

Impact of Sustainable Manufacturing Practices on Financial Performance of MSME in Coimbatore District

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Abstract— Sustainable manufacturing practices are described from an environmental angle, with the objective of minimization of effects of manufacturing activities on environment with best performance of firms. The adoption of sustainable manufacturing practices is not only concentrating on large sized manufacturing firms but also on Micro, Small and Medium Enterprises (MSMEs). Significant difference is prevailing amongst profile of MSMEs and their sustainable manufacturing practices. Cleaner production, eco-efficiency, relation with supplier, relation with employee and relation with customer are having significant and positive impact on financial performance of MSMEs. To improve sustainable manufacturing practices, MSMEs should reduce their solid waste and usage of materials and they must have efficient compliance for environment and adopt environment regulations properly. Furthermore, MSMEs should provide sufficient salary and good work life balance to their employees and they must direct suppliers to act on environment problems and send appraisal of environmental performance to them and these measures will improve financial performance of MSMEs.

Keywords— Financial Performance, MSMEs, Sustainable Manufacturing Practices

I. INTRODUCTION

Presently, manufacturing industry is transformed swiftly because of increasing consciousness of sustainable manufacturing operations. As a result, manufacturing firms are adopted different sustainable practices to decrease carbon emission, stay competitive and as a solution to degradation of environment. (Despeisse et al 2012). The primary principle of sustainable manufacturing practices is its relation with performance of firms in long term (Lopez-Amero et al 2009). Sustainable manufacturing practices are described from an environmental angle, with the objective of minimization of effects of manufacturing activities on environment with best performance of firms (Nordin et al 2014). The major environmental sustainability practices used in manufacturing firms are use of renewable energy, optimization of materials, recycling of waste, environmental design, and management of product and minimization of solid wastes (Alay et al 2014).

The adoption of sustainable manufacturing practices is not only concentrating on large sized manufacturing firms but also on Micro, Small and Medium Enterprises (MSMEs) (Jamian et al 2012). Sustainable manufacturing practices in MSMEs influence environmental, financial and operational performances (Chen and Shih, 2007). MSMEs have a significant place in the industrial structure of India and also in Tamil Nadu. Coimbatore district is highly industrially developed and energetic districts in Tamil Nadu and it has high concentration of MSMEs. Therefore, it is necessary to study impact of sustainable manufacturing practices on financial performance of MSMEs in Coimbatore district.

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II. REVIEW OF LITERATURE

Millar and Russell (2011) found that sustainable manufacturing practices were significantly and positively related with performance, but they were not related with competitive advantage of firms. Schoenherr and Talluri (2012) concluded that sustainable environmental manufacturing practices were influencing performance and competitiveness of manufacturing firms.

Joung et al (2013) revealed that financial growth, social welfare, management of environment and clear technologies were positively and significantly related with performance of firms. Russell and Millar (2014) indicated that negative and significant relation was prevailing among sustainable manufacturing practices and business performance and significant and positive performance was there among sustainable manufacturing practices and competitive advantage of firms.

Fadly et al (2015) showed that supply chain management, process for manufacturing, management of environment and social responsibility were sustainable manufacturing practices adopted by automobile firms. Nordin and Adebambo (2016) found that economic growth, environment stewardship and social well being were sustainable manufacturing practices used in manufacturing firms.

Hashidah et al (2017) concluded that sustainable manufacturing practices were positively related with economy sustainability performance of firms. Hami et al (2018) revealed that clean production, eco-efficiency, relation with customer, supplier and customer were sustainable manufacturing practices adopted by small and medium enterprises.

III. METHODOLOGY

The present study is done Coimbatore district. MSMEs are selected by using simple random sampling method and structured questionnaire is used to collect data from 250 MSMEs. Percentages are calculated to know profile of MSMEs and mean and standard deviation are worked out to understand sustainable manufacturing practices in MSMEs. t-test and F-test are done to scrutinize difference amongst sustainable manufacturing practices and profile of MSMEs. Multiple regression analysis is used to evaluate impact of sustainable manufacturing practices on financial performance of MSMEs.

IV. RESULTS AND DISCUSSION

A. PROFILE OF MSMEs

The profile of MSMEs is given in Table-1. The findings explain that 64.40 of them are running as sole proprietorship, whilst 35.60 per cent of them are running as partnership and 37.20 per cent of them are having investment of Rs.10,00,001 – Rs.20,00,000, whilst, 6.80 per cent of them are having investment of more than Rs.40,00,000. The findings display that 50.40 per cent of them are operating in leased establishments, whilst, 23.20 per cent of them are operating in rented establishments and 28.00 per cent of them are providing employment to 11 – 20 employees, whilst, 20.80 per cent of them are providing employment to above 30 employees. And 44.00 per cent of them are having annual turn over of Rs.5,00,001 – Rs.10,00,000, whilst, 22.40 per cent of them are having annual turn over of more than Rs.10,00,000.

Table-1. Profile of MSMEs

Profile MSMEs	Number of MSMEs	Percentage
Nature of Ownership		
Sole Proprietorship	161	64.40
Partnership	89	35.60
Investment		
Less than Rs.10,00,000	41	16.40
Rs.10,00,001 – Rs.20,00,000	93	37.20
Rs.20,00,001 – Rs.30,00,000	54	21.60
Rs.30,00,001 – Rs.40,00,000	45	18.00
More than Rs.40,00,000	17	6.80
Business Establishment		
Own	76	30.40
Leased	116	50.40
Rented	58	23.20
Number Employees		
Below 10	59	23.60
11 – 20	70	28.00
21 – 30	69	27.60
Above 30	52	20.80
Annual Turnover		
Less than Rs.5,00,000	84	33.60
Rs.5,00,001 – Rs.10,00,000	110	44.00
More than Rs.10,00,000	56	22.40

B. SUSTAINABLE MANUFACTURING PRACTICES IN MSMEs

The sustainable manufacturing practices in MSMEs were studied and the results are given below.

A. CLEANER PRODUCTION

The cleaner production in MSMEs is given in Table-2.

Table-2. Cleaner Production

Cleaner Production	Mean	Standard Deviation
Use of clean technologies	3.82	1.03
Reduction of solid waste	3.26	1.14
Decrease in consumption of energy	3.74	1.07
Lessening of emission	3.79	1.05
Reduction in usage of materials	3.35	1.10

MSMEs are agreed with use of clean technologies, decrease in consumption of energy and lessening of emission,

while, they are neutral with reduction of solid waste and reduction in usage of materials.

B. ECO-EFFICIENCY

The eco-efficiency in MSMEs is given in Table-3.

Table-3. Eco-Efficiency

Eco-Efficiency	Mean	Standard Deviation
Recycling of waste materials	3.76	1.08
Environmental enhancement through cross functional activities	3.72	1.10
Compliance for environment	3.32	1.13
Quality management of environment	3.78	1.04
Adoption of environment regulations	3.30	1.14

MSMEs are agreed with recycling of waste materials, environmental enhancement through cross functional activities and quality management of environment, while, they are neutral with compliance for environment and adoption of environment regulations.

C. RELATION WITH EMPLOYEE

The relation with employee in MSMEs is given in Table-4.

Table-4. Relation with Employee

Relation with Employee	Mean	Standard Deviation
Safety measures	3.86	1.05
Sufficient salary	3.38	1.11
Personal development	3.83	1.11
Encouragement	3.85	1.07
Good work life balance	3.34	1.14

MSMEs are agreed with safety measures, personal development and encouragement, while, they are neutral with sufficient salary and good work life balance.

D. RELATION WITH SUPPLIER

The relation with supplier in MSMEs is given in Table-5.

Table-5. Relation with Supplier

Relation with Supplier	Mean	Standard Deviation
Selection supplier based on environmental standards	3.70	1.06
Environmental programmes for suppliers	3.68	1.12
Directing suppliers to act on environment problems	3.36	1.14
Communicating suppliers on advantages of clean technologies	3.77	1.09
Appraising environmental performance of suppliers	3.31	1.16

MSMEs are agreed with selection supplier based on environmental standards, environmental programmes for suppliers and communicating suppliers on advantages of clean technologies, while, they are neutral with directing suppliers to act on environment problems and appraising environmental performance of suppliers.

E. RELATION WITH CUSTOMER

The relation with customer in MSMEs is given in Table-6



Table-6. Relation with Customer

Relation with Customer	Mean	Standard Deviation
Eco-friendly waste management	3.90	1.03
Eco-friendly packaging	3.94	0.95
Eco labeling	3.91	0.99
Complete avoidance of harmful effects	3.28	1.12
Incorporation of feedback into manufacturing activities	3.88	1.06

MSMEs are agreed with eco-friendly waste management, eco-friendly packaging, eco labeling and incorporation of feedback into manufacturing activities, while, they are neutral with complete avoidance of harmful effects.

B. SUSTAINABLE MANUFACTURING PRACTICES AND PROFILE OF MSMEs

To scrutinize difference amongst sustainable manufacturing practices and profile of MSMEs, t-test and ANOVA (Analysis of Variance) test are done and the results are given in Table-7.

Table-7. Difference amongst Sustainable Manufacturing Practices and Profile of MSMEs

Particulars	t-Value / F-Value	Sig.
Nature of Ownership and Sustainable Manufacturing Practices	4.780** (t-value)	.000
Investment and Sustainable Manufacturing Practices	5.143** (F-Value)	.000
Business Establishment and Sustainable Manufacturing Practices	4.952** (F-Value)	.000
Number Employees and Sustainable Manufacturing Practices	5.065** (F-Value)	.000
Annual Turnover and Sustainable Manufacturing Practices	4.846** (F-value)	.000

** Significant at 1 % level

The t-value and F-values are explicating that significant difference exist in sustainable manufacturing practices amongst profile of MSMEs.

C. IMPACT OF SUSTAINABLE MANUFACTURING PRACTICES ON FINANCIAL PERFORMANCE OF MSMEs

To evaluate impact of sustainable manufacturing practices on financial performance of MSMEs, multiple regression analysis is used and the results are given in Table-8. R² and adjusted R² are 0.57 and 0.55 which reveal the regression model has good fit and 55 per cent of variation in dependent variable is shared by independent variables. F-value of 15.824 is illustrating the model is significant at one per cent level.

Table-8. Impact of Sustainable Manufacturing Practices on Financial Performance of MSMEs

Sustainable Manufacturing Practices	Regression Co-efficients	t-Value	Sig.
Intercept	1.016**	9.835	.000

Cleaner Production (X ₁)	.542**	6.716	.000
Eco-Efficiency (X ₂)	.484**	6.102	.000
Relation with Employee (X ₃)	.391**	5.048	.000
Relation with Supplier (X ₄)	.435**	5.830	.000
Relation with Customer (X ₅)	.378**	4.964	.000
R ²	0.57	-	-
Adjusted R ²	0.55	-	-
F	15.824	-	.000

** Significant at 1 % level

The findings make clear that cleaner production, eco-efficiency, relation with supplier, relation with employee and relation with customer have positive and significant impact on financial performance of MSMEs at one per cent level.

V.CONCLUSION

The foregoing analysis elucidate that cleaner production, eco-efficiency, relation with employee, relation with supplier and relation with customer are sustainable manufacturing practices adopted by MSMEs. Significant difference is prevailing amongst profile of MSMEs and their sustainable manufacturing practices. Cleaner production, eco-efficiency, relation with supplier, relation with employee and relation with customer are having significant and positive impact on financial performance of MSMEs. To improve sustainable manufacturing practices, MSMEs should reduce their solid waste and usage of materials and they must have efficient compliance for environment and adopt environment regulations properly. Furthermore, MSMEs should provide sufficient salary and good work life balance to their employees and they must direct suppliers to act on environment problems and send appraisal of environmental performance to them. In addition, MSMEs should completely avoid harmful effects of their products and these measures will improve financial performance of MSMEs.

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