

## CHAPTER-5

### Material Productivity Analysis

#### 5.1 Concept of Productivity

“Productivity is the basic mission of any organization to provide the maximum welfare for the maximum number. Productivity as a measure of efficiency and effectiveness and as a means of improving the quality of life is generic from achieving the highest output from the limited resources. Productivity implies the certainty of being able to do better than yesterday and keeping the tempo continuously to improve upon. Such continuous improvements are to be generated through the research for new technique, methods, process, materials, software, and expertise coupled with vision and dedicated leadership having the ultimate faith in the welfare in the welfare of human system. ”<sup>1</sup>

“Productivity means different things to different stakeholders. To workers productivity means a speed up in their work pattern. To union leaders it means the opportunities to negotiate for higher wages. To management, it means increased profitability. To customer, it betters goods after costs. To marketing directors productivity improvement increases the firm’s competitiveness abroad by reducing the cost of goods sold in foreign market and to economists; it means an increase in country’s standard of living field to gain in output per man-hour. ”<sup>2</sup>

Productivity is simply the ratio of output to input. When this ratio is calculated in based price it indicates the change in productivity efficiency over the base year. As the input consist of a number of production factors and elements. Productivity can also be determined separately for each of these factors. Both the output and the input may be expressed in terms of physical units or interims of money.

Productivity is measured as the ratio between the output of a given commodity or service and the inputs used for that product. Productivity ratio is the ratio of output of wealthy produced to the input of resources used in the process.

## **5.2 Productivity and Production:**

Productivity and production are often not distinguished at all. Productivity is” The measure of the efficiency in production factors, inputs, and / or factor / input Services.<sup>3</sup> But production is the amount of absolute flow of product during given period without talking the input factors into consideration.

The term “Productivity” is used with reference to performance in production and measuring efficiency of organization which refers of improvements in productivity.

“A rise in productivity may con note an increase in output with same resources or the same output by utilizing a smaller quantum of

resources. If productivity increases in an economy it means that its factors of production and commodity inputs are manifesting increase in their output efficiency”<sup>4</sup> Thus increasing productivity means the increasing efficiency of various resources of production or better results with lesser efforts. Therefore, measurement of productivity indicates results of performance and efficiency of any enterprise or organization. “It is the pivot of all the productive economic activities affecting the cost of production and determining all the variables like the prices, wages, salaries and cost of capital and services.”<sup>5</sup> The key to efficiency and higher productivity lies in working better, ensuring quality rather than faster, ensuring only quantity. ”One of the best proper uses of team work and competition is to increase productivity.”<sup>6</sup>

On the whole it can be said that production is an absolute term and refers to the total value or quality of goods or services produced during a period. Productivity, on the other hand, is such a relative terms as shows not only the value or quantity of output or production but also its relation to the input or resources used in turning out a given amount of output. Increase in production does not necessarily result in increase in productivity.

### **5.3 Productivity and Profitability:**

Productivity is a sign of efficiency in production. It can be raised only when production is carried out in a more economical manner. Lower

productivity is of Wastage and inefficiency in the use of resources. Higher productivity results in higher Profits. The level of productivity sees to it that maximum outcome should take place from whatever minimum input one engages in the best of a concern depends upon profits. The level of productivity sees to it that maximum outcome should take place from whatever minimum input one engages in the best of a concern depends upon the maximum profit it draws. The profit earned thus brings in the term 'profitability'. If selling prices are increased. The profitability of an enterprise will also increase but it will have a zero effect on the productivity level. In this context J. P. Srivastava remarks, "In between cost and profitability there are actually so many other factors besides productivity. For example, Profitability may have its origin in current scarcity."<sup>7</sup>

Thus profitability does not necessarily increase the real wealth of an enterprise as it may increase whenever either the selling prices are increased or by overlooking the effect of inflation etc. He further points out that "the stresses of development and the market mechanism may be playing their due role in inflating the profitability of a product unit. While rationalization of effort in every direction is the true basis of productivity"<sup>8</sup>

However, Chen and Garrah observe: "with due allowances for temporary current value fluctuations or changes in commodity of product

prices there is a strong positive correlation among time series data measuring productivity, profitability, or efficiency. They are of the view; " All these measures indicate a rate of growth in capabilities of organization to fulfill their mission, mainly, to produce and distribute more and better products or services by managing the development and application of technology and human resources." <sup>9</sup> Higher productivity results in higher profit and brings prosperity not only for the concern but also for the workers, the consumers and the nation as a whole lower cost and higher profit, greater stability and incentive for expansion, widespread market, overall prosperity and growth of industry.

#### **5.4 Partial Productivity and Overall Productivity**

Partial of factorial is the productivity of individual factors, which contributes to the overall productivity. In order to obviate the difficulty to the overall arising out of diversity of methods of measurement of units of input of different factors (Material, Labour, Overheads) it is convenient to adopt cost as a convenient measure of productivity. In other words, various input and output factors are measured in terms of money and overall productivity, which measured as follows.

$$\text{Overall productivity} = \frac{\text{Cost of output}}{\text{Cost of input}}$$

Overall productivity e.g. the productivity of the business as a whole at king all input factors together may be determined provided the different inputs are expressed in the same quantitative units.<sup>10</sup> so it is necessary to measure the output and input as a whole and every input separately to determine the productivity ratios.

### **5.5 Measurement of Output**

Output is sometimes difficult to measure because it consists of a products or a group of products. It may be measured in terms of sales value or quantity. “Accounting always measures revenues for those goods and services of the responsibility center that are sold to outside customers.”<sup>11</sup>

In the present study, both sales value and quantity have been taken into account for measuring the output and the units of output which are weighed by a standard selling price selected for the base period.

### **5.6 Measurement of Input**

In the accounting measurement inputs called as interims of cost. Although resources which are physical things e.g. a pound of material and an hour of labors. It is compulsory to measure these physical constraints with sources common denominator e.g. money for the purpose of management control system.”

We need to be extremely cautious of interpreting any productivity gains in any one of the inputs as a gain in labour productivity may reflect. Change in the technological composition of the product.

The interrelationship between the production inputs it is the relative productivity of all the firms inputs that is the dominant sources of its competitive position”<sup>12</sup>

The quantity output of each year has been calculated for each product with adjustment of closing and opening quantity stock. The prices of the year 1997-98 have been taken as the base year prices.

### **5.7 Productivity Accounting:**

Production of goods involves three types of cost material, Labour and other costs, Present study of productivity accounting divided in to four types of productivity

i.e.

01) Materials,

02) Labor,

03) Overhead and

04) Overall.

### **5.8 Material Productivity:**

The cost of materials used in production of ten surpasses, in this view materials are treated as the first factor in production or manufacturing. “Raw materials are the major inputs in an organization

and form the bulk which gets converted in to output.”<sup>13</sup> Materials is one of the basic inputs which constitute 50 to 70 percentage of the total value of the output of selected companies. Therefore, to improve the performance of the selected companies, material productivity will have to be improved. Computation of material productivity ratios involves the following steps.

### **5.9 Computation of Material Productivity:**

For calculating the material productivity ratio, material output (Net sales) is divided by the material input the ratio reveals the output received in constant prices per rupees of material input. Suppose, the base year material productivity ratio as 100, Material productivity indices have also been calculated. Material index below 100 will mean low productivity and above 100 will mean improvement in productivity in comparison with the productivity of the base year.

### **5.10 Steps for Computation of Material Productivity**

#### **HYPOTHESIS**

For the analysis purpose of material productivity, there are two hypothesis based on statistical methods are tested. Hypothesis is based on Chi-square test. The hypothesis has been tested to overcome the difficulty of understanding and analysis the results. In fact productivity ratios and indices are based on material inputs and total output, which shows to vary over a period of time, the resulting picture of productivity

ratios and indices, also describes fluctuations. Acceptance of the following Null hypothesis will resolve both these difficulties.

**[1] Hypothesis Based On Chi-Square:**

**Null Hypothesis:-** Indices of material productivity can be represented by the straight-line trend based on the least square method.

**Alternative hypothesis:** - Material productivity indices can't be described by the line of the best fit.

Level of significance: - 5 percent

Statistical test used: - chi-square

$$\text{CHI-SQUARE } (\chi^2) = \frac{(\text{O}-\text{E})^2}{\text{E}}$$

Critical value: - 11.07

Acceptance of Null Hypothesis would reveal that the calculated value of Chi-square is less than table value; it means that the null hypothesis is accepted and alternative hypothesis is rejected and assumption of researcher is true. Table No. 5.1 to 5.14 describes the material productivity ratio and index of material productivity average of material indices, co-efficient of variation and value of Chi-square for selected unit of textiles industry in India under study.

## 5.11 Material productivity analysis of selected companies

### (1) Siyaram Silk Mills Ltd.

Table No. 5.1 describes the material productivity ratio and index of material productivity average of material indices, co-efficient of variation and value of chi-square of Siyaram Silk Mills Ltd

**Table No.-5.1**

**Analysis of Material Productivity Ratio In Siyaram Silk Mills Ltd.  
(Rs. In crores)**

YEAR	OUTPUT	INPUT	O/I	COEF.	PROD.	TREND	I/O
	IN CRORES	IN CRORES		FACTOR	INDEX	VALUE	
2002-03	325.59	130.01	2.50	0.080	100.00	98.09	0.40
2003-04	317.98	127.14	2.50	0.081	99.87	99.82	0.40
2004-05	339.96	139.84	2.43	0.085	97.07	101.56	0.41
2005-06	450.00	169.91	2.65	0.100	105.75	105.03	0.38
2006-07	525.16	188.03	2.79	0.125	111.52	106.76	0.36
2007-08	590.85	223.58	2.64	0.119	105.52	108.49	0.38
TOTAL	2549.54	978.51	15.52	0.59	619.74	619.74	2.32
AVE.	728.44	279.57	4.43	0.17	103.29	103.29	0.66
STANDARD DEVIATION =			5.2925	A=103.29	Chi-square =		0.534
Co-Efficient of Variance =			5.124	B=1.73			

**Source: Compiled From Annual Reports And Accounts Of Ssml**

**Table No.5.2**

**Calculation of Chi-square value of SSML**

Observe	Expected	(O-E)	(O-E) <sup>2</sup>	(O-E)2/E
100	98.09	1.91	3.6481	0.037
99.87	99.82	0.05	0.0025	0.000
97.07	101.56	-4.49	20.1601	0.199
105.75	105.03	0.72	0.5184	0.005
111.52	106.76	4.76	22.6576	0.212
105.52	108.49	-2.97	8.8209	0.081
<b>(Chi-square value) X2</b>				0.534

Table No.-5.1 showed that the ratio of material productivity of SSML was fluctuated during the study period. In 2002-03 it was 2.50 while in 2005-06 it highlighted 2.65 with an average of 4.43. The trend was mix and fluctuating. The impact of productivity ratio describes the fluctuation trends in productivity index mainly the study period.

Above table reveals materials productivity of Siyaram Silk Mills Ltd. was slightly fluctuating during the period of study as shown by the value of co-efficient of variation 5.124. Further in order to test the Null Hypothesis whether the distribution of material productivity indices of Siyaram Silk Mills Lt ltd. confirms to the straight line based on least square method. It was found that the calculated value of chi-square

figured at 0.534 is less than the table value. Hence Null Hypothesis is accepted. It showed that material productivity indices follow the trend value. The computed productivity indices index showed a 1.73 growth rate per year.

## **(2) Digjam Ltd.**

Table No. 5.3 describes the material productivity ratio and index of material productivity average of material indices, co-efficient of variation and value of chi-square of Digjam Ltd

The table No.-5.3 shows material productivity ratio of Digjam Ltd. had a rising trend e.g. in 2002-03 it was 2.7769 while in 2007-08 it showed 2.317. It ranged between 2.7769 in 2002-03 to 2.2113 in 2003-04 with an average of 4.2163. It is fact that the overall trend of material productivity showed slight fluctuated trend.

Above table reveals that material productivity of Digjam Ltd. was less marginal fluctuating during the study period as shown by value of co-efficient of variation 8.204. This is further confirmed by  $X^2$  test. The computed value of Chi-square 2.520 has been very less than the critical value 11.07.

**Table No. - 5.3**

**Analysis of Material Productivity Ratio in Digjam Ltd.**

YEAR	OUTPUT	INPUT	O/I	COEF.	PROD.	TREND	I/O
	IN CRORES	IN CRORES		FACTOR	INDEX	VALUE	
2002-03	220.01	79.23	2.7769	0.25138	100.00	91.97	0.36012
2003-04	270.09	122.14	2.2113	0.18921	79.63	90.84	0.45222
2004-05	295.34	119.84	2.4645	0.21546	88.75	89.71	0.40577
2005-06	30.59	11.81	2.5902	0.21624	93.28	87.44	0.38607
2006-07	109.2	45.55	2.3974	0.21319	86.33	86.3	0.41712
2007-08	112.05	48.36	2.317	0.19968	83.44	85.17	0.43159
TOTAL	1037.28	426.93	14.757	1.28516	531.43	531.4	2.4529
AVE.	296.366	121.98	4.2163	0.36719	88.57	88.57	0.70083
STANDARD DEVIATION =			7.2665	A=88.57	Chi-square =		2.520
Co-Efficient of Variance			8.204	B=-1.13			

**Source: Compiled From Annual Reports And Accounts Of Dgl**

**Table No.5.4**

**Calculation of Chi-square value of DGL**

Observe	Expected	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
100	91.97	8.03	64.4809	0.701
79.63	90.84	-11.21	125.6641	1.383
88.75	89.71	-0.96	0.9216	0.010
93.28	87.44	5.84	34.1056	0.390
86.33	86.3	0.03	0.0009	0.000
83.44	85.17	-1.73	2.9929	0.035
<b>(Chi-square value) X2</b>				<b>2.520</b>

Hence, the Null hypothesis is accepted and Alternative Hypothesis is rejected. It showed that the material productivity indices follow the trend value. The computed value of productivity index showed a negative growth of -1.13 rates per year. It had also been showed that average material requirement per rupee of output for Digjam Ltd. amounted to rupee 0.70.

**(3) Oswal Spinning & Wvg. Mills Ltd..:-**

**Table No.5.5**

**Analysis of Material Productivity Ratio**

**In Oswal Spinning & Wvg. Mills Ltd. (Rs. In crores)**

YEAR	OUTPUT	INPUT	O/I	COEF.	PROD.	TREND	I/O
	IN	IN					
	CRORES	CRORES		FACTOR	INDEX	VALUE	
2002-03	55.19	31.75	1.7383	0.07685	100.00	94.13	0.57529
2003-04	54.97	36.13	1.5215	0.06323	87.53	94.43	0.65727
2004-05	60.78	37.69	1.6126	0.06746	92.77	94.74	0.62011
2005-06	79.07	45.69	1.7306	0.08355	99.56	95.34	0.57784
2006-07	67.23	40.99	1.6402	0.07833	94.36	95.65	0.6097
2007-08	77.4	46.37	1.6692	0.07889	96.03	95.95	0.5991
TOTAL	394.64	238.62	9.9123	0.44832	570.24	570.24	3.63929
AVE.	112.754	68.177	2.8321	0.12809	95.04	95.04	1.0398
STANDARD DEVIATION =			4.6484	A=95.04	Chi-square =		1.115
Co-Efficient of Variance			4.891	B=0.304			

**Source: compiled from annual reports and accounts of os&wml.**

**Table No.5.6**

**Calculation of Chi-square value of OS &WML**

Observe	Expected	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
100	94.13	5.87	34.4569	0.366
87.53	94.43	-6.9	47.61	0.504
92.77	94.74	-1.97	3.8809	0.041
99.56	95.34	4.22	17.8084	0.187
94.36	95.65	-1.29	1.6641	0.017
96.03	95.95	0.08	0.0064	0.000
(Chi-square value) X2				1.115

Table No. 5.5 describes the material productivity ratio and index of material productivity average of material indices, co-efficient of variation and value of chi-square of Oswal Spinning & Wvg. Mills Ltd

Table No.-5.5 describes that the ratio of material productivity of Oswal Spinning & Wvg. Mills Ltd which showed decreasing trend i.e. 1.7383 in 2002-03 in 1.6692 in 2007-08 with mix trend during the study period. It varied from 1.7383 in 2002-03 to 1.5215 in 2003-04 with an average of 2.8321

Above table showed that material productivity of Shree Oswal Spinning & Wvg. Mills Ltd was fluctuating during study period as shown by the value of co-efficient of variation 4.891. Further in order to test Null Hypothesis whether the distribution of material productivity indices confirms to the strait line based. On least square method it was found that

the value of chi-square figured at 1.115 it is less than the table value 11.07 hence the null hypothesis is accepted.

**(4) Shri Dinesh Mills Ltd.:-**

Table No. 5.7 describes the material productivity ratio and index of material productivity average of material indices, co-efficient of variation and value of chi-square of Shri Dinesh Mills Ltd

**Table No.-5.7**

**Analysis of Material Productivity Ratio In Shri Dinesh Mills Ltd. (Rs. In crores)**

YEAR	OUTPUT	INPUT	O/I	COEF.	PROD.	TREND	I/O
	IN	IN					
	CRORES	CRORES		FACTOR	INDEX	VALUE	
2002-03	53.46	15.04	3.5545	0.33051	100.00	94.76	0.28133
2003-04	59.31	17.7	3.3508	0.31448	94.27	95.23	0.29843
2004-05	59.76	18.56	3.2198	0.30599	90.58	95.71	0.31058
2005-06	69.14	22.08	3.1313	0.30114	88.09	96.65	0.31935
2006-07	75.77	19.72	3.8423	0.37762	108.10	97.12	0.26026
2007-08	79.36	23.25	3.4133	0.32546	96.03	97.60	0.29297
TOTAL	396.8	116.35	20.512	1.9552	577.07	577.07	1.76292
AVE.	113.371	33.243	5.8606	0.55863	96.18	96.18	0.50369
STANDARD DEVIATION =			7.1686	A=96.18	Chi-square =		2.599
Co-Efficient of Variance			7.453	B=0.473			

**Source: Compiled From Annual Reports And Accounts Of Sdml**

**Table No.5.8**  
**Calculation of Chi-square value of SDML**

Observe	Expected	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
100	94.76	5.24	27.4576	0.290
94.27	95.23	-0.96	0.9216	0.010
90.58	95.71	-5.13	26.3169	0.275
88.09	96.65	-8.56	73.2736	0.758
108.1	97.12	10.98	120.5604	1.241
96.03	97.6	-1.57	2.4649	0.025
(Chi-square value) X2				2.599

It was reveals from Table No.-5.7 that the material productivity ratio of Shri Dinesh Mills Ltd. had shown mix and raising trend. The ratio varied from 3.8423 in 2006-07 to 3.1313 in 2005-06 with an average of 5.8606. However it was 3.5545 in 2002-03 than after it decreased by 3.3508 in 2003-04. After this year the ratio again declined to 3.2198 in 2004-05 and 3.1313 in 2005-06, which is lowest among all the years of the study period

The compound value of productivity index showed a positive growth of 0.473 per year. It may also be seen from the table no. 5.7 that the average material requirement per rupee of output for Shri Dinesh Mills Ltd. counted to Rs. 0.50369

The computed value of Chi-square 2.599 has been less than the table value of 11.07 therefore null hypotheses is accepted and alternative

hypothesis is rejected. It describe that the material productivity indices follows the trend values. It describes that computed value of Productivity index shows a margin of 0.50369. Input-out ratio was lowest in 2006-07 by 0.26026. It indicates that unit achieved its maximum efficiency in that year. The company also showed fluctuating trend as shown the value of co-efficient of variation 7.453 and the standards deviation was 7.1686.

**(5) Welspun India Ltd..:-**

Table No. 5.9 describes the material productivity ratio and index of material productivity average of material indices, co-efficient of variation and value of chi-square of Shri Dinesh Mills Ltd

It was apparent from Table No.-5.5 that the material productivity ratio of Welspun India Ltd. has an overall rising trend e.g. 2002-03 to 2007-08. In the last year it declined to 2.805. The average material productivity ratio showed by figured 1.934. The improvement in efficiency may also been observed from average of material productivity indices which workout as high as 112.81 over the year of 2004-05.

**{Table No. -5.9 is given on the next page}**

**Table No. -5.9**

**Analysis of Material Productivity Ratio In Welspun India Ltd.(Rs. In crores)**

YEAR	OUTPUT	INPUT	O/I	COEF.	PROD.	TREND	I/O
	IN	IN					
	CRORES	CRORES		FACTOR	INDEX	VALUE	
2002-03	302.15	142.89	2.1146	0.09722	100.00	102.31	0.47291
2003-04	368.04	193.88	1.8983	0.08669	89.77	102.2	0.52679
2004-05	483.18	202.56	2.3854	0.14215	112.81	102.1	0.41922
2005-06	685.61	268.72	2.5514	0.17974	120.66	101.8	0.39194
2006-07	1045.06	510.33	2.0478	0.12536	96.84	101.7	0.48833
2007-08	1311.76	678.27	1.934	0.11202	91.46	101.5	0.51707
TOTAL	4195.8	1996.7	12.931	0.74319	611.54	611.54	2.81626
AVG.	1198.8	570.47	3.6947	0.21234	101.92	101.92	0.80465
STANDARD DEVIATION =			12.297	A=101.92	Chi-square =		7.407
Co-Efficient of Variance			12.06	B=-0.129			

**Source: Compiled From Annual Reports And Accounts Of Wil**

**Table No.5.10**

**Calculation of Chi-square value of WIL**

Observe	Expected	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
100	102.31	-2.31	5.3361	0.052
89.77	102.2	-12.43	154.5049	1.512
112.81	102.1	10.71	114.7041	1.123
120.66	101.8	18.86	355.6996	3.494
96.84	101.7	-4.86	23.6196	0.232
91.46	101.5	-10.04	100.8016	0.993
(Chi-square value) X2				7.407

In “Welspun India Ltd.” the computed value of chi-square showed by 7.407 has been less than the critical value of 11.07. Hence null hypothesis is accepted and Alternative hypothesis is rejected. It showed that the material productivity indices follow trend value which was hypotheses. The calculated value of productivity index showed negative - 0.129 per year base. It observes Rs. 0.80465 from the table that material requirement per rupees of output average for the unit.

**(6) S Kumars Nationwide Ltd.:-**

The Table No.-5.11 showed material productivity ratio, Co-efficiency of co-relationship, material productivity index, trend values, input output ratio and calculated value of  $x^2$  of S Kumar’s Nationwide Ltd.

**Table No.-5.11**

**Analysis of Material Productivity Ratio In S Kumars Nationwide Ltd.  
(Rs. in crores)**

YEAR	OUTPUT	INPUT	O/I	COEF.	PROD.	TREND	I/O
	IN CRORES	IN CRORES		FACTOR	INDEX	VALUE	
2002-03	624.65	525.82	1.188	0.02802	100.00	100.90	0.84178
2003-04	618.55	492.08	1.257	0.03336	105.81	105.28	0.79554
2004-05	346.21	257.13	1.3464	0.02893	113.34	109.66	0.7427
2005-06	890.87	646.63	1.3777	0.03121	115.97	118.42	0.72584
2006-07	1230.38	895.35	1.3742	0.03164	115.68	122.80	0.7277
2007-08	1606.56	1013.5	1.5851	0.03822	133.43	127.18	0.63088
TOTAL	5317.22	3830.6	8.1284	0.19137	684.24	684.24	4.46444
AVE.	1519.21	1094.4	2.3224	0.05468	114.04	114.04	1.27555
STANDARD DEVIATION =			11.382	A=114.04	Chi-square =		0.905
<b>Co-Efficient of Variance</b>			9.981	B=4.38			

**Source: Compiled From Annual Reports And Accounts Of Sknl  
Table No.5.12**

**Calculation of Chi-square value of SKNL**

Observe	Expected	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
100	100.9	-0.9	0.81	0.008
105.81	105.28	0.53	0.2809	0.003
113.34	109.66	3.68	13.5424	0.123
115.97	118.42	-2.45	6.0025	0.051
115.68	122.8	-7.12	50.6944	0.413
133.43	127.18	6.25	39.0625	0.307
(Chi-square value) X2				0.905

The productivity ratio of the S.Kumar Nationwide Ltd showed increasing trend e.g. it was 3.248 in 2002-03 and 3.920 in 2007-08 with an average of 2.32. The out-put was Rs. 624.65 crores in 2002-03 and then in 2003-04 it decreased to 618.55 crores but then after it went down marginally Rs. 345.21 crores. In 2005-06 it was Rs. 890.87 crores. In the last years of the study period it was highly increased to 1606.56 crores. Thus the out put showed mix trend during the study period.

In this unit the calculated value of chi-square is 00.905, which is less than the critical value of 11.07. Hence the null hypothesis is rejected and alternative hypothesis is accepted. It indicates that the material productivity indices followed trend value. The computed values of productivity index showed growth of 4.38per annum resulting with down ward trend.

The strait line based on trend values showed a down ward trend with positive growth of 4.38 per annum. Thus, Material productivity of the unit under was found to be gradually down-ward trend during the period of the study with an overall decreasing trend during the period of study.

**(7) Mafatlal Industries Ltd.**

Table No.-5.13 shows the material productivity ratio, co-efficiency of co- relationship, productivity index of material indices, value of Chi-square, co-efficient of variation for Mafatlal Industries Ltd.

**Table No.-5.13**

**Analysis of Material Productivity Ratios In Mafatlal Industries Ltd. (In crores)**

YEAR	OUTPUT	INPUT	O/I	COEF.	PROD.	TREND	I/O
	IN	IN					
	CRORES	CRORES		FACTOR	INDEX	VALUE	
2002-03	430.91	188.47	2.2864	0.14036	100.00	86.62	0.43738
2003-04	172.91	74.83	2.3107	0.13992	101.06	98.88	0.43277
2004-05	176.52	77.37	2.2815	0.12539	99.79	111.14	0.43831
2005-06	146.34	49.54	2.954	0.15416	129.20	135.66	0.33853
2006-07	156.16	59.39	2.6294	0.1469	115.00	147.92	0.38032
2007-08	401.57	89.92	4.4659	0.27135	195.33	160.18	0.22392
TOTAL	1484.41	539.52	16.928	0.97808	740.38	740.38	2.25122
AVE.	424.117	154.15	4.8365	0.27945	123.40	123.40	0.6432
STANDARD DEVIATION =			37.098	A=123.40	Chi-square =		18.621
Co-Efficient of Variance			30.06	B=12.26			

**Source: Compiled From Annual Reports And Accounts Of Mftl**

**Table No.5.14**

**Calculation of Chi-square value of MFTL**

Observe	Expected	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
100	86.62	13.38	179.0244	2.067
101.06	98.88	2.18	4.7524	0.048
99.79	111.14	-11.35	128.8225	1.159
129.2	135.66	-6.46	41.7316	0.308
115	147.92	-32.92	1083.726	7.326
195.33	160.18	35.15	1235.523	7.713
(Chi-square value) X2				18.621

The above table explained that material productivity of Mafatlal Industries Ltd showed fluctuated trend from 2002-03 to 2007-08. The out-put was Rs. 430.91 crores in 2002-03 and it was Rs. 146.34 crores in 2005-06. But it was highly increased to Rs. 401.57 crores in 2007-08. The input was Rs. 188.47 crores in 2002-03 and it was Rs. 49.54 crores in 205-06 but then in 2007-08 it increased to 89.92 crores. The out-put to input ratio had showed fluctuated trend with an average of 4.83. The ratio was 2.2864 in 2002-03 and it was 2.3107 in 2003-04. It was 2.2815 in 2004-05. The ratio was 2.95 in 2006-07. In the last year of the study period it was 4.46.

The co-efficient of variation showed 30.06 percent and the value of chi-square remained at 18.621 which higher than the critical value of 11.07 therefore the null hypothesis is rejected and alternative hypothesis accepted. It showed the material productivity index does not follow than trend values. The computed value of productivity index showed a negative growth of 12.26 per year resulting in a down-ward trend. All these factors showed the declining conditions of the company. These are not regarded as a good sign and this downward trend in material efficiency should be required to control.

**TABLE NO.-5.15**

**Comparative Analysis Of Materialroductivity**

	OUTPUT		PROD.		CO-		CHI-		INPUT-		Growth Rate		OVER	
	-INPUT		INDEX		IFF.		SQUARE		OUTPUT				ALL	
	AVE.		AVE.						AVE.				AVE.	
COMPANY	VAL	RNK	VAL.	RNK	VAL.	RNK	VAL.	RNK	VAL	RNK	VAL.	RNK	VAL.	RNK
SS M L	4.43	5	103.29	5	5.124	1	0.534	7	0.66	5	1.73	4	27	3
DGL	4.22	4	88.57	1	8.204	2	2.52	4	0.7	4	-1.13	1	16	7
O S & W														
ML	2.83	2	95.04	2	4.891	3	1.115	5	1.04	2	0.304	5	19	6
SDML	5.86	7	96.18	3	7.453	7	2.599	3	0.5	7	0.473	3	30	2
WIL.	3.69	3	101.92	5	12.065	5	7.407	2	0.8	3	-0.13	2	20	5
S K N L	2.32	1	114.04	6	9.981	6	0.905	6	1.28	1	4.38	6	26	4
MFTL.	4.84	6	123.4	7	30.064	7	18.621	1	0.64	6	12.26	7	35	1
group	4.03	4	103.21	4.14	11.11	4.43	0.66	4	0.8	4	2.56	4	25	4

Source: compiled from annual reports and accounts.

The Table No.-5.15 showed the overall analysis of material productivity of textiles group of companies. It also showed material productivity ratio, Co-efficient of co-relationship, productivity index, trend value, input-output ratio, value of chi-square, co-efficient of variation, and standard deviation.

The table No. 5.15 shows that the material productivity ratio was the highest in S K N L followed by O S & W ML, WIL, DGL, SS M L, SDML and SDML. The productivity index was the highest in MFTL followed S K N L, WIL, SS M L, SDML and DGL. The co-efficient was the in MFTL followed by S K N L, WIL, O S & W ML and SS M L. The Chi-square was significant in MFTL and it was insignificant in all other selected units. The input output ratio was the highest in S K N L followed by S K N L, O S & W ML, DGL, SDML, WIL and SS M L. the growth rate was the highest in MFTL. And the lowest growth was found in DGL. The material productivity ratio is the best in MFTL .therefore this Company ranked first for utilizing material

## **5.12 CONCLUSION**

As conclusion point of view chapter titled “Analysis of productivity” described the concept, importance and measurement of productivity. The term productivity is using for interchangeably behavior and achievement, refers to ratio of output divided by input it is noted that

productivity improvement concerns itself with the goals and objective of the organization as well as with the manner in which they are to be achieved, It involves both 'doing the right things' which is effectiveness but also 'doing them right' (efficiency) according to above Para, it can be said that productivity concerned with to effectiveness and efficiency, and, it is a semi healthy parameter for measuring the performance of business organization.

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