

Impacts of Poor Productivity on Profitability-A Comparative Analysis on Selected Public and Private Sector Manufacturing Enterprises in Bangladesh

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Abstract: The study examines the impacts of poor productivity in 05 public sector and 05 private sector manufacturing enterprises in Bangladesh. The study reveals that direct material productivity, labor productivity per worker, capital productivity and total productivity had been 4 to 5 times higher in the private sector samples than those in the public sector samples during the study period. Whereas, labor productivity per Taka of direct wages was almost same in both the public sector and private sector samples. On the other hand, material total productivity had been higher in the public sector samples as compared to the private sector samples. Total productivity had been more or less satisfactory in all the private sector samples and in three out of five public sector samples. But, the same in the remaining two public sector samples had been poor and hence unsatisfactory. Labor productivity, capital productivity and total productivity had direct positive correlation with the profitability, measured in terms of profit margin, return on capital employed, return on investment and earning per hundred Taka share. Therefore, in order to improve existing profitability of the samples; it is essential to increase their productivity. To this end, the factors responsible for poor productivity as identified by the respondents must be removed without any further delay. For the purpose, the suggestions put forward by the respondents need to be implemented by the concerned authority.

Key words: Impacts, productivity, profitability, manufacturing, Bangladesh

Statement of the Problem: In every country, whether developed, developing or underdeveloped, with a market economy or centrally planned economy; the main source of economic growth is an increasing productivity. Productivity improvement results in direct increase in the standard of living of the people of the country. But, the level of the productivity in developing country like Bangladesh is very low. Such low level of productivity is a serious obstacle to the rapid industrialization of Bangladesh. For poor productivity coupled with other problems had resulted in several hundred sick and dead industries (Abdur Rab, 1993). In Bangladesh, low productivity has been characterized by investments in general and the industry sector, in particular. At present, it would be an understatement to say that the capital productivity has been declining in Bangladesh. On the other hand, labor productivity continues to be low in the country.

Moreover, the low productivity in the fertilizer, chemical and pharmaceutical sectors in Bangladesh is another field of serious concern because of the important role played by these industries. Fertilizer and chemical sector industries help growth and development of agriculture sector, to a great extent, through supplying fertilizer and some chemicals. The agricultural sector is the most significant economic sector in the country, since it contributes 32.77 percent of the total gross domestic product of the country (Planning Commission, 1997-2002). Again, pharmaceutical products and some of the chemical products directly contribute to the growth and development of health sector which help a lot to the sound manpower development in the country. But, their productions in the post liberation Bangladesh have not been satisfactory, thereby leading to poor productivity in these cases. The main reason behind the same may be deteriorated production and capacity utilization in these cases. The Fourth Five Year Plan of Bangladesh had already identified the poor labor productivity for low productions and capacity utilization in the overall industry sector of the country. Against this backdrop, an attempt has been made in this study to examine the impacts of poor productivity in the sample enterprises.

Objectives of the Study: The objective of the study is to examine the impacts of poor productivity on the profitability of the sample enterprises. In order to achieve this main objective, the study covered the following specific objects :

- (i) To examine the types of productivity as considered in the selected enterprises vis-a vis the types as recognized by the authors.
- (ii) To examine the trend of productivity and profitability in the sample enterprises during the study period.
- (iii) To study the impacts of poor productivity on profitability in the sample enterprises during the study period.
- (iv) To identify the major factors responsible for poor productivity.
- (v) To suggest the probable measures as to improve the productivity.

Scope and Methodology

Scope of the Study: The study was limited to a total number of (ten) manufacturing enterprises, taking 05 from each of the public and private sectors. Of the private sector enterprises 01 belongs to multi-national company (MNC). The industry sectors included had been fertilizer, chemical and pharmaceuticals. These enterprises were selected on the basis of simple random sampling. For empirical analysis of the study, a period of 3 (three) years ranging from 1998-99 to 2000-01 was selected.

Methodology of the Study: Methodology of the study have been discussed as under.

Concepts of the Important Terms Used

(i) **Productivity:** Productivity refers to a comparison between the output and input. More specifically, it is the ratio between output and input (Bhatia, 1988). In other words, it is a measure over time comparing the performance of the current year with the previous one which shows either improvement or decline in production and reflects the return of the resources employed. Productivity has various concepts viz., labor productivity, material productivity, capital productivity, total productivity etc. Labor productivity is defined as the ratio of the value of output to the value of labor input (International Labor Organization, 1969). Labor input may represent total wages and salaries paid to factory labor and other staff. Labor productivity may be of two types, such as, individual labor productivity and social labor productivity (Durgadas Bhattacharjee, 1990). Individual labor productivity refers to average output per employee in a section, process, enterprise or a branch. While, social labor productivity means output per unit of living and materialized labor. Material productivity refers to the ratio of the value of output to the input of materials (Sardana, 1984). Input of materials may be the value of direct materials or direct and indirect materials. Capital productivity may be defined as the ratio of the value of output to capital input. Capital input may represent fixed capital invested in fixed assets and total capital invested in total asset, fixed and current. Total productivity may be defined as the ratio of the value of total output to the value of total input factors. Here, labor input, material input and capital input comprise total input factors. According to the American Productivity Centre, productivity is a total output over total input and the total outputs include labor, material, capital, energy and purchase services. Again, some experts view productivity as an effectiveness to paralleled concept; while some other sought to distinguish the two terms.

(ii) **Profitability:** "Profitability" is the primary measure of the overall success of an enterprise. Profitability refers to the ability of the enterprise to generate profits. Profitability may be defined as the expression of net profits in terms of sales, capital employed, total investment, net worth etc. (Walsted Bertil, 1980) When profit is expressed in terms of sales it is known as profit margin. Again, when profit is expressed in terms of net worth it is known as return on net worth. When profit is expressed in terms of total investment it is known as return on investment (ROI); while profit is expressed in terms of capital employed it is known as return on capital employed (ROCE). The return on investment has been considered as the best measure of profitability by the classical writers (Sharma, 1974). In their views this return can be measured mainly in two ways; firstly, by dividing net profits after interest and taxes by the capital employed and then multiplying the quotient by hundred to express the return in percentage. Secondly, by dividing net profits after interest and taxes by the total investment and then multiplying the quotient by hundred to express the return in percentage.

Profitability so far discussed relates to commercial profitability. Such profitability will best serve the purpose of performance measurement for the private sector enterprises since these are to set up and run as commercial ventures. Now, the question arises whether commercial profitability will serve the purpose of performance measurement for the public enterprises. There are differences of opinions amongst the experts in this respect. Some experts (Ahmed, 1974) view that social profitability measure in place of commercial profitability be used for measuring the performance of a public enterprise. Again, some experts (Sayed, 1980) opine that commercial profitability may best serve the purpose of performance measurement in public enterprises. The Planning Commission of Bangladesh (Planning Commission, 1973-78) emphasized that the public sector industrial enterprises are to run on commercial principles. The Government has further emphasized the commercial profitability criterion as the performance measurement in the public sector industrial enterprises of Bangladesh. Since public sector industrial enterprises have been set up as commercial ventures and are required to earn a good return on investments, commercial profitability should, therefore, serve as a good criterion for performance measurement of public sector enterprise in Bangladesh.

Measurement of Productivity and Profitability Used

(i) **Measurement of Productivity:** There are at least two alternative versions of productivity measurement such as: (a) Value Added Version and (b) Output Version. In value added version, there are two values namely gross value added and net value added. In output version, there are also two concepts namely physical term and value

term. In order to reduce the length of discussion, the study is limited to net value added version only. Net value added is calculated by adding the components of sales other than external expenses. Hence, in equation form: Net Value Added = Sales – Material Cost and Services.

(ii) **Measurement of Profitability:** Commercial profitability of an industrial enterprise may be measured as under:

- $$\begin{aligned} & \text{Net Profits before Taxes} \\ \text{(a) Profit Margin} &= \frac{\text{Net Profits before Taxes}}{\text{Sales}} \times 100 \\ & \text{Net Profits after Taxes} \\ \text{(b) Return on capital employed} &= \frac{\text{Net Profits after Taxes}}{\text{Capital Employed}} \times 100 \\ & \text{Net Profits after Taxes} \\ \text{(c) Return on Total Investment} &= \frac{\text{Net Profits after Taxes}}{\text{Total Assets}} \times 100 \\ & \text{Net Profit after Taxes} \\ \text{(d) Return on Net Worth} &= \frac{\text{Net Profit after Taxes}}{\text{Net Worth (Equity)}} \times 100 \\ & \text{Net Profit after Taxes} \\ \text{(e) Earning Per Share} &= \frac{\text{Net Profit after Taxes}}{\text{No. of Equity Shares}} \\ & \text{Dividend Per Share} \\ \text{(f) Dividend Yield} &= \frac{\text{Dividend Per Share}}{\text{Market Price Per share}} \\ & \text{Earning Per Share} \\ \text{(g) Earning Yield} &= \frac{\text{Earning Per Share}}{\text{Market Price Per Share}} \end{aligned}$$

Data and their Collection: The study is the product of both the primary data and secondary data. Primary data were collected by the researcher through direct interview with help of a questionnaire. A total number of 20 (twenty) respondents, 02 from each sample enterprise were interviewed for the purpose. Amongst the 02 respondents one was Production Manager of the sample enterprises and the other one was Finance Manager. On the other hand, requisite secondary data were collected by the researcher from the Annual Reports, Annual Accounts and other published documents of these sample enterprises.

Data Processing: The collected data and information were critically processed by the researcher by using various financial and statistical tools to analyze them and to make the study informative and useful to the readers. Of the financial tools ratio analysis has been extensively used. Of the statistical tools correlation and multiple regression analysis have been extensively used.

Findings and Analysis: The major findings of the study have been analyzed under the following headings:

Types of Productivity: While discussing the various concepts of productivity it is found that in the opinions of the authors productivity may be of four types namely material productivity, labor productivity, capital productivity and total productivity. Material productivity may be of two types namely direct material productivity and total material productivity. Labor productivity may be of three types, such as labor productivity per worker, labor productivity per taka of direct wages and labor productivity per Taka of total wages and salaries (direct and indirect). Capital productivity may be of two types namely fixed capital productivity and total capital productivity. Taking all these above concepts into consideration, total productivity is the ratio of the value of total output to the value of total input. However, the Fig. 1 shows the various types of productivity as recognized by the authors.

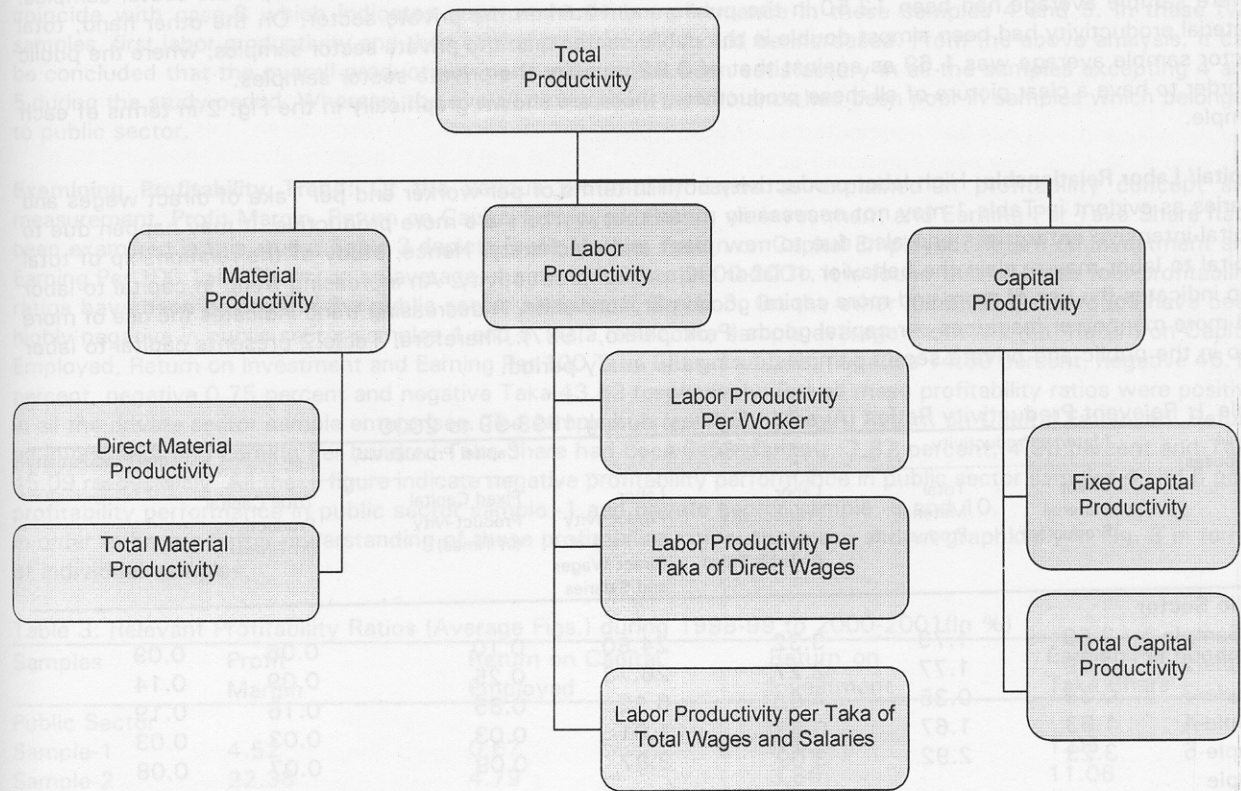


Fig. 1: Various types of productivity

As against the above types of productivity, the selected respondents opined that they consider direct material productivity, total labor productivity and total capital productivity only while measuring productivity of their respective enterprises. As to our query, they also replied that although they are aware of other types of productivity, but they do not calculate those types of productivities mainly because of complexity in calculation and shortage of skilled accounts personnel.

Examining Productivity Trend: Irrespective of the types of productivity as considered by our sample enterprises, in this study we have examined the following types of productivity:

- i. Direct material productivity;
- ii. Total material productivity;
- iii. Labor productivity per worker;
- iv. Total labor cost productivity (direct wages and salaries);
- v. Fixed capital productivity;
- vi. Total capital productivity and
- vii. Total productivity.

However, Table 1 shows the above mentioned productivity ratios in the sample enterprises, on an average, during 1998-99 to 2000-2001 which indicate productivity trend. It is depicted in the Table that fixed capital and total capital productivity and total productivity had been much higher in the private sector enterprises as compared to those in the public sector enterprises during the study period. The private sector sample average of all these productivity had been 4 to 5 times higher than the public sector sample average. It is found that the sample average fixed capital and total capital productivity and total productivity had been 1.38, 0.46 and 0.49 respectively as against those of 0.26, 0.08 and 0.11 respectively for the public sector. Again, direct material productivity and labor productivity per worker had also been higher in the private sector samples as compared to those in the public sector samples. The private sector sample average of these two productivity had been 2.26 times and 5.26 Lakh

Taka respectively as against those of 1.71 times and 2.79 Lakh Taka for the public sector sample average. Lastly, labor productivity per Taka of direct wages and salaries was almost same in the public and private sector samples; where sample average had been 12.50 in the public and 12.51 in the private sector. On the other hand, total material productivity had been almost double in the public sector than the private sector samples; where the public sector sample average was 1.69 as against that of 0.82 time for the private sector samples. In order to have a clear picture of all these productivity, these are shown graphically in the Fig. 2 in terms of each sample.

Capital/ Labor Relationship: High labor productivity both in terms of per worker and per Taka of direct wages and salaries as evident in Table 1 may not necessarily mean that workers are more productive. It may happen due to capital-intensive enterprises and also due to new plant and machinery. Hence, study of the relationship of total capital to labor may explain the behavior of labor and capital productivity. An increasing trend in capital to labor ratio indicates the use of more and more capital goods per labor units. A decreasing trend indicates the use of more and more manpower resources per capital goods (Prokopenko, 1987). Therefore, Table 2 presents capital to labor ratio in the public and private sector samples during the study period.

Table 1: Relevant Productivity Ratios (Average Figures) during 1998-99 to 2000

Sample Enterprises	Material Productivity		Labor Productivity		Capital Productivity		Total Productivity (In Times)
	Direct Material Productivity	Total Material Productivity	Labor Productivity Per Worker (In Lakh Taka)	Labor Productivity Per Taka of Direct Wages and Salaries	Fixed Capital Productivity (In Times)	Total Capital Productivity (In Times)	
Public Sector							
and Sample-1	2.69	1.73	3.32	24.80	0.10	0.06	0.09
Sample-2	2.99	1.77	2.27	26.73	0.25	0.09	0.14
Sample-3	0.39	0.35	4.62	6.12	0.85	0.16	0.19
Sample-4	1.93	1.67	0.63	1.01	0.03	0.03	0.03
Sample-5	3.23	2.92	3.09	3.87	0.09	0.07	0.08
Sample Average	1.71	1.69	2.79	12.51	0.26	0.08	0.11
Private Sector							
and Sample-1	0.96	0.56	4.36	3.13	2.41	0.57	0.64
Sample-2	1.08	0.91	11.58	19.33	0.47	0.42	0.45
Sample-3	1.35	1.38	6.22	5.14	2.37	0.64	0.68
Sample-4	1.02	0.34	2.16	15.10	0.68	0.27	0.30
Sample-5	6.89	0.89	1.99	19.78	0.98	0.33	0.36
Sample Average	2.26	0.82	5.26	12.50	1.38	0.45	0.49

Source : Appendix-1

Table 2: Capital to Labor Ratios in the Sample Enterprises during 1998-99 to 2000-21

Years	Sample-1	Sample-2	Sample-3	Sample-4	Sample-5	Sample-6	Sample-7	Sample-8	Sample-9	Sample-10
1998-1999	162.01	123.40	20.14	1.03	35.50	3.90	58.63	5.41	11.00	16.03
1999-2000	152.00	107.96	19.85	0.55	31.33	3.32	85.32	6.06	27.16	12.17
2000-2001	130.02	93.21	18.23	0.39	25.21	3.35	91.42	5.87	25.61	9.56
Average	148.01	108.19	19.41	0.66	30.58	3.52	78.46	5.78	21.26	12.59

Source : Based on data shown in Annual Reports of the sample enterprises during 1998-99 to 2000-2001.

Appendix-1 indicates an increasing trend in both types of labor productivity and capital productivity in samples 1, 2, 3, 6, 7, 8, 9 and 10 over the study period. It is found in Table -2 that capital to labor ratio in all these samples excepting 7 and 9 had also shown an increasing trend over the study period. Whereas, in samples 7 and 9, capital labor ratio had shown an opposite i.e. decreasing trend. After comparing with the situations presented in Appendix-3, it can be said that the positions of the samples 1, 2, 3, 6, 8 and 10 correspond to case -1 which indicate good productivity performance in these samples; where these productivity should be increased further or at least the same should be maintained. But, the positions of the samples 7 and 9 coincide with case -2 as presented in Appendix -3 which also indicates good productivity performance; where this productivity should be further increased or at least the same should be maintained. On the other hand, Appendix-1 portrays a decreasing trend in both types of labor productivity and capital productivity in the remaining samples 4 and 5 over the study period.

It is found in Table-2 that capital to labor ratio had also shown a decreasing trend over the study period. After comparing with the situations presented in Appendix- 3, it can be said that the positions of these two samples coincide with case-8 which indicates poor productivity performance in these samples 4 and 5. In these two samples, first labor productivity and then capital productivity should be increased. From the above analysis, it can be concluded that the overall productivity performance had been satisfactory in all the samples excepting 4 and 5 during the study period. Whereas, the overall productivity performance had been poor in samples which belonged to public sector.

Examining Profitability Trend: Of the various profitability ratios as explained in profitability concept and measurement, Profit Margin, Return on Capital Employed, Return on Investment and Earning Per Taka Share have been examined in this study. Table 3 depicts Profit Margin, Return on Capital Employed, Return on Investment and Earning Per 100 Taka Share, on an average, during 198-99 to 2000-2001. It is found that all these four profitability ratios have been positive in the public sector samples 1, 2 and 3. On the other hand, all these ratios have been highly negative in public sector samples 4 and 5. As a result, the sample average Profit Margin, Return on Capital Employed, Return on Investment and Earning Per 100 Taka Share had been negative 14.59 percent, negative 46.16 percent, negative 0.75 percent and negative Taka 43.63 respectively. But all these profitability ratios were positive in all the private sector sample enterprises. The sample average Profit Margin, Return on Capital Employed, Return on Investment and Earning Per hundred Taka Share had been 7.58 percent, 7.82 percent, 4.96 percent and Taka 45.09 respectively. All these figure indicate negative profitability performance in public sector samples 4 and 5 poor profitability performance in public sector sample -1 and private sector sample -9 and 10.

In order to have a better understanding of these profitability ratios, these are shown graphically in Fig. 3 in terms of individual samples.

Table 3: Relevant Profitability Ratios (Average Figs.) during 1998-99 to 2000-2001(In %)

Samples	Profit Margin	Return on Capital Employed	Return on Investment	Earning Per hundred Taka Share
Public Sector				
Sample-1	4.52	0.67	0.52	1.05
Sample-2	22.38	4.79	3.86	11.06
Sample-3	12.43	5.22	4.51	11.23
Sample-4	(64.63)	(225.43)	(3.72)	(23.03)
Sample-5	(47.65)	(16.05)	(8.98)	(218.45)
Sample average	(14.59)	(46.16)	(0.75)	(43.63)
Private sector				
Sample-1	7.10	13.55	6.84	44.18
Sample-2	17.46	9.93	7.16	89.39
Sample-3	9.42	10.16	7.35	49.46
Sample-4	1.82	2.43	2.01	19.84
Sample-5	2.10	3.01	1.47	22.60
Sample average	7.58	7.82	4.96	45.09

Source : Appendix-2.

Examining Impacts of Poor Productivity on Profitability: There is no doubt in the statement that productivity has impacts on the profitability of the manufacturing enterprises. The higher the productivity, the higher will be the profitability of the enterprise and vice versa. This statement appears to be true in the case of the sample enterprises of the study. The comparative analysis of productivity and profitability as presented in Tables-1 and 3 points out that the enterprises with higher total productivity had also higher profitability in terms of Profit Margin, Return on Capital employed and Return on Investment. As for example, sample enterprise -8 with the highest total productivity equal 0.68 times had the highest Return on Capital Employed and Return on Investment equal to 10.16 percent and 7.35 percent respectively (vide Tables - 1 and 3). On the other hand, the enterprises with lower total productivity had also lower profitability. As for example, sample, sample enterprise -4 with the lowest total productivity equal to only 0.03 times had the lowest Profit Margin (negative 225.43 percent). However, these statements need to be examined statistically and such attempts are made in the following sub-sections.

Impacts of Individual Measure of Productivity: In order to measure the impacts of productivity on profitability of the enterprises; total material productivity (x_1), labor productivity per Taka of wages (x_2), total capital productivity (x_3) and total productivity (x_4) have been considered as the independent variables. But, profit margin (y_1), return on capital employed (y_2), return on investment (y_3) and earning per hundred Taka share (y_4) have taken as the

dependent variables. To this end, Pearson correlation test ($\alpha = 0$) between each of the dependent variable and each of the independent variable has been made. Here, it is assumed that there exists correlation between the dependent and independent variables. Hence, the null hypothesis is that there exists no correlation between these variables. The results of Pearson correlation are shown in Table-1 in Appendix-3. The Table reveals that r between y_1x_1 , y_1x_2 , y_1x_3 and y_1x_4 has been computed at -0.446, 0.515, 0.429 and 0.464 respectively. Again, r between y_2x_1 , y_2x_2 , y_2x_3 and y_2x_4 has been computed at -0.266, 0.389, 0.429 and 0.461 respectively. Again, r between y_3x_1 , y_3x_2 , y_3x_3 and y_3x_4 has been computed at -0.659, 0.223, 0.705 and 0.727 respectively. Lastly, r between y_4x_1 , y_4x_2 , y_4x_3 and y_4x_4 has been computed at -0.688, 0.300, 0.536 and 0.550 respectively. All these values of r together with p values indicate that there exists significant positive correlation between y_1 and x_2 , y_1 and x_3 , y_1 and x_4 , y_2 and x_2 , y_2 and x_3 and y_2 and x_4 , y_3 and x_3 , y_3 and x_4 , y_4 and x_3 and y_4 and x_4 . All these positive values signify that labor productivity, capital productivity and total productivity had positive impact on profit margin and return on capital employed. Whereas, capital productivity and total productivity had positive impact on ROI and earning per hundred Taka share. All these signify that the higher the relevant productivity the higher the relevant profitability. On the other hand, r between y_1 and x_1 , y_2 and x_1 , y_3 and x_1 and y_4 and x_1 had been significantly negative. Such negative values of r imply that the total material productivity had imposed adverse impacts on the relevant profitability.

Composite Impacts of the Measures of Productivity: In sub-section 4.4.1 impacts of individual measures of productivity on profitability have been examined. In this sub-section, the combined or composite impacts of the relevant measures of productivity, taken together on each of the measures of profitability have been examined with the help of multiple regression analysis. Here, four multiple regression models have been formed as follows:

$$Y_1 = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + Er. \quad (1)$$

$$Y_2 = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + Er. \quad (2)$$

$$Y_3 = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + Er. \quad (3)$$

$$Y_4 = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + Er. \quad (4)$$

On the basis of the above regression models it is assumed that there exists a linear relationship between the dependent and independent variables. β_0 is the constant term; $\hat{\alpha}_1$, $\hat{\alpha}_2$, $\hat{\alpha}_3$, and $\hat{\alpha}_4$ are the coefficients; whereas, $Er.$ is the standard error of the estimate. The results of multiple regression analysis for y_1 , y_2 , y_3 and y_4 have been shown in Tables 2, 3, 4 and 5 respectively. These Tables indicate that R^2 for y_1 , y_2 , y_3 and y_4 has been computed at 0.6955, 0.5354, 0.7740 and 0.6849 respectively. All these signify that y_1 (profit margin), y_2 (return on capital employed), y_3 (return on investment) and y_4 (earning per hundred Taka share) have been influenced to the extent of 69.55 percent, 53.54 percent, 77.40 percent and 68.49 percent respectively by the independent variables x_1 (total material productivity), x_2 (labor productivity per Taka of wages), x_3 (capital productivity) and x_4 (total productivity), taking together.

Major Factors Responsible for Poor Productivity: The productivity of an enterprise is governed by a number of factors. One author (Dowd, 1984)¹ has identified as many as twelve factors which are responsible for poor productivity of an enterprise. However, in order to identify the main factors responsible for poor productivity in the sample enterprises; a total number of 20 (twenty) respondents taking 02 (two) from each of the sample enterprises were interviewed. Of the 02 respondents of each of the sample enterprises one was Production Manager and the other one is Finance Manager. Their responses have been gathered on the basis of 5 – point Likert Scale which are presented in Table 4. The Table incorporates a total number of 16 (sixteen) reasons for poor productivity as identified by the sample respondents. These need a brief discussion which goes as follows in order of importance (ranking):

(i) **Shortage of Adequate Working Capital:** This factor tops the list of all the factors of poor productivity since it ranks first, the weighted average score being 4.30 in the 5–point scaling. Shortage of working capital reported to be acute in all the sample public sector enterprises due to continued incurrence of losses during the study period.

(ii) **Management Inattention:** Ackson Grayson, founder of the Houston-based American Productivity Centre, believes that one of the biggest impediments to productivity growth lies in management lapses. This statement is all the more true in our present study. This factor of management inattention ranks the second position, the weighted average score being 4.25. Such problem reported to be acute in case of all the public sector samples; since in these samples the operating mill management at the production level has been least concerned in the decision making functions relating to their respective mill, thereby discouraging the same to give serious attention to improve productivity.

Table 4: Importance of major factors of poor productivity in sample enterprises

Sr. No.	Major Problems	Not at all important	Below average important	Responses' Scale Importance			Weighted average score	Remarks
				Average important	Above average important	Extremely important		
1.	Shortage of adequate working capital	-	-	4(20)	6(30)	10(50)	4.30	1
2.	Shortage of raw materials and their irregular supply	-	-	6(30)	6(30)	8(40)	4.10	3
3.	Instability in raw material prices	-	-	4(20)	10(50)	6(30)	4.10	3
4.	Shortage of skilled manpower	-	2(10)	6(30)	8(40)	4(20)	3.70	5
5.	Use of obsolete plants and technology	-	3(15)	6(30)	7(35)	4(20)	3.60	7
6.	Absenteeism of workers from jobs	-	4(20)	8(40)	4(20)	4(20)	3.40	10
7.	Adverse environmental factors	-	2(10)	5(25)	7(35)	6(30)	3.35	11
8.	Poor production planning and control	-	3(15)	6(30)	6(30)	5(25)	3.55	8
9.	Inefficient production staff	-	4(20)	7(35)	8(40)	1(5)	3.30	12
10.	Power disruption and troubles in machinery	-	4(20)	8(40)	6(30)	2(10)	3.30	12
11.	Lack of requisite R and D activities	-	-	2(10)	5(25)	9(45)	3.75	4
12.	Obstacles in introducing product diversification	-	3(15)	4(20)	8(40)	5(25)	2.75	13
13.	Government regulations	-	2(10)	4(20)	6(30)	3(15)	3.50	9
14.	Lack of proper responsibility and accountability	-	1(5)	3(15)	4(20)	6(30)	3.65	6
15.	Management inattention	-	-	2(10)	6(30)	7(35)	4.25	2
16.	Limited markets for products	-	-	3(15)	6(30)	5(25)	3.60	7

Notes :and (i) Figures in the margin indicate percentage positions.

(ii) Weighted average score is calculated using weights of 1 for "not all mportant" and 5 for "ex tremely important".

Source: Field Investigation

(iv) Instability in Raw Material Prices: This factor also ranks the third position, the weighted average score being 4.10. The prices of raw materials and other supplies especially of imported ones found to be unstable during the study period.

(v) Lack of Requisite R and D Activities: This factor ranks the fourth position, the weighted average score being 3.75. This problem reported to be more acute in the public sector samples simply because of shortage of fund, in one hand and shortage of skilled manpower, on the other.

(vi) Shortage of Skilled Manpower: This factor ranks the fifth position, the weighted average score being 3.70. In all the public and in few private sector samples there had been the shortage of skilled manpower, especially the labor which hampers efficient and smooth production.
andand

(vii) Lack of Proper Responsibility and Accountability: This factor ranks the sixth position, the weighted average score being 3.65. It is recognized by an author (Anwar, 1990) that accountability is a pre-requisite for productivity. In case of the selected public sector samples, no responsibility and hence accountability has been fixed for any performance. Hence, the production staff would not feel any obligation to achieve their production targets. This is also true in case of a few private sector samples.

(viii) Limited Markets for Products: This factor ranks the seventh position, the weighted average score being 3.60. It is reported that in case of the public sector samples, due to low quality of products and high cost of production their product markets have been limited mainly to domestic markets. This is also true in case of a few private sector samples.
andand

(ix) Use of Obsolete Technology: This factor also ranks the seventh position of all the factors of poor productivity in the sample mills. It is reported that the existing plants and technology especially in public sector samples are obsolete and outdated. Such a situation hampers the quality as well as the quantity of the products.

(x) Poor production Planning and Control: Production planning and control have been poor especially in the public sector samples in the sense that their productivity goals have been unrealistic. But, it is recognized by an author (Dowd, 1984) that for goals in productivity improvement to generate positive benefits, they must meet a number of criteria viz., realistic, specific, comprehensive and formalized.

(xi) Government Regulations: Government imposes restrictions and regulations on the manufacturing enterprises in the form of restricted import policy, tariff policy etc. which hamper productivity. This is true both in case of some of the public and private sector samples.

(xii) Absenteeism of Workers from Jobs: This is another important factor mainly in the public sector samples. It is reported that the trade union leader type of workers remain absent from participating in the production works due to their heavy engagement in trade union activities.

(xiii) Adverse Factory Environmental Factors: It is reported that adverse factory environmental factors such as unhealthy labor-management relations, unauthorized strikes, undue influence of trade union leaders etc. hamper productivity. This is mostly true in case of the public sector samples.

(xiv) Power disruption and Troubles in Machinery: These factors reported to be another chronic and malignant problems, especially in the public sector samples. As a result, production targets could not be achieved fully.

(xv) Inefficient Production Staff: The staff engaged in production reported to be inefficient, especially in the public sector samples. Such inefficiency reported to occur due to absence of proper qualification and inadequate on job

Table 5: Probable suggestions for improving productivity

Sr. No	Probable Suggestions	No. of Respondents	% of Respondents
1.	Providing adequate working capital to continue smooth production	16	80
2.	Removing management inattention through empowering mill management in decision makings	15	75
3.	Providing adequate raw materials and ensuring their regular supply	14	70
4.	Undertaking adequate R & D activities by procuring necessary funds	12	60
5.	Production level personnel and other manpower need proper training	12	60
6.	Proper responsibility and accountability should be fixed up-to make the personnel accountable	11	55
7.	The quality of products needs to be ensured with minimum cost in order to expand the products markets	11	55
8.	Introducing various cost control and cost reduction techniques to minimize cost of production of the products	10	50
9.	Obsolete plants and outdated production technologies need to be replaced by new plants and improved technology	10	50
10.	Realistic, specific, comprehensive and formalized production goals and targets need to be formulated	10	50
11.	Government regulations in the form of restricted import policy, tariff policy etc. need to be withdrawn	10	50
12.	Workers unauthorized absent from participating job should be severely dealt with	9	45
13.	Factory working environment needs to be made favorable by improving labor management relations; restricting unauthorized strikes by the workers and regulating trade union activities and influences	9	45
14.	Power failure should be stopped altogether by installing the generator of their own	9	45
15.	Product diversification needs to be ensured by removing the various obstacles involved therein	8	40

Source : Field Investigation.

Appendix 1

Relevant Productivity Ratios in the Sample Enterprises during 1998-99 to 2000-2001

Years and Samples	Material Productivity		Labor Productivity		Capital Productivity		Total Productivity (DM + DL + TC)
	Direct Material	Total Material	Per Worker (In Lakh Taka)	Per Taka of Direct Wages and Salaries	Fixed Capital	Total Capital	
Public Sector							
Sample-1							
1998-1999	1.93	1.28	2.21	18.32	0.06	0.04	0.08
1999-2000	2.52	1.64	3.61	21.18	0.08	0.05	0.10
2000-2001	3.61	2.28	4.13	34.91	0.15	0.08	0.09
Average	2.69	1.73	3.32	24.80	0.10	0.06	0.09
Sample - 2							
1998-1999	2.95	1.66	1.89	18.13	0.22	0.08	0.13
1999-2000	3.42	2.07	2.29	29.78	0.23	0.09	0.15
2000-2001	2.59	1.59	2.63	32.29	0.29	0.10	0.14
Average	2.99	1.77	2.27	26.73	0.25	0.09	0.14
Sample - 3							
1998-1999	0.29	0.27	3.25	4.38	0.64	0.13	0.17
1999-2000	0.32	0.29	3.78	5.46	0.76	0.15	0.19
2000-2001	0.55	0.50	6.92	8.53	1.15	0.19	0.21
Average	0.39	0.35	4.62	6.12	0.85	0.16	0.19

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Sample - 4							
1998-1999	1.48	1.20	0.69	1.24	0.03	0.03	0.04
1999-2000	1.76	1.99	0.69	1.13	0.03	0.03	0.03
2000-2001	2.50	1.82	0.50	0.67	0.02	0.02	0.02
Average	1.93	1.67	0.63	1.01	0.03	0.03	0.03
Sample - 5							
1998-1999	3.59	3.26	3.10	4.17	0.10	0.08	0.09
1999-2000	3.44	3.08	3.12	3.84	0.09	0.07	0.08
2000-2001	2.65	2.43	3.05	3.60	0.08	0.06	0.07
Average	3.23	2.92	3.09	3.87	0.09	0.07	0.08
Private Sector							
Sample - 6							
1998-1999	0.84	0.48	3.07	2.47	1.48	0.43	0.49
1999-2000	1.11	0.67	4.52	3.38	2.52	0.58	0.65
2000-2001	0.76	0.52	5.50	3.57	3.22	0.71	0.78
Average	0.96	0.56	4.36	3.13	2.41	0.57	0.64
Sample - 7							
1998-1999	1.02	0.87	11.30	18.68	0.45	0.40	0.42
1999-2000	1.10	0.93	11.36	19.34	0.47	0.42	0.44
2000-2001	1.11	0.94	12.09	19.97	0.49	0.43	0.49
Average	1.08	0.91	11.58	19.33	0.47	0.42	0.45
Sample - 8							
1998-1999	1.40	1.26	5.91	4.81	2.23	0.60	0.64
1999-2000	1.45	1.34	6.55	5.22	2.36	0.64	0.68
2000-2001	1.20	1.53	6.19	5.40	2.51	0.68	0.71
Average	1.35	1.38	6.22	5.14	2.37	0.64	0.68
Sample - 9							
1998-1999	1.97	0.33	2.05	14.50	0.65	0.23	0.27
1999-2000	0.53	0.34	2.15	14.95	0.68	0.27	0.30
2000-2001	0.57	0.35	2.27	15.84	0.71	0.30	0.34
Average	1.02	0.34	2.16	15.10	0.68	0.27	0.30
Sample - 10							
1998-1999	6.94	0.85	1.68	17.99	0.52	0.32	0.35
1999-2000	7.01	0.88	2.02	19.10	0.58	0.33	0.36
2000-2001	6.71	0.93	2.27	22.24	1.84	0.34	0.37
Average	6.89	0.89	1.99	19.78	0.98	0.33	0.36

Note : Compiled from the data shown in the Annual Reports of Selected Enterprises during 1998-99 to 2000-2001.

Appendix 2

Relevant Profitability Ratios in the Sample Enterprises during 1998-99 to 2000-2001

Years and Samples	Profit Margin	Return on Capital Employed	Return on Investment	Earning Per 100 Taka Share
Public Sector				
Sample - 1				
1998-1999	14.71	1.72	1.34	2.74
1999-2000	(5.90)	(0.70)	(0.56)	(1.14)
2000-2001	4.76	0.98	0.77	1.56
Average	4.52	0.67	0.52	1.05
Sample - 2				
1998-1999	25.95	5.65	4.44	12.50
1999-2000	22.83	5.43	4.37	12.70
2000-2001	18.35	3.30	2.77	7.98
Average	22.38	4.79	3.86	11.06
Sample - 3				
1998-1999	9.47	4.02	3.84	8.30
1999-2000	12.28	2.88	2.51	5.85

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2000-2001	15.55	8.77	7.19	19.55
Average	12.43	5.22	4.51	11.23
Sample - 4				
1998-1999	(86.30)	(166.98)	(4.69)	(29.32)
1999-2000	(63.46)	(239.35)	(3.71)	(22.87)
2000-2001	(44.13)	(269.96)	(2.76)	(17.02)
Average	(64.63)	(225.43)	(3.72)	(23.07)
Sample - 5				
1998-1999	(6.83)	(13.17)	(8.38)	(146.10)
1999-2000	(64.25)	(14.72)	(8.46)	(235.00)
2000-2001	(71.87)	(20.27)	(10.09)	(274.26)
Average	(47.65)	(16.05)	(8.98)	(218.45)
Private Sector				
Sample - 6				
1998-1999	6.23	11.46	6.00	36.15
1999-2000	6.73	12.43	6.58	39.66
2000-2001	8.35	16.76	7.93	56.72
Average	7.10	13.55	6.84	44.18
Sample - 7				
1998-1999	17.23	11.08	7.79	87.36
1999-2000	17.23	10.47	7.36	90.01
2000-2001	17.92	8.25	6.32	90.79
Average	17.46	9.93	7.16	89.39
Sample - 8				
1998-1999	11.79	10.62	7.61	50.19
1999-2000	8.35	10.82	8.01	53.08
2000-2001	8.13	9.05	6.43	45.11
Average	9.42	10.16	7.35	49.46
Sample - 9				
1998-1999	1.04	1.45	1.29	12.08
1999-2000	2.03	2.70	2.36	21.88
2000-2001	2.38	3.14	2.37	25.55
Average	1.82	2.43	2.01	19.84
Sample - 10				
1998-1999	2.60	4.04	1.97	32.80
1999-2000	1.80	2.21	1.10	13.40
2000-2001	1.90	2.77	1.34	21.60
Average	2.10	3.01	1.47	22.60

Source : Compiled from the data shown in Annual Reports of the Selected Enterprises during 1998-99 to 2000-2001.

Note : Since face value of shares of the selected enterprises varies; hence, instead of earning per share, earning per 100 Taka share has been computed to make the same uniform in these samples.

Appendix 3

Capital/ labor Relationships

Case	Labor Productivity	IF Capital Productivity	THEN C/L ratios	What happens	What should be done
1				Good productivity performance	Maintain or increase productivity further
2				Good productivity performance	Maintain or increase productivity further
3				Unfavorable productivity performance	Increase capital productivity
4				Satisfactory productivity performance	Increase labor productivity by (a) developing identifying other jobs for displaced labor; (b)

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		retaining displaced labor for other jobs.
5	Poor productivity performance	First increase capital productivity. Adapt available manpower to machines.
6	Satisfactory productivity performance	Increase capital productivity
7	Unfavorable productivity performance	Increase labor productivity
8	Poor productivity performance	First increase labor productivity, then, increase capital productivity.

Source : Avedillo Cruz Elena : A Manual on Quick Productively Appraisal (QPA), Manila Development Academy, Philippines, 1984.

Appendix - 4
Table 1:Correlations Matrix

	X ₁	X ₂	X ₃	X ₄	Y ₁	Y ₂	Y ₃	Y ₄
X ₁ Pearson Correlation	1.000	0.028	-0.438*	-0.460*	-0.446*	-0.266	-0.659**	-0.688**
Sig. (2-tailed)	0.0	0.882	0.015	0.010	0.013	0.156	0.000	0.000
Sum of Squares and Cross-products	19.045	6.599	-2.243	-2.466	-314.254	-447.700	-79.063	-1324.644
Covariance	0.657	0.228	-7.73E-02	-8.50E-02	-10.836	-15.438	-2.726	-45.677
N	30	30	30	30	30	30	30	30
X ₂ Pearson Correlation	0.028	1.000	-0.182	-0.163	0.515**	0.389*	0.223	0.300
Sig. (2-tailed)	0.882	0.0	0.335	0.389	0.004	0.034	0.236	0.107
Sum of Squares and Cross-products	6.599	2837.776	-11.395	-10.678	4427.625	8008.876	326.596	7051.734
Covariance	0.228	97.854	-0.393	-0.368	152.677	276.168	11.262	243.163
N	30	30	30	30	30	30	30	30
X ₃ Pearson Correlation	-0.438*	-0.182	1.000	0.997**	0.429*	0.429*	0.705**	0.536**
Sig. (2-tailed)	0.015	0.335	0.0	0.000	0.018	0.018	0.000	0.002
Sum of Squares and Cross-products	-2.243	-11.395	1.375	1.436	81.111	194.508	22.751	277.179
Covariance	-7.73E-02	-0.393	4.741E-02	4.950E-02	2.797	6.707	0.785	9.558
N	30	30	30	30	30	30	30	30
X ₄ Pearson Correlation	-0.460*	-0.163	0.997**	1.000	0.464**	0.461*	0.727**	0.550**
Sig. (2-tailed)	0.010	0.389	0.000	0.0	0.010	0.010	0.000	0.002
Sum of Squares and Cross-products	-2.466	-10.678	1.436	1.507	91.920	218.778	24.538	298.138
Covariance	-8.50E-02	-0.368	4.950E-02	5.196E-02	3.170	7.544	0.846	10.281
N	30	30	30	30	30	30	30	30
Y ₁ Pearson Correlation	-0.446*	0.515**	0.429*	0.464**	1.000	0.701**	0.796**	0.691**
Sig. (2-tailed)	0.013	0.004	0.018	0.010	0.0	0.000	0.000	0.000
Sum of Squares and Cross-products	-314.254	4427.625	81.111	91.920	26049.385	43702.386	3532.812	49205.346
Covariance	-10.836	152.677	2.797	3.170	898.255	1506.979	121.821	1696.736
N	30	30	30	30	30	30	30	30
Y ₂ Pearson Correlation	-0.266	0.389*	0.429*	0.461*	0.701*	1.000	0.467**	0.194
Sig. (2-tailed)	0.156	0.034	0.018	0.010	0.000	0.0	0.009	0.303
Sum of Squares and Cross-products	-447.700	8008.876	194.508	218.778	43702.386	149228.7	4965.778	33132.239
Covariance	-15.438	276.168	6.707	7.544	1506.979	5145.818	171.234	1142.491
N	30	30	30	30	30	30	30	30
Y ₃ Pearson Correlation	-0.659**	0.223	0.705**	0.727**	0.796**	0.467**	1.000	0.882**
Sig. (2-tailed)	0.000	0.236	0.000	0.000	0.000	0.009	0.0	0.000
Sum of Squares and Cross-products	-79.063	326.596	22.751	24.538	3532.812	4965.778	756.573	10706.556
Covariance	-2.726	11.262	0.785	0.846	121.821	171.234	26.089	369.192
N	30	30	30	30	30	30	30	30
Y ₄ Pearson Correlation	-0.688**	0.300	0.536**	0.550**	0.691**	0.194	0.882**	1.000
Sig. (2-tailed)	0.000	0.107	0.002	0.002	0.000	0.303	0.000	0.0
Sum of Squares and Cross-products	-1324.644	7051.734	277.179	298.138	49205.346	33132.239	10706.556	194767.1
Covariance	-45.677	243.163	9.558	10.281	1696.736	1142.491	369.192	6716.109
N	30	30	30	30	30	30	30	30

*Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)

Table 2: Multiple regressio n analysis for y1 summary output

Regression	Statistics
Multiple R	0.833941

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R ²	0.695458
Adjusted R	0.646731
Standard Error	17.81363
Observation	30

	df	SS	MS	F	Significance F
Regressor	4	18116.25	4529.062	14.27261	3.4E-06
Residual	25	7933.136	317.3254		
Total	29	26049.38			

Table 3: Multiple regression analysis for y2 summary output

Regression	Statistics
Multiple R	0.731689
R ²	0.535369
Adjusted R	0.461028
Standard Error	52.66357
Observation	30

	df	SS	MS	F	Significance F
Regressor	4	79892.42	19973.1	7.201533	0.000531
Residual	25	69336.29	2773.452		
Total	29	149228.7			

Table 4: Multiple regression analysis for y3 summary output

Regression	Statistics
Multiple R	0.879773
R ²	0.774
Adjusted R	0.73784
Standard Error	2.615227
Observation	30

	df	SS	MS	F	Significance F
Regressor	4	585.5874	146.3969	21.40488	9.011E-08
Residual	25	170.9853	6.839413		
Total	29	756.5727			

Table 5: Multiple regression analysis for y4 summary output

Regression	Statistics
Multiple R	0.827587
R ²	0.6849
Adjusted R	0.634484
Standard Error	49.54638
Observation	30

	df	SS	MS	F	Significance F
Regressor	4	133396.1	33349.02	13.58499	5.14E-06
Residual	25	61371.08	2454.843		
Total	29	194767.1			

training of the staff.

(xvi) Obstacles in Introducing Product Diversification: This is another factor applicable to the public sector samples. The concerned enterprises while introducing product diversification have been faced with various obstacles, both internal and external.

Probable Suggestions for Improving Productivity: The sample respondents were requested by the researcher to put forward some probable suggestions in order to improve the productivity in their mills. Their valued suggestions in this regard are tabulated in Table 5.

Conclusion

The main findings of the study are summarized as : (i) fixed capital productivity, total capital productivity and total productivity had been much higher, ranging from 4 to 5 times, during the study period in the private sector samples than those in the public sector samples; (ii) direct material productivity and labor productivity per worker had also been higher in the private sector samples than those in the public sector samples during the period; (iii) labor productivity per taka of direct wages had almost the same in the same in the public and private sector samples during the period; (iv) material total productivity, on the other hand, had been almost double in the public sector samples; (v) both types of labor productivity and capital productivity had shown an increasing trend over the study period in samples 1, 2, 3, 6, 7, 8, 9 and 10; while capital to labor ratio in these samples excepting 7 and 9 had also shown an increasing trend. This situation fully coincides with the case - 1 as presented in Appendix - 3 which indicates good productivity performances in these samples which should be at least maintained. The positions of samples 7 and 9 coincide with case - 2, Appendix - 3 which also indicate good productivity performances which should also be maintained at least; (vi) both types of labor productivity and capital productivity, on the other hand, had shown a decreasing trend in samples 4 and 5 only; while capital/ labor ratio had also shown a decreasing trend in these samples. The positions of samples 4 and 5 correspond with case - 8, Appendix - 3 which indicate poor productivity performance, where both labor and capital productivity need to be increased; (vii) poor productivity had adversely affected profitability in terms of Profit Margin, ROI, ROCE and Earning per hundred Taka share. This statement has also been substantiated by statistical analysis viz., correlation and multiple regression analysis; (viii) the major factors responsible for poor productivity have been identified as : shortage of adequate working capital, management inattention, shortage of raw materials etc. instability in raw materials prices, lack of requisite R & D activities, shortage of skilled manpower, lack of proper responsibility and accountability, limited markets for products, use of obsolete plant and technology, poor production planning, government regulations etc. Therefore, it can be concluded that in order to improve the existing productivity in the sample enterprises, the suggestions put forward by the respondents need to be implemented as early as possible by the concerned authority. Of the various suggestions, the major ones are : providing adequate working capital, empowering mill management in decision making, providing adequate raw materials in time, undertaking adequate R & D activities, proper training to production level personnel, fixing up proper responsibility and accountability, ensuring quality of products, introducing cost control and cost reduction techniques, replacing obsolete plants and technology, setting of realistic production goals and targets and withdrawing excessive government regulations.

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