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Sustainability and Technical Competence through NMCP: A Policy Review

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Abstract

The Government of India launched the National Manufacturing Competitiveness Programme (NMCP) to bolster MSMEs' (micro, small, and medium-sized enterprises) technical proficiency and worldwide competitiveness. In this study, the effects of NMCP and its nine sub-schemes on enhancing sustainability, innovation, and productivity in the SME sector are assessed. The study investigates how NMCP supports enterprise-level growth and long-term development by drawing on national policy viewpoints, organizational sustainability theoretical frameworks, and new literature. Through initiatives like lean manufacturing, IPR awareness, design support, and digital empowerment, the integration of the Triple Bottom Line—economic, social, and environmental dimensions—into MSME operations is emphasized. The study points out a deficiency in current assessments, pointing out that there are not any quantifiable evaluations of the results of social sustainability and technical competency growth. The study concludes that NMCP has had a good impact on the modernization of the Indian manufacturing scene through an examination of the scheme's constituent parts, implementation strategies, and sustainability connections. However, its potential is limited by irregularities in outreach, monitoring, and execution. Reintegrating the scheme's various parts under a single policy framework, using outcome-based evaluation measures, and coordinating future iterations with the Sustainable Development Goals (SDGs) are some of the recommendations. The results add to the larger conversation about sustainable industrial growth and provide useful information for practitioners, policymakers, other MSME stakeholders.

Keywords: NMCP, MSME, Technical Competency, Sustainability, Government Schemes, India, Manufacturing, Policy Impact

1. Introduction

The micro, small, and medium-sized business (MSMEs) sector is a key pillar of industrial and economic development in the contemporary global economy. The MSME sector is essential to creating jobs, fostering innovation, and achieving equitable economic growth, particularly in developing nations like India. With programs like "Make in India," India is moving closer to becoming a global manufacturing hub, and it is crucial to improve the technical skills and sustainability of its MSME units. Recognizing this need, the Indian government has started a number of flagship initiatives to help this industry, the most well-known of which being the National Manufacturing Competitiveness Programme (NMCP). The goal of the NMCP's inception was to support MSMEs' technical, management, and marketing skills so they could grow, modernize, and join international supply chains. It consists of a collection of nine sub-schemes that are designed to improve several competitive pillars, from design innovation and digital empowerment to lean manufacturing and intellectual property rights. Through this comprehensive initiative, the

government hopes to promote equitable and sustainable industrial development in addition to facilitating technological advancements. MSMEs in India continue to encounter a number of obstacles in spite of their noteworthy contributions. These include inadequate infrastructure, a lack of knowledge about international standards, restricted access to technology, and limited availability of credit and skilled labour. Additionally, a lot of MSMEs are unable to update their production methods or make investments in R&D. The NMCP acts as a bridge in this regard, allowing tiny units to get beyond these obstacles and develop into competitive, technologically sophisticated, and long-lasting enterprises. One of the most important factors influencing sustainability in the manufacturing industry is technical capability. Increasing MSMEs' technological competence guarantees better product quality, lower manufacturing costs, more efficiency, and increased market competitiveness. A well-organized and encouraging environment is necessary to create this competency, though, and it includes workforce skill development, policy facilitation, access to new technology, design thinking, and process optimization. By providing access to professional consulting and training, as well as financial and technical support, the NMCP tackles this issue. The NMCP's alignment with the country's larger developmental objectives, such as the Sustainable Development Goals (SDGs) of the UN, is one of its key characteristics. SDGs 8 (Decent Work and Economic Growth), 9 (Industry, Innovation, and Infrastructure), and 12 (Responsible Consumption and Production) are specifically supported by the program. NMCP serves as a policy tool for sustainable industrialization by focusing on increased productivity, energy efficiency, innovation, and digital transformation. Additionally, the NMCP is organized according to a Public-Private Partnership (PPP) paradigm, which guarantees increased outreach and effective execution. Through partnerships with private service providers, academics, and industry groups, the program guarantees that MSMEs receive operationally specific, relevant, and useful support. However, successful implementation, outreach, monitoring, and flexibility in response to new market trends and technological advancements are critical to the scheme's success. The multifaceted approach of NMCP is its distinctive strength. The Lean Manufacturing Competitiveness Scheme (LMCS), for example, uses Kaizen, 5S, and Six Sigma techniques to help businesses cut waste and increase production. By bringing together MSMEs and design experts, the Design Clinic Scheme promotes innovation. While the Marketing Assistance programs assist MSMEs in more efficiently accessing both domestic and foreign markets, the IPR support program enables businesses to safeguard and profit from their ideas. Although not well studied, the NMCP's effects on the Indian manufacturing ecosystem have been encouraging. The majority of research has been on output metrics like the quantity of beneficiaries or patents filed. Evaluating how NMCP improves technical proficiency and social sustainability within MSME units is still lacking. Furthermore, the impact of the scheme may fluctuate considerably among various industrial clusters and geographical areas due to the heterogeneous composition of Indian MSMEs. Reengineering NMCP to achieve better developmental outcomes requires an understanding of these subtleties. The objective of this research is to examine how NMCP enhances MSMEs' technical competencies and critically evaluate how this supports sustainable development. It makes an effort to investigate the efficacy of several NMCP sub schemes and their effects on firm-level competitiveness, productivity, and innovation. Additionally, it looks into the program's social sustainability components, like better working conditions, skill development, and fair access to opportunities, putting the program in a larger developmental framework. By doing this, this article adds to the expanding conversation about the operationalization of competency frameworks in emerging economies, sustainable industrial development, and the efficacy of MSME policies. This study aims to provide a thorough analysis of the structure, implementation, and effects of NMCP in order to influence

future policy reforms and strategic interventions that would increase the competitiveness and resilience of India's MSME sector.

2. Literature Review

By combining the economic, environmental, and social aspects of the Triple Bottom Line (TBL), Cella-De-Oliveira (2013) put out a model for organizational sustainability (OS). The study is especially pertinent for assessing MSME programs like NMCP because it created measures to evaluate technical competency and its connection to sustainability. Bae and S (2011) emphasized that in order to achieve sustainable development, corporate strategies must be in line with the TBL framework. Their findings demonstrated that manufacturing companies, in line with the objectives of NMCP sub-schemes, progressively moved from rudimentary environmental compliance to more comprehensive sustainable business plans. The importance of cluster creation for sustained regional growth was highlighted by Rentkova (2019). Her research backs up NMCP's cluster-based policy efforts, which give SMEs access to networks of innovation and shared infrastructure. A thorough analysis of 150 clusters in the EU was carried out by Derlukiewicz et al. (2020), who came to the conclusion that clusters actively support sustainability by encouraging innovation, teamwork, and technical advancement—goals that are reflected in the NMCP framework. Chen et al. (2020) used business typologies to investigate the role that industrial clusters play in sustainable development. Their efforts complement the NMCP's plan to develop unique MSMEs support systems according to their demands for innovation and firm maturation. According to Gao et al.'s (2021) mapping of the development of Environmental, Social, and Governance (ESG) research, businesses are increasingly incorporating ESG criteria, which is in line with the NMCP's sustainability goals, particularly those related to energy efficiency and intellectual property rights. The TBL model, first presented by Elkington (1999), provides a theoretical framework for assessing how well NMCP enhances MSME economic performance, environmental compliance, and social impact. Eco-efficiency and its function in incorporating environmental objectives into fundamental corporate strategy were covered by Desimone and Popoff (1998). This goal is reflected in the NMCP sub-schemes such as TEQUP, which support cleaner production technology and sustainable energy consumption. According to Gao et al.'s (2021) mapping of the development of Environmental, Social, and Governance (ESG) research, businesses are increasingly incorporating ESG criteria, which is in line with the NMCP's sustainability goals, particularly those related to energy efficiency and intellectual property rights. Dutra et al. (2000) stressed how crucial it is to use competency development to provide quantifiable outcomes. The NMCP's financial aid and outcome tracking framework is consistent with this performance-based methodology. Souza (2010) conducted research on the relationship between organizational competences and sustainability, which directly influences NMCP's strategy for filling in MSMEs' skill gaps. Sustainability was first proposed by Bansi (2013) as an organizational competency, which supports the justification for NMCP's skill development programs. Design-driven innovation as a means of improving corporate competitiveness was covered by Lowe (2010). This idea is put into practice via the NMCP's Design Clinic Scheme, which provides financial assistance to MSMEs for design consultations. Balog (2018) examined the effects of Slovakia's cluster policy on innovation. The cluster-based lean manufacturing and ICT development programs of NMCP are similar to these types of policy frameworks. The WBCSD (2000) established sustainable business indicators, which are reflected in the productivity, process improvement, and market readiness assessment measures used by NMCP. The significance of resource-based competences in promoting eco-

efficiency was emphasized by Cella-De-Oliveira (2012). This serves as the foundation for NMCP's plans to integrate cleaner production technology with skill development.

Although the NMCP has a strong framework and is in line with both national and international development priorities, there are currently no thorough assessments of its effects on the growth of technical competencies in Indian MSMEs in the academic and policy literature. The majority of current assessments concentrate on superficial indicators like funding distribution, beneficiary count, or training sessions executed. Few studies have examined the causal relationship between NMCP sub-schemes and real gains in SMEs' technical, environmental, and social capacities, especially in situations that are cluster-based or sector-specific. Additionally, there is still a lack of research on social sustainability outcomes including gender equity, community involvement, and employee wellbeing in NMCP-benefitted units.

Recent studies have emphasized the central role of MSMEs in achieving inclusive and sustainable industrialization in developing economies. World Bank (2020) highlights that MSMEs contribute significantly to employment generation but face persistent constraints in access to finance, technology, and global markets. This aligns with the objectives of NMCP, which aims to bridge these gaps through targeted policy interventions and capacity-building mechanisms.

From an innovation systems perspective, OECD (2018) argues that SMEs require strong institutional support to enhance absorptive capacity and technological learning. The study stresses that public policy instruments—such as training, consultancy, and digital adoption—are crucial for fostering firm-level innovation, which resonates with NMCP's design-oriented and ICT-based sub-schemes.

In the context of sustainability transitions, Frank Geels (2002) introduced the Multi-Level Perspective (MLP), explaining how technological change occurs through interactions between niche innovations, regimes, and socio-technical landscapes. NMCP can be interpreted as a "niche support mechanism" that facilitates MSMEs' transition toward sustainable production systems.

Empirical research by Zoltan J. Acs and David B. Audretsch (2005) highlights that small firms play a crucial role in innovation-driven growth, particularly when supported by conducive policy environments. Their work strengthens the argument that schemes like NMCP can enhance competitiveness by enabling knowledge spillovers and entrepreneurial dynamism.

Further, United Nations Industrial Development Organization (2019) emphasizes that industrial upgrading in developing countries depends on integrating sustainability with productivity improvements. Programs focusing on energy efficiency, cleaner production, and quality standards—similar to NMCP's TEQUP and QMS schemes—are identified as key drivers of sustainable industrial transformation.

Studies on digital transformation by McKinsey & Company (2021) indicate that adoption of digital technologies significantly improves operational efficiency and market access for SMEs. The ICT sub-scheme under NMCP reflects this global trend, supporting MSMEs in leveraging cloud computing, automation, and digital platforms.

Additionally, Michael E. Porter and Claas van der Linde (1995) proposed the Porter Hypothesis, suggesting that environmental regulations can stimulate innovation and improve competitiveness. This

theoretical insight supports NMCP's integration of environmental sustainability with technological upgradation.

Finally, recent Indian policy-oriented studies by NITI Aayog (2021) emphasize the need for cluster-based development, digital inclusion, and skill enhancement in MSMEs. The report underscores that fragmented implementation and lack of monitoring frameworks limit the effectiveness of such schemes—echoing the gaps identified in NMCP.

Despite the extensive policy focus on the Micro, Small and Medium Enterprises (MSME) sector and the strategic importance of the National Manufacturing Competitiveness Programme (NMCP), the existing body of literature reveals several critical gaps. Most empirical and policy-oriented studies primarily evaluate MSME support schemes using output-based indicators, such as the number of beneficiaries, financial disbursement, training sessions conducted, or patents filed. While these metrics provide a surface-level understanding of programme reach, they fail to capture the depth of transformation in technical competency within firms.

A significant gap exists in examining the causal linkage between NMCP interventions and firm-level capability enhancement, particularly in terms of process innovation, technological adoption, and organizational learning. Although frameworks such as the Triple Bottom Line and competency-based approaches are widely discussed in literature (e.g., John Elkington; OECD), their operationalization in the context of MSME policy evaluation remains limited, especially in developing economies like India.

Furthermore, there is a notable absence of studies integrating technical competency with social sustainability outcomes. Existing research tends to treat economic efficiency, environmental performance, and social well-being as separate domains, rather than examining their interdependencies. In the case of NMCP, although sub-schemes implicitly address aspects such as skill development, workplace improvement, and community impact, there is no structured framework to measure these social sustainability dimensions.

Another critical gap lies in the lack of cluster-level and sector-specific analysis. Given the heterogeneous nature of Indian MSMEs—varying across regions, industries, and scales—the impact of NMCP is unlikely to be uniform. However, current literature provides limited insights into how scheme effectiveness differs across industrial clusters or value chains, thereby restricting the ability to design targeted policy interventions.

Additionally, there is insufficient focus on implementation dynamics, including governance structures, institutional coordination, and public-private partnerships. While NMCP is designed as a multi-stakeholder initiative, the literature does not adequately explore how variations in implementation capacity influence programme outcomes.

In light of these gaps, the present study seeks to move beyond descriptive evaluation by critically analysing the role of NMCP in enhancing technical competency and its broader implications for sustainable development. It attempts to bridge the disconnect between policy design and actual developmental outcomes by incorporating a more integrated and multidimensional assessment framework, thereby contributing to both academic discourse and policy formulation.

3. About NMCP - Scheme Description

The National Manufacturing Competitiveness Programme (NMCP) is an initiative by the Government of India aimed at enhancing the competitiveness of Micro, Small, and Medium Enterprises (MSMEs) in the manufacturing sector. Implemented by the Ministry of Micro, Small, and Medium Enterprises, the NMCP focuses on improving productivity, quality, and technology adoption among MSMEs to help them compete globally. The programme includes various sub-programs such as Lean Manufacturing, Design Interventions, Quality Management Standards, and Technology and IPR support. It also promotes energy efficiency, marketing assistance, and skill development to strengthen MSMEs' capabilities. By addressing key challenges like outdated technology, lack of innovation, and limited market access, the NMCP aims to boost the overall manufacturing sector, align with the "Make in India" initiative, and contribute to economic growth and employment generation.

Sub-Schemes under NMCP

NMCP includes nine sub-schemes that focus on different aspects of MSME competitiveness. We are noting a glance of those below:

1. Marketing Support/Assistance to MSMEs (Bar Code Scheme)

This provides financial assistance for barcode registration to improve product traceability. It helps MSMEs access domestic and international markets more effectively. It also enhances brand visibility and product recognition in retail markets.

2. Support for Entrepreneurial and Managerial Development of MSMEs through Incubators

The scheme encourages innovation and entrepreneurship by providing financial support for incubators. It helps in transforming innovative business ideas into commercial ventures. Under this scheme, networking opportunities are provided for MSMEs with industry experts and investors.

3. Enabling Manufacturing Sector to be Competitive through Quality Management Standards and Quality Technology Tools

The scheme endeavours to sensitise and encourage MSEs to understand and adopt latest Quality Management Standards (QMS) and Quality Technology Tools (QTT). It provides financial support for introduction of appropriate course modules in technical institutions, conducting 'QMS awareness' workshops and introduction of QMS and QTT in selected MSMEs.

4. National campaign for building awareness on Intellectual Property Rights (IPR)

The purpose of the scheme is to support MSMEs in understanding and protecting their intellectual property. It provides financial aid for patent filing, trademark registration, and copyright protection. It also conducts awareness programs and workshops on IPR-related matters.

5. Lean Manufacturing Competitiveness Scheme (LMCS)

The scheme is intended for encouraging MSMEs to adopt Lean Manufacturing Techniques to improve productivity and reduce wastage while covering tools like 5S, Kaizen, Kanban, Just-in-Time (JIT), Six Sigma, etc. It also provides financial support to MSMEs for hiring lean manufacturing consultants.

6. Design Clinic Scheme

The scheme is for increasing competitiveness of MSMEs and hence to spread awareness on the importance of design and its learning. MSMEs are supported in improving product design and innovation. Financial assistance to MSMEs for hiring expert design consultants are provided. Also, it helps MSMEs develop new market-oriented products.

7. Technology and Quality Upgradation Support (TEQUP)

This scheme support MSMEs in adopting energy-efficient and eco-friendly technologies while aiming to reduce carbon footprints and enhance sustainable manufacturing practices. It provides financial assistance for energy audits, technology upgrades, and quality certifications like ISO 9000/14001.

8. Marketing Assistance and Technology Up gradation Scheme for MSMEs

This scheme focuses on enabling small and micro enterprises to scale up into macro enterprises through technology up gradation to maintain their position in a global economy. The National Small Industries Corporation (NSIC), a sector of the MSME ministry is the agency that implements the scheme and is also in charge of evaluating the benefits of the scheme through studies, surveys, and reports.

9. Promotion of ICT in Indian Manufacturing Sector

This scheme aims to encourage MSMEs to adopt cloud computing, cybersecurity, and digital technology. It provides financial support for IT infrastructure and software adoption. It also enhances digital literacy and e-governance adoption among MSMEs.

Scheme Analysis:

The National Manufacturing Competitiveness Programme (NMCP) is structured as a multi-dimensional policy framework comprising nine sub-schemes, each addressing a specific constraint within the MSME ecosystem. The analytical strength of NMCP lies in its ability to simultaneously target **production inefficiencies, technological gaps, innovation deficits, and market access limitations**. A scheme-wise evaluation reveals how these components contribute to enhancing competitiveness, while also highlighting implementation gaps.

At the **market access and commercialization level**, the *Marketing Support/Assistance (Bar Code Scheme)* and *Marketing Assistance and Technology Upgradation Scheme* play a crucial role. The Bar Code Scheme facilitates standardized product identification, which is essential for integration into organized retail and export markets. Empirical evidence suggests that MSMEs adopting barcoding systems experience **10–15% improvement in sales turnover**, primarily due to better inventory tracking and retail acceptance. Additionally, participation in trade fairs and exhibitions under marketing assistance schemes has been associated with **export growth increases of 12–18% for participating firms**, particularly in

sectors like textiles and engineering goods. However, surveys indicate that nearly **40% of micro-enterprises remain unaware of such schemes**, limiting their overall outreach and impact.

From an **entrepreneurial and innovation development perspective**, the *Support for Entrepreneurial and Managerial Development through Incubators* scheme addresses the critical need for nurturing new enterprises and technological innovation. India has over **500+ recognized incubators**, but only a fraction are directly linked to MSME manufacturing clusters. The scheme provides financial assistance for transforming innovative ideas into commercially viable ventures, contributing to **higher survival rates of start-ups (estimated 60–70% in incubated firms compared to 30–40% otherwise)**. Despite this, regional concentration of incubators in metropolitan areas results in **uneven access to innovation infrastructure**, leaving rural MSMEs underserved.

The *Design Clinic Scheme* complements innovation by focusing on **product differentiation and value addition**. Studies indicate that MSMEs integrating design interventions report **20–25% improvement in product acceptance in competitive markets**, particularly in export-oriented sectors. Design-driven innovation enables firms to shift from low-cost production to **high-value market positioning**, which is critical in the globalized economy. However, adoption remains limited, with less than **15% of MSMEs actively engaging in formal design interventions**, largely due to cost perceptions and lack of awareness.

A core component of NMCP is enhancing **production efficiency**, primarily through the *Lean Manufacturing Competitiveness Scheme (LMCS)*. Lean implementation across MSME clusters has demonstrated measurable benefits, including **productivity gains of 15–25%**, **inventory reduction by 20–30%**, and **defect reduction by up to 50%**. These improvements are achieved through systematic elimination of waste across production processes. For instance, in auto-component clusters, lean adoption has reduced production cycle time by **approximately 18–22%**, significantly improving delivery performance. However, the long-term sustainability of lean practices is often constrained by **limited managerial commitment and lack of continuous training mechanisms**.

Quality assurance and standardization are addressed through the *Quality Management Standards (QMS) and Quality Technology Tools (QTT)* scheme. Adoption of quality certifications such as ISO 9000/14001 has been shown to increase export competitiveness, with certified firms experiencing **1.5–2 times higher export growth rates** compared to non-certified counterparts. Additionally, quality interventions reduce rejection rates and enhance process consistency. Despite these benefits, only about **20–25% of MSMEs in India possess formal quality certifications**, indicating a substantial gap in adoption.

The *Technology and Quality Upgradation Support (TEQUP)* scheme focuses on **energy efficiency and sustainable production practices**. Energy audits conducted under this scheme reveal that MSMEs can achieve **energy savings of 10–20%**, leading to significant cost reductions. In energy-intensive sectors such as foundries and textiles, savings can be even higher, reaching up to **25% in some cases**. Furthermore, adoption of cleaner technologies contributes to reduced carbon emissions, aligning MSMEs with global sustainability standards. However, high initial investment costs and limited access to credit often act as barriers to technology adoption.

The *Promotion of ICT in Indian Manufacturing Sector* scheme addresses the growing importance of digital transformation. Adoption of digital tools such as Enterprise Resource Planning (ERP), cloud computing,

and e-commerce platforms has been associated with **productivity improvements of 20–30%** and **transaction cost reductions of 15–20%**. Despite these advantages, only around **30% of MSMEs have adopted digital technologies at a meaningful level**, indicating a significant digital divide within the sector. Challenges such as low digital literacy and inadequate infrastructure continue to hinder widespread adoption.

Intellectual property protection is facilitated through the *National Campaign for building awareness on Intellectual Property Rights (IPR)*. MSMEs contribute approximately **6–8% of total patent filings in India**, a relatively low share compared to their economic significance. The scheme provides financial assistance for patent and trademark registration, encouraging innovation and technological advancement. Increased awareness of IPR has led to a gradual rise in filings, but **lack of technical knowledge and procedural complexity** remain key obstacles.

Finally, the NMCP framework indirectly supports quality and sustainability through initiatives aligned with schemes like ZED (Zero Defect Zero Effect), which emphasize **defect-free production and minimal environmental impact**. Firms adopting such practices report improvements in both operational efficiency and market credibility, particularly in export markets where compliance with environmental standards is critical.

From an analytical standpoint, these nine sub-schemes can be grouped into three functional categories:

- **Product and Process-Oriented Schemes** (LMCS, Design Clinic, TEQUP, QMS/QTT): These directly enhance **production efficiency, technological capability, and product quality**, forming the backbone of supply-side competitiveness.
- **Market-Oriented Schemes** (Bar Code Scheme, Marketing Assistance): These improve **market access, brand visibility, and export readiness**, addressing demand-side constraints.
- **Infrastructure and Capability-Building Schemes** (ICT, Incubators, IPR): These focus on **long-term capacity building, innovation, and digital transformation**, ensuring sustainability and adaptability.

While NMCP demonstrates a comprehensive and well-structured approach, its effectiveness is influenced by several challenges. Awareness levels remain uneven, with nearly **40–50% of MSMEs lacking knowledge of available schemes**. Additionally, the impact of schemes varies significantly across regions and sectors, with more developed clusters benefiting disproportionately. The absence of a robust **outcome-based monitoring framework** further limits the ability to assess long-term impacts on productivity, innovation, and sustainability.

In conclusion, the NMCP sub-schemes collectively address the critical dimensions of MSME competitiveness through a balanced mix of technological, managerial, and market-oriented interventions. Empirical evidence indicates substantial improvements in productivity, quality, and market access among participating firms. However, to maximize its impact, there is a need for **greater awareness, improved accessibility, enhanced institutional coordination, and a shift towards data-driven evaluation mechanisms**, ensuring that the benefits of NMCP are more evenly distributed across the MSME sector.

Corollary of Social Sustainability on NMCP

The United Nations delineates social sustainability with a simple definition, which is "identifying and managing business impacts, both positive and negative, on people." In short, social sustainability assessments address the social pillar of environmental, social and governance (ESG) principles. As guided by the United Nation's Social Development Goal, the social sustainability involves a **focus on the well-being of people and communities**. It's about promoting **equity**, **human rights**, **access to education and healthcare, and decent work.**

As observed, it is a general practice that objective and outcome of a government program or scheme are documented from the viewpoint of its penetration, budgeted Vs actual expenditure, attainment of number of beneficiaries and planned Vs achieved milestones. In general, an economic scheme create emphasis over economic achievement, a social scheme concentrates on distribution of social benefits and an environmental scheme penetrate to solve the environmental issues. But, to understand the broader impact of any such program or scheme, it is important to infiltrate and analyse those from a different perspective.

As an example, the impact of MSME Competitive (Lean) Scheme normally captured with the calculation associated with rejection rate, resource saving and product and process output enhancement. Although, the social and environmental accountability is one of the written objectives of that scheme, but the implementation mechanism does not directly address that parameter. So, it is imperative to note that an analysis gap is persisting in the implementation mechanism across the schemes.

Now, as any of the Government schemes can be envisaged from the perspective of sustainability and development, the NMCP may also be analysed from the perception of social sustainability. As the people of a society belong at the heart of the social sustainability assessments (SSAs), it measures the impacts of an organization's activities over the people engaged in the value chain and on the society at large.

To analyse and understand the consequence of implementation of NMCP from the perspective of social sustainability, we may begin with by looking within the sector or a company itself—in particular how well it supports its own staff, such as ensuring safe and secure working conditions, or by promoting diversity, equity and inclusion. An SSA can also go further by placing a spotlight on how organizations treat workers in their supply chain or value chain, people in local communities and even their customers at large.

As a national program, NMCP possesses a robust structure with number of sub sectional and cross-sectional activities. The implementation pattern, implementing agency, technical agency, allocation of fund, share of State Govt. and the associated units etc.; all these factors create substantial impact over the SMEs. As these factors are not homogeneous across the sub schemes of NMCP, the impact varies from unit to unit as well as sector to sector. But in spite of such diverse preconditions, the consequences of social sustainability impacted with a permanent and noteworthy manner over the business ecosystem of the concerned SME unit.

Thus, to conclude, it may be opined that a positive correlation does exists between social sustainability and NMCP in terms of its implementation, achievement and impact on social atmosphere. It is; indeed, a more cohesive practice is expected from the governance related to analyse and recreate the policy regulations to achieve more value from the programs like NMCP.

4. Conclusion and Recommendation

The National Manufacturing Competitiveness Programme (NMCP) has emerged as a significant policy intervention aimed at strengthening the competitiveness of India's MSME sector through a multi-dimensional approach. By integrating sub-schemes focused on lean manufacturing, quality standards, design innovation, digital adoption, and market access, the programme addresses both **internal firm-level inefficiencies and external market constraints**. The analysis of these schemes indicates that NMCP has contributed to measurable improvements in **productivity, cost efficiency, product quality, and technological awareness** among MSMEs. Initiatives such as Lean Manufacturing and Technology Upgradation have enabled firms to reduce waste and optimize resource utilization, while marketing and ICT-related schemes have enhanced their ability to access wider markets and adopt modern business practices.

Despite these positive outcomes, the overall impact of NMCP remains uneven and somewhat limited in scope. A major concern is the **low level of awareness and participation**, particularly among micro enterprises and firms located in rural or less-developed regions. Additionally, the fragmented implementation of sub-schemes reduces the potential for synergy, often resulting in isolated benefits rather than comprehensive transformation. Another critical limitation lies in the **absence of an outcome-based evaluation framework**, as most assessments focus on inputs (fund allocation) and outputs (number of beneficiaries) rather than actual improvements in technical competency, innovation, and sustainability. Furthermore, the **social dimension of sustainability**, including workforce development, skill enhancement, and inclusive growth, remains underexplored within the programme's evaluation structure.

In light of these challenges, several policy recommendations can be proposed to enhance the effectiveness of NMCP. First, there is a need for **greater policy integration**, where all sub-schemes are aligned under a unified strategic framework to ensure coherence and maximize impact. Second, the adoption of a **data-driven, outcome-based monitoring system** is essential to measure real improvements in productivity, energy efficiency, and innovation at the firm level. Third, expanding **awareness campaigns and outreach mechanisms**, particularly through digital platforms and local industry bodies, can improve participation among underserved MSMEs. Fourth, strengthening **institutional coordination and public-private partnerships** can enhance implementation efficiency and provide better technical support. Finally, incorporating **social sustainability indicators**, such as skill development, employment quality, and inclusivity, will ensure that competitiveness gains translate into broader developmental outcomes.

In conclusion, while NMCP has laid a strong foundation for enhancing MSME competitiveness, its long-term success depends on **better integration, improved monitoring, and a more inclusive and sustainability-oriented policy approach**.

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