co-occurrence analysis based on all keywords. While this approach is appropriate for mapping the structure and evolution of a research field, it does not provide the same depth of interpretive insight as a full systematic review with detailed manual coding of article content. As a result, the study is better suited to identifying patterns, themes, and research

directions than to drawing strong conclusions about causal relationships or detailed theoretical mechanisms.

Future research could address these limitations in several ways. Subsequent studies may combine bibliometric mapping with systematic content analysis to examine how digital leadership is conceptualized and operationalized in SME research more deeply. Comparative studies across countries, sectors, or stages of digital maturity would also be valuable in clarifying how contextual conditions shape digital leadership. In addition, future research should give more attention to underdeveloped human-centered themes, including employee adaptation, resistance to change, learning processes, and well-being in digitally transforming SMEs. Such work would help enrich the field and move it toward a more balanced understanding of both strategic and human implications.

## CONCLUSION

This study mapped the development of research on digital leadership in SMEs using bibliometric analysis based on Scopus data and VOSviewer visualization. The results show that the field has grown rapidly in recent years, particularly after 2023, and has developed as an interdisciplinary and internationally distributed body of knowledge. The findings further reveal that the literature is strongly centered on digital transformation and digital technologies, indicating that digital leadership is still embedded within the broader SME digitalization discourse rather than fully established as an autonomous domain.

At the same time, the increasing prominence of keywords such as digital leadership, innovation capability, competitive advantage, digital literacy, and technological innovation suggests that the field is evolving in an important direction. Research attention is gradually moving away from a reactive focus on digital survival and operational adaptation toward a more strategic concern with leadership capability, organizational renewal, and long-term competitiveness. This indicates that digital leadership is becoming more visible as a strategic element in how SMEs navigate digital transformation.

Overall, this study contributes by showing that digital leadership in SMEs should be understood not simply as a matter of technology use, but as an emerging capability linked to innovation, performance, and organizational adaptability. The field is still developing conceptually, but its growing visibility suggests strong potential for future research. Accordingly, further studies are needed to refine the conceptual boundaries of digital leadership, clarify its distinctive role in SMEs, and examine the conditions under which it can generate meaningful organizational and human outcomes.

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