

Machinery & Parts Industry Of Punjab -An Empirical Analysis Of Growth And Productivity

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INTRODUCTION

Machinery & Parts industry constitutes an integral part of the capital goods sector. As the process of economic development paces up, the economy starts its transformation from the primary sector towards secondary and tertiary sectors, and the capital goods industry in general and the machinery and parts industry in particular, plays a prominent role and catalyzes the process of economic development.

In Punjab, agricultural growth has saturated and the State government is making every effort to develop secondary and tertiary sectors in order to augment the income of its people. But the efforts of the state government face numerous challenges, which are confined not only to the adverse geo-political situation of the state, but also relate to various socio-economic factors like militancy and global factors like WTO etc. Still, the small scale industry of the state is able to withstand all the challenges.

The small scale machinery & parts industry of the state, which, as per the state industry classification, does not include electrical machinery & parts, demonstrated remarkable resilience and succeeded in strengthening its footholds despite the economic challenges unleashed by the policies of the liberalized regime. The policies of the liberalized regime aim to dismantle all the growth retarding structures to trade, investment and productivity. Removal of quantitative and non-quantitative restrictions, rationalization of subsidies, toning up tax administration, easing regulatory controls etc are some of the hallmarks of the liberalized regime. And as a consequence of this, competition has increased manifold, compelling the businesses to enhance productivities in order to survive in the market.

Punjab, where small scale industries predominate, machinery & parts industry has emerged as one of the prominent industries of Punjab. As per the Annual Survey of Industries (ASI) classification, machinery & parts industry include: manufactures of engines, turbines except aircraft vehicle and cycle engines; manufactures of pumps, compressor taps and valves; manufactures of bearings, gears, gearing and driving elements; manufactures of ovens, furnaces and furnace burners; manufactures of lifting and handling equipments; manufactures of agricultural and forestry machinery; manufactures of machine tools; manufactures of machinery for metallurgy; manufactures of converters, ingots, moulds; manufactures of ladles and casting machines; manufactures of metal rolling mills and rolls for such mills; manufactures of machinery for mining and quarrying and construction; manufactures of machinery for food, beverages and tobacco processing; manufactures of machinery for textiles, apparel and leather production; manufactures of weapons and ammunition; manufactures of office accounting and computing machinery; manufactures of domestic appliances.

The machinery & parts industry is one amongst the very few industries of the state which have shown remarkable achievements both in the pre-liberalisation and liberalization period. The machinery & parts producing units in the small scale sector were 4336 (forming 10¹ percent of total SSI units registered with the Directorate of Industries, Punjab) in the year 1980-81 which soared to 9088 units (5.1¹ percent of the total SSI units) in 1991-92 and further escalated to 17608 units (constituting 8.08¹ percent of total SSI units) in the year 2004-05. With regards to employment, the industry provided employment to 25286 persons (forming 9.5¹ percent of total employment in SSI sector of Punjab) in the year 1980-81, which surged to 52443 persons (constituting 7.4¹ percent of total employment in SSI sector of Punjab) in the year 1991-92 and which further climbed to the top position of 90011 persons (forming 9.6¹ percent of total employment in the SSI sector) in the year 2004-05. In the fixed capital investment space, the industry was holding ₹ 45.20 crores (forming 13.7¹ percent of total fixed investment in the SSI sector of Punjab) in the year 1980-81, which jumped to the level of ₹ 117.28 crores (constituting 7.8¹ percent of the total fixed investment in the SSI sector) in the year 1991-92 and which, further advanced to the level of ₹ 357.11 crores (constituting 6.6¹ percent of the

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total fixed investment in the SSI sector) in the year 2004-05. Similarly, the value of production of small scale machinery & parts industry was only worth ₹ 105.87 crores (forming 9.5¹ percent of total value of production of SSI sector) in the year 1980-81, and this expanded to the level of ₹ 262.19 crores (forming 5.9¹ percent of total value of production of SSI sector) in the year 1991-92, which further enhanced to the level of ₹ 1911.8 crores (forming 7.2¹ percent of the total value of output of SSI sector) in the year 2004-05 (Directorate of Industries, Punjab, 2005).

OBJECTIVES OF THE STUDY

A sound industrial development strategy is essential, obligatory to be framed on the basis of analysis of growth and productivity of the concerned industry. In this study, an attempt has been made to capture the facts about machinery & parts industry in Punjab, which can be treated as the conducive agent for policy formulation regarding this industry. The specific objectives of the study are:

1. To compute productivities of labour and capital, capital output ratio and capital intensity and to examine prevailing trends in them.
2. To analyze comparative picture of growth in number of units, fixed investment, employment, and production during pre-liberalization and liberalization periods.
3. To carry out analysis of strength, weaknesses, opportunities and threats (SWOT) of machinery & parts industry of Punjab.

DATABASE AND METHODOLOGY

The present study is based on secondary data for the period of 25 years i.e. 1980-81 to 2004-05. The data relating to number of units, direct employment, fixed capital and production of machinery & parts industry (in small scale industrial sector) at aggregate level for the above said period were culled from Directorate of Industries, Punjab. Since the figures of fixed capital and production were given at current prices, these have been converted into constant prices by deflating them with index number of the wholesale prices of manufactured products' total, taking 1993-94 as the base year. Yearly growth rates for all the four variables were computed to capture year-to-year fluctuations in growth. Partial productivities of labour and capital were obtained as O/L and O/K. For making an assessment of the extent of amount of units of capital that are needed to produce a certain level of output as well as capital intensity, K/O and K/L ratios were computed. Compound Annual Growth Rates (CAGRs) for overall period (1980-81 to 2004-05) and two sub-periods: pre-liberalization (1980-81 to 1991-92) and liberalization periods (1991-92 to 2004-05) for all the variables were estimated by fitting an exponential function of the following form (Gupta and Kumar, 2006 p.298):

$$Y_t = \beta_0 \beta_1^t e^{U_t} \quad \dots (1)$$

Where Y_t is dependent variable, β_0 and β_1 are the unknown parameters, and U_t is the disturbance term. The equation (1) could be written in the logarithmic form as follows:

$$\log Y_t = \log \beta_0 + t \log \beta_1 + U_t \quad \dots (2)$$

The above equation was estimated by applying Ordinary Least Square Method and compound rate of growth (gr_c) was obtained by taking antilog of estimated regression coefficient, subtracting 1 from it and multiplying the difference by 100, as under:

$$gr_c = \left(\frac{\beta_1}{\beta_0} - 1 \right) \times 100 \quad \dots (3)$$

Where β_1 is an estimate for β_1 . The significance of growth rates was tested by applying t - test, given as follows:

$$t = \frac{\beta_1}{s(\beta_1)} \sim t(n-2) \text{ d.f.} \quad \dots (4)$$

where β_1 is the regression estimate, $s(\beta_1)$ the respective standard error.

¹ **Note :-** The superscript 1 in the above text refers to percent share calculated by the author on the basis of data supplied by Directorate of Industries, Punjab.

LIMITATIONS OF THE STUDY

The present study is confined to registered small scale units and data was taken up to 2004-05 to make it in tune with the previous data because data after this period are not available with Directorate of Industries, Punjab in the form that was same in the yesteryears due to change in classification of industries.

RESULTS AND DISCUSSION

This section presents the results and discussion of the study. The first subsection is devoted to analysis of compound annual growth rates of number of units, employment, fixed capital investment and production. Moreover, yearly growth rates are also calculated to capture the year- to- year fluctuations. The second subsection is devoted to the profile of capital intensity, capital-output ratio and partial productivities of labour and capital in machinery and parts industry. The third subsection deals with SWOT analysis of machinery & parts industry.

Table 1: Year To Year And Compound Annual Growth Rates (In Percent)

Year	Number of units	Fixed investment (in ₹ Crore)	Direct Employment (in no.)	Production (in ₹ Crore)
1981-82	14.74	9.21	11.53	2.50
1982-83	9.85	2.14	7.22	-0.59
1983-84	8.49	5.24	6.13	5.69
1984-85	8.48	4.08	9.30	2.22
1985-86	6.87	-3.70	6.19	-5.08
1986-87	5.28	9.06	5.49	10.56
1987-88	5.02	5.71	15.67	6.83
1988-89	6.67	-3.36	6.02	-2.17
1989-90	6.22	0.93	3.92	0.74
1990-91	3.89	-6.56	2.79	-2.51
1991-92	1.59	-8.34	1.88	-8.78
1992-93	3.20	-4.65	3.18	2.68
1993-94	2.63	1.46	2.39	26.59
1994-95	2.82	1.83	2.56	16.77
1995-96	-0.12	3.31	0.77	-55.39
1996-97	2.01	6.12	1.87	149.82
1997-98	1.78	13.38	2.60	16.78
1998-99	2.21	19.86	3.63	12.65
1999-00	1.39	6.75	1.47	8.54
2000-01	1.06	1.01	1.39	5.27
2001-02	0.66	-1.96	1.21	1.66
2002-03	61.19	27.39	37.02	51.06
2003-04	0.63	-0.69	1.16	8.07
2004-05	0.32	-18.69	0.56	-9.42
CAGRs:-				
Pre Liberalization Period	6.76*	1.64*	7.18*	1.56*
Liberalization Period	4.97*	6.14*	0.39**	12.70*
Overall Period	4.74*	2.51*	4.64*	6.20*

*Significant at 5 percent level of significance.

**Insignificant at 5 percent level of significance.

Source: Calculated from the data supplied by Directorate of Industries, Punjab.

Note: - Fixed investment and production figures are taken on 1993-94 constant prices to compute various growth rates.

SECTION -1 : GROWTH PERFORMANCE

Measurement of growth has been one of the most extensively researched areas. The growth rate analysis provides the complete vision of growth performance. The year to year growth rates and compound annual growth rates (CAGRs) of number of units, fixed investment, employment and production of machinery & parts industry are shown in Table 1. The results have been discussed in brief under the following four sub heads:-

✿ **Number Of Units :** The yearly growth rate of number of units as compiled in column 2nd of Table 1 observed almost continuous fall with the exception of the year 2002-03, when it noticed unprecedented rise of 61.19 percent over a meager level of 0.63 percent in 2001-02. The column also dots the weak resistance shown to the declining trend during the years 1988-89, 1992-93, 1994-95, 1996-97, and 1998-99. Starting from a yearly growth rate of 14.74 percent in 1981-82, it plummeted to the level of 5.02 percent in 1987-88, then after experiencing fluctuations, it further declined to -0.12 percent in 1995-96. The yearly growth rate then recovered to the level of 2.01 percent in 1996-97, but failed to maintain the momentum. Barring the year 2002-03, the growth rates continued their decline to finish at 0.32 percent in 2004-05.

Further perusal of the column envisages that the compound annual growth rate (CAGR) for the pre-liberalisation period was 6.76 percent, which declined to 4.97 percent in the liberalization period. However a CAGR of 4.74 percent was observed for the over all period of the study.

✿ **Fixed Investment :** The year-to-year growth rates of fixed investment as displayed in column 3rd of Table 1 exhibit no clear cut pattern throughout the study period. There are certain years like 1998-99 and 2002-03, which show extraordinary growth, while there exists some years like 1991-92 and 2004-05, which shows huge negative growth rates. Starting from a growth rate of 9.21 percent in 1981-82, it reached a level of 5.71 percent in 1987-88 after experiencing fluctuations of low to moderate magnitude. Then started the decline in the yearly growth rates, which intensified and remained in the negative territory till 1992-93. The year 1993-94 witnessed upswing, which managed to muster strength after every passing year and touched a peak of 19.86 percent in 1998-99. The yearly growth rates again started tapering off, with the exception of the year 2002-03, when it mounted a peak of 27.39 percent.

The column further reveals that the CAGR, which was just 1.64 percent during pre-liberalization period, climbed to the level of 6.14 percent in the liberalization period. However, a growth rate of 2.51 percent was observed for overall period of the study.

✿ **Direct Employment :** The data on year-to year growth rates of employment as arranged in 4th column of Table 1 reveals fluctuations of relatively low intensity. The column also dots two very exceptional years i.e. 1987-88 and 2002-03, when it clocked growth rates of 15.67 and 37.02 percent respectively. The yearly growth rates in employment, which was 11.53 percent in 1981-82 reached a level of 15.67 percent in 1987-88 after observing fluctuations. Then started a wave of narrow swings in the yearly growth rates, which traveled throughout the study period with the exception of the year 2002-03, till it reached to 0.56 percent.

The column further demonstrates that the CAGR, which was 7.18 percent in the pre-liberalization period plummeted to 0.39 percent in the liberalization period. However, a CAGR of 4.64 percent was registered for the entire period of the study.

✿ **Production :** The yearly growth rates of production as sketched in column 5th of Table 1 unfolds a baffling pattern, showing fluctuations at every step ranging from low, moderate, high and very high magnitude. Starting from a yearly growth of 2.50 percent in 1981-82, it reached almost the same yearly growth rate of 2.68 percent in 1992-93 after experiencing fluctuations of low to moderate intensity. It jumped to 26.59 percent in 1993-94, nosedived to -55.39 percent in 1995-96, climbed to the highest peak of 149.82 percent in 1996-97, plummeted to a level of 16.78 percent in 1997-98, which further declined in the following years to reach at -5.27 percent in 2000-01. The upturn again started in 2001-02, peaked at a level of 51.06 percent in 2002-03, fell equally sharply in the following years to reach at a negative growth of -9.42 percent in 2004-05.

The column further reveals that the compound annual growth rate for the liberalization period was just 1.56 percent, which shot up to 12.70 percent in the liberalization period. However, a CAGR of 6.20 percent was observed for over all period of the study.

The conclusion that emanates from the above discussion is that the CAGR for the fixed investment and production improved significantly during the liberalization period, while it decelerated substantially for direct employment and

moderately for number of units for the same period. Hence, liberalization has entailed capital investment and technological up gradation in the machinery & parts industry in Punjab.

SECTION II : PRODUCTIVITY ANALYSIS AND PROFILE OF RELATED VARIABLES

Productivity depends on the relationship between total output and related inputs such as labour and capital which have been used in production of output. It is evident that the capacity of the economy to produce goods and services mainly depends on productivity of these factors. Productivity can be enhanced through proper utilization of such resources. It is widely agreed that increasing productivity is a barometer of good health of a system, which allows producing at lower cost and makes it competitive both in short as well as in long run. Table 2 depicts the profile of capital intensity, capital output ratio and partial productivities of labour and capital of the machinery & parts industry of Punjab. This Table also highlights the compound growth rates of capital intensity, capital-output ratio and partial productivities of labour and capital for the pre-liberalization and liberalization period.

✿ **Labour Productivity (AOLR)** : The figures of annual growth rates of labour productivity as compiled in column 2nd of Table 2 shows clear signs of turn around in labour productivity, especially after 1992-93. The labour productivity which was ₹ 0.0110 crores in 1980-81, declined, almost consistently till 1992-93 to reach at a level of ₹ 0.0057 crores. The improvement in labour productivity started in 1993-94, which continued un-interruptedly till 2003-04, with the exception of the year 1995-96, when it nosedived to ₹ 0.0036 crores. The labour productivity peaked at the level of ₹ 0.0142 crores in 2003-04 and then fell to ₹ 0.0128 crores in 2004-05.

The column clearly mirrors an improvement in labour productivity in the liberalization period over the pre-liberalization period. The compound annual growth rate of 8.25 percent as observed in the liberalization period is way ahead of its counterpart -5.24 percent belonging to the pre-liberalization period. However, for the overall period of the study, a CAGR of 1.50 percent was observed.

✿ **Capital Intensity (DOM)** : Perusal of column 3rd of Table 2 reveals that the capital intensity, which was at the highest level of ₹ 0.0047 crores in 1980-81 plummeted, gradually with minor fluctuations, to the lowest level of ₹ 0.0023 crores in 1994-95. The capital intensity started its uphill journey in 1995-96, which continued un-interruptedly till 1999-00 to reach at ₹ 0.0034 crores. It started tapering thereafter to touch a level of ₹ 0.0024 crores in 2004-05.

The column further exhibits that capital intensity decelerated in the pre-liberalization period as shown by the negative CAGR of -5.13 percent. But the liberalization period registered an improvement in capital intensity in the form of positive CAGR of 1.86 percent. However, the overall period of the study witnessed a CAGR of -2.03 percent.

✿ **Capital - Output Ratio (COR)** : A glance at the 4th column of Table 2 shows that the capital - output ratio, which was 0.43 in 1980-81, jumped to a level of 0.48 in 1985-86, then decelerated gradually to reach a level of 0.29 in 1994-95. The year 1995-96 turned out to be an exceptional year, when COR sharply peaked at a level of 0.67 followed by an equally sharp fall to reach at the same base level of 0.29 in 1996-97. The capital-output ratio finally plunged to the lowest level of 0.19 in 2004-05 after experiencing fluctuations.

The column further demonstrates that COR witnessed almost no growth in the pre-liberalization period, when it clocked insignificant CAGR of 0.08 percent. It registered a negative CAGR of -5.74 percent in the liberalization period, underlining a healthy sign for the industry. However, in the over all period of the study, a CAGR of -3.42 percent was observed.

✿ **Capital Productivity (AOCP)** : It is evident from the column 5th of Table 2 that the capital productivity remained sluggish during the initial years of the study till 1985-86. It picked up momentum thereafter, and showed healthy growth for the remaining period of the study, though with minor fluctuations at few intervals. There was a single exception of the year 1995-96, when capital productivity nosedived to the lowest level of 1.49 followed by an equally sharp bounce back.

The column also reveals an improvement of CAGR for the liberalization period (6.17 percent) over the CAGR of the pre-liberalization period (-0.76). However, the CAGR for the entire study period was found to be 3.60 percent.

On the basis of above discussion, we can conclude that the liberalization has given a boost to the mechanization and technological improvement in the machinery & parts industry in Punjab. The policies of the liberalization regime

Table 2: Profile of Capital Intensity, Capital-Output Ratio and Partial Productivity of Capital and Labour

Year	AOLR (ln ₹ Cr.)	DOM (ln ₹ Cr.)	COR	AOCR
1980-81	0.0110	0.0047	0.43	2.34
1981-82	0.0101	0.0046	0.45	2.20
1982-83	0.0094	0.0044	0.47	2.14
1983-84	0.0093	0.0044	0.47	2.15
1984-85	0.0087	0.0041	0.47	2.11
1985-86	0.0078	0.0038	0.48	2.08
1986-87	0.0082	0.0039	0.47	2.11
1987-88	0.0076	0.0036	0.47	2.13
1988-89	0.0070	0.0032	0.46	2.16
1989-90	0.0068	0.0031	0.46	2.15
1990-91	0.0064	0.0029	0.45	2.25
1991-92	0.0057	0.0026	0.45	2.24
1992-93	0.0057	0.0024	0.42	2.41
1993-94	0.0071	0.0024	0.33	3.00
1994-95	0.0080	0.0023	0.29	3.44
1995-96	0.0036	0.0024	0.67	1.49
1996-97	0.0087	0.0025	0.29	3.50
1997-98	0.0099	0.0028	0.28	3.61
1998-99	0.0108	0.0032	0.30	3.39
1999-00	0.0116	0.0034	0.29	3.45
2000-01	0.0120	0.0033	0.28	3.59
2001-02	0.0121	0.0032	0.27	3.72
2002-03	0.0133	0.0030	0.23	4.42
2003-04	0.0142	0.0030	0.21	4.81
2004-05	0.0128	0.0024	0.19	5.35
CAGRs:-				
Pre-liberalization period	-5.24*	-5.13*	0.08**	-0.76**
Liberalization period	8.25*	1.86*	-5.74*	6.17*
Overall Period	1.50**	-2.03*	-3.42*	3.60*

Source: Calculated from the data supplied by Directorate Of Industries, Punjab.

Note *significant at 5 percent level of significance.

** Insignificant at 5 percent level of significance

have resulted in lower capital-output ratio and enhancement of factor productivities.

SECTION -III : SWOT ANALYSIS OF MACHINERY & PARTS INDUSTRY

SWOT analysis is a basic, straight forward model that provides a direction and serves as a basis for the development of marketing plans. It accomplishes this by assessing an organization's strengths, weaknesses, opportunities and threats. It is an important step in planning. The role of SWOT analysis is to take information from the environment and separate it into internal issues (strengths& weaknesses) and external issues (opportunities and threats).Once this is completed, SWOT analysis determines if the information indicates something, that will assist the firm in accomplishing its objectives or if it indicates an obstacle that must be overcome or minimized to achieve desired results (**Ferrel, Lucas and Luck, 1998**).

✿**Strengths** : A firm's strengths are its resources and capabilities that can be used as basis of developing a competitive

advantage. In the strength analysis, the researcher examines what advantages the machinery & parts industry has over its counterparts. The following points highlight the strengths of the machinery & parts industry of Punjab:

- ✿ Hard and tenacious local people.
- ✿ Wide range of products.
- ✿ Availability of basic raw materials within the country.
- ✿ If supported by the government sponsored institutions, innovative ideas are applied in respect of products and processes.
- ✿ The Industry is largely concentrated at a few strategic locations along the Grand Trunk road and enjoys various external economies of scale.
- ✿ Flourishing domestic market.
- ✿ Declining capital output ratio, especially during the liberalization period provides a promising outlook for the future.
- ✿ Marked improvement in labour and capital productivities provides a strong impetus to growth.

✿ **Weaknesses :** Weaknesses are those areas in which the existing machinery & parts industry do not perform well. The absence of certain strengths may be viewed as weaknesses. The following points highlights the weaknesses of the machinery & parts industry of Punjab:

- ✿ No mineral base in the state leading to dependence on outside sources.
- ✿ Lack of education among entrepreneurs.
- ✿ Shortage of skilled labour and quality control staff.
- ✿ Tendency among the producers to under cut each other.
- ✿ A peripheral location of the state distant from national markets.
- ✿ Location on the border with an unfriendly country.
- ✿ Poor access to R&D facilities.
- ✿ Poor marketing and brand building.
- ✿ Irregular and erratic power supply.
- ✿ Industry associations are fragmented and are not managed professionally.
- ✿ Lack of synergies between government support institutions and practical market.

✿ **Opportunities :** The external environment analysis may reveal chances for profits and growth, known as opportunities. Opportunities are those factors that have the potential to make the business stronger, more enduring and profitable. The following points highlight the opportunities available to the machinery and parts industry:

- ✿ Opportunities to gain new export markets due to phasing out of quantitative restrictions and falling trade barriers.
- ✿ If promoted in clusters, it can compete with large enterprises by reaping the benefits of economies of scale and technological upgradation.
- ✿ Improvement in relations with neighbouring countries can open new vistas of growth.
- ✿ Punjab being a part of national freight corridor scheme can help the industry to expand their businesses.
- ✿ Low cost manufacturing base can provide a competitive edge in the export market.
- ✿ Sunrise areas like I. T. enabled services, Software etc can be tapped aggressively to enhance efficiency.

✿ **Threats :** Changes in the external environment may present threats to an industry. Threats can be treated as those factors that have the potential to adversely affect the machinery & parts industry of Punjab. The following points highlight the threats to the machinery & parts industry in Punjab:

- ✿ Increased competition owing to dismantling of quantitative restrictions under W.T.O.
- ✿ Vulnerability to fast changes in technologies from large business houses.
- ✿ Emergence of new low cost manufacturing countries like China, Taiwan and Republic of Korea.
- ✿ Changing consumer trends.
- ✿ For export oriented units ,greater volatility in forex rates is a challenge.

CONCLUSION AND FINDINGS OF THE STUDY

The upshot of the entire discussion is that despite the problem of militancy during pre-liberalization period, significant growth rate was observed in all the four variables namely - *Number Of Units, Employment, Fixed Investment And Production*. Highly significant growth rate was recorded in *Fixed Investment, Production And Number Of Units* but insignificant growth was gauged in *Employment* during the liberalization period. However, in the overall period of the study, significant growth rate was registered in the case of all the four variables. Thus, it could safely be inferred from the analysis that the liberalization has resulted in jobless growth because along with acceleration in the growth of production, the rate of growth of employment has gone down miserably.

The profile of labour and capital productivity reflects that in absolute terms, only the capital productivity exhibited significant growth rate while labour productivity recorded insignificant growth and capital output ratio and capital intensity fell substantially during the overall period of the study. The comparative profile of pre-liberalization and liberalization period indicates that during the liberalization period, productivities of labour and capital accompanied by capital intensity have improved significantly, whereas capital output ratio decelerated.

Even the SWOT analysis of the machinery & parts industry of Punjab highlights immense challenges as well as opportunities for the industry. The industry is facing a tremendous amount of competition from big domestic and foreign producers. Fiscal incentives provided by some neighbouring states coupled with unfavorable and irresponsive approach of the state administration is forcing the industry to relocate its businesses. The need of the hour is that the state administration puts in place a healthy, congenial and investment friendly policy and regulatory framework so that the small scale sector in general and the machinery & parts industry in particular can flourish in the fast changing competitive and globalized business environment.

TERMS USED

a) DOM: Degree of Mechanization (capital intensity) : It is fixed capital at constant prices per employee.

b) COR: Capital output Ratio: It is ratio of total fixed capital to total production (both deflated).

c) AOCR: Average output capital ratio (Capital Productivity): It is ratio of total production to total fixed capital (both deflated).

d) AOLR: Average Output Labour Ratio (Labour Productivity): It is total production at constant prices per employee.

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