

Impact of Industrial Policy on Small Scale Industries: A Cluster Analysis

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Abstract: Small Scale Industries (SSI) is a boom for new business entrepreneurs. In India many business leaders are stars of their business from small scale industries. In general, many people and committees have proved that, small business policies are effective one. The Government of Tamilnadu announced several schemes for the upliftment of SSI in the State, in its industrial policy, 2011-12. However, there is a need to find the effective type of support provided by the government. This paper is an attempt to identify the effectiveness of the policy in promotion and development of SSI, and it's suitability to the enterprise.

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Key Words: Small Scale Industry; industrial Policy; policy support; MSME Act.

1. Introduction:

The definition of SSI has gone through changes in terms of the number of employees, nature of activities and capital investment during start up. Micro Small and Medium Enterprise (MSME) act 2007 defines SSI on the basis of investment ceiling which restricts the fixed asset (Plant and machinery) not exceed Rs. One crore. SSI is considered as the backbone to industrial development. Because, SSI has a major contribution to Gross Domestic Product (GDP). SSI promotes development of national economy and providing employment opportunity to near local people. Every kind of business success is based on the industrial policy. Both Governments (Central and State) are involved in framing the industrial policy. Government of Tamilnadu has announced a separate policy for the development of small business enterprise in the State. The salient feature of SSI policy is listed in Table No 1:

Table No. 1: Small Scale Industrial Policy 2011-2012

S.No	Nature Of Support	Concession (In%)
I. Infrastructure Support		
1	Reservation of land from State Industries Promotion Corporation of Tamilnadu Limited (SIPCOT).	20
2	Reservation of land from Small Industries Development Corporation (SIDCO).	30
3	Stamp duty and registration charges	50
4	Infrastructure subsidy	20
II. Incentive Support		
1	Capital subsidy.	15
2	Low Tension Power Tariff subsidy (LTPT).	20
3	Value Added Tax (VAT)	100
4	Stamp duty exemption on mortgaged and pledged documents	100

III. Technical Support		
1	Establishment of Industrial Cluster and Mini Tool Rooms	-
2	Back-ended interest subsidy	3
3	Creation of Technology Development Fund	-
4	Cost of filling a patent application	50
5	Reimbursement of tuition fees	50
IV. Information And Marketing Support		
1	Price preference	15
2	Purchase preference	-
3	Allotment of Waiver in Earnest Money Deposit	-
4	Hall rent for participating in exhibition	50
5	Support for marketing under a common banner	-
V. Deregulation And Simplification		
1	Introduction of common application form	-
2	Self-certification in respect of their compliance	-
3	Single window clearance Act	-
VI. Administrative Reforms		
1	Micro and Medium Industries Board	-
2	Empowered Committee	-
3	Department of Industries and Commerce	-
VII. Policy Support		
1	Policy of rehabilitation	-
2	Export policy	-

Source: Government of Tamilnadu Micro, Small and Medium Enterprises (MSME) (B) Department

To understand the features and effectiveness of the Industrial policy, an extensive literature survey was done, and it is presented in the following section:

2. Materials and Methods:

Review of Previous Studies:

Many authors have contributed to SSI policy initiatives studies. They have stated that implemented SSI policies in various states are effective in nature.

Micro, Small & Medium Enterprises Report, India., (2008) pointed out milestones of SSI policy. The report said that industrial policy over the years fulfil the socio economic objectives. In India 90 % of garment export is contributed by SSI sector. 35 % of export are direct export, remaining are indirect export. SSI promotes India's balanced regional growth. The third censuses noted that Tamilnadu, Maharashtra, Uttar Pradesh and Delhi continue to be the premier exporting states. 19.8 % of the overall export of India is contributed by Tamilnadu State small scale sector. Finally, the report concluded that, performance of SSI sector has significant implications for the policy.

Lakshmi Narasaiah. M., (1999) discussed about the place of SSI in the industrial policy. The author coated the major benefits of small scale sector in India, as utilisation of resources, generation of employment, generation of foreign exchange, entrepreneurial development and regional development. The author listed the industrial policy resolutions in India. According to the author, SSI plays a major role for development of Indian economy since the independence. The author concluded that, SSI policy is targeted production value more than 35,000 crores, employment of 11 million persons and export of 2,000 crores.

Organisation for Economic Co-operation and Development (OECD)., (2005) conducted Ministerial Conference in Istanbul. In the conference, OECD made statements on policy issues and recent policy developments concerning Small and Medium Enterprise (SME) and entrepreneurship in European Countries. A series of small business policies has been implemented in recent years. The report states that, the policy initiatives are aimed at faster innovation for small scale sector. OECD lunched Enterprise Policy Performance Assessment (EPPA) in 2005. The assessment states that small enterprise policies are developing the culture of encouraging entrepreneurship. In most of the European countries, Government focus on women entrepreneurship development. For promotion of women entrepreneurs, the governments have to eliminate the barriers for enterprise creation and growth.

Veena Bhatnagar.,(1995) made an attempt to analyse small scale industry concept, status and policy. The analyses revealed that every stage small scale entrepreneurs faced lot of problems due to large scale entrepreneurs. So, there is need to implement effective industrial policy to protect of small entrepreneurs. However, the assessment of the author shows that, small business policy allowed equal participation by large scale sector. The policy has removed financial hurdle for modernisation and

growth of small business. Implemented policy statement was clear focus on expansion of entrepreneurial development programme. It recognises faster growth of self employment of unemployed youth. The author concluded that, the implemented industrial policy has a focus to improve the health of small scale sector, and reduce sickness.

Vijayarani K.R., (2011) made an attempt to study Small Scale Industries in India. The author opined that, after the independence of India, the number of SSI has widely increased. SSI provides immediate and large number of employment to people. SSI offered more equitable distribution of income to all level of people. The author points out that, announced SSI policy has encouraging SSI growth through wide range of concessions and exceptions. Now, the performance of SSI is notable and better in all India level. So, SSI policy enables them to stand competition with large scale industries.

Need of Industrial Policy for SSI

With the introduction of globalisation in India, SSI entrepreneurs are faced with rigorous challenges. viz., trade barriers, communication problem and stiff competition. So, SSI's should have ability to respond to these challenges. To meet these challenges, efforts have been accelerated in the formulation of new policy initiatives. Hence, a study was formulated to analyse the impact of SSI with the following objectives:

Objectives of the Study

- To identify the effective kind of support rendered by the government.
- To assess the impact of the current industrial policy on the development of SSI enterprises.

Research Methodology

The descriptive study was conducted at Erode district. It is located in the State of Tamilnadu, India. It is one among the industrially developing districts. The sample size of 10 respondents was selected and questionnaire was pretested and necessary modifications were done. The study constituted 7 Taluks in the district. Viz., Erode city 38%, Perundurai 21%, Gobichettipalayam 10%, Sathiyamangalam 6%, Kangayam 5%, Bhavani 11% and Dharapuram 9%. 100 samples of small scale entrepreneurs were selected on the basis of Stratified Random Sampling (SRS). Sampling frame constituted the percentage share of SSI in each district.

In order to group the respondents into various clusters based on the various types of support, and to identify the impact of the industrial policy on the entrepreneurs in each cluster, the researcher applied Cluster Analysis.

Cluster Analysis

Cluster analysis is a multivariate statistical technique, which groups occasions into unknown number of groups such that the members of each group are having similar characteristics. Grouping is done on the basis of similarities existing among the objects or persons. In this study, the researcher has used Squared Euclidean distance measure to compute the similarity between two cases. When items are clustered, Proximity is usually indicated by some sort of distance. Let x_{ij} be the score (1 or 0) of the j^{th} binary variables on the i^{th} item and x_{kj} be the score (again 1 or 0) of the j^{th} variable on the k^{th} item, $j = 1, 2, \dots, P$.

Consequently,

$$\left\{ \begin{array}{l} 0 \text{ if } x_{ij} = x_{kj} = 1 \text{ or } x_{ij} = x_{kj} = 0 \\ (x_{ij} - x_{kj})^2 = \\ 1 \text{ if } x_{ij} \neq x_{kj} \end{array} \right.$$

Squared Euclidean distance is $\sum_{j=1}^P (x_{ij} - x_{kj})^2$, provides a count of the number of mismatches.

$J = 1$ A large distance corresponds to many mismatches; that is, dissimilar items.

Clustering procedures can be hierarchical, non-hierarchical or even the application of both the methods in determining the formation of clusters. The researcher has adopted both the methods for deriving the results. In the first step of hierarchical clustering technique, agglomerative clustering between groups, average linkage method has been used in this study. After selecting the number of clusters from the above method, a non-hierarchical clustering technique, k-mean clustering method was applied. From the solution, the number of respondents in each cluster and the types of support from industrial policy of Tamil Nadu Government was used and their impacts were identified.

3. Results and Discussions:

The scale scoring data (five point scaling: 5-Strongly agree, 4-Agree, 3-Neutral, 2-Disagree, 1-stroglly disagree) collected from 100 respondents on various demographic characteristics were analysed in 2 stages by using PASW 18th version.

Step 1:

The researcher took the sample of 100 respondents with various demographic characteristics in small scale industry entrepreneurs.

Step 2:

The most important part in the clustering problem is selecting the variables on which the clustering is based. The researcher selected the different types of supports provided by the industrial policy as the variables which included infrastructure support, incentive support, technical support,

information and marketing support, Deregulation and simplification, administrative reforms and policy support.

Step 3: The similarities among the cases / entities were computed either through correlations, distance measures and other techniques. Among the various distance measures, Squared Euclidean distance measure was adopted to compute the similarity between 2 cases in this study.

Step 4: In the clustering procedure, hierarchical clustering method was adopted for the I stage. In this method, agglomerative method was used with Average linkage between groups method. As the agglomeration schedule for 100 cases was little large, the values from last 90 cases were given in the table and the remaining were listed in the Appendix.

Table No.2: Agglomeration ScheduleC: Cluster

Stage	Cluster combined		Coefficients	Stage cluster first appears		Next stage
	C1	C 2		C1	C2	
80	4	5	10.250	65	63	85
81	18	18	10.333	39	69	90
82	16	16	10.625	38	67	98
83	13	13	10.750	20	0	91
84	1	1	11.436	78	75	92
85	6	6	12.364	17	79	86
86	1	1	12.518	7	84	88
87	2	2	13.485	50	77	94
88	6	6	13.750	29	85	92
89	10	10	14.333	77	76	91
90	4	4	14.643	87	80	96
91	6	6	16.090	16	88	94
92	2	2	16.964	13	87	96
93	2	2	17.727	62	92	93
94	1	1	18.657	4	86	95
95	1	1	20.653	2	94	95
96	6	6	23.012	10	91	97
97	1	1	25.991	6	95	97
98	1	1	32.087	18	97	98
99	1	1	39.980	9	98	99

(The first part of the agglomeration schedule from cases 1 to 79 is given in the Appendix)

Cluster method: Average linkage between groups method (Hierarchical Clustering Method)

Distance method: Squared Euclidean Distance measure.

Table No. 2 shows the agglomeration schedule of the cluster analysis. In the agglomeration schedule, the figures from top to bottom (stage 1 to 79) indicates the sequence in which the cases get combined with other until all 100 cases are combined together in one cluster at the last stage (stage 99). To identify the number of clusters, the co-efficient values (i.e. difference between rows) in column 4 is considered. The figures of co-efficient values were seen from the last row upwards to have the lowest

possible number of clusters for interpretation. The difference in the value of co-efficient from stage 19 and stage 18 is 7.893 (39.980-32.087) indicating the 1st cluster. The procedure is continued till the difference between the 2 stages gets reduced in order to identify the number of clusters.

In the next stage, the difference between stage 18 and 17 is 6.116 (32.087-25.971) which is little low but again the difference between 17 and 16 is 2.979 (25.991-23.012) indicating the increasing trend with more difference. But the difference between stages 16 and 15 is 2.377 (23.030-20.653), stages 15 and 14 is 1.996 (20.653-18.657) and in stages 14 and 13 is 0.930 (18.657-17.727) showing a little increase and decrease. Hence, it is better to stop with the stage 17 and 16 with the difference of 2.979 indicating a 3 cluster solution with maximum differences in the value of co-efficient. It was decided consequently to have 3 clusters from the agglomeration schedule.

Step 5:

After deciding the number of clusters as 3, the non-hierarchical k-means (quick clustering) clustering method was used to find out the agreed industrial policy supports in each cluster. The output initial cluster centres, final cluster centres and ANOVA tables are interpreted to decide the variables in each cluster.

Table No.3: Initial Cluster Centres

S.No.	Types of Support	Cluster		
		1	2	3
1	Infrastructure support	4.00	2.00	3.00
2	Incentive support	2.00	4.00	3.00
3	Technical support	4.00	2.00	3.00
4	Information and marketing support	3.00	4.00	3.00
5	Deregulation and simplification	2.00	4.00	3.00
6	Administrative reforms	1.00	2.00	2.00
7	Policy Support	5.00	3.00	2.00

Table No.3 shows the initial cluster formations for 7 variables selected with their mean scores.

The final cluster centres given in Table No.4 contain the mean values for each variable in each cluster. As the data is scaled scoring with the scores 5 to 1, (i.e. 5- strongly agree, 4-agree, 3-netural, 2-disagree, 1-strongly agree), the variables for which the mean values with scores more than 3 were being selected in each cluster which was equivalent to the moderate level of agreed towards the support provided by the industrial policy. Hence, in cluster I the variables such as Infrastructure support, Technical support, Information and Marketing support, Policy support were selected and in cluster 2, the variables selected were Incentive support, Information and Marketing support, Deregulation and simplification

whose mean values are more than 3. The variables as infrastructure support and incentive support were included in the III cluster with the mean value greater than 3. From the table no. 4, the variables in each cluster were identified for the three cluster segments.

Table No.4: Final Cluster Centres

S.No.	Types of Support	Cluster		
		1	2	3
1	Infrastructure support	3.82	2.35	3.77
2	Incentive support	2.55	3.88	3.25
3	Technical support	3.70	2.70	2.68
4	Information and marketing support	3.26	3.96	2.79
5	Deregulation and simplification	2.16	3.16	2.42
6	Administrative reforms	1.77	1.81	1.48
7	Policy Support	3.87	2.57	2.49

The number of respondents in each cluster segment is shown in Table No.5.

Table No. 5: Number of Cases in Each Cluster

Cluster 1	36.000
Cluster 2	27.000
Cluster 3	37.000
Valid	100.00
Missing	.000

Table No. 5, shows the number of respondents in each clusters out of the 100 respondents. The I cluster was grouped by 36 respondents (36.00%), II cluster by 27 respondents (27.00%) and III cluster by 37 respondents (37.00%).

Step-6 The variables in each cluster segment were identified based on the mean values in the final cluster centre table. The number of respondents in each cluster was also found as given in Table No.6.

Table No. 6: Cluster Formation with Variables and Mean Values

C 1 (36%) (R 36)	M	C 2 (27%) (R 27)	M	C 3 (37%) (R 37)	M
I	3.82	I S	3.88	I	3.77
T S	3.70	I M S	3.96	I S	3.35
I M S	3.26	D S	3.16		
P S	3.87				

C: Cluster

M: Mean Value

R: Respondents

I: Infrastructure support

I S: Incentive support

T S: Technical support

I M S: Information and marketing support

D S: Deregulation and simplification

A R: Administrative reforms

P S: Policy Support

From Table No. 6, it is clear that the industrial policies are effective in the types of support namely infrastructure support, technical support, information and marketing support and policy support that form the first cluster of respondents. The respondents in the second cluster opined that industrial policies was effective in the types of support namely, Incentive support, information and marketing support and deregulation and simplification among the various 7 types of supports provided by the Industrial Policy of Tamilnadu Government. The industrial policy was effective in the supports namely infrastructure and incentives according to the third cluster of respondents. The Administrative support provided by the industrial policy was found to have less effect among the entrepreneurs. To study which of the variables is statistically significant across the 3 clusters, ANOVA was employed and the result obtained is given in Table No.7.

Table No.7: ANOVA

Types of Support	Cluster		Error		F	Sig.
	M	df	M	df		
I	4.540	2	.837	97	5.426	.006
I S	58.961	2	1.063	97	55.485	.000
T S	14.447	2	1.162	97	12.429	.000
I M S	3.282	2	1.223	97	2.684	.073
D S	17.957	2	1.191	97	15.077	.000
A R	.037	2	.917	97	0.040	.961
P S	90.450	2	.822	97	110.027	.000

M: Mean Square

I: Infrastructure support

I S: Incentive support

T S: Technical support

I M S: Information and marketing support

D S: Deregulation and simplification

A R: Administrative reforms

P S: Policy Support

The ANOVA table helped in identifying which of the 7 variables were significant across the 3 clusters. The last column in the table indicates that the variables namely Infrastructure support, incentive support, technical support, deregulation and simplification and policy support are significant at the 0.01 level (equivalent to 99% confidence level) as they have probability values less than 0.01. The other variable information and marketing support and administrative reforms were not statistically significant as its probability value is greater than 0.10.

Findings and Conclusion:

The respondents were grouped in 3 heterogeneous groups / clusters. The I cluster segment was with 36 respondents, cluster II with 27

respondents and III cluster with 37 respondents. It was found from the analysis that 36 respondents in cluster I opined that the industrial policies were effective impact on infrastructure support, technical support, information & marketing support and policy support. On the other hand, 27 respondents in II cluster expressed that the industrial policies were effective in the types of support namely, incentive support, information & marketing support and deregulation & simplification and 37 respondents in III cluster stated that the industrial policies were effective in the types of support namely infrastructure support and incentive support. The clustering however explained the effectiveness of Industrial policy in promoting SSI, and explains the utility of Tamilnadu Industrial policy, there by highlighting the weak links to. Thus, the objective of the study is fulfilled.

Appendix Agglomeration Schedule C: Cluster

Stage	Cluster Combined		Co-efficients	Stage Cluster First Appears		Next Stage
	C 1	C 2		C 1	C 2	
1	33	97	.000	0	0	23
2	68	93	.000	0	0	19
3	37	74	.000	0	0	16
4	35	46	.000	0	0	20
5	22	30	.000	0	0	26
6	41	100	1.000	0	0	29
7	5	98	1.000	0	0	27
8	76	83	1.000	0	0	56
9	81	82	1.000	0	0	28
10	44	71	1.000	0	0	14
11	66	67	1.000	0	0	52
12	3	43	1.000	0	0	15
13	24	25	1.000	0	0	43
14	36	44	1.500	0	10	41
15	3	32	1.500	12	0	30
16	37	96	2.000	3	0	31
17	8	95	2.000	0	0	58
18	7	72	2.000	0	0	40
19	27	68	2.000	0	2	30
20	35	65	2.000	4	0	45
21	47	54	2.000	0	0	61
22	6	34	2.000	0	0	45
23	31	33	2.000	0	1	53
24	23	26	2.000	0	0	25
25	15	23	2.000	0	24	39
26	2	22	2.000	0	5	41
27	5	90	2.500	7	0	63
28	80	81	2.500	0	9	50
29	19	41	2.500	0	6	79
30	3	27	2.556	15	19	46
31	37	85	2.667	16	0	47
32	84	92	3.000	0	0	46
33	87	89	3.000	0	0	90
34	78	88	3.000	0	0	55
35	56	73	3.000	0	0	48
36	64	69	3.000	0	0	42
37	49	59	3.000	0	0	57
38	12	58	3.000	0	0	65
39	15	48	3.000	25	0	52
40	7	21	3.000	18	0	66

Stage	Cluster Combined		Co-efficients	Stage Cluster First Appears		Next Stage
	C 1	C 2		C 1	C 2	
41	2	36	3.444	26	14	58
42	16	64	3.500	0	36	62
43	20	24	3.500	0	13	64
44	28	99	4.000	0	0	60
45	6	35	4.000	22	20	54
46	3	84	4.167	30	32	72
47	37	91	4.500	31	0	61
48	1	56	4.500	0	35	70
49	18	94	5.000	0	0	69
50	50	80	5.000	0	28	59
51	61	70	5.000	0	0	71
52	15	66	5.000	39	11	77
53	31	57	5.333	23	0	67
54	6	42	5.400	45	0	71
55	78	79	5.500	34	0	84
56	63	76	5.500	0	8	74
57	40	49	5.500	0	37	73
58	2	8	5.500	41	17	72
59	50	55	5.750	50	0	78
60	28	75	6.000	44	0	75
61	37	47	6.200	47	21	70
62	16	60	6.333	42	0	67
63	5	52	6.333	27	0	80
64	20	45	6.333	43	0	83
65	4	12	6.500	0	38	80
66	7	51	6.667	40	0	73
67	16	31	6.750	62	53	82
68	11	14	7.000	0	0	76
69	18	53	7.500	49	0	81
70	1	37	7.714	48	61	75
71	6	61	7.833	54	51	79
72	2	3	7.875	58	46	77
73	7	40	8.167	66	57	86
74	29	63	9.000	0	56	88
75	1	28	9.067	70	60	84
76	10	11	9.500	0	68	89
77	2	15	9.542	72	52	87
78	50	86	10.000	59	0	87
79	6	19	10.000	71	29	85

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