

Research Article

Digital Mindset and the Transformation of Family Business Management in Advancing SMEs' Circular Business Practices toward the SDGs (A Systematic Literature Review)

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Abstract: Global economic developments show the acceleration of the adoption of circular business models, where resource efficiency and waste reduction are the main focuses to answer sustainability demands and SDGs targets. Although this trend is strengthening globally, MSMEs, especially those based on family businesses, are still lagging behind in their implementation, even though digitalization is increasingly opening up opportunities for operational optimization and innovation. The urgency of this research arises from the need to understand how the digital mindset and transformation of family business management can accelerate the readiness of MSMEs in implementing circular business practices. The novelty of this research lies in the integration of the three strategic concepts into a single analytical framework through the Systematic Literature Review (SLR), a perspective that has rarely been combined in previous studies. With the SLR method based on the PRISMA protocol, this study shows that MSMEs already have a strong foundation in the digital mindset, including technology readiness, innovation orientation, and adaptation of digital business models. Family business values have also been proven to support business continuity through knowledge transfer and long-term investment. However, the implementation of circular business practices is still weak, especially in resource cycle management, sustainable product design, and environmental impact measurement. The implication is that the synergy of digital mindset and family business governance can strengthen the transition of MSMEs to a circular economy that directly supports the achievement of the SDGs, especially in the areas of sustainable consumption-production and industrial innovation.

Keywords: Digital Mindset; Family Business; Management; MSME Circular Business Practices; SDGs.

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1. Introduction

In recent years, circular business practices have become a global strategic issue that has driven the transformation of the economic model from a linear *take-make-dispose* to a *reduce-reuse-regenerate* approach. European countries, Japan, and South Korea have integrated the circular economy into national industrial policies, including encouraging companies to recycle materials, create products with a longer lifespan, and develop a low-waste industrial ecosystem (Gajanayake et al., 2024; Neligan et al., 2023). The World Economic Forum (2024) and the Ellen MacArthur Foundation (2025) report show that circular businesses are projected to create trillions of dollars in global economic value through energy efficiency, emission reduction, and sustainability-based technological innovation. This trend is getting

stronger after the emergence of the *green transition agenda* and carbon border adjustment regulations in various countries that directly pressure business people to implement circular practices to remain competitive in the international market (De Angelis, 2024; von Kolpinski et al., 2023).

In the Asian region, including Indonesia, the implementation of circular business is also increasingly visible in the MSME sector, especially in the environmentally friendly fashion industry, food and beverages with *a zero waste concept*, crafts made from recycled materials, and the use of digital technology to reduce residual production. The Government of Indonesia through the Ministry of Industry, the Ministry of Cooperatives and SMEs, and Bappenas are intensively strengthening circular economy initiatives as part of the strategy towards Net Zero Emission 2060 and the achievement of the SDGs. Various business media and ministry reports in 2024–2025 highlight the increase in circular startups, the growth of the recycled product marketplace, and the adoption of digital technologies such as IoT and AI for industrial waste management. While these dynamics point in a positive direction, there is also a gap between the global macro narrative and the readiness of MSMEs to understand and apply circular business principles.

In an ideal situation, MSME actors are able to make circular business practices as a core operational model to create economic value while minimizing environmental impact. A mature implementation of circular business allows MSMEs to optimize the use of resources, extend the product life cycle, and reduce production costs through material efficiency (Capponi & Castaldi, 2025; Ezeudu & Kennedy, 2024; Pham & Vu, 2024a). This model also opens up opportunities for business diversification through environmentally friendly product innovation, industrial symbiosis, and the use of waste as a new resource. Globally, the circular economy has been proven to increase productivity and business competitiveness, as reported by the Ellen MacArthur Foundation (2025) that the circular model is able to generate sustainable economic growth without adding to environmental pressures.

Nikam & Melati, (2023); Pham & Vu, (2024b) stated that MSMEs need strong digital capacity so that the integration between *digital mindset* and circular business principles can run synergistically. Digital technologies such as the Internet of Things (IoT), big data, artificial intelligence, and digital platforms play an important role in strengthening material tracking, minimizing waste, and improving supply chain optimization. With the support of digitalization, circular practices are not only a sustainability strategy, but also a source of innovative excellence through improving the quality of products and services. The OECD (2024) emphasizes that digitalization accelerates the implementation of the circular economy through energy efficiency and transparency of the production process.

In addition, family businesses have great potential to become a key driver of long-term sustainability through values, cross-generational commitments, and future-oriented investments. A solid family structure can foster a circular business culture as part of everyday business identity and practices, not just an adaptive strategy. (Basco et al., 2021; Gomez-Mejia et al., 2020; Ramírez et al., 2021) found that family businesses have a stronger tendency to adopt sustainability practices due to the drive to pass on values and assets to the next generation. This condition provides a strong opportunity for family MSMEs to internalize circular principles consistently.

(Megawati et al., 2024; Muafi & Sugarindra, 2023; Zhaksybayeva et al., 2024) added that the implementation of circular business by MSMEs has a direct relationship with the achievement of various SDGs targets, especially SDG 8, SDG 9, SDG 12, and SDG 13. The circular economy supports the creation of sustainable economic growth, the reduction of carbon emissions, the improvement of production efficiency, and the change in consumption patterns towards a more responsible direction. (Muzamwese et al., 2024) emphasized that MSMEs that adopt a circular model tend to be more resilient to market volatility and changes in environmental policies. Thus, the transformation towards a circular economy is a strategic path that is able to strengthen the contribution of MSMEs in achieving the SDGs in a systemic and sustainable manner.

Unfortunately, reality shows that the implementation of circular business in MSMEs still faces various structural and operational obstacles. One of the biggest challenges is the limited understanding and literacy of the circular economy concept itself (De Angelis, 2024; Ezeudu & Kennedy, 2024; von Kolpinski et al., 2023). Many MSME actors have not been able to translate the principles of *reduce-reuse-recycle*, *design for circularity*, and material efficiency into daily business practices. (Capponi & Castaldi, 2025) revealed that more than 60% of MSMEs in developing countries do not have adequate knowledge about product lifecycle planning and waste management as a new economic asset. This condition shows that there is a fundamental understanding gap that hinders the transformation towards a more sustainable business model.

The next challenge is related to the lack of technological capacity and funding to carry out environmentally friendly innovations (Muzamwese et al., 2024; Nikam & Melati, 2023; Pham & Vu, 2024b). Although digitalization is becoming more widespread, the majority of MSMEs are still in the early stages of technology adoption, so they are not able to utilize digital technology to support emission measurement, material tracking, or sustainable supply chain strengthening. (Megawati et al., 2024; Muafi & Sugarindra, 2023) explained that barriers to initial investment costs and low digital skills make it difficult for MSMEs to adopt technology to support the circular economy, both in the production, distribution, and post-production processes. As a result, circular practices are often perceived as an additional cost burden, rather than as a competitiveness-enhancing strategy.

(Zhaksybayeva et al., 2024) added that family-based MSMEs present additional dynamics that are not always in line with circular transformation. Many family businesses still prioritize traditional operating patterns, intuitive decision-making, and minimal management system updates required for sustainable change. (Dey et al., 2022; Perramon et al., 2024; Rizos & Bryhn, 2022) show that although family businesses have a long-term orientation, they tend to be slow to adopt new business models due to attachment to old practices and the low readiness of the next generation to manage sustainable innovation. This condition strengthens the gap between the global demand for circular practices and the real readiness of family MSMEs in the field.

The strategy to solve the above challenges needs to strengthen the digital mindset as the main foundation in accelerating the readiness of MSMEs towards circular business practices (Nitsche et al., 2023; Rohwer et al., 2023; Sarwar et al., 2024). This transformation not only focuses on the operability of digital devices, but further instills a proactive mindset that is data-driven, experimental, and oriented towards continuous innovation. For this reason, a

structured learning curriculum is needed including microlearning about *data analytics*, *digital supply-chain*, and *product-life tracking*, accompanied by an *action learning* program that allows MSMEs to implement one technology-based circular innovation directly in the field (Annisa et al., 2023; Krohn & Jantos, 2022). The implementation of this strategy must be supported by the availability of basic-level *digital tools* such as inventory optimization applications, circular marketplace platforms, and simple emissions dashboards that are easily accessible. Indicators of success include an increase in the use of data in decision-making, the frequency of digital tool updates, and an increase in the digital literacy score of MSMEs after the intervention.

In line with that, the professionalization of family business governance is needed to create a managerial structure that is able to accommodate circular and digital innovations without letting go of the family's distinctive values. This restructuring includes the establishment of a *family charter* that explicitly contains a vision of sustainability, the appointment of an external advisory board on digital and circular issues, and the formulation of a *competency-based job profile for the next generation so that the succession process runs objectively and capacity-based* (Erdogan et al., 2020; Kandade et al., 2021). Human resource development interventions such as competency assessments, mentoring programs, and long-term incentive schemes need to be aligned with the family's business environment and economic targets. The success of this strategy can be measured by the level of professionalism of the division of roles, the increasing proportion of competency-based managerial positions, and the involvement of the younger generation in digital and circular initiatives.

Furthermore, MSMEs need to build circular capabilities through product redesign, process innovation, and cyclically-oriented material management. This approach includes reengineering products to make them modular, easy to repair, or use renewable materials; the application of a simple life cycle analysis (LCA) to priority products; to the development of a community-based *take-back* or *reverse logistics* system. Strategic supporters include circular design workshops, pilot projects to process waste into new raw materials, and the formation of clusters between MSMEs that can share treatment facilities and technologies (Ferreira et al., 2021; Maseda et al., 2022; Obermayer et al., 2022; Rovelli et al., 2022). The effectiveness of this strategy can be measured through *the material circularity index*, the reduction of virgin raw materials, and the proportion of products that meet *the criteria for remanufacturing* and repair.

On the other hand, the transformation towards a circular economy requires an innovative financing model that is able to overcome barriers to the initial cost of investment. Circular financing can be facilitated through *blended finance* combining grants, soft credit, and local capital as well as leasing schemes for green equipment and *payoff sharing mechanisms* in energy efficiency projects (James et al., 2021; Qiu & Freel, 2020). The government plays a role in providing microcredit guarantees, tax incentives, and certification of environmentally friendly technologies, while the private sector and CSR can be *co-funders* for pilot projects. Financing evaluations need to take into account the medium-term benefits of waste reduction, energy efficiency, and increased competitiveness. Success indicators include the number of MSMEs receiving green financing, the NPV ratio of circular projects, and *the decreasing payback period* (Cardella et al., 2020; Csákné Filep et al., 2024).

Strengthening this strategy must be supported by an integrated multi-stakeholder collaborative ecosystem. The transformation of MSMEs cannot run without connection with suppliers, buyers, research institutions, technology incubators, and regional regulators.

Implementing practices include the establishment of regional or sector-based circular clusters, the development of marketplaces for recycled products, and shared data platforms to monitor material movements and environmental performance. Local governments can speed up the process by simplifying licensing, expanding waste treatment infrastructure, and providing circular technology pilot centers. The effectiveness of the ecosystem can be measured from the number of collaborative networks, the capacity of circular materials managed per region, and the level of MSME participation in collaborative digital platforms (Glyptis et al., 2021; Sági et al., 2020).

Therefore, all of these strategies need to be directed at a monitoring mechanism that is measurable and in line with the SDGs. MSMEs need to establish key performance indicators (KPIs) which include emission intensity, waste reduction per unit of production, energy efficiency, and economic-environmental contribution to SDGs 8, 9, and 12. In the context of family businesses, governance success can be measured through the completeness of *family governance documents*, the quality of succession processes, and the level of integration of sustainability values in strategic decisions. Monitoring can be done through a KPI-based dashboard that is updated regularly, an annual independent audit, and a *feedback loop mechanism* for continuous improvement. With this alignment, strengthening the digital mindset and transforming family business management not only solves the internal problems of MSMEs, but also makes a real contribution to the circular economy and the achievement of the SDGs in a more systematic manner (Bertschi-Michel et al., 2020; Wahyono et al., 2022).

Although studies related to the circular economy on MSMEs are growing, previous research tends to separate discussions on digitalization, family business management, and circular business practices as stand-alone themes. Most studies only highlight the adoption of digital technologies without considering the characteristics of family businesses that have unique decision-making patterns and long-term orientation (Calabrò et al., 2022). On the other hand, research on family businesses focuses more on succession, family values, and business sustainability, but has not linked them to the need for a transition to a circular economy (Rivo-López et al., 2023). This literature gap shows that there has been no comprehensive research that integrates all three concepts simultaneously, especially in the context of MSMEs in developing countries.

The novelty of this research lies in its approach that combines digital mindset, family business management transformation, and MSME circular business practices in one analytical framework through the PRISMA-based Systematic Literature Review (SLR) method. This integrative approach has rarely been done in previous literature, which generally focuses only on one or two aspects. This research also introduces the perspective that the digital mindset is not only related to the use of technology, but is the foundation for cultural change and family business strategies in encouraging circularity. In addition, novelty lies in the emphasis that family values such as stewardship, long-term investment, and cross-generational orientation have the potential to be social capital that strengthens the transformation towards circular business practices.

The urgency of this research is driven by increasing global pressure to achieve the Sustainable Development Goals (SDGs) 2030 targets, especially in the aspects of sustainable consumption and production. MSMEs, as the backbone of the economy in many developing countries, are at a critical point due to the low adoption of circular business practices and

weak digital readiness (OECD, 2023). This lag creates a risk of losing the competitiveness of MSMEs in the global value chain which is now increasingly demanding sustainability standards. On the other hand, family businesses that are dominant in the MSME structure require management transformation to be able to respond to market changes, efficiency needs, and environmental challenges. Therefore, understanding the relationship between digital mindset and family business management is crucial to create a relevant, sustainable, and adaptive MSME empowerment model.

This research has strategic implications at the academic, practical, and policy levels. Academically, the results of this SLR enrich the literature with a conceptual model that connects digitalization, family business character, and the circular economy in the context of MSMEs. Practically, the research findings provide direction for MSME actors to instill a digital mindset as the basis for business transformation while utilizing family values to strengthen business sustainability and circular innovation. From a policy perspective, this study emphasizes the need for more structured government interventions in the form of digital training, circular innovation incentives, and supporting regulations that strengthen sustainability. Thus, this research provides a scientific foothold to encourage the transition of MSMEs towards a circular economy that contributes significantly to the achievement of the SDGs.

2. Literature Review

Digital Mindset

Digital mindset is operationally defined as the mindset and work orientation of MSME actors in utilizing digital technology for data-based decision-making, process efficiency, and business model innovation. The main indicators include digital awareness, technological adaptability, and digital-based innovation trends. In the context of this research, the digital mindset is understood as a strategic ability that allows MSMEs, especially family businesses, to integrate technology to support circular business practices and accelerate the achievement of sustainability targets (Annisa et al., 2023; Krohn & Jantos, 2022; Sarwar et al., 2024).

Family Business Management

Family Business Management in this study is operationalized as a family business governance mechanism which includes: (1) the structure of roles and authorities between family members, (2) the process of knowledge transfer and succession, and (3) long-term orientation in business decision-making (Basco et al., 2021; Erdogan et al., 2020; Kandade et al., 2021; Obermayer et al., 2022). In the context of circular and digital transformation, Family Business Management is understood as the ability of families to regulate, direct, and support innovation, including the readiness of the next generation, governance discipline, and consistency of family values in encouraging the adoption of technology and sustainable business practices.

MSME Circular Business Practices

MSME Circular Business Practices in this study are operationalized as the ability of MSMEs to manage the resource cycle efficiently through sustainable product design, waste reduction, material reuse, and the use of circular-based business models (reuse, recycle, remanufacture) (Megawati et al., 2024; Perramon et al., 2024; Zhaksybayeva et al., 2024). Technically, these practices include: optimization of the use of raw materials, the implementation of low-emission production processes, the design of modular products that are easy to repair, as well as the measurement of environmental impact through carbon footprint indicators, material efficiency, and waste volumes that are successfully minimized. The focus is on real implementation at the product-process-supply chain level, not just narrative commitments, so that circular business practices are understood as concrete

operational actions of MSMEs in realizing measurable sustainability and in line with the SDGs.

SDGs

In this study, the Sustainable Development Goals (SDGs) are operationalized on four main targets that are relevant for MSMEs, namely SDG 8, SDG 9, SDG 12, and SDG 13, through measurable indicators: (1) sustainable economic performance (income growth, creation of decent jobs); (2) innovation and digitalization capabilities (technology adoption, product redesign for circularity); (3) sustainable consumption–production (waste reduction, use of recycled materials, resource efficiency); and (4) environmental footprint (reduction of emissions and energy intensity). This indicator is used to assess the contribution of digital mindset and family business governance in strengthening MSME circular business practices towards achieving the SDGs.

3. Materials and Method

This study uses the Systematic Literature Review (SLR) approach to analyze the relationship between digital mindset, family business management, and MSME circular business practices in supporting the achievement of the SDGs. The SLR method was chosen because it is able to produce a structured, transparent, and replicable knowledge mapping, making it suitable for examining complex multidisciplinary integrations (Kitchenham et al., 2020). The SLR process follows four main stages, namely identification, screening, eligibility, and final inclusivity, which are visualized through the PRISMA Flow Diagram.

Data Sources

The data was collected from six reputable scientific databases, namely Scopus, Web of Science, ScienceDirect, Emerald Insight, DOAJ, and Google Scholar. Publication restrictions are set for the 2018–2025 period to capture the latest developments related to the digitalization of MSMEs, family business transformation, and the circular economy. The documents analyzed include journal articles, international conference proceedings, and systematic reviews relevant to the research topic.

Search Strategies and Keywords

The search is conducted using a combination of keywords in English and Indonesian with Boolean operators to increase relevance. English Keywords: "digital mindset" AND "family business management" AND "circular business practices" OR "circular economy MSMEs" AND "SDGs" Indonesian Keywords: "digital mindset" AND "family business management" AND "MSME circular business practices" AND "SDGs" Variations of keywords are used to include synonyms and cross-disciplinary technical terms.

Kriteria Inklusi

Articles are selected when they meet the following criteria:

- 1) Explicitly discuss digital mindsets, family business transformation, or circular business practices.
- 2) Relevant to the context of MSMEs, family businesses, or small-medium scale businesses.
- 3) Using empirical methods or strong conceptual studies (quantitative, qualitative, mixed-method, review).
- 4) Contains indicators or discussions about sustainability or SDGs.
- 5) Published in English or Indonesian and available in full-text.

Exclusion Criteria

An article is removed when:

- 1) Focusing on irrelevant digital technical aspects (coding, application design, algorithms).
- 2) Lack of a clear methodology (editorials, opinion articles, comments).
- 3) It is a duplicate that appears in multiple databases.
- 4) It does not discuss sustainability or circular economy aspects.
- 5) Published before 2018 so does not reflect the latest developments.

Selection and Analysis Process

The identification stage begins with the collection of all articles from the database using predetermined keywords. The article then goes through screening to remove duplication and assess suitability based on headings and abstracts. At the eligibility level, a full-text analysis was conducted to determine the fulfillment of the inclusion criteria. The articles that passed were then analyzed using a content analysis approach, focusing on: (a) the role of digital mindset in the transformation of MSMEs, (b) the family business governance mechanism in business sustainability, (c) the form of circular business implementation in MSMEs, and (d) the contribution of the three to the SDGs. In addition, bibliometric mapping was carried out using VOSviewer to identify research trends, citation patterns, and relationships between keywords in the literature

4. Results and Discussion

Identification of Literature

The initial identification process used a combination of keywords related to digital mindset, family business management, circular business practices, MSMEs/MSMEs, and SDGs, which were searched through six main scientific databases: Scopus, Web of Science, ScienceDirect, DOAJ, Emerald Insight, and Google Scholar. From the initial search, 2,184 articles were obtained that matched the general keywords. The articles cover various topics related to the digitalization of MSMEs, family business transformation, circular economy, and sustainability.

The screening stage is carried out by applying full-text access criteria, the 2018–2025 publication period, and the type of academic document (journal articles, proceedings, and reviews). The results of the first stage of screening resulted in 812 articles that met the criteria for access and publication period. The article was then re-selected based on the relevance of the topic through the identification of titles and abstracts containing elements of digital mindset, family business governance, and MSME circular business practices.

At the eligibility stage, an in-depth abstract analysis was conducted to assess the suitability of the article with the research focus, especially those that integrate the digital dimension of mindset with the transformation of family business management and the implementation of the circular economy, as well as its relationship with the SDGs targets (especially SDGs 8, 9, and 12). After this process, the number of articles was reduced to 61 articles that were considered to have substantial proximity to the research theme.

The final inclusiveness stage is carried out by studying the full-text and evaluating the suitability of the methodology, the context of MSMEs or family businesses, as well as discussions on circular practices. As a result, 8 core articles were obtained that were most relevant and met all SLR criteria. These articles form the main basis for theoretical synthesis analysis and research discussions. In full, it looks like the following image:

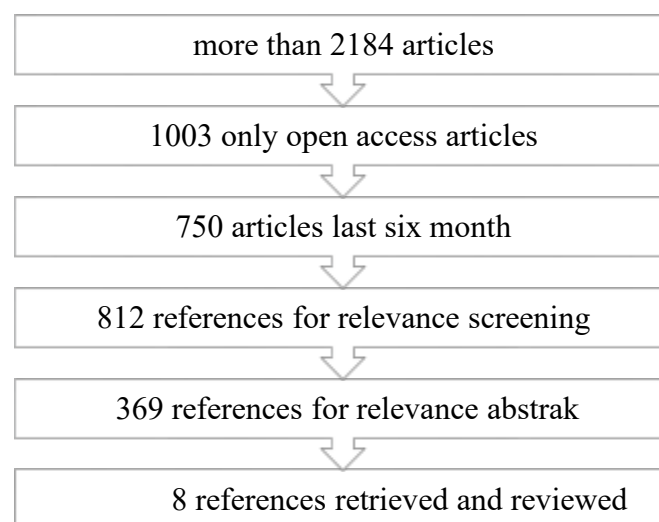


Figure 1. PRISMA Flow Diagram.

Source : processed by researchers, 2025

The results of the selected article review answered the formulation of problems regarding the distribution of journals that discuss Digital Mindset; Family Business Management; MSME Circular Business Practices; SDGs. as follows:

Table 1. Journal Distribution related to Digital Mindset; Family Business Management; MSME Circular Business Practices.

No	Author and Year	Article Title	Method	Relevance to Research Variables
1	Kraus, S., Jones, P., Kailer, N., Weinmann, A. (2021)	<i>Digital Transformation in SMEs: A Systematic Literature Review</i>	SLR	Strengthening the variables of digital mindset, technological readiness, and digital transformation that encourage innovative business models for MSMEs.
2	Aboelmaged, M. (2021)	<i>Circular Economy and SMEs: A Systematic Review and Future Research Directions</i>	SLR	Explain the implementation of circular business practices in MSMEs as well as the obstacles and opportunities towards a circular economy.
3	Hernández-Linares, R. & López-Fernández, M. C. (2018)	<i>Entrepreneurial Orientation and Family Business Performance: A Meta-analysis</i>	Meta-analysis	Relevant to the transformation of family business management, family values, and its influence on business sustainability.
4	Kraus, S., Durst, S., Ferreira, J.J., Veiga, P. (2022)	<i>Digitalization and Family Firms: A Systematic Literature Review</i>	SLR	Connecting digital mindset and family business management, especially in the adoption of technology in family businesses.
5	Del Giudice, M., Scuotto, V., et al. (2021)	<i>Digital Knowledge and Innovation in SMEs: The Role of Family Influence</i>	Empirical	Explain how family values, knowledge transfer, and digital innovation affect the transformation of family businesses.
6	Rizos, V., Tuokko, K., & Behrens, A. (2017)	<i>Barriers and Drivers to Circular Economy in SMEs</i>	Empirical	It is relevant to the obstacles to the implementation of circular business practices and the readiness of MSMEs towards a sustainability model.
7	Raut, R., Gardas, B., Jha, M. (2019)	<i>Sustainable Supply Chain and Circular Economy Practices in SMEs</i>	Mixed Method	Supporting analysis on resource cycle management, sustainable production, and environmental impact of MSMEs.
8	Poponi, S., Fratocchi, L., et al. (2023)	<i>Family Business and Sustainability Transition: A Systematic Review</i>	SLR	Linking family business management to the sustainability transition, relevant to the direction of research towards the SDGs.

Source : processed by researchers, 2025

The results of the literature review show that research on digital mindset, family business management, and circular business practices of MSMEs has developed through various methodological approaches, especially Systematic Literature Review, empirical studies, and meta-analysis. In general, the literature emphasizes that the digital mindset is an important

foundation for MSMEs in facing business transformation, especially through technology readiness, innovation orientation, and digital model adaptation. On the other hand, family business management has proven to play a strategic role in business sustainability through knowledge transfer, family values, and adaptability to digitalization. Meanwhile, research related to the circular economy on MSMEs highlights that there are still strong obstacles in resource management, sustainable design, and the integration of circular economy principles. Overall, the distribution of this article shows that there is a mutually reinforcing connection between digital mindset, family business governance, and MSMEs' readiness towards circular business practices that contribute to the achievement of the SDGs, as well as identifying research gaps related to the integration of the three concepts in one analytical framework.

These findings confirm that research trends are increasingly leading to the integration of digital mindsets, family business management, and circular business practices as the foundation for the transformation of MSMEs towards sustainability. However, studies that explicitly link the three variables in a single analytical framework are still very limited, thus reinforcing the urgency of this study to present a more comprehensive perspective on the role of digitalization and family business governance in driving the transition to a circular economy based on SDGs. The researcher also identified articles based on year, keywords, and references through bibliometric visualization using VOSviewer, as follows

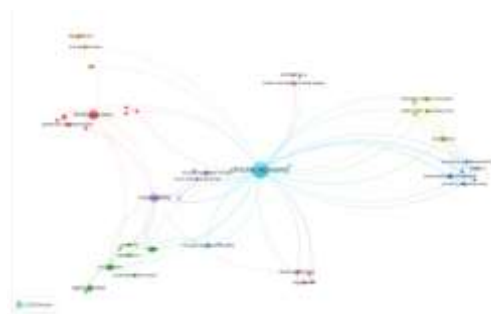


Figure 2. references retrieved and reviewed.

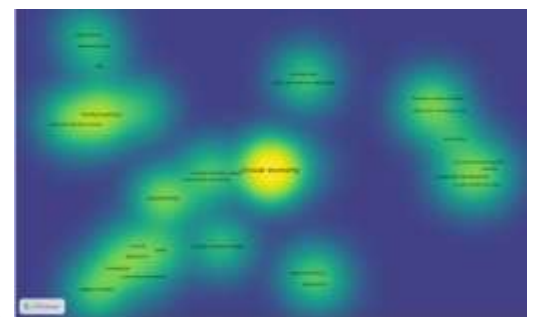


Figure 3. Article Filtering Flow Chart.

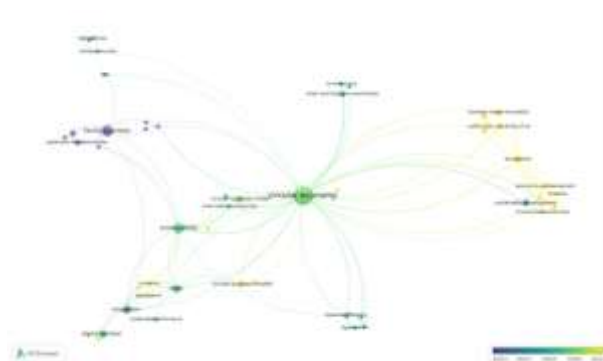


Figure 4. articles 2019-2025.

The results of bibliometric visualization through VOSviewer show that the circular economy is the core cluster with the highest level of connectivity, indicating that the circular economy issue has become the main axis in MSME research in recent years. Terms such as circular business models, resource efficiency, and sustainable development emerged as the closest nodes, indicating that the global academic focus has shifted to operational strategies that drive resource efficiency and business model innovation. These findings support the urgency of the research because it shows that the circular economy is the dominant framework in sustainability discussions, but it has not been comprehensively associated with the context of family business transformation and the digital mindset of MSMEs.

The keyword group in the bottom-left part of the visualization shows the digital mindset, innovation, digitalization, and sustainable performance clusters that are interconnected with the SME node. This pattern of connectivity confirms that the literature is beginning to recognize the importance of digital orientation as the foundation of MSME innovation, but the position of its cluster on the margins shows that research on the role of digital mindset is still supportive, not yet the main discourse. This strengthens the research gap that digital mindset has the potential to be an important driver in accelerating the implementation of circular business practices, but its integration in the circular economy framework of MSMEs is still relatively rarely explored in depth.

The family business cluster is in a fairly strong position but is still separate from the circular economy cluster, with connections mainly in systematic literature review, entrepreneurship, and SME. This pattern shows that family business research focuses more on governance, internal values, knowledge transfer, and business stability, but has not been directly linked to the transition to a circular economy. The lack of connectivity between family business and circular economy on the bibliometric map confirms the scientific gap that the contribution of family business values (continuity, long-term orientation, stewardship) to circular business practices still does not receive adequate academic attention. This is the space for this research's contribution to integrate digital mindset and family business management transformation to strengthen MSME circular economy practices that are in line with the SDGs agenda.

Discussion

The role of digital mindset in MSMEs in encouraging the implementation of circular business practices

The results of the bibliographic analysis using VOSviewer show that the concept of digital mindset occupies a central position in the research cluster related to MSME transformation, with strong connections to keywords such as innovation capability, technology readiness, digital transformation, and sustainability practices. The co-flow mapping shows that the digital mindset emerges as a hub that connects the topics of organizational transformation, technology adaptation, and sustainability strategies, indicating that digital orientation is not just a technical aspect, but a cognitive-strategic ability that allows MSMEs to reposition their business models towards more efficient and circular practices. The most dominant "digital capability–innovation–sustainability" cluster indicates that the global literature places the digital mindset as the foundation for improving analytical capabilities, process automation, and data integration in resource management, which are at the core of circular business practices.

These findings are strengthened by previous research showing that digital mindsets increase the ability of MSMEs to optimize resources through digital technology (Goldmann et al., 2025; Novita et al., 2023), expanding sensing seizing capabilities in identifying sustainable innovation opportunities (Santiago & Guo, 2018), as well as accelerating the adoption of reusability-based business models and process efficiency (Allen, 2020). Another study confirms that digital orientation allows MSMEs to develop data-driven decision-making that is critical in monitoring material flow, reducing waste, and measuring environmental impact (Forsythe & Rafoth, 2022). In the context of family businesses, the digital mindset has been proven to help the next generation integrate traditional values with technological innovation, strengthening business continuity while opening up space for transformation towards a circular economy (Dwifani & Fajar Hendarman, 2023). Consistently, the literature concludes that a digital mindset contributes to increased operational efficiency, eco-friendly product innovation, and the integration of technologies such as IoT, big data, and digital platforms that support reduce–reuse–recycle practices.

The synthesis of this research shows that the digital mindset functions as the main enabler that bridges the technological readiness, innovation capabilities, and understanding of MSMEs to the circular business mechanism. Digital orientation not only drives changes in tools and processes, but also forms a framework that is more adaptive to risk, more proactive towards sustainability opportunities, and more strategic in optimizing the product lifecycle. In the context of family-based MSMEs, the digital mindset strengthens the dynamics of managerial transformation through increasing awareness of resource efficiency, waste management, and the potential for new economic value born from circular practices. Thus, the digital mindset becomes an epistemological foundation that allows the integration between digital technology, family business governance, and the implementation of circular business practices, accelerating the contribution of MSMEs to the achievement of the SDGs, especially in the sustainable consumption-production dimension.

Key elements in family business management contribute to the readiness of MSMEs in transitioning to a circular economy

The results of bibliographic analysis using VOSviewer show that keywords such as family governance, succession planning, long-term orientation, knowledge transfer, and organizational resilience form the dominant cluster in the family business management discourse that is most often correlated with the topic of sustainability, circular practices, and digital transformation. This cluster shows that family business management is consistently

mapped as a governance structure that has a long-term orientation, stability characteristics, and a strong value inheritance mechanism, so that it becomes a core part of MSMEs' readiness towards a circular economy. In addition, network visualization indicates a close relationship between innovation capability and family leadership continuity, which strengthens the role of family leadership in directing the adaptation of business models towards circularity, especially when combined with digitalization.

The bibliographic findings are in line with previous research. Sharma & Chua (2020) emphasized that long-term orientation and family values are the strategic foundation for family MSMEs in adopting sustainability practices because business decisions are directed to maintain continuity across generations. De Massis et al. (2021) added that knowledge retention in family businesses strengthens innovation capabilities, including business model innovations that support waste reduction and resource efficiency. In the context of digital transformation, Arzubiaga et al. (2022) found that family businesses with a high level of digital readiness are better able to integrate technology in the production process and resource cycle management, so that the acceleration towards circular business can take place faster. Other research such as Rauh (2023) emphasizes that family governance that is adaptive to technology allows for process optimization, which directly improves the ability of businesses to apply the 3R (reduce, reuse, recycle) principle. This is also reinforced by the findings of Calabrò et al. (2023) which show that the involvement of the younger generation in family management structures accelerates the implementation of circular innovation through a digital approach, especially in sustainable product design and the use of environmental data.

Therefore, this study emphasizes that the core elements of family business management, namely long-term orientation, value inheritance, stable governance, and knowledge transfer mechanisms, are strategic capital that strengthens the readiness of MSMEs in transitioning to a circular economy. When such governance is combined with a digital mindset, the effect is synergistic: family value stability drives sustainability commitment, while digitalization provides the operational instruments to implement it. Thus, the contribution of family business management not only lies in internal sustainability, but also becomes a lever for the structural transformation of MSMEs towards circular business practices that are more mature and aligned with the goals of the SDGs.

The integration of digital mindset and the transformation of family business management can form a strategic framework to strengthen MSME circular business practices in supporting the achievement of the SDGs

Bibliographic analysis using VOSviewer shows that scientific maps related to digital mindset, family business management, and circular business practices form three main clusters with a strong level of connectivity. The first cluster is grouped under the theme of digital transformation, digital capability, and innovation orientation, which emphasizes the crucial role of digital readiness in encouraging efficiency and adaptation of MSME business models. The second cluster is dominated by the concepts of family governance, succession, long-term orientation, and knowledge transfer, showing that family business governance plays a stabilization and sustainability function. The third cluster is centered on the terms circular practices, resource efficiency, remanufacturing, and sustainable product design, which still have a weaker connection distance with the other two clusters. This pattern indicates that the integration between the digital dimension and family business governance into circular business practices has not been optimal in previous studies, thus opening up an important theoretical gap for the contribution of this study.

These findings are reinforced by previous literature. Recent research shows that digital mindset accelerates the transformation of MSMEs through the ability to use technology, data-driven decision making, and business model innovation (Pratama et al., 2022; Li & Wu, 2021). Digitalization has been proven to increase resource utilization efficiency and enable material tracking that supports the implementation of the circular economy (Georgescu et al., 2023). Meanwhile, studies on family business explain that typical values of family businesses such as continuity orientation, legacy preservation, and relational trust encourage long-term investment in sustainability (Astrachan & Jaskiewicz, 2020; Hernández-Linares & López-Fernández, 2023). However, a number of studies underline that family MSMEs tend to be slow to adopt circular practices due to limited digital capabilities and lack of technical knowledge regarding sustainable product design (Nobre & Ferreira, 2022; Ünal et al., 2021).

Thus, the integrative gap between digital capabilities and family governance is still a substantive challenge in accelerating MSME circular business practices.

Based on the researcher's synthesis, the integration of digital mindset and the transformation of family business management can be formulated as a new strategic framework for MSMEs to strengthen circular business practices. The digital mindset functions as an enabler that enhances innovation capabilities and process efficiency, while family management transformation provides stability, long-term direction, and value control mechanisms that support the implementation of circular economy principles. These two dimensions, when combined in one strategic architecture, are able to strengthen the capabilities of MSMEs to optimize the resource cycle, adopt sustainable product designs, and implement environmental impact measurement systems. Thus, the integration of the two not only improves operational readiness, but also directly contributes to the achievement of the SDGs, especially on the goals of sustainable consumption-production (SDG 12) and industrial innovation (SDG 9). These findings affirm the position of this research as a theoretical contribution that fills the gap in the literature and as a strategic recommendation for the development of resilience and sustainable transformation of family-based MSMEs

5. Conclusion

This research emphasizes that the integration of digital mindset and the transformation of family business management is a strategic framework that is able to strengthen the readiness of MSMEs in implementing circular business practices that are relevant to the sustainable development agenda (SDGs). Through the analysis of the Systematic Literature Review based on the PRISMA protocol and bibliometric mapping using VOSviewer, it was found that the literature on digital mindset and family business management has developed significantly and has a strong interconnection to innovation and sustainability. However, the relationship between the two with circular business practices is still relatively loose, so the implementation of the circular economy in MSMEs, especially those based on family businesses, is still in the early stages and has not been structured. This research makes a conceptual contribution by showing that the synergy between digital readiness, family values, and long-term oriented governance can encourage the optimization of resource use, sustainable product design, and the strengthening of innovation capabilities, which directly support the achievement of SDG 9 and SDG 12.

Future research can expand the scope by conducting an empirical approach based on quantitative methods or mixed-method to test the causal relationship between digital mindset, family business governance, and circular business practices in MSMEs in various industrial sectors. In addition, a deeper exploration is needed on mediating and moderating mechanisms such as digital capability, strategic agility, or socio-emotional wealth in mediating the influence of digital variables and family business on the implementation of the circular economy. Follow-up research can also develop a more comprehensive measurement model to assess the maturity level of circular practices in MSMEs, including the integration of environmental, social, and economic indicators. Thus, the next research will not only enrich the academic literature, but also produce policy recommendations that are more applicable for the development of sustainable MSMEs in the context of digital transformation and the circular economy.

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