



TREND AND GROWTH OF OUTPUT AND EMPLOYMENT IN MANUFACTURING INDUSTRIES OF ODISHA

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Article DOI: <https://doi.org/10.36713/epra12713>

DOI No: 10.36713/epra12713

ABSTRACT

The objective of the study is to analyse the trend, growth and performance of manufacturing industries in Odisha. The study is based on time series data of twenty five years i.e. from 1990-91 to 2014-2015 has been taken into account. The number of reporting units are increasing but at a slower rate. It was 1678 units in the year 2003-04 and in 2006-07 it was increased to 1906 units. But just after one year it was again reduced to 1745 units, though it was again increased to 1848 units in 2008-09. During 2013-14 it was increased to 2714 units. It is marked from the above table that both input and output are increasing and always output is greater than input. The correlation between total employment with number of registered factories and Fixed Capital is same as 0.84 but the correlation between employment and Working Capital is 0.77. From this we can say that, if we want to increase the total employment, we have to increase total number of factories and Fixed Capital not the Working Capital. Similarly in the case of value of output there is a high and positive correlation with that of Fixed Capital, which is equal to 0.98. So in order to increase total output, Fixed Capital should increase at a faster rate. The use of Fixed Capital and Working Capital increased but at a slower rate. The investment should be directed to those industries which not only help in achieve the objective of productivity and growth but also generates employment.

KEY WORDS- Employment, Growth, Industry, Output, Productivity

INTRODUCTION

Manufacturing Industries plays an important role in generating employment. But Manufacturing Industries in Odisha are not generating substantial growth and employment. Odisha is not only an eastern agricultural region but also a major alternative source of economic activity as well. With, growth of the industrial sector there lays a high degree of employment opportunities. As Odisha is a state of abundant natural resources and agriculture restructuring, that would relieve the agricultural sector of both the factors and techniques of production operating within a traditional socioeconomic framework, is surely the most sensible process for the development in the state.

As per 2011 Census, the population of Odisha is 41.97 million which is 3.47 per cent of India's population. The population density is 270 persons per sq. km as per 2011 census. The State contributes about 2.6 per cent of the national income. Its per capita income is 62.47 per cent of the average per capita income of the country as per NSDP estimated for 2013-2014. This implies that State has to continue with greater efforts to catch up with the rest of India. Irrespective of wide inter-district variations, the decadal population growth rate of Odisha which is 14 per cent in 2011 is lower than the national average. The pace of industrialisation in Odisha started after the year 1991. Actually in Odisha industrialisation started shortly after independence. The oldest industries in Odisha were Cole mines at Talcher, paper mill at Choudwar and textile mill also at Choudwar. The setting up of integrated still plant at Rourkela, during the second five year plan strengthened Odisha's place in the industrial map of the country. After this a lots of industrial development were seen like IDCOL cement at Bargarh, NALCO, the biggest aluminium smelter plant in the country, Oswal fertilisers and chemicals, the largest phosphate fertiliser plant in the country, thermal power plants, pulp and paper industries, Ferro alloy plants, cement plants etc. In the mean while certain development process were initiated by the Government of Odisha, which pushed the industrialisation process ahead in the state.

OBJECTIVE AND METHODOLOGY

The objective and methodology of the study are as follows.

1. To analyse the trend, growth and performance of manufacturing industries in Odisha.

The main data sources for this study are the Annual Survey of Industries (ASI) published by Ministry of Statistics and programme implementation, Central Statistics Office, Government of India and also Annual Survey of Industries,



Odisha, published by Directorate of Economics and Statistics, Government of Odisha. Another source of data are District Statistical handbook, Cuttack of different years, published by Directorate of Economics and Statistics, Govt of Odisha, different issues of Economic Survey of Odisha, published by Planning and Coordination Department, Govt of Odisha.

For the present study, a time series data of twenty five years i.e. from 1990-91 to 2014-2015 has been taken into account. The methods of analysis are related to measurement of productivity, measurement of output, measurement of input, measurement of other variable. Table and graph is the key instrument for the presentation of data. Statistical instruments like, mean, standard deviation, regression, correlation and time series analysis etc. has been used in this study. Methodologies like Total Factor Productivity, Cobb- Douglas production function for elasticity estimation, Compound Growth Rate, Correlation and Regression Analysis have been used.

REVIEW OF LITERATURE

Panchanan Das, Reetwika Bass, Abhishek Halder (2017) in study on “Employment, Wage and Productivity: Analysis of Trend and Causality in Indian Manufacturing Industries” have explored the relationship between labour productivity and wage rate and its implication for employment outcomes in registered manufacturing industries in India and have analysed the trend behaviour of the time series of employment, productivity and wage. This study finds out the differential effects on employment and wage through productivity growth across different industry groups and provides some serious policy implications in the context labour market flexibility.

Bishwanath Goldar, Suresh Aggarwal, Deb Kusum Das, Abdul A Erumban and Pilu Chandra Das (2016), in study entitled “Productivity Growth and Levels - A Comparison of Formal and Informal Manufacturing in India” has analysed growth in total factor productivity (TFP) in the formal and informal segments of Indian manufacturing industries also difference in the level of TFP in the formal and informal segments of Indian manufacturing industries. The analysis of TFP growth reveals that the average growth rate in TFP in informal manufacturing during 1980-2011 was significantly lower than that in formal manufacturing (0.4 per cent per annum as against 4.2 per cent per annum). Both formal and informal manufacturing experienced a fall in the rate of TFP growth during 1994-2002 as compared to 1980-1993, and then achieved a marked acceleration in TFP growth during 2003-11.

Deb Kusum Das, Abdul Azeer Erumban and Pilu Chandra Das (2016) observed in the study “Productivity Dynamics in Indian Industries - Input Re-allocation and Structural Change” has analysed that at the average labour productivity growth in Indian economy was only 1 per cent during the period of 1951 to 2010. During 1981-1995 it grew marginally to 2 per cent while it grew significantly to 5 per cent in 1995 to 2010. Over all the growth rate of TFP was 1.12 per cent during 1980- 2011.

Panchanan Das and Anindita Sengupta (2015) in a study entitled “Wages, Productivity and Employment in Indian Manufacturing Industries: 1998-2010” have examine the regional variation in output, employment and productivity growth with data from registered manufacturing industries across major states in India. The higher rate of growth of manufacturing output leads to higher rate of productivity growth, but not a faster rate of employment growth. The structural change took place in favour of capital that increased profit rate by displacing workers in manufacturing industries in India. Workers were affected badly more as compared to other employees, i.e. office staff and supervisors by this kind of job destroying structural change in manufacturing industry in India. This study observes significant regional disparity in industrial growth in India although the incidence of unevenness declined at a very slow rate. The Western part of the country has been traditionally leading in industrial development and the Eastern part has been lagging further behind.

Radhicka Kapoor (2014) in study on “Creating Jobs in India’s Organised Manufacturing Sector” Using data from the Annual Survey of Industries, She examined that the factors holding back the growth of output and employment in this sector. She finds that there are heterogeneities in the performance of the manufacturing sector across industries and states. Recent economic growth has benefited industries which rely more on capital and skilled workers as opposed to unskilled or low skilled workers. This fact combined with the rising capital intensity of production over the decade partly explains the limited contribution of the manufacturing sector to employment generation.

Sangita Mishra and Anoop K Suresh (2014), in a published paper “Estimating Employment Elasticity of Growth for the Indian Economy” has estimated that the aggregate employment elasticity estimates for India have declined over the decades and vary from 0.18 (arc elasticity) to 0.20 (point elasticity) during the post reform period. Sector-wise, while agriculture has witnessed negative elasticity, services including construction have generally been employment intensive.

DATA ANALYSIS AND RESULTS

Given the composition of industrial sector in Odisha in terms of types of industries, the absence of diversification over time, the pattern of aggregate growth rate and its divergence from the national pattern observed all through only speaks about the gross injustice meted out to the state through the negative dynamics of a competitive federal set up and also the absence of state’s own perspective and preservance of a pertinent industrialisation strategy (Ahluwalia, 1985). The industrial sector contributes about 26 per cent share to Odisha’s gross state domestic product in real terms, where as the manufacturing industries contributes about 16 per cent. The industrial sector has been defined to include manufacturing, mining and quarrying and electricity-gas-water



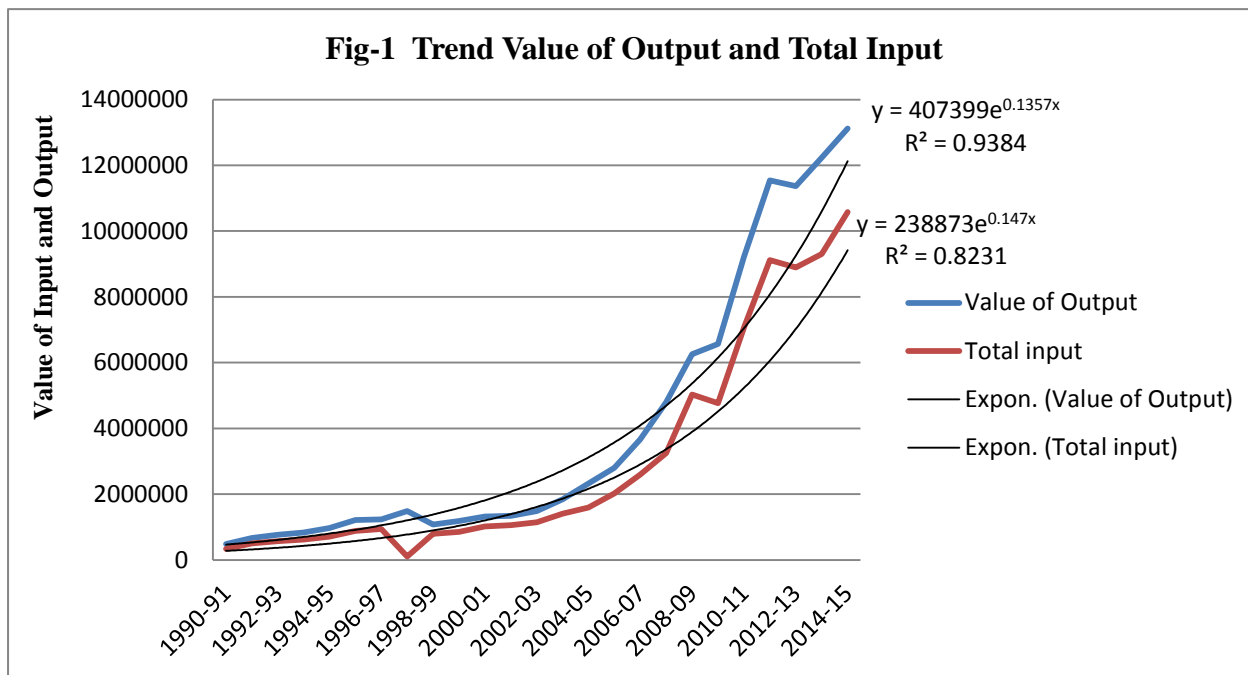
supply. In these studies we will take only the case of manufacturing industries. In this regard the following table may give a clear picture about the manufacturing sector of Odisha.

Table-1 Number of Registered Factories, Fixed and Working Capital, Employment, Net Value Added of Manufacturing Sector of Odisha (Value & Capital in Rs Lakh, & Employment in number)

Year	No of factories	Fixed Capital (FC)	Working Capital (WC)	Total employment	Value of Output	Total input	Net value added
1990-91	1465	474476	103813	154532	487019	339218	115270
1991-92	1566	614093	153715	171478	667906	500040	125081
1992-93	1554	756563	179011	180140	766321	574413	141132
1993-94	1611	877417	169022	185276	832536	621721	168439
1994-95	1774	1239931	172223	195004	970084	712336	206432
1995-96	1790	1484562	231766	197569	1211205	884439	257828
1996-97	1779	1936840	243129	184882	1235921	937896	222388
1997-98	1650	1523909	273323	180122	1491389	101667	375547
1998-99	1539	1089317	181855	142053	1083255	796622	207581
1999-00	1591	956551	109127	132058	1182658	851992	267446
2000-01	1665	1146938	126345	128662	1324267	1016324	235168
2001-02	1709	1178862	181861	115652	1342672	1063469	194639
2002-03	1679	1061308	180697	118187	1486235	1143312	265626
2003-04	1678	1611513	90966	124983	1850105	1408121	321492
2004-05	1749	1604281	126231	145747	2329400	1589922	604542
2005-06	1862	2361133	239524	144554	2797711	2023076	628749
2006-07	1906	2957210	333809	162558	3664160	2594387	902270
2007-08	1822	4337008	570718	184886	4801383	3250472	1351150
2008-09	1848	5468284	379627	213534	6253292	5033761	1667405
2009-10	2052	9272234	1246121	227525	6566234	4771268	1479974
2010-11	2536	12166281	587550	282860	9214154	7069789	1693137
2011-12	2678	16080526	990623	284637	11541915	9121209	1820476
2012-13	2854	16377525	624989	263651	11369603	8897360	1805725
2013-14	2714	21086599	1101487	260771	12237946	9303658	2133980
2014-15	2803	22947886	-297870	262817	13119797	10574792	1668493

Source: Annual Survey of Industries (1990-91 to 2014-15)

From the data it is clear that the manufacturing sector of Odisha is growing gradually. In 1990-91 the no of reporting industries increased at an increasing rate due to introduction of New Economic Policy till 1997-98. It was 1465 units in the year 1990-91, 1779 units in 1996-97 and 1650 units in 1997-98 respectively. Just after one year the no of reporting industries sharply declined to 1539 due to super cyclone occurred in Odisha. It may be noted that the number of reporting units are increasing but at a slower rate. It was 1678 units in the year 2003-04 and in 2006-07 it was increased to 1906 units. But just after one year it was again reduced to 1745 units, though it was again increased to 1848 units in 2008-09. During 2013-14 it was increased to 2714 units. It is marked from the above table that both input and output are increasing and always output is greater than input. So there is always a positive net value added. The use of Fixed Capital and variable capital is increasing but use of Fixed Capital is always much higher than the Working Capital. The trend of output and input throughout the study period can be represented graphically in the figure-1.



It is clear from the figure-1 that both input and output are decreasing and positive at the first half of the period i.e. from the period 1990-91 to 1997-98. In 1998-99 there is a sudden down fall in the value of input and output due to super cyclone in Odisha, after that though these two variables increase but at a very slow rate. But the value of output is always greater than the value of input. After obtaining the graphical trend, the Least Square trend was computed by using exponential function for value of output and total input. The coefficient in the equation is found to be 0.135x and 0.147x for output and input respectively and their R² values are 0.938 and 0.832 respectively. It implies that over the period both the output and input has increasing trend. The descriptive statistics of Fixed Capital, Working Capital, and total employee, value of output, total input and net value added is given in the table-2.

Table -2 Descriptive Statistics (Value in Rs. Lakh & Employment in number)

Statistical Measures	No of registered factories	Fixed Capital (FC)	Working Capital (WC)	Total employment	Value of Output	Total input	Net value added
Mean	1878	4486029	358231	182555	3612807	2730062	716312
Median	1762	1564096	206814	180131	1488813	1103391	294469
S.D	398	5928438	330025	50949	3820597	2971908	685581

Source- Computed by the author

The average Fixed Capital in industries of Odisha is Rs.4486029 lakhs but Working Capital is comparatively very less that is Rs.358231 lakhs. The average total employment is 182555 which is relatively less. The standard deviation is very high, which implies that there is fluctuation in Fixed Capital, Working Capital and value of output over the year. The average net value added is Rs.736312lakhs which is also relatively very less in Odisha. In order to understand the relationship among various given variables we would calculate correlation in table-3.

Table - 3 Correlation Matrix

	No of Registered Factories	Fixed Capital (FC)	Working Capital (WC)	Total employment	Value of Output	Total input	Net value added
No of registered factories	1.00						
Fixed Capital	0.96	1.00					
Working Capital	0.78	0.86	1.00				
Total employment	0.84	0.84	0.77	1.00			
Value of Output	0.96	0.98	0.85	0.84	1.00		
Total input	0.96	0.98	0.84	0.84	1.00	1.00	
Net value added	0.88	0.91	0.85	0.80	0.96	0.96	1.00

Sources- Computed by the author.



It is observed from the table-3 that the correlation between total employment with number of registered factories and Fixed Capital is same as 0.84 but the correlation between employment and Working Capital is 0.77. From this we can say that, if we want to increase the total employment, we have to increase total number of factories and Fixed Capital not the Working Capital. Similarly in the case of value of output there is a high and positive correlation with that of Fixed Capital, which is equal to 0.98. So in order to increase total output, Fixed Capital should increase at a faster rate.

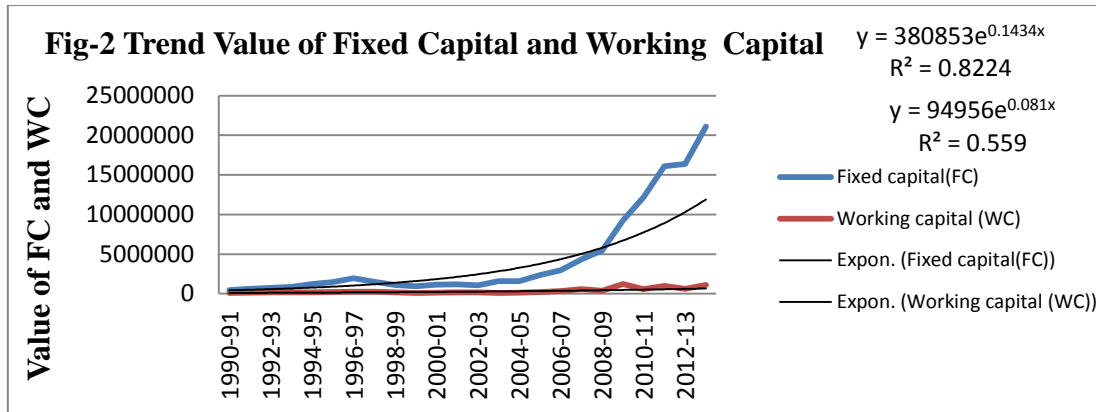
In a financial management, two important decisions are very vital and crucial. They are decision regarding Fixed Capital and decision regarding Working Capital. Both are important and a firm always analyzes their effect to final impact upon profitability and risk. For this researcher has calculated the percentage of Fixed Capital and Working Capital of total Productive Capital in table-4. It is observed that the percentage of contribution of Fixed Capital and Working Capital had always shown increasing trend but the use of Fixed Capital is always higher than the working capital. As the share of Working Capital in productive capital is lower, it shows that there is more investment in plant and machineries.

Table - 4 Fixed Capital and Working Capital as a Percentage of Productive Capital of Manufacturing Sector of Odisha.(Values in lakhs)

Year	Fixed Capital (FC)	FC as % of PC	Working Capital (WC)	WC as % of PC	Productive Capital
1990-91	474477	82.05	103814	17.95	578291
1991-92	614094	79.98	153715	20.02	767809
1992-93	756564	80.87	179011	19.13	935575
1993-94	877417	83.85	169022	16.15	1046439
1994-95	1239932	87.80	172224	12.20	1412156
1995-96	1484562	86.50	231767	13.50	1716329
1996-97	1936841	88.85	243130	11.15	2179971
1997-98	1523910	84.79	273324	15.21	1797234
1998-99	1089317	85.69	181855	14.31	1271172
1999-00	956551	89.76	109127	10.24	1065678
2000-01	1146938	90.08	126345	9.92	1273283
2001-02	1178862	86.63	181861	13.37	1360723
2002-03	1061308	85.45	180697	14.55	1242005
2003-04	1611513	94.66	90966	5.34	1702479
2004-05	1604281	92.71	126231	7.29	1730512
2005-06	2361133	90.79	239524	9.21	2600657
2006-07	2957210	89.86	333809	10.14	3291019
2007-08	4337008	88.37	570718	11.63	4907726
2008-09	5469614	93.51	379627	6.49	5849241
2009-10	9272234	88.15	1246121	11.85	10518355
2010-11	12166281	95.39	587550	4.61	12753831
2011-12	16080526	94.20	990623	5.80	17071149
2012-13	16377525	96.32	624989	3.68	17002514
2013-14	21086599	95.04	1101487	4.96	22188086
2014-15	22947886	101.32	-297870	-1.32	22650016

Source- Computed by the Author

It is observed from the table-4 that, the percentage of contribution of Fixed Capital and Working Capital had always shown increasing trend but the use of Fixed Capital is always higher than the variable capital. The use of Fixed Capital is highest as compared to Working Capital in the year 2014-15, and lowest in the year in the year 1990-91. It is also clear from the table that Fixed Capital and Working Capital has increased after the introduction of New Economic policy in 1990-91 till 1997-98. The use of Fixed Capital which was of Rs. 474477 in the year 1990-91 and increased to 1523910 in 1997-98, accordingly the use of Working Capital which was Rs.103814 in the year 1990-91 and increased to Rs. 273324, but during 1998-99 it sharply declined due to the hit of super cyclone in Odisha, after that, though the use of Fixed Capital and Working Capital increased but at a slower rate. The trend value of Fixed Capital, Working Capital and value of output is given in the figure -2.



From the figure 4.2 it is clear that Fixed Capital and Working Capital has increasing trend, though Fixed Capital is higher than Working Capital. After obtaining the graphical trend the Least Square trend was calculated using exponential function. The coefficient in exponential equation was found to be 0.143x, 0.081x and their R² values are 0.822, 0.559 for the value of Fixed Capital and Working Capital respectively. It implies that over the period from 1990 to 2014 both the Fixed Capital and Working Capital has increasing trend.

The ratio of Fixed Capital to employment implies, the more Fixed Capital is used per worker, the more productive the worker can be. Working Capital per employment displays the amount of capital that is necessary to generate one employment. As per the economic theory there is a positive relationship in between Working Capital and employment. Similarly the per capita output per employment is one of the primary indicators of an industry economic performance. So it is essential to calculate Fixed Capital, Working Capital and value of output per employment. This is represented in the table 4.5.

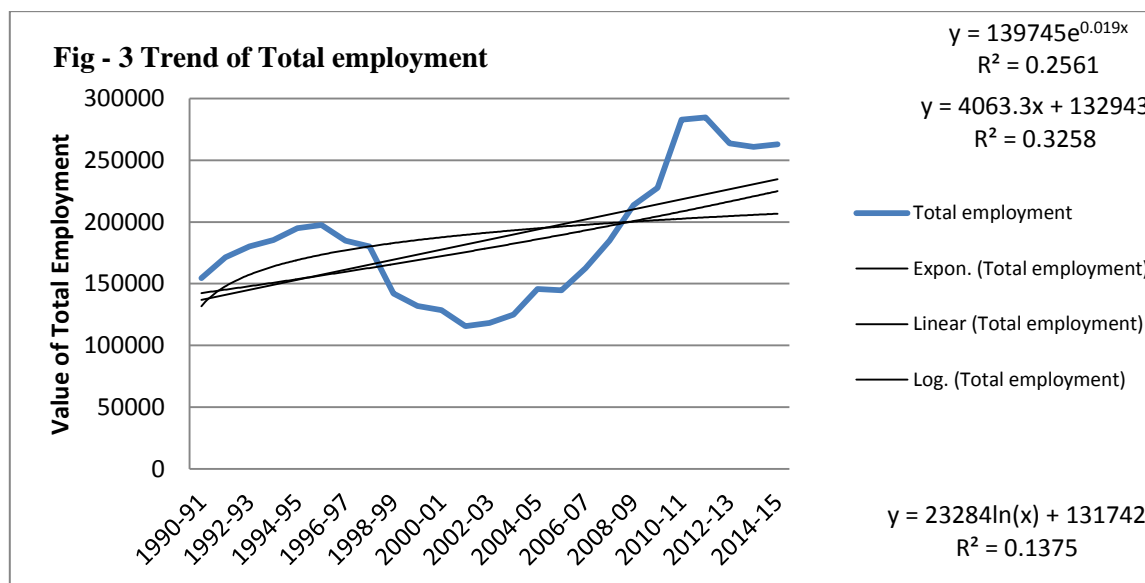
Table - 5 Fixed Capital, Working Capital and Output per Employment
(Value in Rs. Lakh & Employment in number)

Year	No of factories	Fixed Capital (FC)	Working Capital (WC)	Value of Output	Total employment	FC/ Employment	WC/ Employment	Value of output/ Employment
1990-91	1465	474476	103813	487019	154532	3.07	0.67	3.15
1991-92	1566	614093	153715	667906	171478	3.58	0.90	3.89
1992-93	1554	756563	179011	766321	180140	4.20	0.99	4.25
1993-94	1611	877417	169022	832536	185276	4.74	0.91	4.49
1994-95	1774	1239931	172223	970084	195004	6.36	0.88	4.97
1995-96	1790	1484562	231766	1211205	197569	7.51	1.17	6.13
1996-97	1779	1936840	243129	1235921	184882	10.48	1.32	6.68
1997-98	1650	1523909	273323	1491389	180122	8.46	1.52	8.28
1998-99	1539	1089317	181855	1083255	142053	7.67	1.28	7.63
1999-00	1591	956551	109127	1182658	132058	7.24	0.83	8.96
2000-01	1665	1146938	126345	1324267	128662	8.91	0.98	10.29
2001-02	1709	1178862	181861	1342672	115652	10.19	1.57	11.61
2002-03	1679	1061308	180697	1486235	118187	8.98	1.53	12.58
2003-04	1678	1611513	90966	1850105	124983	12.89	0.73	14.80
2004-05	1749	1604281	126231	2329400	145747	11.01	0.87	15.98
2005-06	1862	2361133	239524	2797711	144554	16.33	1.66	19.35
2006-07	1906	2957210	333809	3664160	162558	18.19	2.05	22.54
2007-08	1822	4337008	570718	4801383	184886	23.46	3.09	25.97
2008-09	1848	5468284	379627	6253292	213534	25.61	1.78	29.28
2009-10	2052	9272234	1246121	6566234	227525	40.75	5.48	28.86
2010-11	2536	12166281	587550	9214154	282860	43.01	2.08	32.57
2011-12	2678	16080526	990623	11541915	284637	56.49	3.48	40.55
2012-13	2854	16377525	624989	11369603	263651	62.12	2.37	43.12
2013-14	2714	21086599	1101487	12237946	260771	80.86	4.22	46.93
2014-15	2803	22947886	-297870	13119797	262817	87.32	-1.13	49.92

Source- Computed by the Author



It is observed from the table- 5 that the ratio of Fixed Capital to employment and the ratio of Working Capital to employment show an increasing trend till 1996-97. After that though the above said ratios increase but show a decreasing trend. The ratio of Fixed Capital to employment which was 3.07 in the year 1990-91 increased to 3.58 and 4.19 in the year 1991-92 and 1992-93 respectively. After that it increased and reached its highest point that is 10.48 in the year 1996-97. After that it starts declining till 2004-05 and after that though it is increasing but at a slower rate. If we take the case of Working Capital and employment it shows the same result as in the case of Fixed Capital and employment. But here the matter of concerned is that if we compare both the ratios, former is always higher than the later. This shows that the workers are more productive and utilising their capacity more efficiently. The trend of total employment is given in the figure -3.



From the figure -3 it is clear that employment has an increasing trend. After obtaining the graphical trend the Least Square trend was calculated using exponential, liner and logarithmic function. The coefficients in equation were found to be 0.019x, 4063x and 23284x and their R^2 values are 0.256, 0.325 and 0.137 for the value of employment respectively. It implies that over the period from 1990 to 2014 the employment has increasing trend.

From the above discussion we may concluded that the state has large potential for industrialisation. The role of manufacturing industries and small and medium scale industries is important for development of Odisha. The share of this Sector in Odisha's GSDP is around 15.4 per cent as per the advance estimate in 2014-15. This Sector provides employment, directly or indirectly, to more than 60 per cent of the population. However the sector suffers from frequent natural shocks like cyclones, droughts and flash floods affecting the growth trend. This followed by illiteracy and poverty. Odisha has historically witnessed higher incidence of poverty. In 2004-05 the poverty rate was 57.2 per cent, where as in 2011-12 it reduced to 32.6 per cent for such condition manufacturing sector is a best option which can absorb growing illiterate person from the agriculture sector. Besides this the productivity of labour is very low which subsequently lower their contribution to output. The most common cause behind the low productivity in Odisha is low wage and lack of technology. In recent year much interest has been shown by the private investors, by Indian large companies. As a result Odisha has emerged as one of the most preferred investment destinations in India. But for a state like Odisha investment in medium and small scale industries is more important than the investment in large industries like steel, iron, aluminium and oil refinery. So investment should be directed to those industries which not only help in achieve the objective of productivity and growth but also generates employment.

CONCLUSION

The state of Odisha has large potential for industrialisation. The role of manufacturing industries and small and medium scale industries is important for development of Odisha. Odisha is an agrarian state. The share of this Sector in Odisha's GSDP is around 15.4 per cent as per the advance estimate in 2014-15. This Sector provides employment, directly or indirectly, to more than 60 per cent of the population. However the sector suffers from frequent natural shocks like cyclones, droughts and flash floods affecting the growth trend. This followed by illiteracy and poverty. Odisha has historically witnessed higher incidence of poverty. In 2004-05 the poverty rate was 57.2 per cent, where as in 2011-12 it reduced to 32.6 per cent for such condition manufacturing sector is a best option which can absorb growing illiterate person from the agriculture sector. Besides this the productivity of labour is very low which subsequently lower their contribution to output. The most common cause behind the low productivity in Odisha is low wage and lack of technology. In recent year much interest has been shown by the private investors, by Indian large



companies. As a result Odisha has emerged as one of the most preferred investment destinations in India. But for a state like Odisha investment in medium and small scale industries is more important than the investment in large industries like steel, iron, aluminium and oil refinery. So investment should be directed to those industries which not only help in achieve the objective of productivity and growth but also generates employment.

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