

Linking Fiscal Strategies to Resilience, Innovation, and Global Competitiveness in Micro, Small, and Medium-Sized Enterprises (MSMEs)

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Abstract

Purpose: This qualitative analysis, based on limited published sources and brief interviews, discusses how effective government policies, budgetary allocations, and strategic fiscal measures can significantly enhance the resilience of micro, small, and medium-sized enterprises (MSMEs) in developing countries. Focusing on targeted budgetary support and interconnected resource allocation can empower MSMEs to adopt advanced technologies and overcome the challenges posed by Industry 5.0. This, in turn, will equip them to thrive in an increasingly competitive global environment.

Design/methodology/approach: The study was developed by applying a thematic analysis (TA) to a limited sample. Seven secondary published interviews of industry leaders and seven first-hand interviews based on a brief one-to-one call with leaders of early-stage MSMEs have been conducted to collect the data. This reflexive TA approach followed the six-phase framework and enabled the systematic generation of themes that captured recurring patterns across the qualitative evidence.

Findings: The analysis reaffirmed prior scholarship by highlighting the significant role of government fiscal strategies in strengthening MSMEs' resilience, fostering technological innovation, and advancing global competitiveness. Themes emerging from this reflexive TA indicated that targeted budgetary measures such as improved credit access, investment in digital infrastructure, and workforce upskilling act as critical enablers for MSMEs to navigate the challenges of Industry 5.0. The findings further proposed a suggestive conceptual framework, still exploratory in nature, showing how fiscal policies work in an interconnected manner, collectively supporting the global competitiveness of MSMEs in developing economies.

Research limitations/implications: The framework proposed in this study is based on a small qualitative dataset, which limits its generalizability and has not undergone empirical testing. The study did not advance any empirically testable hypotheses or propositions from this framework, which further constrains the broader applicability of the findings. It offers policy-relevant insights by outlining how MSMEs could enhance resilience and global competitiveness, drawing on both the current findings and prior studies in the field.

Originality/value of paper: This study synthesizes industry insights and policy analysis to demonstrate how government actions influence MSMEs in developing countries. Existing literature has emphasized that global competitiveness among MSMEs is closely tied to innovation and technological adoption. Building on this foundation, our reflexive TA extends prior insights and proposes a suggestive conceptual framework. Given the limited dataset and the constraints on generalizability, this framework should be regarded as exploratory rather than definitive. Our findings advance understanding by highlighting how fiscal strategies may shape resilience, innovation, and competitiveness in MSMEs.

Categories: SME Entrepreneurship, Strategic finance, Trade and economic development

Keywords: msme, resilience, union budget, technological adoption, financial accessibility, digital transformation, innovation, skill development, infrastructure investment

Introduction

Micro, small, and medium-sized enterprises (MSMEs) are vital components of the global economy, contributing significantly to job creation, innovation, and economic growth (Algan, 2019), (Gherghina et al., 2020). Their role is increasingly recognized as essential for fostering economic dynamism and entrepreneurial spirit across various sectors. However, as the business environment evolves, MSMEs face mounting challenges related to vulnerability and resilience. The interplay of economic fluctuations, technological advancements, and environmental pressures has intensified the need for businesses to adapt and build robust resilience strategies (Williams et al., 2017).

In this context, Industry 5.0 introduces a transformative paradigm that reshapes the operational

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landscape for MSMEs. Industry 5.0 emphasizes human-machine collaboration, aiming for a more personalized production approach and aligning business practices with broader societal goals (Bucci et al., 2024), (Patil et al., 2024), and (Mourtzis and Wang, 2024). This new industrial era highlights the integration of advanced technologies with human skills to drive innovation and sustainability, pushing MSMEs to adapt to these changes rapidly.

With limited resources, uneven digital adoption, and cybersecurity gaps, the MSMEs are often heightened by technology vulnerabilities impacting operations, security, and competitiveness. MSMEs must also develop the ability to withstand shocks and uncertainties and to grow stronger, adapt, and innovate. This resilience in MSMEs will help them leverage crises such as policy shifts, market disruptions, or pandemics as opportunities to diversify, digitize, and build more sustainable business models. The resilience in MSMEs are needed to be tackled in a planned way.

In MSMEs, their capacity to reorganize and innovate in response to disruptions, ensuring continuity and growth in an uncertain environment, builds adaptive resilience. Discussing the interplay between adaptive resilience and technological vulnerability is crucial, as it provides practical insights into how MSMEs can effectively manage disruptions and scale their operations (Tajpour et al., 2025). Understanding these dynamics is essential for developing strategies that not only address immediate challenges but also foster long-term growth and sustainability.

There is still limited evidence on how MSMEs develop resilience through digital transformation strategies and technology adoption especially in developing countries, which requires critical examination (Sagala and Öri, 2024).

MSMEs prioritize financial assistance as the most crucial support for overcoming these challenges, highlighting the vital role of accessible funding in facilitating technological adoption (Carayannis et al., 2025). Future research should focus on developing a practical resilience model specifically designed for MSMEs operating in resource-constrained environments-developing economies (Crespo et al., 2025).

As the question remains, how can MSMEs, particularly in developing nations, adopt technology, drive innovation, and build resilience to sustain and serve their clients effectively?

From this gap, the objective of the present study is set to explain and propose a conceptual framework aimed at transforming MSMEs by enhancing their resilience and fostering technological innovation. In pursuit of this objective, we explored how strategically planned and effectively allocated budgetary measures can act as a critical lever for reshaping the future of MSMEs in developing economies.

We formulated research question to structure our inquiry and applied a qualitative approach to analyze and reach the explanatory power of the phenomenon of inquiry. By examining insights from industry players, this study offers actionable suggestions for MSMEs and policymakers to overcome technological vulnerabilities and leverage adaptive resilience.

Research question: How can fiscal strategies enhance the resilience and technological advancement of MSMEs in developing economies within the Industry 5.0 paradigm?

Research Method

Given the exploratory nature of this phenomenon and the research question, this qualitative research demands an ongoing interaction with the dataset and a thorough understanding of the research context to derive meaningful insights (Mansourian, 2008). Thematic analysis (TA) was chosen as the most appropriate method to uncover patterns and insights; this approach enabled a structured yet flexible examination (Nowell et al., 2017) of how budgetary measures influence technological adoption, innovation, and resilience-building in SMEs. By analyzing narratives from primary interviews and relevant expert interview commentary from published sources, the study aimed to generate a grounded conceptual understanding of the phenomenon under investigation.

Study design

Reflexive TA was employed to generate themes, using an inductive, data-driven coding approach (Ayre and McCaffery, 2022). This iterative-reflexive cycle gradually leads to a sharper analytical focus and deeper understanding (Srivastava and Hopwood, 2009). In this study, the analysis was guided by a reflexive perspective, with the researcher maintaining ongoing self-awareness and critical engagement throughout the interpretative process.

TA was used as the analytical approach to identify and connect emergent themes; the study seeks to construct a conceptual framework (Figure 1) that illustrates how targeted and well-executed budgetary interventions can foster innovation and strengthen resilience in the SME sector.

TA is a fundamental and versatile approach in qualitative research that allows researchers to uncover, examine, and interpret recurring patterns of meaning (themes) within datasets. It is particularly well-suited for explanatory qualitative studies aimed at exploring how individuals perceive and react to complex phenomena in specific contexts (Nowell et al., 2017). Unlike purely descriptive methods, TA supports both inductive and deductive reasoning, making it especially effective for investigating how different stakeholders understand and respond to policy measures or institutional interventions. TA was refined by scholars such as Virginia Braun and Victoria Clarke (Braun and Clarke, 2006), (Braun and Clarke, 2020). This analytical method maintains transparency and rigor while preserving the depth of qualitative data, making it well-suited for generating meaningful insights in studies focused on policy impact and stakeholder reactions (Terry et al., 2017), (Clarke and Braun, 2018).

Representative datasets

To ensure the relevance and rigor of the study, both primary and secondary datasets were selected based on inclusion criteria aligned with the central research question. This dual approach in data collection facilitated data triangulation (Jentoft and Olsen, 2017), strengthened the study’s credibility, and contributed to the conceptualization of a framework addressing the research question.

Following the perspective of Braun and Clarke (Braun and Clarke, 2019), the study relied on the principle of information power (Malterud et al., 2016) rather than seeking data saturation. The seven primary interviews, supported by seven secondary ones, provided sufficient richness and diversity to generate themes that meaningfully addressed the research aims.

For primary data, a criterion-based purposive sampling strategy was employed. Entrepreneurs were selected based on their active involvement in managing MSMEs and their firsthand exposure to the effects of recent fiscal policy measures. Respondents were also required to have at least three years of operational experience to ensure depth and relevance of insights.

For secondary data, only those established industry-experts’ published interview have been documented and analyzed where they have discussed the role of fiscal policy for MSMEs competitiveness. The secondary data from the year 2024 were considered. The selection criteria for both the datasets focused on sources that provided contextual analysis, policy impact assessments, or sectoral insights relevant to SME development and fiscal strategies in developing economies.

	Dataset: secondary
(Mansharamani, 2024)	The discussed budget represents a momentous for MSMEs, offering opportunities to strengthen resilience, embrace future trends, and tackle prevalent challenges.
(Sagar, 2024)	Highlighted the critical opportunity this budget represents for transforming India’s refractory industry. According to Sagar, strategic budgetary allocations can be pivotal in propelling the industry to new heights, enhancing its capacity, and addressing significant challenges.
(Chowdhry, 2024)	Has highlighted that substantial budgetary allocations are needed to develop talent and ensure a skilled workforce that can sustain and enhance India’s manufacturing capabilities.
(Doshi, 2024)	Emphasized that the Union Budget 2024 represented micro, small, and medium enterprises (MSMEs) in leveraging warehouse automation to enhance efficiency and competitiveness.
(Gaurav, 2024)	Emphasized the crucial role of skill development in overcoming challenges and driving industry progress. Despite facing global economic pressures and supply chain disruptions, India’s manufacturing sector has continued to meet and exceed international quality standards. However, significant skill gaps remain a major obstacle to realizing the full potential of this sector
(Anil, 2024)	Highlighted its key impacts on employment, investment, and innovation. As the first full budget of the new government, it represents a balanced approach aimed at addressing various economic priorities while maintaining fiscal discipline.
(Goyal, 2024)	Reiterated that strategic allocations and policies aim to foster an environment conducive to innovation, job creation, and sustainable development. Here are the key takeaways and their potential impacts on the MSME sector and the broader economy.

TABLE 1: Dataset: secondary

Source: (Mansharamani, 2024), (Sagar, 2024), (Chowdhry, 2024), (Doshi, 2024), (Gaurav, 2024), (Anil, 2024), (Goyal, 2024)

In Table 1, we have summarized expert interviews and responses across columns detailing the source

and expert opinions. This secondary data, collected from published sources, captures the insights and perspectives of industry experts in response to the research question. The dataset included seven carefully selected published interviews with MSMEs leaders (Table 1), sourced from credible and reliable electronic platforms. In addition, seven primary short interviews were conducted and MSMEs owners' responses were collected through electronic interviews. These provided rich, context-specific insights into the lived experiences and strategic perspectives of small enterprise stakeholders.

The dataset was thematically analyzed in detail to identify recurring fiscal priorities and policy directions relevant to SME advancement. The analysis revealed six key themes: financial support, skill development, infrastructure development, building new market opportunities, global competitiveness, and fostering innovation (Table 2, Tables 3, Table 4, and Table 5). These themes reflect how the Union Budget is widely perceived as a strategic intervention to strengthen SME competitiveness, sustainability, and innovation potential.

Data collection and analysis

Online platforms (Google meet) and digital platform (Whatsapp) were utilized for data collection because they help reduce costs, improve efficiency, and minimize errors during analysis (Tate and Smallwood, 2021). Microsoft Word was used to compile and organize the transcribed data, while Microsoft Excel supported the coding process by facilitating the identification of recurring patterns, the creation of codes, and the development of key themes and subthemes through TA. This approach provided a systematic yet flexible method for managing data, enhancing the reliability, depth, and interpretive rigor of the findings (Meyer and Avery, 2009), (Bree and Gallagher, 2016).

To efficiently manage and analyze a large volume of qualitative data, this study employed a cost-effective and systematic TA approach using Microsoft Office tools. This method, recommended by previous researchers, offers a transferable framework well-suited for analyzing interview transcripts and other textual data (Bree and Gallagher, 2016).

Phases	Thematic Analysis (TA) followed in the current study
Phase 1: Familiarization with Data	Revisiting the dataset and individual data items involved noting emerging ideas and systematically cross-checking the recorded responses. This process was iterative, requiring continual movement back and forth through the collected data to ensure thorough analysis and consistency.
Phase 2: Generating Initial Codes	We carefully examined each data item from the dataset, including both primary and secondary interview responses. The responses were coded to develop themes aligned with our research question. This process was not highly time-consuming, as the dataset was concise and comprised clear, manageable responses.
Phase 3: Searching for Subthemes and Themes	We identified and separated recurring codes found in the majority of participants' responses to develop subthemes, which were recorded on a separate sheet. Once patterns emerged among these subthemes, we grouped them under broader, representative themes that directly addressed our research question. This process was more time-consuming in our TA based research, particularly when aligning subthemes under overarching themes. To ensure coherence and relevance, we continuously referred back to our research question.
Phase 4: Reviewing Themes	We cross-checked the identified themes with the overall dataset to ensure consistency and relevance. The themes were clearly aligned with our research question. Subthemes were formally documented first, which then informed the development of the final themes.
Phase 5: Defining the Themes	In the theme-defining phase of our TA, we consolidated the coded responses into subthemes (not for each individual data item) and then integrated these subthemes into broader, representative themes that effectively captured the essence of our research question.
Phase 6: Producing the Report	In this phase, we connected our findings to the research question, compared them with relevant literature and previous studies, and thoroughly discussed them in light of the rigorous insights drawn from our data. We also reflected on how our sample responded and interpreted the issues, ensuring a well-rounded analysis.

TABLE 2: Phases of Thematic Analysis for capturing themes on the role of budget allocation in supporting SME sustainability and resilience in Industry 5.0*

Developed by authors from TA literature (Braun and Clarke, 2006). SME, small, and medium-sized enterprise

*Industry 5.0 emphasizes human-machine collaboration, integrating data-driven technologies with human creativity to build sustainable, resilient, and personalized production systems (Maddikunta et al., 2022). For MSMEs, this highlights the growing importance of data utilization in fostering innovation and competitiveness

Results

Industry insight

Indian small business owners are increasingly turning to technology as a means to scale their operations and enhance efficiency in an era of industry 5.0.

The founder 1, who owns a Textile Manufacturing Unit and has invested in automating textile manufacturing processes, has seen significant improvements in production efficiency and quality control. Founder 1, responded, *"Investing in technology was a turning point for us. By automating our production processes, we not only increased efficiency but also reduced errors, allowing us to scale up production without compromising on quality."*

Founder 2, who owns a handicrafts e-commerce store, has leveraged online sales platforms to expand her market reach beyond local boundaries, tapping into national and international customers. Founder 2 emphasized, *"The shift to online sales has opened up new markets for us. We no longer rely solely on local customers; now, we can reach buyers across the country and even internationally, which has significantly boosted our sales."*

Founder 3, who is the owner of a small food processing business, is able to connect directly with customers and tailor his food processing business offerings based on feedback. Founder 3 has shared with us, *"Adopting digital marketing strategies has helped us connect with our customers directly. We use social media to showcase our products, and the feedback we receive helps us tailor our offerings to meet their needs."*

Co-founder of a Sustainable Fashion Brand; it differentiates itself by focusing on eco-friendly practices, appealing to environmentally conscious consumers. According to respondent Founder 4, *"Sustainability is at the core of our business. By using eco-friendly materials and practices, we not only attract conscious consumers but also differentiate ourselves in a crowded market."*

Meanwhile, Founder 5, of a local electronics repair shop, has streamlined operations through online booking, improving customer convenience and workload management. The participant, Founder 5, added, *"We started offering online booking for repairs, which has streamlined our operations. Customers appreciate the convenience, and it has allowed us to manage our workload more effectively."*

Founder 6 of a Beauty Salon Chain has used mobile app-based loyalty programs to foster repeat business, strengthening client relationships. Participant Founder 6 shared, *"We implemented a customer loyalty program through a mobile app, which has significantly increased repeat business. Technology has enabled us to build stronger relationships with our clients."*

In the construction sector, Founder 7, of a Construction Firm, has embraced project management software to enhance team communication and ensure timely project completion. F7 responded, *"Leveraging project management software has transformed how we operate. It helps us track progress in real-time and communicate better with our teams, ensuring projects are completed on time"* (Table 3).

These small initiatives by MSMEs working on the ground demonstrate their determination to sustain and thrive through strategic moves and technology adoption. Taken together, these insights highlight how small business owners across diverse industries are strategically adopting technology not only to improve efficiency and market access but also to differentiate themselves in competitive environments. Whether through automation, digital platforms, sustainable practices, or customer-focused innovations, these cases demonstrate that technology serves as a critical enabler of growth, resilience, and long-term competitiveness for Indian MSMEs.

Primary respondents	Response from primary respondents
Founder 1	"Investing in technology was a turning point for us. By automating our production processes, we not only increased efficiency but also reduced errors, allowing us to scale up production without compromising on quality." - generated theme <i>Building new market opportunity</i>
Founder 2	"The shift to online sales has opened up new markets for us. We no longer rely solely on local customers; now, we can reach buyers across the country and even internationally, which has significantly boosted our sales." - generated theme <i>Building new market opportunity</i>
Founder 3	"Adopting digital marketing strategies has helped us connect with our customers directly. We use social media to showcase our products, and the feedback we receive helps us tailor our offerings to meet their needs." - generated theme <i>Building new market opportunity</i>
Founder 4	"Sustainability is at the core of our business. By using eco-friendly materials and practices, we not only attract conscious consumers but also differentiate ourselves in a crowded market." - generated theme <i>Global competitiveness</i>
Founder 5	"We started offering online booking for repairs, which has streamlined our operations. Customers appreciate the convenience, and it has allowed us to manage our workload more effectively." - generated theme <i>Global competitiveness</i>
Founder 6	"We implemented a customer loyalty program through a mobile app, which has significantly increased repeat business. Technology has enabled us to build stronger relationships with our clients." - generated theme <i>Global competitiveness</i>
Founder 7	"Leveraging project management software has transformed how we operate. It helps us track progress in real-time and communicate better with our teams, ensuring projects are completed on time." - generated theme <i>Global competitiveness</i>

TABLE 3: First-hand responses from primary respondents, founders of MSMEs

Collected by authors. MSME, micro, small, and medium-sized enterprise

Note: All seven interviews were conducted online via Google Meet in March 2024. Recordings were manually replayed and relevant segments aligned with the research question were selectively transcribed into Word, then coded in Excel for theme generation. In addition, asynchronous communication via WhatsApp was used multiple times to clarify doubts and refine responses, thereby ensuring clearer and more meaningful data.

From above section of the shared transcript, two main themes were generated: F1–F3 reflected theme- Building new market opportunity, while F4–F7 reflected theme Global competitiveness.

Triangulated data sources and theme generation

Based on triangulated data sources, including primary data and secondary data, TA was conducted. First, multiple subthemes were identified from the datasets, then representative main themes were named for the subthemes. The findings are organized into main themes that capture the core concerns and perspectives of the respondents (see Table 4, Table 5, Table 6) answering our research question.

In this process, subthemes were subsequently merged to represent overarching thematic categories, reflecting critical fiscal strategies supporting MSME advancement. Further identified themes leading to the conceptualization of a framework (Figure 1).

Financial support
1. Targeted financial support
2. Enhanced credit access
3. Tax incentives for the business investing in innovation
4. Product link incentive
Skill development
1. Talent development
2. In-house training program
3. Build collaboration with industry and institution
4. Incubation centers
5. Multi-pronged approach
6. Remote teaching facility using internet and e-learning

TABLE 4: Exploring themes and subthemes in the global resilience of MSMEs

Identified by the authors. MSME, micro, small, and medium-sized enterprise

Source: Based on primary interviews and published expert insights

Table 4 presents two key themes, *Financial Support* and *Skill Development*. Each derived through TA of primary interviews and published expert insights.

Coded and captured subthemes such as *targeted funding*, *credit access*, and *tax incentives for innovation* were grouped all together and gave rise to the main theme of *Financial Support*. Similarly, subthemes such as *talent development*, *in-house training*, and *incubation centers* were identified and generated the main theme of *Skill Development*.

Financial support (Table 4) for MSMEs is reinforced through several key subthemes that directly address funding challenges for MSMEs in a way that promotes technological advancement and resilience. The findings highlighted targeted financial support to ensure that the aid is directed toward vulnerable enterprises and in a way that enables them to be armed with technology and build their capacity.

Enhanced *credit access* through collateral-free loans and credit guarantees improves liquidity, allowing MSMEs to adopt digital tools and expand operations without financial strain. *Tax incentives* for businesses investing in innovation reduce the cost of R&D and technology upgrades, making innovation more financially viable. *Production-linked incentives (PLI)* further motivate MSMEs to modernize and scale by rewarding increased output and performance, encouraging the adoption of efficient, tech-enabled production systems. The repeated emphasis on tax incentives highlights a layered policy strategy aimed at supporting innovation at multiple stages. Collectively, these measures create a strong financial foundation that enables MSMEs to pursue technological transformation and build long-term resilience.

Skill development (Table 4) for MSMEs can be effectively achieved through several interlinked subthemes that focus on enhancing human capital and fostering innovation. *Talent development* involves identifying and nurturing the specific skills needed for digital transformation, helping SME employees adapt to new technologies and business models. *In-house training programs* allow businesses to upskill their workforce with tailored content, ensuring that employees are equipped with relevant technical and operational knowledge. *Collaboration with industry* and academic institutions facilitates knowledge exchange, access to research, and exposure to best practices, strengthening the innovation ecosystem. *Incubation centers* provide mentorship, technical support, and infrastructure for entrepreneurs, enabling the development and commercialization of new ideas. A *multi-pronged approach* integrates various strategies-formal education, on-the-job training, and mentorship-to build comprehensive skill sets. Additionally, *remote teaching facilities* using internet and e-learning platforms expand access to learning, especially for MSMEs in remote or underserved areas. Together, these initiatives build a skilled workforce capable of driving technological adoption and enhancing the resilience of MSMEs.

Infrastructure development
1. Establishing manufacturing power houses
2. Local sourcing centers
3. Collaboration with industry and institutions results in talent development
4. Entrepreneurial program
5. Upskill to remote learners-it is possible with eLearning platform
Building new market opportunity
1. Digital tools
2. Technology advancement
3. Investment in research and innovation
4. Investment in recycling technology
5. Focus on emerging technology, robotics, and machine learning
6. Reduce paper work
7. Reduce compliances
8. Reduced documentation

TABLE 5: Exploring themes and subthemes in the global resilience of MSMEs

Identified by the authors.

Source: Based on primary interviews and published expert insights. MSME, micro, small, and medium-sized enterprise

Table 5 presents two main themes-*Infrastructure Development* and *Building New Market Opportunity*-identified through TA of primary interviews and published expert insights.

Main theme of Infrastructure Development emerged from subthemes such as establishing *manufacturing powerhouses*, *local sourcing centers*, *talent development through institutional collaboration*, *entrepreneurial programs*, and *upskilling via e-learning*. Similarly, subthemes such as *digital tools*, *technology advancement*, *investment in innovation and recycling*, *focus on robotics and machine learning* along with policy-driven enablers like reduced paperwork, compliance, and documentation were converged into main theme of *Building New Market Opportunity*.

This thematic mapping reflects the strategic focus on enhancing MSME capacity, access to emerging markets, and readiness for future-oriented growth.

Infrastructure development (Table 5) plays a critical role in enabling MSMEs to adopt technology and build long-term resilience. Establishing manufacturing powerhouses creates centralized, well-equipped hubs that provide MSMEs access to advanced technologies and shared facilities, reducing the cost of production and encouraging innovation. Local sourcing centers strengthen supply chains by connecting MSMEs with nearby suppliers, improving efficiency, reducing lead times, and enhancing self-reliance. Collaboration with industry and institutions supports not only infrastructure but also talent development by integrating academic knowledge with practical business needs, fostering a skilled and adaptable workforce. Entrepreneurial programs build a support ecosystem that includes mentorship, incubation, and access to funding and technology, empowering MSMEs to scale their operations. Finally, upskilling remote learners through e-learning platforms ensures that even MSMEs in rural or underserved areas can access quality training and technical knowledge. These infrastructure-driven initiatives collectively create an enabling environment for technological growth, capacity building, and sustainable competitiveness among MSMEs.

Building new market opportunities (Table 5) for MSMEs can be achieved by leveraging key subthemes that promote digital integration, innovation, and operational efficiency. The adoption of digital tools enables MSMEs to expand their reach, enhance customer engagement, and access e-commerce and global markets more effectively. Embracing technology advancement helps businesses streamline operations and remain

competitive in a rapidly evolving landscape. Investment in research and innovation drives the development of new products, services, and business models, allowing MSMEs to differentiate themselves and tap into niche markets. Supporting recycling technology aligns MSMEs with sustainable practices, opening doors to green markets and environmentally conscious consumers. A focus on emerging technologies such as robotics and machine learning enhances productivity and allows businesses to move up the value chain. Additionally, efforts to reduce paperwork, compliance burdens, and documentation requirements simplify business processes, lower entry barriers, and free up resources for innovation and market exploration. Together, these measures empower MSMEs to access new market segments, increase scalability, and build long-term growth potential.

Global competitiveness
1. AI skilled workforce
2. Advance automation
3. Upskilling
4. Skill development in emerging technology
5. Well-trained workforce
6. Trade facilities
7. Cyber security
8. Financial literacy
9. Export subsidies
10. Domestic production capability
11. Reducing carbon footprints
12. Sustainability initiatives
Bringing innovation
1. Warehouse automation
2. Training in soft skills for international collaboration and adaptability
3. Industry academia partnership

TABLE 6: Exploring themes and subthemes in the global resilience of MSMEs

Identified by the authors.

Source: Based on primary interviews and published expert insights. MSME, micro, small, and medium-sized enterprise

Table 6 presents two overarching themes-*Global Competitiveness* and *Bringing Innovation*-identified through TA from the representative datasets.

Subthemes such as *AI-skilled workforce*, *advanced automation*, *skill development in emerging technologies*, and *export subsidies* were grouped under *Global Competitiveness*, reflecting priorities for enhancing productivity, trade readiness, and workforce efficiency in MSMEs. On the other hand, subthemes like *warehouse automation*, *training in soft skills for international collaboration*, and *industry-academia partnerships* were categorized under *Bringing Innovation*, emphasizing the role of innovation ecosystems and collaborative frameworks in future-proofing MSMEs.

Global Competitiveness for MSMEs (Table 6) is driven by several key factors aimed at enhancing skills, technology adoption, and market access. An AI-skilled workforce enables MSMEs to leverage artificial intelligence to optimize operations, improve decision-making, and stay competitive globally. Advanced automation helps reduce production costs and boost efficiency, making MSMEs more agile and capable of meeting international demand. Upskilling the workforce in both technical and soft skills is critical to improving adaptability and fostering effective international collaboration. Additionally, skill development in emerging technologies ensures that MSMEs stay on the cutting edge of industry advancements, such as

blockchain or AI, enhancing their global standing. A well-trained workforce improves productivity, while access to trade facilities and infrastructure supports smooth operations across borders. Cybersecurity ensures the safety of digital transactions and customer data, which is essential for building trust in international markets. Furthermore, financial literacy enables MSMEs to make informed decisions regarding international investments and financing. Export subsidies help lower the financial barriers to global expansion, and focusing on reducing carbon footprints and implementing sustainability initiatives makes MSMEs more attractive to environmentally conscious consumers and helps meet global regulations. Together, these subthemes ensure that MSMEs are positioned to thrive in the global marketplace.

Bringing Innovation to MSMEs (Table 6) is key to their growth and long-term success, particularly through the adoption of advanced technologies and collaborative efforts. Warehouse automation optimizes inventory management, reducing costs and enhancing operational efficiency. Strong industry-academia partnerships foster the exchange of knowledge and cutting-edge research, which drives innovation and ensures MSMEs remain competitive. Investment in research and innovation helps MSMEs stay ahead of technological trends, developing new products and improving processes. By investing in AI integration and advanced automation, businesses can streamline operations, enhance product quality, and drive cost efficiencies. Furthermore, MSMEs are encouraged to engage in sustainability initiatives and work towards reducing carbon footprints, aligning with the growing demand for eco-friendly products and services. Upskilling the workforce and focusing on emerging technologies ensures that MSMEs are equipped with the necessary tools to foster continuous innovation, improve productivity, and explore new market opportunities. Together, these subthemes create an ecosystem that drives innovation, ensuring that MSMEs can adapt, evolve, and succeed in an ever-changing global market.

Discussion

Research question: How can fiscal strategies enhance the resilience and technological advancement of MSMEs in developing economies within the Industry 5.0 paradigm?

Industry 5.0 and MSMEs future

For MSMEs, it is crucial to understand the risks and challenges beforehand which make them vulnerable to rapid environmental shifts. Economic fluctuations, technological disruptions, social and political instability, and environmental challenges all contribute to the vulnerabilities that MSMEs must navigate (Yapicioglu, 2023). Economic vulnerabilities involve exposure to market shifts and financial instability, often exacerbated by limited access to capital (Ogunjobi et al., 2024). Technological vulnerabilities relate to the rapid pace of technological advancement and the need for ongoing innovation and cyber-security (Hellström, 2003). Social and political factors include regulatory changes and socioeconomic conditions that can impact business operations (Griffiths, 2013). Environmental vulnerabilities involve risks from climate change and sustainability pressures that can disrupt supply chains and resource availability (Gordon, 2018).

Technological vulnerability remains a significant and persistent bottleneck for Indian MSMEs, posing ongoing challenges to their growth and sustainability. Rapid advancements in technology, coupled with the increasing complexity of digital tools and systems, create substantial barriers for MSMEs that often lack the resources and expertise to keep pace. Many Indian MSMEs struggle with integrating new technologies, maintaining cyber-security, and updating legacy systems, which can hinder their ability to compete effectively in a technology-driven market (Benjamin, 2024). The lack of access to cutting-edge technologies and the high costs associated with technological upgrades further exacerbate these vulnerabilities (Bradač-Hojnik and Hudek, 2023). Additionally, the rapid evolution of digital tools requires continuous investment in training and skill development, which many MSMEs find challenging due to limited budgets and resources (Santos et al., 2023).

As a result, technological vulnerability not only limits the operational efficiency of MSMEs but also affects their ability to innovate and adapt to market changes due to social, political and economic shifts, making it a critical area of concern in the Indian business landscape.

Resilience in the business ecosystem

In this volatile business environment, resilience has emerged as a crucial determinant of success and sustainability for organizations. Resilience in the business ecosystem refers to the capacity of enterprises, particularly MSMEs, to anticipate, adapt, and thrive amid continuous disruptions, uncertainties, and challenges (Bhamra et al., 2011). Resilience is a core organizational capability that supports advancement by enabling firms to endure stress, drive continuous innovation, and swiftly adapt to change (Duchek, 2020). Whether facing economic downturns, technological shifts, or unexpected crises like pandemics, businesses must develop resilience as a core capability to ensure long-term survival and growth (Williams et al., 2017). Unlike traditional risk management, which focuses on avoiding or mitigating threats, resilience is about building a system that not only withstands shocks but also adapts and evolves in response to them (Duchek, 2020). In this context, resilience is multi-dimensional, encompassing adaptive

capacity, robustness, flexibility, and innovation (Lengnick-Hall et al., 2011). The concept has gained significant attention in both academic and practical discourses as businesses worldwide grapple with the complexities of Industry 5.0, climate change, global supply chain vulnerabilities, and evolving customer demands (Morais-Storz and Nguyen, 2017). For MSMEs, which often operate with limited resources and in highly competitive markets, fostering resilience is particularly critical, as it can be the key differentiator between failure and success in an increasingly uncertain world (Pal et al., 2014). To explore this critical aspect of resilience, the study applied a qualitative approach and gathered the opinions of the founders and leaders of select Indian MSMEs. By focusing on adaptive capacity, our study aims to uncover how these businesses have effectively navigated technological disruptions, evolving market demands, and resource constraints (Lengnick-Hall et al., 2011). We need to strategize resilience in helping firms overcome challenges and adapt in uncertain environments (Morais-Storz and Nguyen, 2017). For MSMEs, it is necessary to position themselves as competitive and sustainable entities. In the context of MSMEs, economic resilience is essential for sustaining strong performance (Pal et al., 2014).

This study explored how MSMEs can enhance their agility and resilience and sustain environmental challenges.

Future trends shaping the resilience of MSMEs

As MSMEs navigate Industry 5.0, several transformative trends have emerged and continuously will keep emerging and challenging the businesses of these small companies working with limited resources and having a knowledge gap. These constraints significantly impact the company's resilience and operational strategies. To be resilient, MSMEs should adapt to digital transformation using advanced technologies such as artificial intelligence, the Internet of Things, and robotics, as they play a crucial role in enhancing operational efficiency and fostering innovation (Kubota and Lins, 2022). These technologies are designed to optimize processes while ensuring that human-centric values remain central to business operations. Another key trend is the rise of agile business models, which emphasize flexibility and rapid adaptation to market changes. Agile approaches enable MSMEs to remain competitive by allowing for iterative development and swift responses to feedback (Rigby et al., 2016). Sustainable business practices are also becoming increasingly important, with MSMEs integrating eco-friendly initiatives to meet environmental goals without compromising profitability (Elkington, 1997). This shift towards sustainability not only addresses regulatory pressures but also caters to the growing consumer demand for responsible business practices. Additionally, data-driven decision-making is gaining prominence as MSMEs leverage big data and analytics to improve strategic planning and gain valuable customer insights (Davenport and Harris, 2007). Effective use of data helps MSMEs optimize operations and enhance their competitive edge.

Strategic budget allocations for a sustainable future of MSMEs

Budgetary measures play a crucial role in fostering sustainable growth and competitiveness among MSMEs, especially within emerging markets (Hokmabadi et al., 2024). MSMEs in turbulent environments grapple with challenges such as low technological capabilities, limited skilled human capital, and intense international competition (Kraemer-Eis et al., 2023). Effective budgetary measures are essential in helping MSMEs overcome these obstacles and build resilience (Mwanza and Benedict, 2018). Technology adoption and resilience in the context of Industry 5.0 are achievable for MSMEs in developing economies through well-planned government budgetary interventions (Guo and Zeng, 2024). By implementing strategic fiscal policies, governments can enhance MSMEs' ability to innovate, adapt, and thrive amidst economic uncertainties and evolving market demands. Effective government budgetary measures prepare MSMEs to confront environmental challenges and strengthen their resilience against vulnerabilities, as they enhance productivity and support technological adoption amidst economic uncertainty (Sudan and Taggar, 2024). Effective government budgetary measures can significantly bolster the resilience of MSMEs by providing essential financial resources, supporting the adoption of management control tools like budgeting and ERP systems, and strengthening overall organizational resilience, as demonstrated by recent research on MSME responses to the COVID-19 pandemic (Roffia and Dabić, 2024).

MSMEs’ journey to technological adoption and resilience

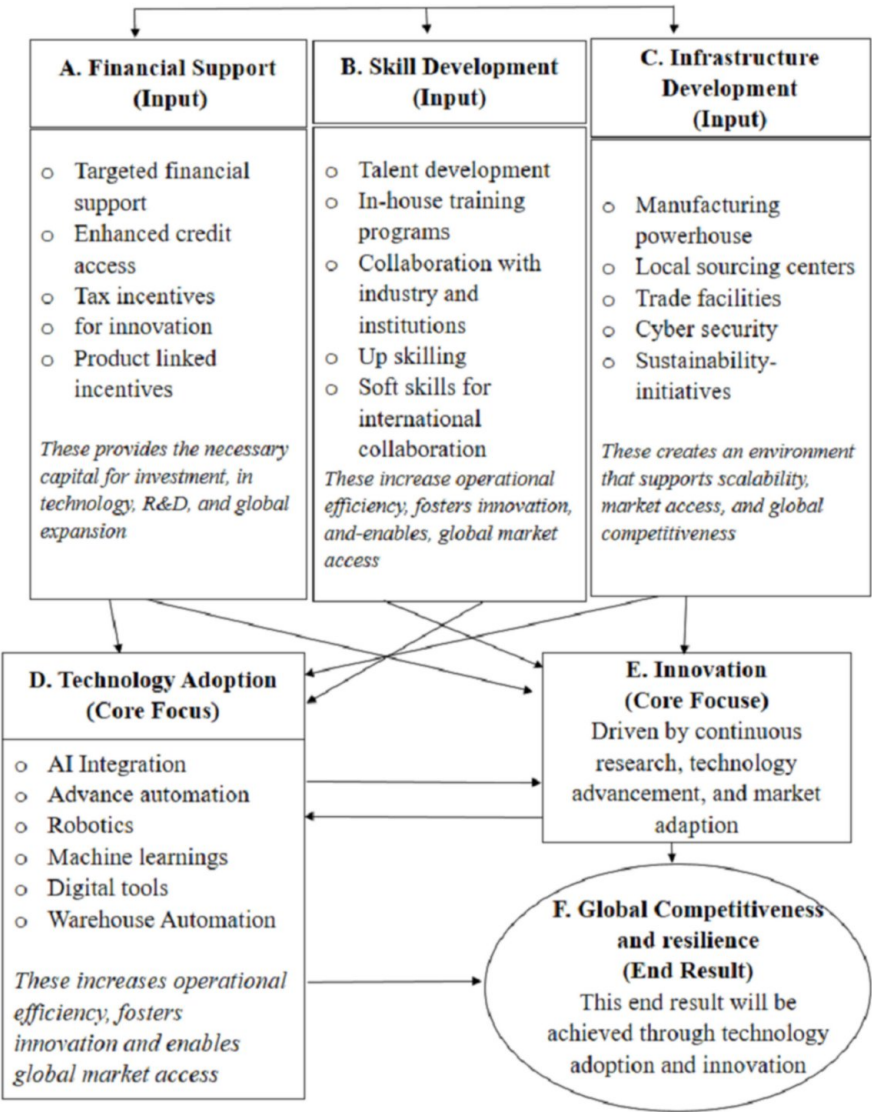


FIGURE 1: MSMEs’ journey of global competitiveness and resilience

Conceptualized by authors. MSME, micro, small, and medium-sized enterprise

Note: This suggestive framework is exploratory in nature.

Figure 1 illustrates a suggestive exploratory cyclical framework where financial support, skill development, and infrastructure (Inputs A-C) drive technology adoption (D) and innovation (E), which in turn reinforces technology adoption (D). The process culminates in enhanced global competitiveness (F), fostering resilient and future-ready MSMEs.

Based on the study findings and identified themes and their subthemes, this conceptual framework (Figure 1) outlines a strategic framework that emphasizes the crucial role of government support in enhancing the global competitiveness of MSMEs through interconnected pillars: *financial support*, *skill development*, and *infrastructure development*. These government interventions, when prioritized effectively, lay the foundation for widespread technology adoption and sustained innovation within the MSME ecosystem.

Financial support (Figure 1, column A), through targeted funding, credit access, tax incentives, and product-linked schemes, provides the essential capital MSMEs need to invest in research, advanced technologies, and global market expansion. Financial support leads to MSMEs success (Rungani and Potgieter, 2018), (Zarrouk et al., 2020). Without accessible and directed financial resources, MSMEs often struggle to adopt high-cost technologies such as AI, automation, and machine learning.

Skill development (Figure 1, column B) is another key enabler. Government initiatives that promote talent development, in-house training, and industry-academic collaborations help build a future-ready workforce. Equipping MSMEs with upskilled employees capable of handling digital tools and fostering innovation not only improves operational efficiency but also ensures that new technologies are effectively integrated and leveraged (Lange et al., 2000), (Mer and Virdi, 2024), (Lehner and Sundby, 2018), and (Robertson, 2003).

Infrastructure development (Figure 1, column C) plays a supporting yet transformative role. Investments in manufacturing hubs, logistics centers, cybersecurity, and sustainable systems create an environment that enables scalability, facilitates market access, and improves business resilience. A robust infrastructure reduces operational bottlenecks, thereby allowing technology-driven innovation to flourish (Singh, 2008), (Usman, et al., 2019).

At the heart of this framework lies technology adoption (Figure 1, column D), which is both a result of and a catalyst for innovation (Figure 1, column E). As MSMEs adopt advanced technologies, they drive continuous innovation. Conversely, innovation often demands the integration of newer technologies, forming a mutually reinforcing cycle. This synergy ultimately culminates in global competitiveness (Figure 1, column F), characterized by improved efficiency, adaptability, and sustained growth in international markets (Clark, 1998), (Berry and Taggart, 1994), (Oyewole et al., 2024), (Naradda Gamage, 2020), and (Prasanna, 2019).

In essence, government actions across financial, skill, and infrastructure dimensions are not isolated efforts but interconnected levers that empower MSMEs to innovate and compete globally and resiliently.

Conclusions

This study synthesizes industry insights and policy analysis to show how government actions shape MSMEs in developing countries. Existing literature has already emphasized that global competitiveness in MSMEs is strongly linked to innovation and technological adoption. Our reflexive thematic analysis builds upon this foundation by extending previous insights and presenting a suggestive exploratory framework. Given the limited data and scope of generalizability, this framework should be viewed as exploratory rather than definitive. These insights may guide policymakers in designing targeted fiscal measures and assist MSME leaders in strategizing for technological upgrading and global competitiveness.

Collectively, the findings indicate that fiscal strategies yield greater impact when designed as complementary bundles rather than isolated measures. This study advances the discourse by proposing an exploratory, evidence-informed framework that connects fiscal levers to capability formation and resilience outcomes in MSMEs. Although the insights are bounded by a small purposive sample and qualitative design, they provide a basis for guiding policy interventions and for future research to validate, refine, and extend the framework toward enhancing MSME global competitiveness.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Aditi Singh, Ashish Bajpai

Acquisition, analysis, or interpretation of data: Aditi Singh, Ashish Bajpai

Drafting of the manuscript: Aditi Singh, Ashish Bajpai

Critical review of the manuscript for important intellectual content: Aditi Singh, Ashish Bajpai

Supervision: Ashish Bajpai

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. Ethics Committee issued approval (IMS/FMS/BHU). The proposed research work has been reviewed and approved by the

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