EJABM European Journal of Applied Business and Management

European Journal of Applied Business Management, 10(2), 2024, pp. 93-127 ISSN 2183-5594

Conceptual Paper

Enhancing the Competitiveness of Manufacturing SMEs: a Framework and Future Research Directions

Submitted on 19th July 2024
Accepted on 25th September2024
Evaluated by a double-blind review system

DR. MURUGANANTHAM GANESAN[1]
MR. S. SRIDAR [2]
MS. S. SUPRIYA PRIYADARSINI [3]
MR. ASWANTH R. S.[4]

ABSTRACT

Purpose: To develop a conceptual framework for enhancing product competitiveness by achieving product capability innovation through internal and external factors for Indian Manufacturing SMEs by reviewing the relevant literature. The study also conducted a bibliometric analysis to identify the research themes and emerging trends in SME research.

Methodology: A bibliometric analysis of 151 Scopus-indexed articles published between 1997 and 2024 and a Systematic Literature Review (SLR) of 118 papers extending from 1978 to 2024 are employed in the research. Key factors influencing the competitiveness of SMEs are identified by examining keyword trends, author contributions, and co-citation patterns in the study.

Results: This research provides a distinctive framework that underscores the importance of product innovation capabilities, manufacturing capabilities, and quality practices in enhancing the competitiveness of SMEs. The bibliometric analysis identifies prominent authors contributing to SME research and reveals significant research themes.

Research limitations: The study's drawbacks include dependence on limited databases, lack of empirical evidence, and the potential exclusion of aspects such as digital transformation and international collaboration.

[1] Department of Management Studies, National Institute of Technology, Tiruchirappalli, Tamil Nadu, India. E-mail: murugan@nitt.edu.
[2] Department of Management Studies, National Institute of Technology, Tiruchirappalli, Tamil Nadu, India. E-mail: sridar_2k@yahoo.com.
[3] Department of Management Studies, National Institute of Technology, Tiruchirappalli, Tamil Nadu, India. E-mail: sspjena4@gmail.com.
[4] Corresponding author. Department of Management Studies, National Institute of Technology, Tiruchirappalli, Tamil Nadu, India. E-mail: rsaswanth007@gmail.com.

Practical implications: This framework offers SMEs owners and managers practical insights to design competitiveness and innovation strategies. The research also recommends policies to foster SMEs growth.

Originality: This research is original in its dual-method approach, combining qualitative and bibliometric analysis to provide a comprehensive understanding of the factors influencing the product competitiveness of Indian manufacturing SMEs. It fills a significant research gap and offers valuable insights for industry and academia.

Keywords: *SMEs; Product Innovation; Product Competitiveness; Manufacturing; Quality Practices; India.*

1. Introduction

Small and Medium-sized Enterprises (SMEs) are vital to India's economic growth (Ministry of MSME, 2023), with the country boasting the second-largest Micro, Small, and Medium-sized Enterprise (MSME) sector globally, after China. As part of the Indian government's "Atmanirbhar Bharat" initiative to foster a self-reliant economy, the MSME sector is poised for substantial growth and is seeking closer integration with global supply chains (Melissa, 2023). SMEs are the foundation of economies worldwide, accounting for 90% of businesses and over half of global employment (Garg & Kashav, 2021; Mishra et al., 2023).

In India, SMEs account for 95% of industrial units and employ 110 million people, representing 45% of the workforce, next to agriculture (Ankush, 2023; Yogima Sharma, 2020). Indian SMEs emphasise quality, delivery, and innovation in sectors like automobiles, electronics, and machinery (Dangayach and Deshmukh, 2003). However, they face significant challenges including an insufficient workforce for new technologies, difficulty adapting to emerging technologies, lack of experience, and limited funds for industrial improvements (Gunasekaran et al., 2001; Tisch et al., 2013). Innovation is crucial for SME competitiveness in developing countries like India, encompassing both technological (products, processes, services) and non-technological (organisational, marketing) innovations (Oliva et al., 2019; Wahyuni et al., 2020). While radical innovations are more common in developed countries and especially in large-scale industries, Indian SMEs focus on incremental, technology-adaptive improvements to remain competitive and boost labour productivity (Lala and Sinha, 2018; Davide Antonioli et al., 2010; Haddad et al., 2019).

European Journal of Applied Business Management, 10(2), 2024, pp. 93-127 ISSN 2183-5594

Government of India initiatives like the "National Manufacturing Competitiveness Programme" and "Make in India" support SMEs in becoming leading global manufacturers (Narasimhan, 2015). However, research on innovation within SMEs, particularly in developing countries, remains limited, with most studies focusing on radical innovations in larger firms (Singh et al., 2017; Arshad and Arshad, 2019). Additional academic research is required to understand the reasons behind SMEs' limited adoption of innovative practices and to fill the existing knowledge gaps in SME innovation (Berne et al., 2019; Duarte Alonso et al., 2017). Based on the research gaps, we propose the following research questions in our study to address these gaps.

RQ1 - How can an integrated framework be developed to enhance the competitiveness of manufacturing SMEs through product innovation?

RQ2 - What are the key factors influencing the ability of Indian SMEs to innovate products?

RQ3 - What are the emerging themes in the domain of product competitiveness and innovation in manufacturing SMEs as identified through thematic map analysis?

RQ4 - What are the most frequent and prominent research topics in product competitiveness and innovation in manufacturing SMEs, as revealed by the word tree map?

This study aims to address the gaps and research questions with the following research objectives:

a. To develop and propose an integrated framework to enhance the competitiveness of manufacturing SMEs through product innovation.

b. To identify the factors leading to the product innovation capabilities of manufacturing SMEs in India.

c. To identify and analyse the emerging themes related to product competitiveness and innovation in manufacturing SMEs through thematic map analysis, focusing on understanding the key concepts, relationships, and patterns that shape the research landscape in this field.

d. To uncover and suggest potential research avenues for future exploration through a bibliometric analysis to identify trends, patterns, and gaps in the existing literature.

The current research is informative and contributes to the literature on product innovation in Indian SMEs. This study consists of two parts: (1) a systematic review of existing papers and

(2) a bibliometric analysis. This paper is one of the first to discuss product innovation capabilities for SMEs. The study extrapolates a new approach for Indian SMEs to improve product competitiveness to make Indian manufacturing SMEs on par with global SMEs.

2. Methodology

This study employed a dual approach, integrating bibliometric analysis and Systematic Literature Review (SLR) to thoroughly assess manufacturing SMEs competitiveness and innovation. The bibliometric analysis identifies emergent trends and key contributors, assuring a robust framework development, while the SLR provides an in-depth exploration of extant research. A comprehensive search was conducted across a variety of databases, such as ProQuest, Emerald, Sage, World Scientific, and Science Direct, using specific keywords such as "Innovation in SMEs," "Manufacturing and quality practices in SMEs," and "Competitiveness of SMEs among global competitors." Initially, this process generated 190 articles subjected to a rigorous screening process founded on specific inclusion and exclusion criteria to guarantee their relevance. Ultimately, 118 papers were chosen, which provided a comprehensive understanding of SME practices in 17 countries and spanned 46 years (1978-2024). The SLR method guarantees a thorough and impartial comprehension of the research landscape, which facilitates the identification of knowledge gaps that this study intends to resolve through additional analysis and synthesis (Kitchenham, 2014; Tranfield et al., 2003). Furthermore, a bibliometric analysis was performed to evaluate the product innovation capabilities of Indian manufacturing SMEs, with a particular emphasis on current trends and emerging themes (Zupic & Čater, 2015).

The framework development commenced with a comprehensive examination of theoretical models, particularly Teece's (2018) concept of dynamic capabilities, which underscores the integration and reconfiguration of internal and external competencies in response to evolving environments. Key components that are indispensable for improving SME competitiveness through innovation were identified based on this foundation. This was succeeded by an iterative process that included pilot testing, expert consultations, and literature synthesis. This method guaranteed that the framework was both theoretically sound and practically applicable to the distinctive obstacles encountered by small SMEs in the Indian manufacturing sector.

The methodology will effectively communicate the framework's systematic and transparent development by incorporating this comprehensive explanation (Page West & Gemmell, 2021; Teece, 2018).

The three-stage iterative process for constructing a conceptual framework for SME competitiveness consists of:-

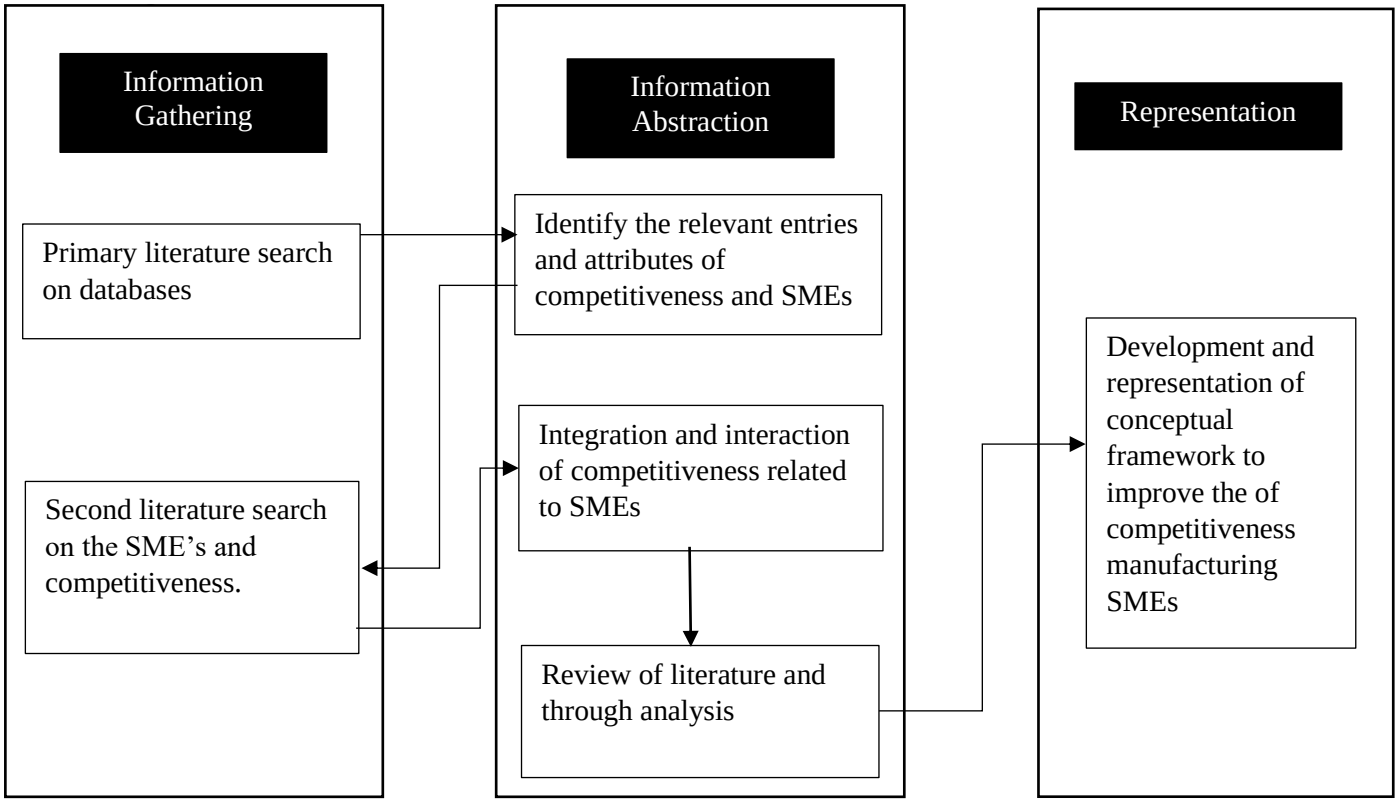
(a) Information Gathering, which entails a comprehensive literature search;

(b) Information Abstraction, where pertinent characteristics are identified and examined; and

(c) Representation, where results are consolidated into a unified conceptual framework.

The research employs a constructivist approach, acknowledging that comprehension is contextually dependent and subjective, reflecting multiple realities. This methodology entails a thorough literature review to investigate variable relationships and synthesise findings, facilitating comprehensive and profound comprehension. Figure 1 visually illustrates this process.

Figure 1: An integrated review of the literature Framework of Competitiveness in SMEs



Source: Compiled by Authors

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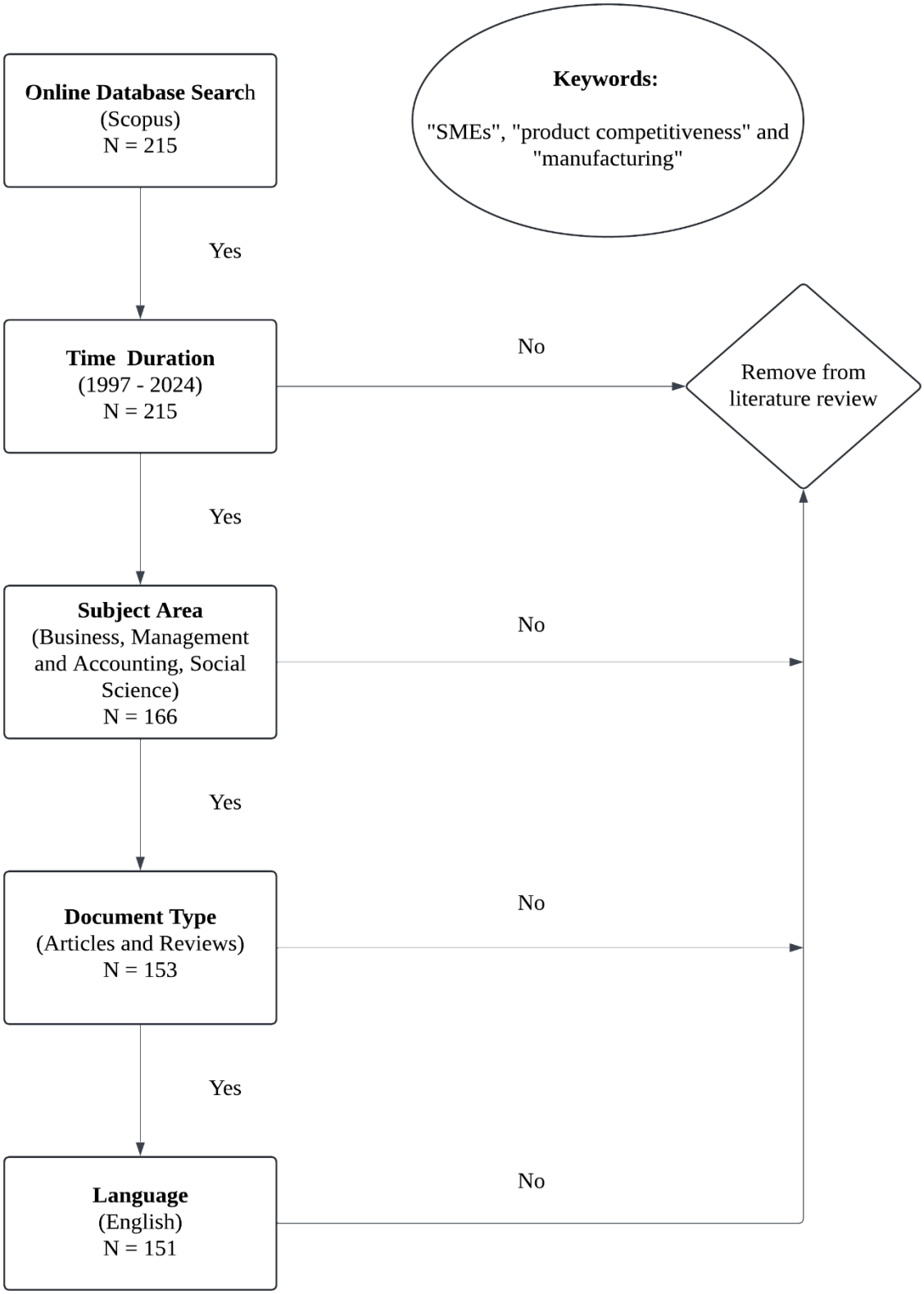
The second part of this study utilised bibliometric analysis to assess current research on product competitiveness and innovation in Indian manufacturing SMEs, identify emerging themes, and recommend future studies (Moral-Munoz et al., 2020; Ragazou et al., 2022). Using the Scopus database for its extensive SME and product competitiveness coverage, an initial search yielded 216 results, which were narrowed to 151 articles. The search string "SMEs," "Product Competitiveness," AND "Manufacturing" was employed to ensure accuracy with Boolean operators. The inclusion criteria required English-language articles or reviews published in business, management, accounting, and social sciences from 1997 to 2024, specifically articles or reviews. Unpublished and non-English works were excluded (Please refer to Figure 2). Data was analysed using Biblioshiny, a web interface for the R-based Bibliometric application, providing insights into keywords, authors, sources, co-citations, and factors enhancing the competitiveness of Indian manufacturing SMEs through product innovation (Moral-Munoz et al., 2020).

Figure 2: Flowchart depicting bibliometric review methodology



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European Journal of Applied Business Management, 10(2), 2024, pp. 93-127 ISSN 2183-5594

3. Previous Research works on SMEs in Various countries

A total of 34 key papers contributing significantly to SMEs across 19 countries are summarized in Table I, with many studies focusing on developed nations. Innovation is recognised as a strategic tool for companies navigating changes, including product, process, organisational, and marketing innovations (Kim et al., 2012). Haddad et al. (2019) define innovation as implementing value-adding improvements, while Oliva et al. (2019) distinguish between technological and non-technological innovations influenced by market dynamics, development levels, business environments, and company characteristics. In India, SMEs are vital to manufacturing, creating further employment opportunities before and after the 1991 economic revolution (Rajesh Raj et al., 2009; Lobo and Samaranayake, 2020). SMEs require innovation to remain competitive, relying on managerial and workforce skills, education, and governmental policies (Macdonald et al., 2008). Innovation activities increase labour productivity (Davide Antonioli et al., 2010), but manufacturing SMEs face administrative, entrepreneurial, and engineering challenges (Miles and Snow, 1978).

Table I: Previous Research works on SMEs in various countries

S.No	Year	Country	Author(s) Name	S.No	Year	Country	Author(s) Name
1	2023	USA	Bhatia and Elsayed	18	2016	South Africa	Sharmilee and Muhammad
2	2022	Saudi Arabia	Al-Hakimi et al	19	2016	Italy	Presenza et al
3	2020	China	Chen and Breed love	20	2016	Spain	Maria Concepción
4.	2020	Dubai	Monther et al	21	2015	UK	James and Stephen
5	2020	Indonesia	Ni Made and Made Sara	22	2015	Greek	Kafetzopoulos and Psomas
6	2019	Norway	Simon Norheim	23	2014	New Zealand	Whittaker et al
7	2019	Pakistan	Arshad and Arshad	24	2014	UK	Mark Saunders et al
8	2019	Brazil	Davi França Berne et al	25	2014	Australia and the UK	Maneesh Kumar et al

9	2019	Dubai	Haddad et al	26	2013	China	Jintong Tang et al
10	2018	Spain	Exposito and Sanchis	27	2010	Italy	Davide Antonioli et al
11	2017	Italy, Spain, and the UK	Abel Duarte et al	28	2009	UK	Yong and Pat
12	2017	Britain	Yanqing Lai et al	29	2006	China	Jia Chen
13	2017	Poland	Ewa Mackowiak	30	2005	Greece	Helen Salavou
14	2017	Norway	Mohammad	31	2000	U.K., Spain	Spence and Lozano
15	2016	European Union	Francioni et al	32	2000	Ireland	Rodney McAdam
16	2016	European Union	Jose et al	33	2000	Cyprus	Athanasios and Keith
17	2016	China	Bai and Pan	34	1992	European Union	De Koning

Source: Compiled by authors

A lack of innovation strategies hinders SMEs performance and goal achievement (Haddad et al., 2019). SME managers need to create organisational structures that foster creativity and innovation (Batra et al., 2017), however, conventional innovation factors like technological platforms may not be as effective within SMEs (Berne et al., 2019). Competitive advantage mediates the relationship between innovation capability and technology assimilation strategy in enhancing SMEs performance (Rhee et al., 2020). This research focuses on factors that enhance the product competitiveness of SMEs, defining innovation as either incremental or radical value additions that satisfy changing customer requirements and improve business performance.

For a better understanding, we have compiled the previous research studies on SMEs and innovation across various countries and presented them in Table II. Studies showed that strong commitment and involvement of SMEs lead to innovation practices and improved business performance.

Table II: Compilation of Previous Research on SMEs and Innovation

S.No	Author, Year	Type of Company /Sector	Country of study	Major Findings / Insight / Contribution
1	Rodney McAdam (2000)	15 SMEs	Ireland	A Culture of Continuous Improvement leads to innovation.
2	Yong and Pat (2009)	SMEs in the ICT business	UK	1. Organisational culture supports innovation and new product development. 2. Senior executive's experience influenceS firm level innovation.
3	Mark Saunders et al (2014)	SME managers	UK	SMEs should have a strong commitment to learning and a shared vision.
4	Maria Concepción (2016)	73 medium-sized family enterprises	Spain	Long CEO tenures facilitate innovation in decisions.
5	Mohammad (2017)	362 exporting SMEs	Norway	Concentrate on product innovation by SMEs to boost export performance.
6	Batra et al., (2017)	450 number of Manufacturing SMEs	India	To nourish innovation in SMEs, Managers are required to create an organisational structure which is coherent and conducive with strategies helping an organisation to have a creative and innovative culture.
7	Davinder Singh et al (2017)	135 small manufacturing firms	India	Entrepreneurial capability, technology infrastructure and government initiative influence small firms Performance.
8	Abel Duarte et al (2017)	163 craft brewery operators	Italy, Spain, and the UK	Involvement in innovation is the primary factor that leads to performance.
9	Davi França Berne et al (2019)	203 micro and small industrial companies in Metallurgy	Brazilian	Promoting innovative practices will aid in increasing the competitive spirit in the organisation leading to survival in the long run.
10	Simon Norheim Colclough (2019)	380 Exporting SMEs	Norway	1. Resource scarcity is not affecting the innovation. 2. Ambition and entrepreneurial capability influence innovation.
11	Monther I. Haddad et al (2020)	5 SME Managers	Dubai	An innovative culture can be initiated and cultivated by the top management in SMEs.
12	Ni Made and Made Sara (2020)	70 Managers from textile manufacturing SMEs.	Indonesia	In SMEs, innovation and performance is encouraged by learning orientation, knowledge competency and market orientation.
13			Saudi Arabia	The innovative strategies implemented by Small and Medium-sized Enterprises (SMEs)

	Adam and alarifi, (2021)	250 Manufacturing SMEs		to overcome the challenges posed by COVID-19.
14	Ramdani, et al., (2022)	382 articles	ABS ranked journals	This review examines digital technologies and contextual factors driving digital innovation in Small and Medium-sized Enterprises (SMEs).
15	Radicic and Petkovic (2023)	2854 SMEs manufacturing and service sectors	Germany	The effects of digitalisation on innovation are modest and depend on the specific form of digitalisation and the type of innovation being pursued.
16	Lu, et al., (2023)	259 Manufacturing SMEs	China	Digital technology's breadth of adoption improves supply chain performance, while depth of adoption hinders innovation's performance.

Source: Compiled by authors

Based on the insights from previous literature reviews and discussions with experts in SMEs and academia, we have categorised the factors influencing product innovation in Indian manufacturing SMEs into internal and external factors. Additionally, manufacturing practices and quality standards have been included as moderating factors, which play a crucial role in shaping product competitiveness within Indian SMEs.

The research papers analyzed in this study offer a thorough examination of the innovative strategies employed by SMEs across various industries and countries to boost performance and drive growth. A recurring theme in these studies is that successful SMEs consistently prioritise continuous innovation and improvement (Barney, 1991; Zahra & George, 2002). he development of an innovative culture is largely shaped by senior management, with leaders who prioritise innovation, invest in research and development, and take a proactive approach to market changes being more likely to lead successful organisations (Teece, 2007). Moreover, a strong technological infrastructure is crucial, as SMEs with advanced technological capabilities are better equipped to implement process innovations that enhance efficiency and competitiveness (Barney, 1991).

The research also emphasises the significance of external factors, such as government policies and market orientation, in the development of SMEs. SMEs can innovate and compete on a larger scale due to government interventions such as subsidies, tax incentives, and access to financing (Yerger, 2023). Additionally, a robust market orientation involving companies actively participating in market trends and consumer feedback is associated with increased adaptability and innovation (Narver & Slater, 1990). These findings deepen our understanding

of the factors driving SME success and provide actionable strategies for businesses aiming to enhance their innovation capacity. By embracing these principles, SMEs can better navigate the challenges of a dynamic market environment, ensuring long-term success and sustainable growth.

3.1 *Internal Factor*

Internal factors tremendously impact the innovation capacities of SMEs. Key elements include top management commitment, human resource management, and organisational culture. Top management's provision of resources, recognition of innovative behaviors, and understanding of both staff strengths and customer needs are vital to fostering innovation capabilities. Additionally, effective human resource management and the cultivation of a positive organisational culture are essential in creating an environment conducive to innovation, enabling SMEs to thrive in a competitive landscape.

3.1.1 *Top Management*

Top management commitment is crucial driver of innovation in SMEs (Haddad et al., 2019; Singh et al., 2017). As key decision-makers involved in daily operations, they possess a deep understanding of both employee strengths and customer needs (Haddad et al., 2019; Singh et al., 2017). Their commitment, resource availability, and recognition of innovative behaviour enhance innovation capabilities (Bhupendra and Shirish Sangle, 2015). R&D investment, along with the competencies, skills, and personalities of SME entrepreneurs or managers, has a significant impact on SME performance, particularly in dynamic and competitive markets (Chen and Breedlove, 2020; Francioni et al., 2016; Gupta et al., 2016; Bala, 2015).

However, SMEs leaders often face conflicts between innovation and survival (James and Stephen, 2015; Collins and Reutzel, 2017). A lack of professional expertise limits innovation, and family managers may lack the necessary knowledge (Lopez Fernandez et al., 2016). The success of a company is greatly influenced by the intuition of its owner or manager. This highlights the importance of sharing knowledge and providing training to employees. (Ewa Mackowiak, 2017). Top management support is vital for developing managerial skills, organisational culture, and employee motivation, with owner-manager demographics influencing innovation performance (Whittaker et al., 2014; Sonal Khurana et al., 2019).

Additionally, incorporating informal learning as part of organisational vision is crucial for enhancing innovation in SMEs (Saunders et al., 2014).

3.1.2 *Human Resource Management*

Skill development is vital for employees, especially emerging business owners (Jabeen et al., 2019). Organisational performance hinges on the entrepreneur's innovative mindset, skills, motivation, business strategy, and HR management (Saunders et al., 2014). The psychological contract between employees and SMEs management plays a key role in shaping the employment relationship (Atkinson et al., 2016), and tailored employee training significantly impacts technology innovation (Patton and Marlow, 2000; Singh et al., 2016).

SMEs owners should strategically invest in HR practices to boost performance and maintain competitive advantage (Sheehan, 2013). Innovation, fostered by employee ideas and Human Resource Management (HRM) practices, is vital for growth and success (Chen and Breedlove, 2020; Haddad et al., 2019). CEOs must prioritise training and address barriers to enhance organisational innovation and business performance (Bai et al., 2016). SMEs' size, age, and business plan affect performance, and their flexibility allows quick adaptation of HR practices (Blackburn and Kovalainen, 2013; Marlow and Patton, 1993). HR management practices are key to boosting overall performance and maintaining competitive advantage in SMEs.

3.1.3 *Organisation Culture*

SMEs managers must cultivate an organisational culture aligned with their strategic goals and communicate the vision to employees to drive growth and innovation (Haddad et al., 2019). A firm's innovation capacity is closely linked to its culture, learning orientation, knowledge competence, and market readiness (Wahyuni et al., 2020). By fostering a supportive culture and enhancing R&D personnel, SMEs can optimise production costs and implement technology upgrades (Davinder Singh et al., 2016). An innovative culture involves empowering employees, fostering teamwork, and prioritising target identification (Guimaraes, 2011). Furthermore, organisational structure, culture, technological advancements, and leadership are key predictors of business model innovation (Bashir and Verma, 2019).

A strong innovation culture generates new ideas, marketing strategies, and services to satisfy customers (Aksoy, 2017). Managers should facilitate team formation, empower employees,

reward contributions, and create a positive climate for idea exchange (Bhupendra and Shirish, 2015). Entrepreneurial firms promote a proactive and innovative work culture, stimulating organisational learning (Dess et al., 2003). To meet the market challenges, SMEs should cultivate a creative culture (McAdam et al., 2000). Top management should also enhance collaboration by networking with stakeholders to foster an innovative culture (Sonal Khurana et al., 2019). Organisation culture pervades SMEs to promote a proactive and innovative work culture, stimulating organisational learning.

3.2 *External factors*

External factors significantly influence the innovation capabilities of SMEs. These factors encompass economic conditions, competition, market demand, and government policies. Government initiatives often provide support to encourage innovation and growth among SMEs by offering assistance and resources. Due to market demand and competition, SMEs are driven to innovate to satisfy consumer demands and preserve a competitive advantage. Furthermore, economic conditions can prevent or promote SMEs innovation by influencing access to capital and market opportunities. SMEs need to understand and adapt to these external factors to improve their innovation capabilities and achieve sustainable growth.

3.2.1 *Government policy and support*

The Indian government has introduced initiatives like Make-In-India, Start-Up India, Skill India, and Digital India to boost the growth of SMEs (Mukherjee, 2018). These programs aim to nurture innovation and growth among new and established entrepreneurial SMEs (Bala, 2015). Studies indicate that government policies, skill development, and innovation strategies significantly impact SME innovation (Jabeen et al., 2019). In China, comprehensive economic policies have enhanced SME growth, size, profitability, and financial health (Jia Chen, 2006).

Research from the European Community suggests centralising ‘SMEs policy definitions’ while decentralising execution to national, regional, and local levels (De Koning et al., 1992). In China, governmental influence ensures SMEs produce higher quality and safer products (Jintong Tang et al., 2013). Policymakers should assist SMEs in overcoming growth barriers regardless of age (Smallbone et al., 1995). Despite reforms, some Indian SMEs still struggle with capital constraints and tax burdens (Das and Das, 2013). However, recent initiatives in

India, including tax incentives, subsidies, intellectual property rights, and proactive local authorities, have improved the SMEs working environment, fostering sustained innovation and subsequent growth (Sonal Khurana et al., 2019). Government policy and support define the distance and direction of SMEs to calibrate their business opportunities and control their cost spread.

3.2.2 *Market Competition*

Indian manufacturing SMEs compete with each other mostly because of their similar size and nature of business. In manufacturing SMEs, innovation is the main reason behind the improved and sustainable performance for attaining market competency (Roach et al., 2016). Continuous evaluation of an SME's market environment is necessary to understand its competitors and their products and services (Sharmilee and Muhammad, 2016). Introducing new products is partially based on customer demand and partially driven by competitors' innovation (Gaur et al., 2011). Competitive spirit motivates SMEs to innovate continuously regarding product, process, and business performance.

3.2.3 *Product Demand*

Demand depends upon the economic conditions and economic cycle of the nation, business performance of the bigger firms and export opportunities. The Indian SMEs ability and willingness to closely align their organisational strategy with the operating demand cycle has led to their superior growth and entrepreneurial attitude in the present times (Gupta et al., 2016).

With growing SMEs in India, it is gaining momentum with investors compared to China for producing anything to everything, from sneakers to utility vehicles (Datta, 2014). SMEs should combine internal and external perspectives and technology when advancing and commercialising ideas as part of open innovation (Wynarczyk et al., 2013). Product demand influences SMEs to innovate and introduce a new product in the marketplace in a sustained manner.

3.2.4 *Economic conditions*

The nation's economic condition and infrastructure affect SMEs' performance (Sharmilee and Muhammad, 2016). The competitiveness of SMEs depends on comprehensive economic policies (Jia Chen, 2006). National policies facilitate and support the competitiveness of

individual Indian SMEs. Encouraging the potential of innovation, SMEs can play a pivotal role in the supply chain and improving financial performance (Shashi et al., 2019). During and after the COVID-19 situation, the Government of India announced many schemes to boost the SMEs sector in India. A stable government, supportive policies, suitable skilled and semi-skilled human resources, and a growing economy could facilitate conducive economic conditions for manufacturing SMEs.

3.3 *Manufacturing Capability*

Indian SMEs face diverse manufacturing capacities, quality standards, and continuous improvement levels, impacting process innovation (Sharmilee and Muhammad, 2016). To remain competitive, they must emphasise best manufacturing practices and high-quality standards, irrespective of product ideas or prototypes. Indian SMEs size and scale restrictions economies of scale and technological advancements (Sharmilee and Muhammad, 2016).

An organisation's strength is indicated by its manufacturing output, customer satisfaction, and timely delivery of high-quality, cost-effective, innovative products (Rosenzweig et al., 2003). Technological innovation is crucial for maintaining a competitive edge and market entry (Souitaris, 2002). SMEs manufacturing performance depends on cost, delivery, flexibility, and quality (Gaur et al., 2011). Process innovation is essential in low to medium-technology-intensive industries (Hervas-Oliver et al., 2016; Mostafiz et al., 2023). Techniques like value stream mapping and Kanban shall be used in SMEs to enhance productivity and competitiveness (Marasini et al., 2014). Increased R&D spending improves product innovation through better knowledge utilisation (Mubarak Rahman and Kavida, 2019).

Technology strategies enhance market research, R&D investment, and manufacturing processes (Rhee et al., 2020). Technology-focused SMEs generally offer more innovative products (Helen Salavou, 2005). They are identifying ‘order qualifying and winning strategies’ that boost manufacturing capability and business performance, leading to the manufacturing excellence of the firm (Balkrishna, 2017).

Table III: Compilation of Previous Studies on Manufacturing and Quality Practices in Indian SMEs

S.No	Author, Year	Type of Company /Sector	Major Findings / Insight / Contribution

1	Davinder Singh et al., (2016)	135 Indian Manufacturing SMEs	Technology infrastructure, entrepreneurial capability and government initiatives are influencing the technological innovation of Manufacturing SMEs.
2	Saumyaranjan Sahoo, Sudhir Yadav (2017)	121 Manufacturing SMEs	To achieve high standards of SMEs performance, the top management and the managers of manufacturing SMEs can use self-assessment, benchmarking, and quality management approach
3	Balkrishna Eknath Narkhede, (2017)	560 Manufacturing SMEs	SMEs should try to improve the lacking skills, with training, to improve individual's capability and improved performance of SMEs.
4	Nevil S et al., (2017)	Indian Manufacturing SMEs	A brand image and sustainable future growth can be developed by Indian SMEs by adopting Lean and Green Manufacturing processes. It will aid Indian SMEs to have a competitive edge in the present market scenario.
5	Saumyaranjan Sahoo, Sudhir Yadav (2017)	121 Small and medium manufacturing firms	1. Top management of SMEs has to establish a performance culture by inspiring staff members to engage in activities. 2. Lean techniques really help to improve operational performance.
6	Hima Gupta (2017)	121 Manufacturing SMEs	Sustainable innovative practices of SMEs lead to fostering growth
7	Ayon Chakraborty (2019)	52 Manufacturing SMEs	Limited knowledge and high training costs hinder the adoption of high-quality practices in SMEs.
8	Shashi et al., (2019)	664 Manufacturing SMEs	Product innovation, environmental performance and the manufacturing process are influenced by Lean Process in SMEs.
9	Sonal Khurana et al., (2019)	Auto components and electronics manufacturing SMEs	It is essential to encourage the integration of innovation with sustainability
10	Kharub et al., (2021)	15 manufacturing SMEs	Competitive strategies impact manufacturing strategies positively, latter is only a mediator between the cost leadership strategy and the firm's performance.
11	Dadhich et al., (2021)	150 manufacturing SMEs	More scope for all SMEs, in developing nations due to the growth of manufacturing sector and the use of environmentally sustainable expansion strategies.
12	Vashishth et al., (2021)	144 manufacturing SMEs	Extrinsic motivation for implementation results is in lesser degrees. Intrinsic motivation drives firms towards a higher degree of maturity.
13	Subrata Mitra (2022)	Manufacturing SMEs	The performance of the firm has shown a favourable link with sustainable HRM techniques.
14	William et al., (2023)	Manufacturing SMEs	Entrepreneurial orientation and competitive advantage are crucial for manufacturing strategy.

Source: Compiled by authors

Table 3 summarises research studies on manufacturing and quality practices in Indian SMEs, highlighting the key findings. The studies reveal that various factors contribute to the success of Indian SMEs, including technology infrastructure, entrepreneurial capability, government initiatives, Top Management support, Innovation, the latest quality management practices and employee training. These studies provide valuable insights into the key factors influencing performance and innovation in Indian SMEs.

3.4 *Quality Practices*

Quality management practices are crucial for SMEs in India to boost efficiency, reduce costs, and maintain quality (Konecny and Thun, 2011; Sahoo and Yadav, 2017). Indian SMEs must integrate quality into products and processes to stay competitive (Saini, 2014; Chakraborty, 2019). Leadership commitment, continuous improvement, and encouraging employee innovation is key to effective quality management in SMEs (Kumar, 2014; McAdam et al., 2000). Total Quality Management (TQM) enhances products, processes, and operations, meeting customer demands (Guimaraes, 2011). Aligning production capabilities with quality control and innovation drives competitive advantage (Alonso et al., 2017).

Integrating sustainability with innovation supports initiatives like "Make in India," aiming for ‘zero-defects’ (Khurana et al., 2019). Technological advancements and TQM boost manufacturing SMEs' competitive positioning, operational efficiency, and quality (Exposito & Sanchis-Llopis, 2018; Kumar et al., 2018). Lean Management is essential for Indian SMEs to maintain their reputation in the local and global market and to achieve sustainable growth (Gandhi et al., 2017), significantly benefiting product and process innovation (Shashi et al., 2019). Meeting global market standards for quality and timely delivery highlights the need for sophisticated quality practices in Indian manufacturing SMEs (Rathod et al., 2016). Good manufacturing quality practices employed in hard factors like process approach, quality information, continuous improvement, and soft factors like customer focus, employee involvement, and supplier relationship with top management commitment as the driving factors will bring about a paradigm shift in the overall business performance and product competitiveness.

3.5 *Product Competitiveness*

According to Lefebvre (1993), SMEs with a stronger competitive position depending on the quality, affordability, and variety of their products and services demonstrate a developed unique culture. Innovation is more important for competitiveness and should be integral to continuous improvement (Torchia et al., 2019). Product innovation addresses specific customer needs through new or modified products. Indian SMEs, often led by entrepreneurs, sometimes face challenges adapting to changing customer requirements (Stanzin Mantok et al., 2019). Itroducing innovative products creates growth opportunities (Helen Salavou, 2005).

To boost innovation, SMEs should integrate customer feedback into product design (Stanzin Mantok et al., 2019). In China, product development units work with small industries to improve quality, reduce costs, and aid marketing (Rajesh K. Singh et al., 2010). For better subcontracting with Original Equipment Manufacturers (OEMs) and market sustainability, SMEs should focus on new product development, R&D investment, and market-oriented pricing (Kotturu et al., 2015). Torchia et al. (2019) suggest that third-party partnerships can provide SMEs with the necessary resources for innovation and mitigate development and marketing risks.

Product innovativeness and successful new products enhance competitiveness, expand the customer base, and create more domestic and international business opportunities (Bhupendra and Shirish Sangle, 2015). Product competitiveness is the desired outcome of the varied degrees of employing and utilising the internal and external factors with the mediating role of quality practices.

4. Conceptual Framework

Based on the literature survey and opinions from SMEs and academic experts, we have developed a conceptual framework to improve the product competitiveness of Indian Manufacturing SMEs (see figure 3). The framework highlights that internal and external factors influence SMEs product innovation capability. Internal factors like top management, human resource management, and working culture collectively significantly impact the ability to construct product innovation (Arshad Ali & Mahmood, 2024). Additionally, external factors such as Government policy and support, demand for the product, competition, and economic conditions collectively impact the product innovation capability construct. The mediating variables of manufacturing capability and quality practices jointly significantly affect the

relationship between the product innovation capability construct and product competitiveness construct.

The framework created in this research aims to systematically improve the product competitiveness of Indian manufacturing SMEs by including many internal and external elements that impact their innovation capabilities. This model functions as a strategic instrument that synchronises the fundamental operational and managerial procedures inside SMEs with the wider environmental and market constraints they encounter. By leveraging a profound comprehension of the intricate interaction among these elements, it presents a comprehensive methodology that identifies the primary catalysts of competitiveness and offers practical ideas for enhancing performance in many aspects.

Fundamental to the concept is the acknowledgement that innovation is a complex process affected by internal capabilities and external forces (Tidd & Bessant, 2018). From an internal perspective, the framework highlights the importance of top management, human resource management, and organisational culture in creating a favourable atmosphere for innovation (Damanpour & Aravind, 2011). By concentrating on these areas, SMEs may establish a strong basis that facilitates ongoing enhancement, fosters innovation, and propels rapid technical progress (Barney, 1991). From an external perspective, the framework considers the influence of market competition, government regulations, and economic circumstances, recognising that these elements may either support or impede innovation endeavours (Porter, 1980). Incorporating these external factors guarantees that the framework is flexible and able to adjust to the evolving business environment, allowing SMEs to sustain their competitive advantage (Christensen, 1997).

Furthermore, the established framework presents manufacturing capabilities and quality procedures as moderating factors that strengthen the correlation between innovation and competitiveness (Flynn et al., 1995). These features serve as crucial facilitators, guaranteeing that the creative endeavours inside SMEs produce concrete enhancements in product quality and market competitiveness (Hayes & Wheelwright, 1984). By integrating these moderating elements, the framework not only tackles the specific obstacles encountered by SMEs but also offers a strategic plan for achieving sustainable expansion and enduring prosperity (Teece et al., 1997). This comprehensive approach makes the framework a significant instrument for SMEs seeking to negotiate the intricacies of the contemporary business environment, providing them with the strategic direction necessary to compete efficiently worldwide (Nonaka, 2007).

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Based on the conceptual model, we suggest the following propositions:

P1: Top Management has a positive impact on the product innovation capability.

P2: Working culture influences product innovation capacity.

P3: Human Resource Management affects the product innovation capability.

P4: Government policy and support significantly impact the product innovation capability.

P5: Demand for the product influences the product innovation capability.

P6: Competition in the market influences the product innovation capability.

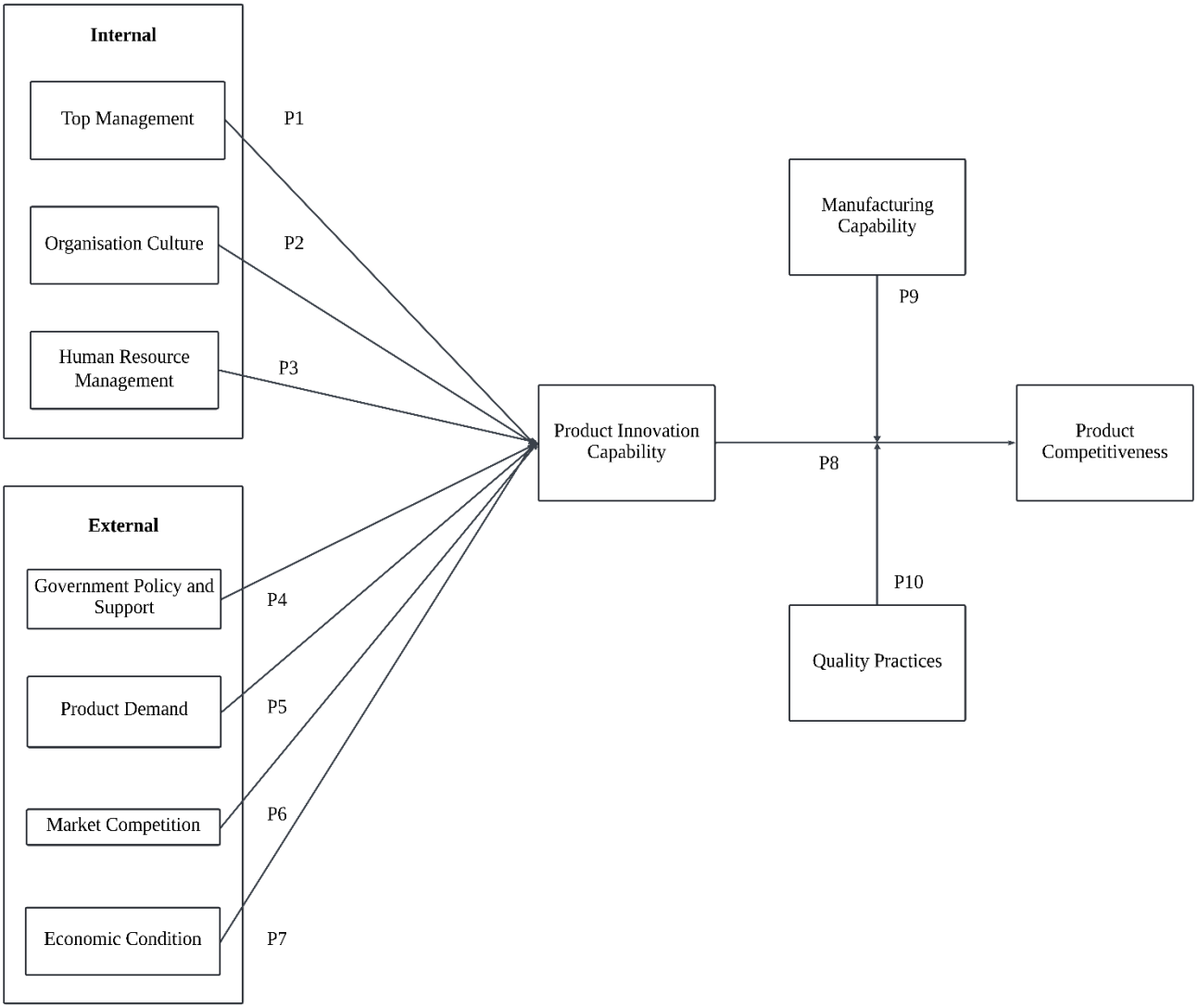
P7: Economic conditions have a positive impact on product innovation capability.

P8: Product innovation capability has a direct influence on product competitiveness.

P9: Manufacturing capability significantly moderates the relationship between product innovation capability and product competitiveness.

P10: Quality practices significantly moderate the relationship between product innovation capability and product competitiveness in Indian manufacturing SMEs.

Figure 3: Conceptual Framework to improve the competitiveness of Indian Manufacturing SMEs



Source: Compiled by Authors

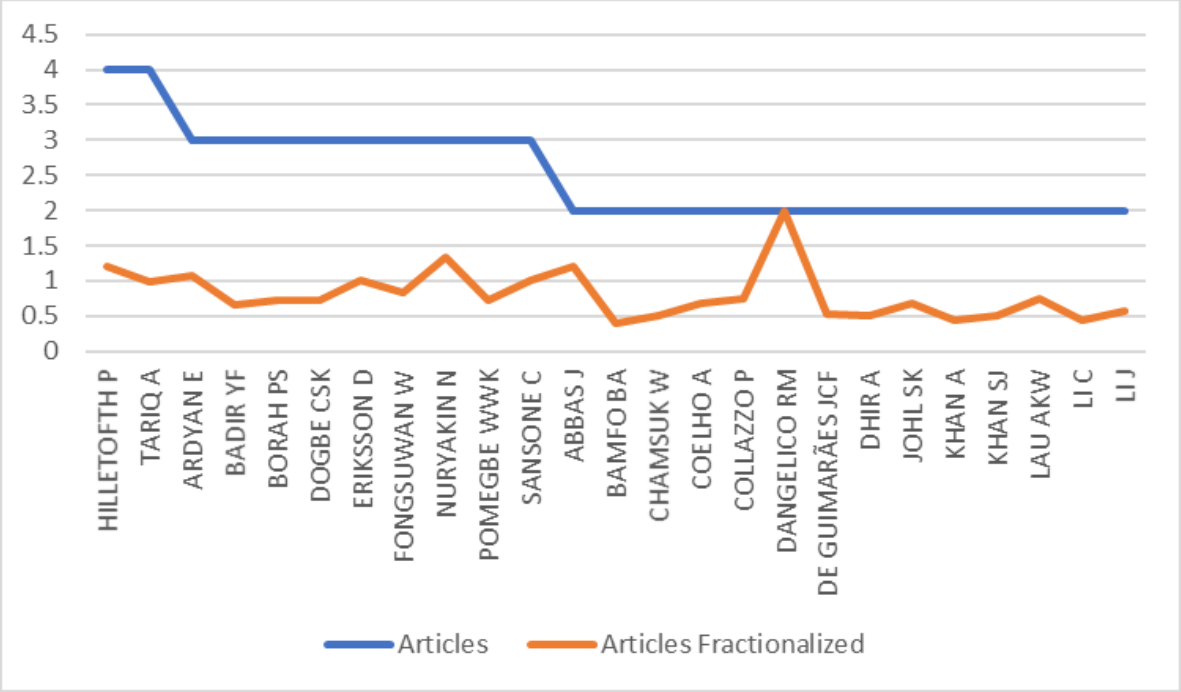
5. Results from Bibliometric Analysis

5.1 *Most relevant author*

The line graph shown in Figure 4 illustrates the number of articles published by various authors and their fractionalised article counts, accounting for co-authorship. The top three authors, Hilletofth P, Tariq A, and Ardyan E, have published 12 articles, with fractionalised contributions from 1.20 to 1.08. Authors such as Badir YF, Borah PS, Dogbe CSK, Eriksson D, Fongsuwan W, Nuryakin N, Pomegbe WWK, and Sansone C each contributed three articles, with varying fractionalised counts indicating shared contributions.

Nuryakin N has the highest fractionalised count of 1.33, suggesting significant individual input. Authors like Abbas J, Bamfo Ba, Chamsuk W, Coelho A, Collazzo P, Dangelico RM, De Guimaraes JCF, Dhir A, Johl SK, Khan A, Khan SJ, Lau AKW, Li C, and Li j each published two articles, with fractionalised counts from 0.40 to 2.00. Dangelico RM stands out with a fractionalised count of 2.00, indicating full contribution. This table underscores the varied contributions of authors, reflecting their productivity and collaborative efforts.

Figure 4: Most Relevant Authors



Source: Compiled by Authors

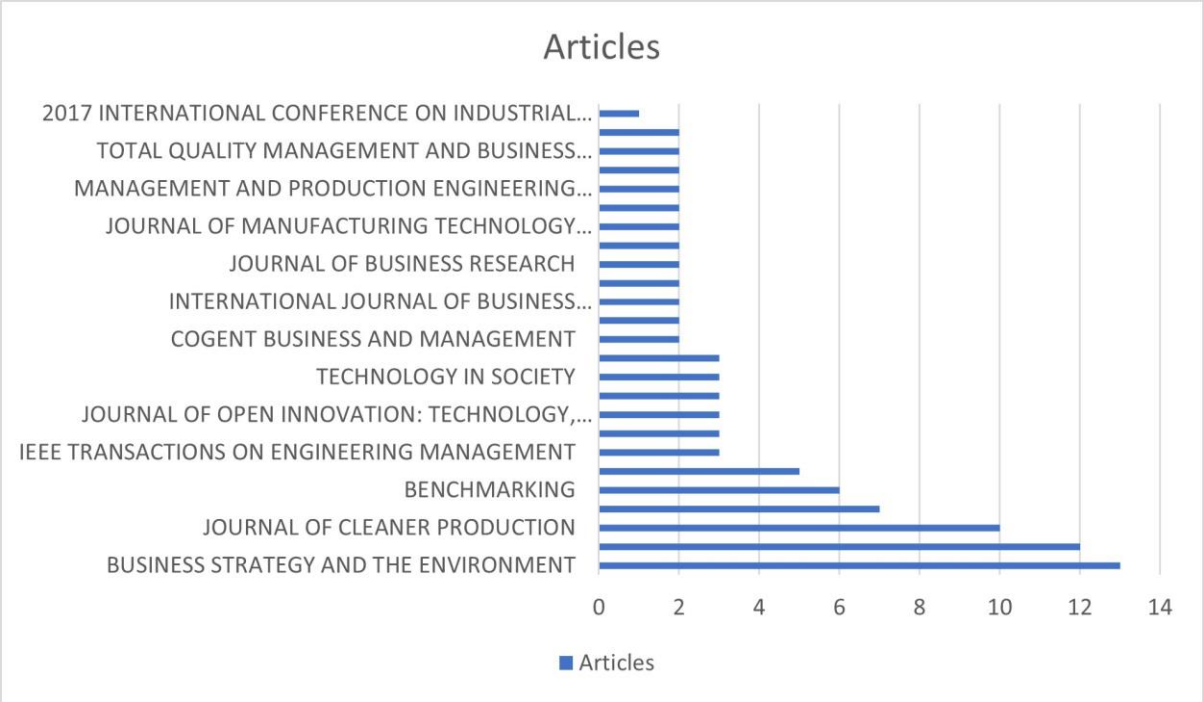
5.2 *Most relevant sources*

The bar graph (refer to Figure 5) illustrates the distribution of articles across various academic sources, highlighting leading journals in the field. "Business Strategy and the Environment" leads with 13 articles, followed by "Journal of Cleaner Production" with 11, underscoring their research contributions. Other significant sources include "Journal of Benchmarking" and "IEEE Transactions on Engineering Management," with numerous publications.

Mid-range contributors like "Journal of Open Innovation: Technology, Market, and Complexity" and "Technology in Society" have 4-6 articles each. Several journals, such as

"Cogent Business and Management" and "International Journal of Business," contributed around 2-3 articles. This visualisation highlights the pivotal role of certain journals in research dissemination and discourse shaping, offering a comprehensive overview of the field's influential sources.

Figure 5: Most Relevant Sources



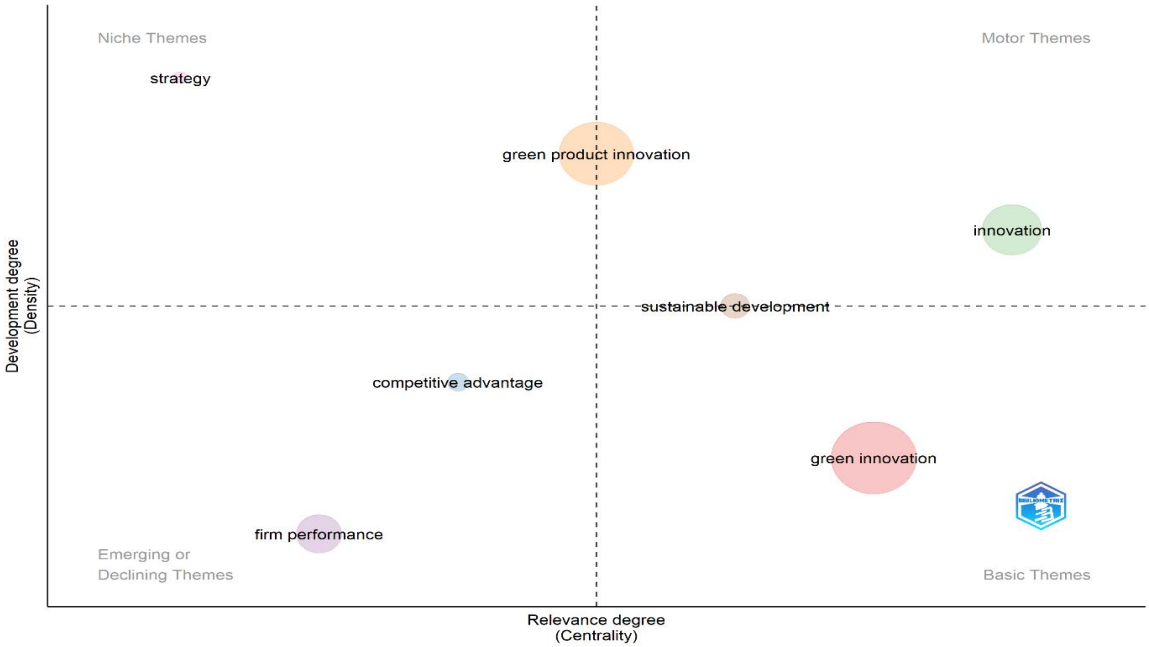
Source: Compiled by authors

5.3 *Thematic Map*

An analysis of thematic maps was performed to discover developing themes within the domain. This research involved using 100-author keywords and setting a minimum cluster frequency of 10 per thousand articles. As a result, seven clusters were identified. Larger circles indicate more keywords in a cluster (Cobo et al., 2011). The map's dimensions are centrality and density. Centrality measures "the intensity of its links with other clusters" (Callon et al., 1983), indicating a theme's significance in domain development. Density measures "the strength of the links that bind the words within the cluster together" (Callon et al., 1983), assessing the theme's capacity to adapt over time (Callon et al., 1983; Cobo et al., 2011).

Figure 6 shows that the "innovation" cluster is a "motor theme" with high density and centrality, indicating strong connections within the domain and its cluster. "Competitive advantage" and "firm performance" are minimally formed themes with low density and centrality, indicating their relevance but also implying they need more scholarly attention (Cobo et al., 2011).

Figure 6: Thematic Map



Source: Compiled by authors

5.4 *Word Tree Map*

The treemap (see Figure 7) visualisation provides an overview of the innovation research landscape, highlighting key topics and their prominence. "Green Innovation" (32 occurrences) dominates, emphasising environmentally sustainable innovations. "Innovation" and "Competitive Advantage" (13 occurrences each) highlight major interest in general practices and strategies. Other significant areas include "Green Product Innovation", "Competitiveness", "Green Process Innovation", and "Firm Performance", showcasing innovation's impact on “performance” and “positioning”. The visualisation also reveals some emerging trends which are less-studied topics such as "Eco-Innovation", "Sustainability", "Corporate Social Responsibility", and SME research, illustrating innovation's wide-ranging influence on various organisational and societal aspects.

Figure 7: Word Tree Map

Source: Compiled by Authors

6. Discussion

This discussion provides a comprehensive overview of the existing literature about the impact of innovation on enhancing the competitiveness of SMEs, specifically engaged in the manufacturing sector. The novel framework proposed in this study suggests that Indian manufacturing SME owners and managers should focus on improving product innovation capabilities, manufacturing capabilities, quality practices, and product competitiveness. The several aspects of HRM, such as skill development and training, are crucial in improving the ability of SMEs to adapt to advanced technology and market dynamics. Certainly, external environments, specifically government regulations and market competition, significantly impact the innovation environment for SMEs. Initiatives such as “Make in India” foster an encouraging ambience for the growth and advancement of SMEs. However, additional issues, such as limited capital, infrastructure, and skilled workforce, remain to be addressed. This study highlights the necessity of possessing analytical abilities to analyse the markets and competition, which is crucial for the survival of SMEs.

The framework addresses the research objectives by incorporating elements such as top management influence, technological infrastructure, and external market factors to improve SMEs' innovation capabilities and competitiveness. The framework directly addresses the identified voids in the literature by harmonising these components with the research objectives, thereby fulfilling the study's aims. This connection will be further substantiated by recent literature, including Foss & Saebi, (2017) investigation of business model innovation, which examines frameworks' critical role in connecting theory and practice. Furthermore, the framework's anticipated results—including enhanced market positioning and increased innovation—will be underscored, utilising the insights of (Criscuolo et al., (2012), who investigated innovation processes in small and medium-sized enterprises. These improvements will elucidate the framework's relevance and illustrate its role in attaining the research objectives.

The bibliometric analysis of this study provides insights into the status of Product Competitiveness and Innovation in Indian manufacturing SMEs using existing research data. Authors such as Hilletofth P. and Tariq A. are recognised for their contributions to the growth of SMEs. The study also indicates that influential academic publications such as 'Business Strategy and the Environment' and 'Sustainability (Switzerland)' have significantly published the associated studies. The thematic map emphasises the key theme of “innovation”, which is associated with density and centrality. Conversely, the word tree analysis indicates that the term 'Green Innovation' constitutes 16% of the words used in the investigated articles, suggesting a strong focus on sustainable measures.

7. Conclusion

The current study draws attention to the crucial significance of innovation in improving SMEs in the Indian manufacturing sector. It examines three main aspects: internal capabilities, external impacts, and bibliometric insights. Initially, the study highlights the significance of internal skills in creating a working environment that benefits innovation, including support from top management, organisational culture, and human resource management. Internal factors are vital in developing strong product innovation skills and improving competitiveness. Furthermore, the study highlights the substantial influence of external factors such as market competition, economic conditions, and government policies on the innovation landscape. SMEs may organise to gain sustainable competitive advantages by effectively managing these internal and external factors.

The bibliometric analysis is the third pillar of this study, offering a thorough overview of the innovation research landscape and identifying significant themes and developing trends. The analysis indicates an increased focus on sustainable developments, with "Green Innovation" emerging as a dominant segment, reflecting the growing importance of green initiatives. In addition, the bibliometric analysis shows the relevance of related topics such as "Competitive Advantage" and "Firm Performance," which are essential for understanding the wider influence of innovation on achieving organisational goals. By combining these bibliometric results, the paper provides useful insights into the present condition of research on SME innovation and identifies areas for more research. In short, this comprehensive approach directs SMEs leaders and managers and informs policymakers on the fundamental need for an ideal setting for innovation and the value of utilising government initiatives.

7.1 *Implications*

The study offers SME owners, managers and policymakers valuable managerial insights. Top management should actively foster an innovative culture by investing in R&D, encouraging creativity, risk-taking, and empowerment, and promoting a supportive working culture that fosters idea generation, collaboration, and continuous improvement. Need-based training and skill development continually are vital for enhancing innovation capabilities. Managers should leverage government initiatives to support innovation while adapting to market competition and economic conditions. Good manufacturing practices followed by SMEs situated in other countries, which are referred to in this research, shall be followed by the Indian SMEs.

Despite SMEs' central role in the global economy, current literature emphasises radical, technology-based innovations in large organisations, overlooking innovation characteristics of SMEs in emerging nations like “India”, highlighting the need for further study on the drivers and barriers to SME innovation. Indian SMEs encounter challenges such as skilled employee scarcity, difficulties translating innovative ideas into implementation, and limited funds, reducing their global competitiveness and self-sufficiency. Identifying the causes of competitive pressures facing Indian manufacturing SMEs is essential to overcoming these challenges. The proposed integrated framework offers a comprehensive approach to help SMEs navigate competition and achieve initiatives like "Make in India."

7.2 *Future Research Directions*

While our study has many benefits, it also has drawbacks that can be addressed in future research. As a result, it would be quite interesting to extend the findings of this study by including more databases such as Web of Science and Google Scholar, among others. The framework encourages future research to empirically validate the model, explore additional factors, investigate export opportunities, and examine networking with various stakeholders to enhance SME competitiveness through product and process innovation. Furthermore, researchers can explore more themes like “Competitive Advantage”, “Firm Performance”, “Eco-Innovation”, "Sustainability," and "Corporate Social Responsibility," which demonstrate innovation's broad impact on numerous organisational and societal aspects. There is a need to fill the knowledge gap about the barriers to adopting innovation in SMEs, especially in developing nations such as India. By examining these areas, future studies can explore additional factors that promote green innovation and provide practical suggestions for SMEs to manage the challenges a rapidly changing market environment faces effectively.

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