

## **IMPACT OF PRODUCTIVITY ON FINANCIAL PERFORMANCE OF TATA STEEL LTD. (A CASE STUDY)**

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### **ABSTRACT**

*An attempt has been made to study the effect of productivity on financial performance of Tata Steel Ltd. The Time period was Ten Year from 2010-11 to 2019-20. The regression model was built by researched. It is found that material productivity index shows fluctuating trend during the study period. Whereas labour productivity trend shows increasing trend during the study period. Overhead productivity trend is also fluctuating during the study period. The overall fluctuating trend is also highly fluctuating during the study period. Chi-square test indicates insignificance difference between actual index and trend value. The adjusted R square is 77.55% which explains that 77.55% effect has been caused by independent variables.*

**KEYWORDS:** *Financial Performance, Globalization, Privatization, Liberalization, Economic Scenario.*

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### **Introduction**

The steel industry is the largest company in India and has a significant impact on the Indian economy. India was the 3rd largest producer of raw steel for three consecutive years, from 2014 to 2016. Iron and steel industry is at the core of globalization and is one of those industries which have direct or indirect ties with every other industry. These metals are used in gadgets and robots. This makes the steel industry a very important and prominent one. The steel industry in India has been an array of changes in the past decade. The economic scenario which emerged after globalization, privatization and liberalization, has thrown a new challenge before the steel producers. Now it has to be more competitive in order to meet the needs and demands of its steel production. The steel industry sector contributed to increase the awareness of the using steel about the wider range of choice of steel products and the price offered by the competing steels in the market. The technical know-how, expertise and wide experience of multinationals that have joined with the Indian companies have revolutionized almost all aspects in the industry.

### **Review of Literature**

**Sarbapriya Ray and Mihir Kumar Pal (2010)** where the authors describes study attempts to measure productivity performance in terms of partial factor productivity and total factor productivity growth and tries to relate and adjust economic capacity utilization with total factor productivity growth for the entire period, 1979-1980 to 2003- 2004. The results on partial factor productivity of factors show improvement in productivity of material, labour and capital. The result on the overall productivity shows declining total factor productivity growth during post-reform period as compared to perform period. Kavitha and Palanivelu (2014) in their study explained that iron and steel industry is important for the economic development of a country in terms of foreign ex-change, employment generation, infrastructure development and technology. This study confines itself to the issues relating to the financial performance of the iron and steel industries with regard to its growth, profitability and liquidity and the impact on

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various factors such as capital, liquidity passion of iron and steel industry for the period of ten years from 2002 – 2003 to 2001 – 2012. Darshak.A.Desai introduced Six Sigma methodology to improve Quality and Productivity in small scale foundry. They found that 2 products namely Grey Flange and S.G. Flange casting in which rejection rate were higher and Process time of Hardening was much more. After applying DMAIC methodology, the sigma level of grey iron flange casting improved from 1.979 to 2.260 and that of S.G. iron flange casting improved from 1.638 to 1.954. And the overall cycle time was reduced to 17.34 hr from 23.76 hr due to reduction in cycle time by 27%.

#### Data Analysis

- Material Productivity**

Table 1 describes the material productivity ratio and index of Material productivity average of material indices, co-efficient of variation and value of chi-square of Tata Steel Ltd

**Table 1: Analysis of Material Productivity Ratio InTata Steel Ltd. (In Crores)**

Year	Output in Crores	Input in Crores	O/i	Prod. Intex	Trend Value	I/O
2010-11	29,396.35	7,841.47	3.75	100.00	93.15	0.27
2011-12	33,933.46	9,917.37	3.42	91.27	90.77	0.29
2012-13	38,199.43	12,421.63	3.08	82.03	88.38	0.33
2013-14	41,711.03	12,641.57	3.30	88.01	86.00	0.30
2014-15	41,785.00	14,701.62	2.84	75.82	83.61	0.35
2015-16	38,210.34	13,116.66	2.91	77.71	78.84	0.34
2016-17	47,993.02	16,129.77	2.98	79.37	76.45	0.34
2017-18	59,616.82	20,831.29	2.86	76.34	74.06	0.35
2018-19	70,610.71	25,688.42	2.75	73.32	71.68	0.36
2019-20	60,435.97	23,586.17	2.56	68.35	69.29	0.39
TOTAL	461892.13	156875.97	30.45	812.22	812.22	3.32
AVE.	46189.21	15687.60	3.04	81.22	81.22	0.33
Standard Deviation =			9.412258957	Chi-square =		
Co-Efficient of Variance =			11.58825057	A= 83.41	B=2.39	3.04

**Table 2: Calculation of Chi-square value of TATA Steel**

Observe	Expected	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
100.00	92.36	7.64	58.39	0.63
91.27	90.57	0.70	0.49	0.01
82.03	88.78	-6.75	45.54	0.51
88.01	86.99	1.02	1.05	0.01
75.82	85.20	-9.39	88.10	1.03
77.71	81.62	-3.92	15.34	0.19
79.37	79.83	-0.46	0.22	0.00
76.34	78.04	-1.70	2.90	0.04
73.32	76.26	-2.93	8.60	0.11
68.35	74.47	-6.12	37.40	0.50
Chi-square =				3.04

Table 1 shows Material Productivity of Tata steel ltd. The output of Tata steel ltd shows increase trend and input of Tata steel ltd shows increase trend. The productivity ratio was 3.75 in 2010-11 and 2.91 in 2015-16. In the last year, it is decrease to 2.56. The average ratio is show highly fluctuation trends. The chi-square value is 3.04 which lower than calculate value 16.919 hence null hypothesis is accepted and it is conduct that there is no significant different between actual index value of productivity and trend value productivity.

- Labour Productivity**

Table 3 describes the labour productivity ratio and index of labour productivity average of labour indices, co-efficient of variation and value of chi-square for selected units of Steel Companies in India under study.

**Table 3: Analysis of Labour Productivity in Tata Steel Ltd. (In crores)**

Year	Output	Input	O/i	Prod. Index	Trend Value	I/O
2010-11	29,396.35	2,837.46	10.36	100.00	96.47	0.10
2011-12	33,933.46	3,047.26	11.14	107.49	98.39	0.09
2012-13	38,199.43	3,608.52	10.59	102.18	100.31	0.09
2013-14	41,711.03	3,673.08	11.36	109.61	102.22	0.09
2014-15	41,785.00	4,601.92	9.08	87.64	104.14	0.11
2015-16	38,210.34	4,324.90	8.83	85.28	107.98	0.11
2016-17	47,993.02	4,605.13	10.42	100.59	109.90	0.10
2017-18	59,616.82	4,828.85	12.35	119.17	111.82	0.08
2018-19	70,610.71	5,131.06	13.76	132.83	113.74	0.07
2019-20	60,435.97	5,036.62	12.00	115.82	115.66	0.08
Total	461892.13	41694.80	109.88	1060.62	1060.62	0.93
AVE.	46189.21	4169.48	10.99	106.06	106.06	0.09
Standard Deviation =			14.34177118	Chi-square =		13.4
Co-Efficient of Variance =			13.52211384	A=106.06	B= -1.92	

**Table 4: Calculation of Chi-square value of Tata Steel Ltd.**

Observe	Expected	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
100.00	96.47	3.53	12.47	0.13
107.49	98.39	9.10	82.81	0.84
102.18	100.31	1.87	3.51	0.04
109.61	102.22	7.39	54.57	0.53
87.64	104.14	-16.50	272.24	2.61
85.28	107.98	-22.70	515.36	4.77
100.59	109.90	-9.30	86.58	0.79
119.17	111.82	7.35	54.03	0.48
132.83	113.74	19.09	364.61	3.21
115.82	115.66	0.17	0.03	0.00
Chi-square =				13.40

Table 3 shows Labour Productivity of Tata steel ltd. The output of Tata steel ltd. shows fluctuation trend and input of Tata steel ltd. shows fluctuation trend. The labour productivity ratio was 10.36 in 2010-11. and highest productivity ratio is 13.76 in 2018-19. The average ratio is show highly fluctuation trends. Standard deviation is 14.34 and c.v. is 13.52. The chi-square value is 13.4 which lower than calculate value 16.919 hence null hypothesis is accepted and it is conduct that there is no significant different between actual index value of productivity and trend value productivity.

- **Overhead Productivity**

Table 5 describe that overheads productivity ratio, co-efficiency of co-relationship, productivity index, Trend value, Input-output ratio, standard deviation, co-efficient of variation and value of chi-square.

**Table 5: Analysis of overhead Productivity in Tata Steel Ltd. (In Crores)**

Year	Output	Input	O/I	Prod. Index	Trend Value	I/O
2010-11	29,396.35	7408.78	3.97	100.00	87.97	0.25
2011-12	33,933.46	9652.78	3.52	88.60	87.20	0.28
2012-13	38,199.43	11447.64	3.34	84.10	86.43	0.30
2013-14	41,711.03	12734.66	3.28	82.55	85.66	0.31
2014-15	41,785.00	13217.83	3.16	79.67	84.89	0.32
2015-16	38,210.34	13414.06	2.85	71.79	83.35	0.35
2016-17	47,993.02	16711.82	2.87	72.38	82.58	0.35
2017-18	59,616.82	17632.36	3.38	85.21	81.81	0.30
2018-19	70,610.71	19782.62	3.57	89.96	81.04	0.28
2019-20	60,435.97	17516.01	3.45	86.96	80.27	0.29
TOTAL	461892.13	139518.56	33.38	841.22	841.22	3.02
AVE.	46189.21	13951.86	3.34	84.12	84.12	0.30
Standard Deviation =			8.351121733	Chi-square =		6.71
Co-Efficient of Variance			9.927358807	A = 84.12	B = 0.77	

**Table 6: Calculation of Chi-square value of Tata Steel Ltd.**

Observe	Expected	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
100.00	87.97	12.03	144.72	1.65
88.60	87.20	1.40	1.96	0.02
84.10	86.43	-2.33	5.44	0.06
82.55	85.66	-3.11	9.68	0.11
79.67	84.89	-5.22	27.23	0.32
71.79	83.35	-11.56	133.66	1.60
72.38	82.58	-10.20	104.14	1.26
85.21	81.81	3.40	11.56	0.14
89.96	81.04	8.91	79.46	0.98
86.96	80.27	6.68	44.68	0.56
			Chi-square =	6.71

Table 5 shows Overheads Productivity of Tata steel Ltd. The output of Tata steel ltd. shows fluctuation trend and input of Tata steel ltd. shows fluctuation trend. The productivity ratio was 3.16 in 2014-15. and highest productivity ratio is 3.97 in 2010-11. Lowest is 2.85 in 2015-16. The average ratio is show highly fluctuation trends. Standard deviation is 8.35 and c.v. is 9.93. The chi-square value is 6.71 which lower than calculate value 16.919 hence null hypothesis is accepted and it is conduct that there is no significant different between actual index value of productivity and trend value productivity.

#### Overall Productivity

Table 7 showed overall ratio, co-efficiency of co relationship, productivity index, average indices, trend value of indices, standard deviation, co-efficient of variation, chi-square and input output ratio for Tata steel Ltd.

**Table 7: Analysis of Overall Productivity Ratio in Tata Steel Ltd.**

Year	Output	Input	O/I	Prod. Index	Trend Value	I/O
2010-11	29,396.35	18087.71	1.63	100.00	91.84	0.62
2011-12	33,933.46	22617.41	1.50	92.32	90.50	0.67
2012-13	38,199.43	27477.79	1.39	85.54	89.16	0.72
2013-14	41,711.03	29049.31	1.44	88.35	87.83	0.70
2014-15	41,785.00	32521.37	1.28	79.06	86.49	0.78
2015-16	38,210.34	30855.62	1.24	76.20	83.81	0.81
2016-17	47,993.02	37446.72	1.28	78.86	82.48	0.78
2017-18	59,616.82	43292.5	1.38	84.73	81.14	0.73
2018-19	70,610.71	50602.1	1.40	85.86	79.80	0.72
2019-20	60,435.97	46138.8	1.31	80.60	78.46	0.76
TOTAL	461892.13	338089.33	13.84	851.51	851.51	7.27
AVE.	46189.21	33808.93	1.38	85.15	85.15	0.73
Standard Deviation =			7.153227571	Chi-square =		3.08
Co-Efficient of Variance =			8.400663858	A =85.15	B =1.34	

**Table 8: Calculation of Chi-square value of Tata Steel Ltd.**

Observe	Expected	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
100.00	91.84	8.16	66.63	0.73
92.32	90.50	1.82	3.30	0.04
85.54	89.16	-3.62	13.13	0.15
88.35	87.83	0.52	0.28	0.00
79.06	86.49	-7.43	55.22	0.64
76.20	83.81	-7.62	58.01	0.69
78.86	82.48	-3.62	13.08	0.16
84.73	81.14	3.59	12.91	0.16
85.86	79.80	6.06	36.71	0.46
80.60	78.46	2.13	4.55	0.06
			Chi-square =	<b>3.08</b>

Table 7 shows Overall Productivity of Tata Steel Ltd. The output of Tata Steel Ltd. shows fluctuation trend and input of Tata Steel Ltd. shows fluctuation trend. The productivity ratio was 1.39 in 2012-13 and highest productivity ratio is 1.63 in 2010-11. Lowest is 1.24 in year of 2015-16. The average ratio is show highly fluctuation trends. Standard deviation is 7.15 and c.v. is 8.40. The chi-square value is 3.80 which lower than calculate value 16.919 hence null hypothesis is accepted and it is conduct that there is no significant different between actual index value of productivity and trend value productivity. Regression analysis: researcher has built the following regression model

$$ROCE = \beta_1(MPR) + \beta_2(LPR) + \beta_3(OPR) + \beta_4(OP) + e$$

Table 9

Dependent Variable: ROCE				
Method: Least Squares				
Date: 10/13/18 Time: 08:00				
Sample: 1 10				
Included observations: 10				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	70.24253	46.23697	1.519186	0.1795
LPR	7.17699	3.402434	2.109369	0.0794
OPR	51.63483	33.95872	1.520517	0.1792
OP	-328.8342	209.2594	-1.57142	0.1671
R-squared	0.715592	Mean dependent var		10.02
Adjusted R-squared	0.573388	S.D. dependent var		4.068527
S.E. of regression	2.65738	Akaike info criterion		5.081733
Sum squared resid	42.37003	Schwarz criterion		5.202767
Log likelihood	-21.40867	Hannan-Quinn criter.		4.948959
Durbin-Watson stat	1.568501			

Above table shows that dependent variable return on investment is positively affected by material productivity ratio, labour productivity ratio and overhead productivity ratio. Whereas Return on investment is negatively affected by overall productivity ratio. The result of the t test shows that all independent variables are insignificant to dependent variable. The R square is 0.71 which shows that overall effect is 71.55 percent on financial efficiency. The Durbin Watson test shows that there is no colinearity among all independent variables

### Finding

Material Productivity Ratio is found between 2.56 to 3.75. labour productivity Ratio 8.83 to 13.76 overhead productivity Ratio 2.85 to 3.97 and overall Productivity Ratio 1.24 to 1.63

The trend value show fluctuating trend index shows increase and decrease trends. Material Productivity is find trend value between 69.29 to 93.15. labour productivity trend value 96.47 to 115.66. Overhead productivity trend value 80.27 to 87.97 and overall Productivity trend value 78.46 to 91.84. Growth rate is 2.39 of Material Productivity, -1.90 of labour Productivity, 0.77 of overhead Productivity and 1.34 of overall Productivity. The chi-square value of Material Productivity is 13.4 which lower than calculate value 16.919 hence null hypothesis is accepted and it is conduct that there is no significant different between actual index value of productivity and trend value productivity. The chi-square value of Labour Productivity is 3.04 which lower than calculate value 16.919 hence null hypothesis is accepted and it is conduct that there is no significant different between actual index value of productivity and trend value productivity. The chi-square value overhead productivity is 6.71 which lower than calculate value 16.919 hence null hypothesis is accepted and it is conduct that there is no significant different between actual index value of productivity and trend value productivity. The chi-square value overall is 3.80 which lower than calculate value 16.919 hence null hypothesis is accepted and it is conduct that there is no significant different between actual index value of productivity and trend value productivity.

**Conclusion**

From the above it is Conclusion that Material productivity can be increased with helpful use of new technology and efficiency of human resources quality material also of place to improve to the productivity positive atmosphere and very working condition please vital role to improve productivity steel productivity. A cross the quality have set benchmark by automatically increase. It is also found that Japanese Industry has very high productivity because of the you of artificial intelligent. Motivational factor from side of management also productivity improves in factor.

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