Role of digital innovation and business transformation for sustainable to micro, small and medium
scale enterprises in Tamil Nadu: an analytical study
P. Gurusamy

Role of digital innovation and business transformation for sustainable to micro, small and medium scale enterprises in Tamil Nadu: an analytical study

P. Gurusamy

Department of Commerce, Nallamuthu Gounder Mahalingam College, NGM College, 90, Pollachi Palghat Road, Pollachi, Coimbatore district, 642001, Tamil Nadu, India, ORCID 0000-0002-0998-8524, gurumiba@gmail.com

Abstract: Small and medium-sized enterprises (SMEs) account for approximately 90% of all businesses and nearly 50% of global employment, with a significant share of these jobs held by women. Therefore, evaluating SME performance in business innovation and examining frameworks that integrate sustainability is crucial for addressing poverty and gender inequality in line with international standards. This study focuses on the role of digital innovation and technology transfer in fostering sustainability within the SME sector in Tamil Nadu. SMEs in this region face numerous challenges while simultaneously encountering new opportunities arising from digital transformation. Existing research highlights how digital technologies can enhance operational efficiency, reduce environmental impact, and promote social equity. By analysing relevant literature, conducting surveys, and interviewing key stakeholders, this research examines the current status of digital innovation and technology transfer among SMEs in Tamil Nadu and assesses their implications for sustainable development.

1 Introduction

Digital Transformation (DT) is increasingly redefining boundaries between organizations and industries, creating significant competitiveness challenges for enterprises. Beyond the GDP growth of India in the SMEs sectors also impacts the social and environmental aspects of sustainability. Further SMEs engaged in international trade tend to be more optimistic about the business landscape and exhibit positive job creation prospects. An analysis of 438 Italian SMEs also shows that DT positively affects their international performance. However, there is a notable tension between DT and environmental sustainability, as they often represent competing growth paths [1,2]. Digital Transformation is reshaping industries globally, and SMEs are no exception, and MSMEs in Tamil Nadu.

Objectives of the study

- To observe the current scenario of Business Innovation in the field of Digital transformation in SMEs in Tamil Nadu.
- To identify the challenges of business innovation and major factors of digital Transformation in SMEs sectors in Tamil Nadu.
- To find out the sustainability performance of SMEs.
- To propose a framework for leveraging DT for sustainable practices in SMEs.

Importance of the study

Informing Policy and Support Frameworks: The observation of the present research will useful to policymakers and support organizations in developing targeted programs and policies that facilitate Digital Transformation among SMEs. By identifying barriers and drivers of DT, the research can guide the allocation of resources and support mechanisms to help SMEs thrive.

Building Knowledge and Skills: This study addresses the knowledge gaps related to DT and sustainability in SMEs [3-5]. By providing a comprehensive analysis, it can serve as a valuable resource for training programs, workshops, and educational initiatives aimed at enhancing the digital skills and capabilities of SME owners and employees.

Regional Development Insights: By focusing on specific districts in Tamil Nadu, the study offers insights into regional variations in SME practices and challenges. This localized approach can help tailor interventions and support strategies to meet the unique needs of SMEs in different areas. Encouraging Collaboration: The study encourages collaboration among stakeholders, including government agencies, industry associations, and technology providers. By fostering partnerships, the research can enhance the collective effort for further research.

2 Research methodology

Sample Size: The 200 SMEs was targeted for this present study, distributed among the four districts as follows: Coimbatore District: 50 SMEs, Tiruppur District: 50 SMEs, Karur District: 50 SMEs, Erode District: 50 SMEs. The stratified random sampling technique was adopted.

Short comings of the study

The unique characteristics of the local market may not reflect broader trends. While the study aims to include 200 SMEs, this sample size may still be insufficient to capture the diversity of experiences and practices across all sectors

Acta Tecnologia – International Scientific Journal about Technologies
Volume: 11 2025 Issue: 4 Pages: 207-211 ISSN 2453-675X

Role of digital innovation and business transformation for sustainable to micro, small and medium scale enterprises in Tamil Nadu: an analytical study
P. Gurusamy

and sizes of SMEs, potentially leading to biased conclusions. The study may prioritize quantitative metrics for assessing Digital Transformation and sustainability, potentially overlooking in observing the intangible services of SMEs sectors.

3 Results and discussion

Age Distribution: In the present study reveals that a significant portion of respondents fall within the age range of 46-50 years, accounting for 38% of the sample. Additionally, 22% of respondents are over 50 years old. This suggests that the workforce in the surveyed small and medium enterprises (SMEs) is predominantly mature, indicating potential stability and experience within the sector (Table 1).

Locality of SME Organizations: Geographic representation among the SMEs shows a noteworthy concentration in Tiruppur district, which comprises 37% of the respondents. This is followed by Coimbatore at 19% and Karur at 23%. The data highlights Tiruppur as a key area for SME activity, reflecting regional economic dynamics (Table 1).

Gender Distribution: Gender analysis demonstrates a significant disparity, with male respondents making up 71% of the sample while female respondents represent only 29%. This indicates a gender imbalance within the surveyed workforce, warranting further investigation into the factors influencing these demographics (Table 1).

Educational Qualification: The educational backgrounds of respondents vary considerably. School-level education constitutes 33% of the group, graduates account for 30%, and postgraduates represent 18%. This distribution suggests a diverse skill set, although a notable percentage lacks higher qualifications (Table 1).

Experience in the Field: A substantial majority of respondents (35%) have 10-15 years of experience in their respective fields. This finding underscores the presence of a relatively experienced workforce within the SME sector, likely contributing to overall industry stability (Table 1).

Type of Industry: The analysis identifies the food processing industry as the most prominent sector, representing 22% of the respondents, closely followed by leather manufacturing at 19%. These sectors highlight key areas of economic activity and employment in the region (Table 1).

Digital Transformation Adoption: The study indicates that a significant portion of SMEs falls into the "Partially Adoption" stage of digital transformation, with 41% of respondents in this category (Table 1).

Digital Tools Used: Among the digital tools utilized by SMEs, cloud services rank highest, with 38% of respondents employing them, followed by social media marketing at 21%. This reflects a growing recognition of the importance of digital solutions, although adoption remains inconsistent across the sector (Table 1).

Importance of Sustainability: Perspectives on sustainability vary among respondents, with 33% viewing it as less important and 22% considering it highly important. This disparity points to differing priorities within the industry regarding sustainable practices (Table 1).

Sustainability Practices: The study reveals that the most frequently implemented sustainability practice among respondents is sustainable sourcing, adopted by 40%. Community engagement follows at 27%, indicating awareness and initiatives aimed at improving local sustainability (Table 1).

Barriers to Digital Transformation: The primary barrier hindering digital transformation for the SMEs surveyed is resistance to change, reported by 40% of respondents. Additionally, a lack of skills is cited by 24% as a significant challenge, highlighting the need for targeted training and change management strategies (Table 1).

Table 1 Demographic details of the respondents and digital transformation adoption

I	DEMOGRAPHIC DETAILS OF THE RESPONDENTS	Number	%
1	Age of Respondent:		
	Below 30	42	21
	30-45	38	19
	46-50	76	38
	Above 50	44	22
		200	100
2	locality of the SME organization	42	21
	Coimbatore district	38	19
	Tiruppur district	74	37
	Karur district	46	23
	Erode district	200	100
3	Gender		
	Male	142	71
	Female	58	29
		200	100

Acta Tecnologia – International Scientific Journal about Technologies
Volume: 11 2025 Issue: 4 Pages: 207-211 ISSN 2453-675X

Role of digital innovation and business transformation for sustainable to micro, small and medium scale enterprises in Tamil Nadu: an analytical study
P. Gurusamy

4	Educational qualification	66	33
	School level	38	19
	Graduate	60	30
	Post graduate	36	18
	Others	200	100
5	Experience in the field of SME		
	less than 5 years	54	27
	5-10 years	36	18
	10-15 years	70	35
	More than 15 years	40	20
		200	100
6	Type of SME industry		
	Textile Manufacturing	36	18
	Leather Manufacturing	38	19
	Food process industry	44	22
	Electronic industry	30	15
	Engineering industry	20	10
	Coir industry	14	7
	Health care industry	18	9
		200	100
II	**DIGITAL TRANSFORMATION ADOPTION**		
1	How would you rate your company's current level of Digital Transformation? (1 = No Adoption, 4 = Full Adoption)		
	No adoption	35	17
	Semi Adoption	43	22
	Partially adoption	82	41
	Fully Adoption	40	20
		200	100
2	Which digital tools does your company currently use?		
	E-commerce platforms	42	21
	Social media marketing	41	21
	Cloud services	76	38
	Data analytics tools	41	20
		200	100
3	How important is sustainability to your business?		
	Highly important	44	22
	average important	54	27
	less important	66	33
	no important	36	18
		200	100
4	Which sustainability practices does your company implement?		
	Waste reduction	28	14
	Energy efficiency	38	19
	Sustainable sourcing	80	40
	Community engagement	54	27
		200	100
5	What barriers do you face in adopting Digital Transformation?		
	Lack of funding	32	16
	Lack of skills	48	24
	Resistance to change	80	40
	Technology limitations	40	20
		200	100

Role of digital innovation and business transformation for sustainable to micro, small and medium scale enterprises in Tamil Nadu: an analytical study
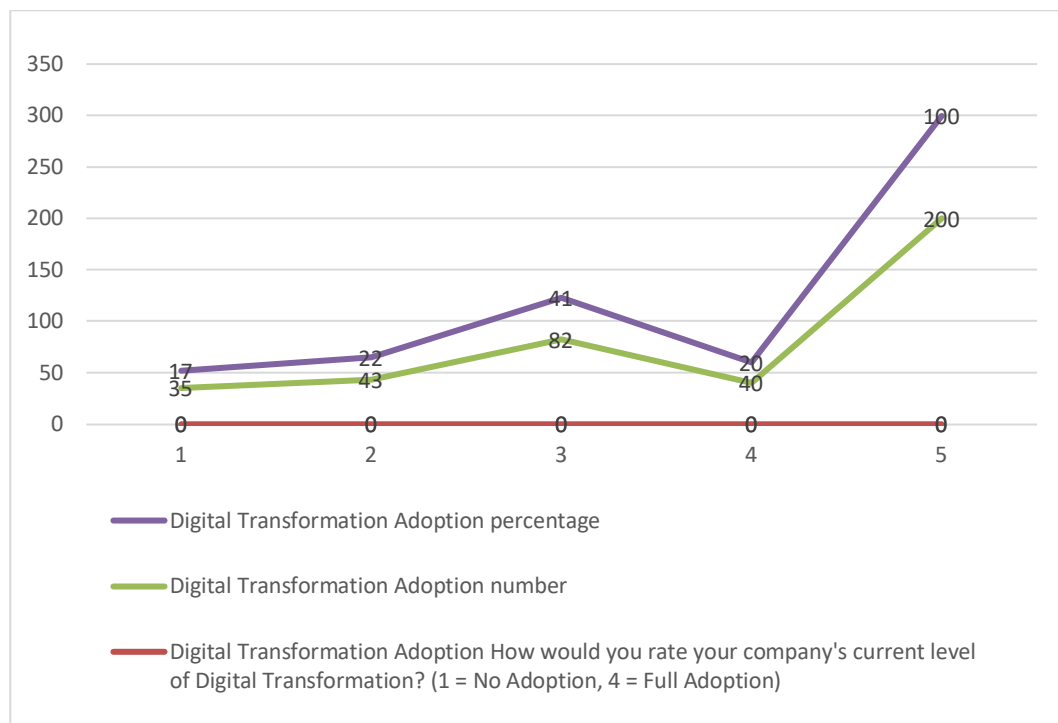P. Gurusamy

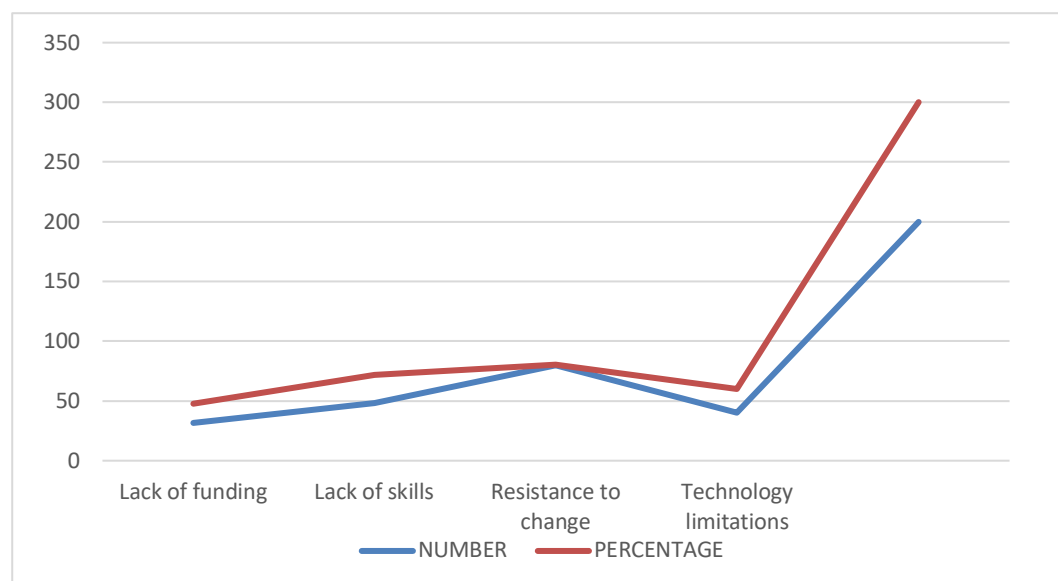*Figure 1 Current level of digital transformation in SME sector*

Figure 2 Challenges of adopting digital transformation

Increase Awareness and Training: To foster digital proficiency among SME workers, it is critical to organize workshops and training programs tailored to their specific needs. These initiatives should focus on topics such as building confidence in the use of digital tools. By offering hands-on training in cloud services, social media marketing, and data analytics, SMEs can empower their workforce to embrace digital transformation. This approach not only enhances skills but also mitigates anxiety related to new technologies, ultimately driving greater adoption and innovation.

Promote Gender Inclusivity: Addressing the gender imbalance in the workforce is imperative. Implementing gender-sensitive recruitment policies can help attract more female candidates, while fostering a supportive work environment will encourage retention and growth. Organizations should consider establishing mentorship programs and flexible working arrangements to support

Role of digital innovation and business transformation for sustainable to micro, small and medium scale enterprises in Tamil Nadu: an analytical study
P. Gurusamy

women in balancing work and personal commitments. By promoting female participation, SMEs can benefit from diverse perspectives, leading to improved innovation.

The business innovation programs could include subsidies or grants for investing in cloud services, data analytics, and other essential digital infrastructure. Enhanced financial support would lessen the burden of initial costs and encourage SMEs to integrate advanced technologies into their operations, ultimately driving efficiency and competitiveness in the market. Strengthen Sustainability Practices: Promoting sustainability within SMEs is not only essential for environmental responsibility but also crucial for long-term business viability. Initiatives aimed at raising awareness about the benefits of sustainable practices can include workshops, informational campaigns, and success stories from peers in the industry.

Establishing partnerships for training programs, internships, and research initiatives can create a pipeline of skilled talent equipped to navigate the digital landscape. Furthermore, local institutions can provide SMEs with valuable insights into current technological trends, allowing for more tailored and effective adoption of digital practices (Figure 1).

Current Scenario Elaboration: In light of these recommendations, the current scenario presents both challenges and opportunities for SMEs (Figure 2). The mature workforce, while experienced, may require reskilling to keep pace with technological advancements. The significant gender gap calls for proactive measures to ensure a more diverse and inclusive workforce, which can enhance creativity and problem-solving within organizations.

Digital tools like cloud services are underutilized, highlighting the potential for growth through increased investment and training. Moreover, the hesitance toward sustainability among some SMEs poses a risk, as businesses increasingly face pressure from consumers and regulatory bodies to demonstrate social responsibility. By executing these recommendations, SMEs can position themselves not only for immediate success but also for long-term sustainability,

4 Conclusion

The present data reveals that while many SMEs in Tamil Nadu recognize the importance of digital transformation, there is considerable room for improvement in adoption levels and sustainability practices. The findings highlight significant barriers, particularly resistance to change and a lack of skills, which must be addressed to foster a more digitally adept and sustainable SME sector. By implementing the recommended strategies, stakeholders may improve the capacity and ultimately contributing to the development and sustainability goals. The analysis of the demographic

profile of SME respondents reveals a diverse range of ages, educational backgrounds, and experiences, which may influence their perspectives and approaches. It is a clear about importance of awareness in digital transformation and sustainability, significant barriers remain [6,7]. Addressing these challenges through strategic initiatives can empower SMEs to thrive in an increasingly digital and environmentally-conscious marketplace. Further, the study highlights the various component for achieving sustainable practices in SMEs. By overcoming existing barriers and fully embracing digital tools, SMEs can enhance their operational efficiency, contribute to sustainability goals in Tamil Nadu.

References

[1] IONASCU, A.E., BARBU, C.A., OLTEANU (BURCĂ), A.L.: *Sustainability in the Digital Age*, In: Chivu, L., Ioan-Franc, V., Georgescu, G., De Los Ríos Carmenado, I., Andrei, J.V. (eds) Europe in the New World Economy: Opportunities and Challenges. ESPERA 2023, Springer Proceedings in Business and Economics, Springer, Cham., pp. 513-524, 2024. https://doi.org/10.1007/978-3-031-71329-3_31

[2] BICAN, P.M., BREM, A.: Digital Business Model, Digital Transformation, Digital Entrepreneurship: Is There a Sustainable "Digital"?, *Sustainability*, Vol. 12, No. 13, pp. 1- 15, 5239, 2020. https://doi.org/10.3390/su12135239

[3] SOŁTYSIK, M., WOJNAROWSKA, M., URBANIEC, M., ZABKAR, V., ĆWIKLICKI, M., VARESE, E.: *Sustainable Business in the Era of Digital Transformation*, Strategic and Entrepreneurial Perspectives, Routledge, Abingdon, Oxon, New York, USA, 2024.

[4] GEORGE, G., SCHILLEBEECKX, S.J.D.: Digital transformation, sustainability, and purpose in the multinational enterprise, *Journal of World Business*, Vol. 57, No. 3, 101326, pp., 1-8, 2022. https://doi.org/10.1016/j.jwb.2022.101326

[5] BAPAT, V.: Sustainability: the next frontier of digital transformation, ERP Today, [Online], Available: https://erp.today/sustainability-the-next-frontier-of-digital-transformation/ [28 Oct 2025], 2022.

[6] VINARDI, C.: *Sustainable Performance in the Digital Age*, Springer Nature Switzerland, 2024. https://doi.org/10.1007/978-3-032-01252-4

[7] ORUGANTI, S.K., KARRAS, D., THAKUR, S., CHAITHANYA, J.K., METTA, S., LATHIGARA, A.: *Digital Transformation and Sustainability of Business*, CRC Press, 2025.