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Productivity and Profitability Analysis of Eastern Refinery Limited (ERL) - An Evaluative Study

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Abstract:
Productivity measures the efficiency of production system and profitability measures the financial soundness of a company. The current study is an attempt to critically evaluate the productivity and profitability position of Eastern Refinery Limited (ERL). The study found that ERL could utilize only 78.74 percent of production capacity in refinery plant and 57.17 percent in secondary conversion plant. A huge unutilized capacity creates inefficient asset management and reduces productivity and profitability of ERL. The study also depicts that average total productivity (TP) and capital productivity (CP) was 1.05 and 0.47 only which indicates the poor productivity performance and asset management of ERL. In case of profitability, net profit margin, ROE, and ROA was found very unsatisfactory which indicates the inability of ERL in generating profit for the shareholders. The study reiterated that average total asset turnover was 0.38 times only which indicates that ERL failed to generate higher amount of sales per amount of tangible assets. The study has identified a number of factors using Likert's 5 point scale and found that, capacity utilization, asset management, decision making authority, debt management and budgetary control were found significant affecting the productivity and profitability of ERL.
Key words: Productivity, Profitability, Asset management, Capacity utilization, Z-score, Balanced Scorecard.

1. Prelude:

Eastern refinery limited (ERL), the largest oil refinery in Bangladesh plays a crucial role in maintaining stability in the POL products market and providing Energy Security in the country. Yearly consumption of petroleum product in Bangladesh is about 52,13,646 metric tons and was increased 7.10% in 2011-12. ERL is supplying around 40% of the country's current petroleum products' demand with the capacity of refining 34,000 barrels of crude oil per day (i.e., 1.5 million metric tons per year). Though ERL still a profitable company in the public sector but with the increase of POL product demand, it will gradually lose its effectiveness as market stabilizer as fallback system and in consequence may jeopardize Energy Security of the country. So at this stage it is essential to analyze the productivity and profitability of the selected company for better performance and attaining sustainable growth in both long run and short run.
Productivity measures the output to input ratio of a manufacturing company. It indicates the efficiency in the production process and due to inefficient production System Company incurs huge cost which in turn affects the profitability of a company. Profitability measures the ability to make profit for a company. The more profitable the more solvent and sustainable the company will be in the long run.
Analysis of productivity and profitability of a company is extremely important for smooth operation. It will help to provide quality products to its customers at lower prices, pay higher salaries to its employees and greater return to investors who put the fund needed to establish and operate a business or industry. Performance analysis becomes a vital issue for any state owned company in an underdeveloped country. And it becomes more complex if the company deals with burning concern like fuel which is like life blood for any country.

2. Literature review: Das and Hoque (1995) found that productivity is positively correlated with profitability. Government policy and regulations are found to have exerted profound influence on productivity and profitability of the mills under study. Khanam (2008) conducted a study on "performance evaluation of public sector enterprise in Bangladesh : a case study" suggested some policy implications such as diversification of product, proper debt management, handover of some autonomy, expansion of market etc for better performance. Jahur and parveen (1996) applied Altman's MDA model to determine overall financial position of Chittagong Still Mills Ltd and found the position of the mill had been at the lowest level of bankruptcy. They concluded

scarcity of raw materials, lack of adequate working capital, strict government regulation, lack of accountability etc. were main reasons of failure. Maleque and Neogy(2009) in their study used mean, standard deviation and correlation matrix to analyze the financial condition of the Square pharmaceuticals Limited and found the overall financial performance of the company is highly satisfactory during the study period. Uddin and Hasan (2013) made a study on "Operational Performance Evaluation of Meghna Petroleum Limited (MPL)- A Case Study". The study evaluated the status of financial performance through liquidity, profitability and productivity of MPL and found that performance in terms of liquidity and profitability was below satisfactory level. Masum and johora(2012) depicted that the financial position and operational performance of the selected ceramic companies in terms of profitability and efficiency is good and suggested due to inefficient liquidity management and lack of proper utilization of debt financing it showed very low performance. Hasan et.al., (2012) in their study found that loan variable is positively and significantly correlated with profitability, productivity and is negatively correlated with liquidity. The study also finds out that fund management decisions were unsatisfactory.

3. Objectives of the study:

The main objective of the study is to critically analyze the productivity and profitability position of Eastern Refinery Limited. To achieve this main objective the study has covered the following specific objectives:

a. To look at the policies regarding production of ERL.
b. To assess the productivity performance of ERL.
c. To appraise the profitability performance of ERL.
d. To expose problems in productivity and profitability performance and furnish policy implications for better performance of ERL.

4. Scope and methodology of the study:

Both primary and secondary data have been used in the current study to achieve the main objective of the study. The secondary data collected from the audited profit and loss account, balance sheet of Eastern Refinery Limited (ERL) for the period of 5 years (2008-2012), Organizational Manual, existing text books, related journals and magazines and research works have been checked to prepare the theoretical framework of the study. The interview method used to collect the primary data relevant to the particular problem area. In order to analyze profitability and productivity various accounting ratios and both descriptive and inferential statistical tools like; average, standard deviation, coefficient of variation, correlation, regression, time series analysis, 't'-test, 'F'-test have been used to make the study more informative and comprehensible to the readers. Last but not least Balanced Score Card analysis and 'Z'-Score analysis have also been done to judge the effectiveness of the research. The scope of the study has been limited to Eastern Refinery Limited (ERL) covering the period of 2008-2012. This is because of the resource and time constraints at the disposal of the researchers.

4.1. Research Questions: The study has developed some questions relevant with the current research which are as follows:

a) Whether or not production policies affect productivity performance?
b) Whether or not management efficiency influence productivity and profitability performance?
c) Whether or not asset management hampers the productivity and profitability performance?
d) Whether or not productivity affects profitability performance?
e) Whether or not cost control mechanism exists and affects productivity and profitability performance?

4.2. Hypothesis of the Study: The following hypotheses have been tested against the objective set forth above:

Ho1: Productivity and Profitability are not significantly associated.

Ho2: Profitability and Asset Management are not significantly associated.

Ho3: Profitability and Debt management are not significantly associated.

5. Production policies and procedure: ERL is the prime crude oil processing plant in Bangladesh. Since its inception, it produces various petroleum products (LPG, Refinery gas, Naphtha, Jet Propulsion, High Speed Diesel, etc.) without interruption and works to mitigate huge gap between demands and supply of petroleum products. ERL faces two major challenges, first keeping price level reasonable for the people and second to ensure long term sustainability of the corporation. The demand is increasing rapidly and the operating and other costs as well. For ensuring better performance ERL must establish judicious policies regarding profitability and productivity. The major objective of ERL's production policy is to ensure adequate petroleum supply, reduce dependency in import, increase crude storage, self reliance in power generation, increasing environmental awareness, introducing environment friendly products and skilled manpower.

5.1. Crude oil processing position: ERL received crude oil from Bangladesh Petroleum Corporation (BPC) in the name of Murban, Arabian Light crude and Condensate. Thus received crude oil has been processed in ERL Plants which in turn produces different types of oil products. The table-1 shows the position of pattern wise crude oil processed in ERL as follows.

Table-1

Position of Pattern wise Crude Oil Processed [M.Ton]

Crude oil processed	2007-08		2008-09		2009-10		2010-11		2011-12	
	MT	%	MT	%	MT	%	MT	%	MT	%
Murban	4,49,669	37.05	4,06,616	45.96	4,96,513	39.06	5,25,142	39.12	6,21,750	52.09
Arabian Light Crude	6,01,265	49.54	4,00,759	45.29	7,25,023	57.07	7,80,823	58.17	5,28,350	44.28
Condensate	1,62,866	13.41	77,425	8.75	49,564	3.90	36,335	2.71	43,320	3.63
Total	12,13,800	100	8,84,800	100	12,71,100	100	13,42,300	100	11,93,600	100

Table-1 portrays the position of pattern wise crude oil processing at ERL. In 2007-08 Murban and Arabian light crude was 10,50,900 MT which was about 87 percent of total crude oil processed by ERL. In 2011-12 total crude oil processed was 11,93,600 MT of which Murban and Arabian Light crude was 11,50,000 MT which was about 96 percent of total crude oil processed by ERL.

5.2. Production Pattern of ERL: As one of the prime refinery oil processing company, ERL produces a number of oil products through its refinery plant, secondary conversion plant and asphaltic bitumen plant. In the initial process crude oil processed in the refinery plant which produces the 'Light Distillate', 'Mid-Distillate' and 'Bottom Product'. Light Distillate includes LPG, Light and Heavy gasoline while Mid-Distillate includes Kerosene and Diesel. Reduced crude oil (RCO) is considered as bottom product which has been processed further in the Secondary Conversion Plant for Naphtha, Diesel and Furnace oil. In the Asphaltic Bitumen Plant RCO used as input for Bitumen, Furnace oil and Diesel as output. The major oil products produced in ERL during the period of 2007-08 to 2011-12 are as follows.

Table-2

Position of Production Pattern (MT)

Name of Products	2007-08	2008-09	2009-10	2010-11	2011-12	Average
LPG	9,986(0.85)	6,278(0.72)	11,829(0.95)	13,284(1.1)	12,791(1.09)	10,580(1.01)
NAPTHA	1,38,521(11.82)	93,759(10.75)	1,45,294(11.64)	1,33,415(10.12)	1,13,271(9.69)	1,12,100(10.51)
SBP	550(.04)	600(.04)	774(.06)	696(.05)	841(.0719)	710(0.05)
MS(PETROL)	66,046(6.5)	67,046(7.69)	44,320(3.59)	41,666(3.16)	58,865(5.03)	61,500(5.20)
HOBC(OCTANE)	13,439(1.20)	13,372(1.53)	12,112(0.97)	13,900(1.05)	4,353(.37)	11,680(1.05)
MIT	5,200(0.50)	5,800(0.48)	6,282(0.52)	8,124(0.61)	7,352(0.62)	6,450(0.52)
JPI	2,100(0.18)	2,400(0.16)	2,511(0.17)	2,069(0.16)	3,851(0.37)	2,510(.19)
SKO(KEROSEN)	2,62,978(22.5)	1,90,059(21.79)	2,41,500(19.33)	2,82,768(21.46)	2,26,191(19.35)	2,05,000(20.16)
HSD(DIESEL)	3,39,131(30.50)	2,45,320(28.13)	3,69,749(29.59)	3,76,081(28.54)	3,73,070(31.93)	3,50,100(30.10)
JBO	13,538(1.60)	16,365(1.88)	19,730(1.58)	21,727(1.65)	25,228(2.16)	18,780(1.78)
LDO	1,500(0.12)	1,700(0.14)	1,871(0.15)	2,276(0.17)	2,206(0.19)	1,900(0.16)
FURNACE OIL	2,90,463(25.60)	1,91,991(22.01)	3,40,851(27.28)	3,66,960(27.84)	2,75,353(23.57)	2,40,560(25.80)
BITUMIN	43,722(3.4)	34,140(3.91)	51,850(4.15)	55,041(4.18)	65,010(5.56)	50,150(4.28)
TOTAL	11,71,320	8,95,908	12,48,673	13,17,920	11,68,382	

Source: Compiled from the annual reports and calculations have been made by the researchers.

Note: Figures in the parenthesis indicate percentage.

Table-2 depicts the position of production pattern of ERL during the period of 2007-08 to 2011-12. After processing the crude oil the major oil products of ERL consists of HSD (Diesel) in 2011-12 was 3,73,070 MT (31.93%), Furnace oil 2,75,353 MT (23.57%), SKO (Kerosene) 2,26,191 MT (19.35%), Naptha 1,13,271 MT (9.69%), Bitumin 65,010 MT (5.56%), Petrol 58,865 MT (5.03%) and the like.

5.3. Capacity utilization of ERL: Capacity utilization is one of the significant aspects of production planning and control. Idle capacity generates more cost to the company which in turn hampers the productivity and profitability of the company. Under utilization of production capacity is the sign of resource de-utilization and inefficient production management of a company. Table-3 depicts the capacity utilization picture of ERL as follows.

Table-3

Position of capacity utilization during the period 2008-12 (Metric Ton)

year	Refinery plant		Secondary conversion plant	
	Installed capacity	Capacity Utilization (%)	Installed capacity	Capacity Utilization (%)
2007-08	15,00,000	80.92	4,94,500	66.17
2008-09	15,00,000	58.99	4,94,500	39.96
2009-10	15,00,000	84.74	4,94,500	74.46
2010-11	15,00,000	79.57	4,94,500	65.61
2011-12	15,00,000	89.49	4,94,500	39.61
Mean	15,00,000	78.74	4,94,500	57.16
S.D	0	11.63	0	16.25
C.V	0	14.85%	0	28.42%

Source: Compiled from Annual Reports during 2008-2012 and Calculations have been made by the researchers.

Table-3 reveals the position of capacity utilization to ERL during the period of 2007-2012. In Refinery plant ERL's installed capacity was 15,00,000 MT but on an average it could utilize only 78.74 percent of total capacity that hampers the asset utilization and productivity. In the secondary conversion plant capacity utilization on an average was only 57.17 percent. A huge unutilized capacity, about 43 percent, in turn creates inefficient asset management and reduces productivity and profitability of ERL.

5.4. Position of actual to budgeted production: Budget always works as a yardstick for controlling the performance. If the target production fulfilled, productivity becomes higher which increase the profitability and asset utilization. The position of actual to budgeted production of ERL during 2007-08 to 2011-12 is shown in table-4.

Table-4

Position of Actual to Budgeted production during the period 2008-12 (Metric Ton)

year	Refinery plant			Secondary conversion plant		
	Budgeted	Actual	% of Achievement	Budgeted	Actual	% of Achievement
2007-8	12,35,000	12,13,800	98.28	3,12,500	3,27,200	104.70
2008-9	11,00,000	8,84,800	80.44	2,66,000	1,97,950	74.28
2009-10	12,48,300	12,71,100	101.83	3,40,200	3,68,200	108.23
2010-11	13,42,300	13,42,300	100	3,21,400	3,24,420	100.94
2011-12	12,00,000	11,93,600	99.47	2,80,000	1,95,860	69.95
Mean	12,25,120	11,81,120	96.004	3,04,020	2,22,726	91.62
S.D	78297.01	175431.4	8.794057	30436.2	80241.52	18.0562
C.V	6.39	14.85	9.16	10.01	36.02	19.71

Source: Compiled from Annual Reports during 2008-2012 and calculations have been made by the researchers.

Table-4 evaluated the percentage of achievement of actual to budgeted production of ERL during 2007-08 to 2011-12. In Refinery plant average actual production was 11,81,120 MT and the average percentage of achievement was about 96 percent. In case of Secondary conversion plant average percentage of achievement

was 91.62 percent. One of the reasons for not achieving the target production is the operational loss which was about 1.69 percent in Refinery plant, 1.96 percent in secondary conversion plant and 1.97 percent in Asphaltic Bitumen Plant in the year 2011-12.

6. Analysis of productivity Position of ERL:

Productivity is the ratio of output to input. The analysis of productivity provides better insight in to the efficiency and effectiveness of scare and valuable resource utilization of an entity. The higher the productivity; the lower is the cost because of increase in the volume of output. Lower cost increases revenue and profit. Productivity position measured by different ratios like Total Productivity (TP), Capital Productivity (CP), Employee Productivity (EP), Profit per employee and Asset per employee and the like. Total Productivity (TP) implies the income to expenses ratio. Capital productivity (CP) explores the value of output to capital employed and employee productivity (EP) measures the value of output to labor cost. The following table shows the position in this regard:

Table-5

Productivity position of ERL from the period of 2008-12

Year / Productivity ratio	2007-8	2008-9	2009-10	2010-11	1011-12	Mean	S.D	C.V %
Total productivity (TP)	1.08	1.01	1.02	1.11	1.06	1.05	0.041	3.90
Capital productivity (CP)	0.40	0.38	0.43	0.58	0.54	0.47	0.08	17.02
Employee Productivity (EP)	3.10	2.96	2.80	2.62	2.44	2.78	0.26	9.35
Profit per Employee	0.23	0.34	0.44	1.21	1.13	0.67	0.46	69.15
Asset per employee	50.07	47.77	46.88	46.33	42.25	46.7	2.85	6.10

Source: Annual report of ERL for the year from 2008-12 and computation have been made by the researchers.

Note: TP = Processing income/Total expenses; CP = Processing income/Total capital employed; EP = Processing income / [Salaries wages (processing + administrative) + employees other cost (processing + administrative)

Table-3 shows the position of productivity ratio of MPL during the period of 2008 to 2012. Position of Total productivity (TP) during the study period was 1.08, 1.01, 1.02, 1.11 and 1.06 times and on an average it was 1.05 times only. The lower TP ratio which is only .05 times greater than 1 indicates poor productivity performance of ERL. In case of Capital productivity (CP) it was 0.40 , 0.38, 0.43, 0.58, and 0.54 respectively during the study period. Average CP was only 0.47 times which was lower than 1 and it indicates the poor asset management and underutilization of capacity of ERL. The Employee productivity (EP) was 3.10, 2.96, 2.80, 2.62, and 2.44 respectively during the study period. On an average it was 2.78 times which is greater than 1 but it is in decreasing trend which implies the increasing labor cost gradually.

7. Profitability Position of ERL:

The profitability ratio measures the efficiency of generating profit of a firm. Since, profit is the ultimate objective of the firm, poor performance here indicates a basic failure. To determine different aspects related with the profitability of the firm various ratios are calculated like, Gross profit margin (GP), Net profit margin (NP), return on capital employed (ROCE), Return on Asset (ROA), Return on Equity (ROE), and Earning per share (EPS). The following table depicts the profitability position of ERL:

Table-6
Profitability position of ERL from the period 2008-12

Year / Ratio	2007-8	2008-9	2009-10	2010-11	2011-12	Mean	S.D	C.V
Gross profit margin (GP) %)	24.96	20.78	20.12	28.29	24.65	23.76	4.01	16.91
Net profit margin (NP) (%)	12.38	3.93	4.76	6.44	10.98	7.7	3.78	49.09
ROCE (%)	4.94	1.48	1.26	4.31	5.88	3.57	2.08	58.53
ROE (%)	0.82	1.73	2.24	5.87	5.83	3.23	2.38	73.86
ROA (%)	0.46	0.71	0.94	2.60	2.70	1.48	1.08	72.97
EPS (Tk.)	4.29	6.61	8.91	24.44	25.57	13.96	10.21	73.13

Source: Annual report of ERL for the year from 2008-12 and computation have been made by the researchers.
Note: GP = GP/S , NPAT = NP/S, ROCE= NPAT/Capital Employed, ROA= NPAT/TA, ROE= NPAT/OE, EPS= NPAT/No. of shares issued.

The above table depicts that the average gross profit margin was 23.65% which was consistent with standard norm of 20% to 30% (Abhijit et, al.,2000). It indicates favorable purchasing and mark up policies and ability of management to generate sales volume. The average net profit margin was 7.7% in the study period which conformed to the standard norm of 5% to 10% (Mandal, 1998). The average Return on capital employed was 3.57% which was below the standard norm of 11% to 12%. And the average ROE was 3.23% which lowers than the standard norm 10% to 15 % (Mandal, 1998) therefore it seems EFL was not in satisfactory position of using shareholders investment. The average ROA was 1.48% which indicates ERL failed to generate adequate return in respect to its total assets.

8. Asset management Position of ERL:

Asset management ratios are also known as activity ratios, efficiency ratios or turnover ratios which indicates the ability to translate its' assets into sales. Inventory turnover, Total assets turnover, and Account Receivable turnover ratio are the commonly used as activity ratios. Account receivable turnover has been computed by dividing net credit sale by closing average receivable. This ratio measures how quick the firm collects their due from their customers. It provides a clear concept credit sale and collection policy. The following table shows the asset management position of the selected firm:

Table-7
Asset management efficiency position of ERL from the period 2008-12

Year / Ratio	2007-8	2008-9	09-10	2010-11	1011-12	Mean	S.D	C.V
Total assets Turnover	0.32	0.29	0.32	0.40	0.38	0.34	0.05	14.7
Inventory Turnover	1.29	1.30	1.39	1.66	1.52	1.43	0.16	11.2
Inventory Conversion	279	276	259	217	237	254	26.0	10.40
Receivable turnover	3.00	2.29	1.84	1.96	3.07	2.33	0.59	25.32
Receivable collection	122	159	198	186	119	150	37.0	24.67

Sources: Annual report of ERL for the year from 2008-12 and computation have been made by the researchers

Table- 4 reveals that, the average total assets turnover was 0.38 times which lower than the standard norm 2 times (Weston and Brigham, 2004). It indicates that EFL failed to generate higher taka of sales per taka of tangible assets which may be an indication of good use of fixed and circulating capital. The inventory turnover of ERL was on an average 1.43 times which lower than the standard norm 8 to 9 times (Moshin, 1970). It means stock is not rapidly turnover and as a result more capital blocked in the form of inventory which hampers the further investment. On the other hand, inventory conversion period was, on an average, 254 days which implies ERL needed more time to convert it into sales. The average accounts receivable turnover was 2.33 times which was lower than the standard norm 4 times (Mohshin, 1970). The average collection period was also high 150 days which implies inefficient policy and management for collecting credit from customers. The high duration of

collection creates requirement of more capital to run the production system which in turn hampers the profitability of ERL.

9. Sales revenue analysis and projection for next four year:

Using trend analysis companies' performances over specific periods of time can be compared. This is a mathematical technique that used to forecast the future movement of different variables of a company based on future data. Trend analysis is based on the idea that what has happened in the past gives traders an idea of what will happen in the future.

Yc= a+bx

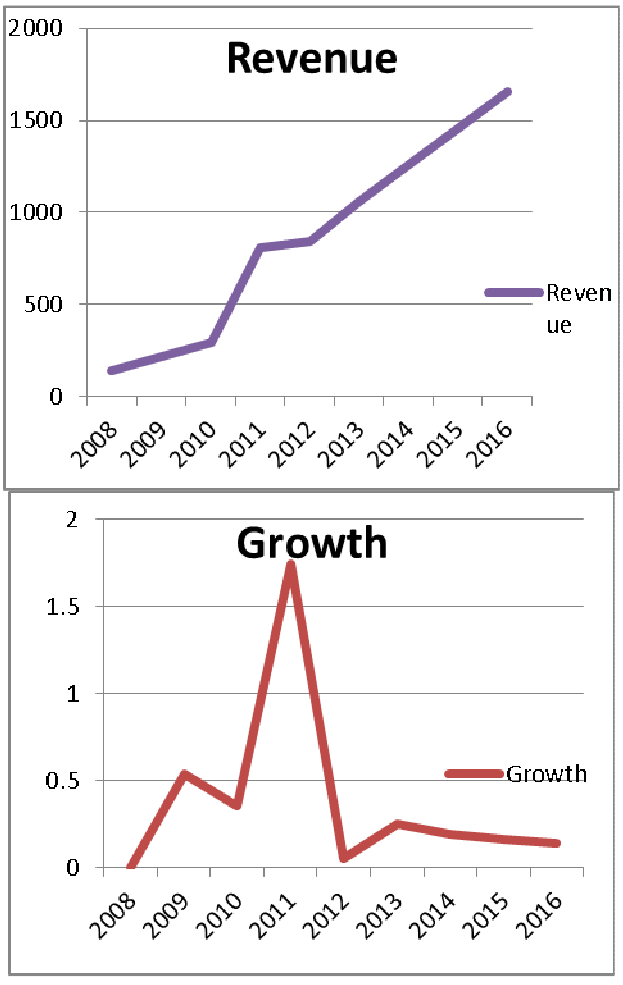
Yc= 460.82+199.325x

Table-8

Position of Revenue and Growth Rate [In Million TK]

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Revenue	141.46	218.20	294.01	806.47	843.95	1058.8	1258.12	1457.4	1656.77
Growth	-	0.54	0.35	1.74	0.05	0.25	0.19	0.16	0.14

Sources: Annual report of ERL for the year from 2008-12 and computation have been made by the researchers.



Time series analysis (graphical view)

From above table -8 graphical presentations of time series, sales figures, we can observe that, in year 2010-2011 ERL achieved remarkable growth in sales revenue. ERL, at the middle of respective year that generated sales of Tk. 806.47, while it was only Tk. 294.01 in previous year. Though in following two years, sales grew at a decreasing rate, it showed steady growth onwards; but this distress on sales growth for prolonged period was not

due to inefficiency in sales management rather appreciation of BDT against USD. As a result it decreasing processing cost and increasing the operating costs as well. With a view to guess the future cash flow from its operation for next four years and there after we have projected sales revenue of ERL from crude processing and other sources. If the situation will not change in the upcoming years, total revenue of ERL will be increased at a declining growth rate.

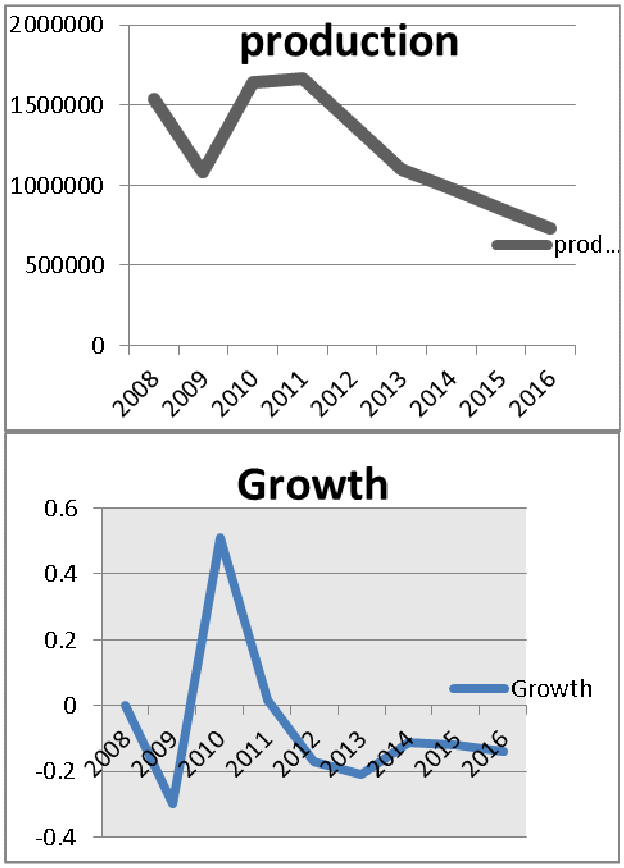
10. Production Position and Growth rate Projection: Trend equation method has been used to calculate the projection of production growth rate as follows in table-9.

Table-9

Position of Production and Growth Rate

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
production	15,41,000	10,82,390	16,39,300	16,66,720	13,89,460	10,98,134	9,76,254	8,54,374	7,32,494
growth	-	(0.30)	0.51	0.0167	(0.17)	(0.21)	(0.11)	(0.12)	(0.14)

Sources: Annual report of ERL for the year from 2008-12 and computation have been made by the researchers.



Time series analysis (graphical view)

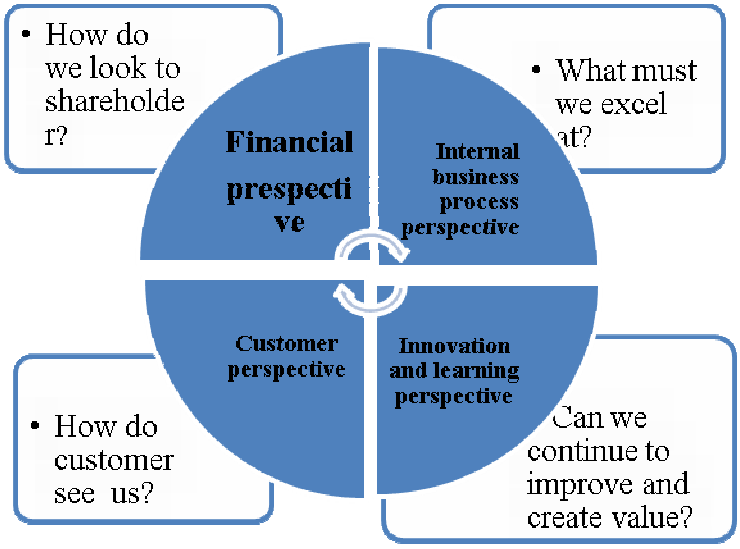
Table-9 illustrates the position of production and growth rate of ERL which included the figure of forthcoming four years. In year 2008-09, the production of the selected company was fall sharply by 4,58,610 metric ton compared to the year 2007-08. Next year it again showed a deviant increase and it achieved 51% growth rate. Within the study period it showed a decreasing trend in production. If the situation remains constant in the upcoming year, time series analysis depicts that ERL production growth will be diminished year by year.

11. Balanced score card:

Balanced Scorecard has been defined "as a set of measures that gives top managers a fast but comprehensive view of the business, combining in a single report the disparate elements of a company's competitive agenda

while attempting to prevent sub-optimization by managers as they must consider all of their organization's significant performance areas together"(Kaplan and Norton,1992).

The balanced scorecard includes four key elements like Customer, Internal, Innovation and financial perspective which is shown in the following diagram:



Source: Kaplan & Norton (1992), The Balanced Score Card-Measures that drive Performance, HBR

Customer perspective: ERL has no direct interaction between the ultimate consumers of oil products in Bangladesh. ERL follows business to business marketing policies. ERL's prime function is to refine and process the crude oil for having different Oil products and supply it to the Bangladesh Petroleum Corporation (BPC). BPC sell the oil products through its distributors like Padma, Meghna, and Jamuna Oil Companies and then they sell it to the different Gas filling stations all over Bangladesh for general customers. Since oil product market in Bangladesh is monopoly in nature so customers have limited choice about the product.

Internal business perspective:

1. Set up a single point pipe line for reducing the lead time of receiving crude oil from mother vessel and its carrying cost.
2. Single Point Mooring (SPM) project has started under the supervision of ILF Consultation Engineers, Germany. SPM is the initial steps for expansion of ERL.
3. At the stage of setting unit-2, ERL acquired General Electric Manufacturing Company's land and received acceptance of Government of Bangladesh for the expansion of main installation which will increase the oil processing capacity of petroleum products 15 lakh metric ton to 45 lakh metric tons.
4. ERL also trying to add new technology to ensure the quality of the services and for minimizing the delivery time of the services. ERL implemented computerized auto tank gauging system to ensure fault free oil movement, inventory control and to reduce accidental oil spoilage.
5. A modern dolphin jetty was constructed at RM-7 for handling crude oil receives and export products.

Innovation and learning perspective:

Skill development of employee is a significant part of any Business. In this regard, HRM division of ERL arranged 20 programs and sent their employees to abroad for higher training to upgrade their knowledge and enhancing the quality.

12. Relationship between variables:

Table-10
Correlation matrix between variables

		Sales	Net profit	Total assets	Total Debt	ROE	ROCE	Total productivity	Capital productivity	ROA
Sales	correlation	1	-	-	-	-	-	-	-	-
	Sig.(2-tailed)	-	-	-	-	-	-	-	-	-
Net profit	correlation	0.30	1	-	-	-	-	-	-	-
	Sig.(2-tailed)	5.26*	-	-	-	-	-	-	-	-
Total assets	correlation	0.05	0.53	1	-	-	-	-	-	-
	Sig.(2-tailed)	0.09	1.08	-	-	-	-	-	-	-
Total Debt	correlation	0.14	(0.93)	(0.76)	1	-	-	-	-	-
	Sig.(2-tailed)	0.24	(4.73)*	(2.02)**	-	-	-	-	-	-
ROE	correlation	0.94	0.49	0.52	(0.76)	1	-	-	-	-
	Sig.(2-tailed)	4.77*	0.97	1.05	(2.02)**	-	-	-	-	-
ROCE	correlation	0.68	0.26	0.29	(0.33)	0.51	1	-	-	-
	Sig.(2-tailed)	1.64*	0.47	0.52	(0.61)	1.02	-	-	-	-
Total productivity	correlation	0.77	0.53	(0.21)	(0.29)	0.60	0.73	1	-	-
	Sig.(2-tailed)	2.09*	2.77*	(0.37)	(0.52)	1.30	1.85**	-	-	-
Capital productivity	correlation	0.19	0.09	0.07	(0.79)	0.89	0.53	0.68	1	-
	Sig.(2-tailed)	0.33	0.16	0.12	(1.29)	3.38*	1.08	1.64**	-	-
ROA	correlation	0.95	0.99	0.52	.035	0.99	0.56	0.53	0.96	1
	Sig.(2-tailed)									
	N	5	5	5	5	5	5	5	5	5

Sources: Annual report of ERL and computation have been made by the researchers
*correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.10 level (2-tailed)

Table-10 shows the correlation among the selected variables like; Sales, Net profit, ROE, ROCE, ROA, Total assets, Total Debt, Total Productivity and Capital Productivity of Eastern Refinery Limited. The correlation matrix reveals that among the selected variables considered in the correlation matrix have significant relationships. Correlation between total productivity and output is 0.7709 which means a unit increase in sales variable keeping all other variables constant would give .77 unit increases in total productivity. The results of linear regression analysis in the table-13 shows that, 59 percent of the total variability in productivity is explained by sales variable. The results of 'F' and 'T' statistics from the table-14 and 15 were found to be highly significant.

The relationship between total productivity and total debt is found negative. A unit increase in total debt (table-16) keeping all other variables constant would give 0.29 unit decrease in total productivity. The table also shows that co-efficient of determination r2 being 0.594 which indicates that, 59.4 percent total variation with total productivity is explained by total debt alone. It is revealed from the table-17 and 18 that the result of 'T' and 'F' statistics were found to be significant**.**

From table-10 it is clear that, a unit increase in sales keeping all other variables constant would increase 0.309 unit increase in profitability (net profit margin). The results of linear regression in table-19 shows that, 9.57 percent variation in profitability is explained by sales only. The 'F' and 'T' statistics were found significant in table-20 and 21.

Correlation between profitability (net profit margin) and total debt in table-10 depicts that a unit increase in total debt variable keeping all other variables remain constant would decrease 0.93 unit in profitability. The results of linear regression in table-22 shows that 86 percent variation in profitability is explained by total debt only. The 'F' and 'T' statistics were found significant in table-23 and 24.

Relationship between total productivity and profitability (net profit margin) is found positive in table-10 which explains that a unit increase in total productivity variable keeping all other variables remain constant would increase 0.53 unit of profitability. The results of linear regression in table-25 portrays that 28.68 percent variation in profitability is explained by total debt only. The 'F' and 'T' statistics were found significant in table-26 and 27.

Z- score model:

After analyzing profitability, activity and productivity of ERL, now it is necessary to determine the financial health of a company during the study period. For determining a company's financial health and bankruptcy risk, the Altman Z score model (Multivariate Discriminate analysis model) considered as a release tools. The model find out the Z score value and on that basis the enterprise will be classified as good, sick and mixed.

Table-11

z- Score of ERL

Year / score	2007-8	2008-9	2009-10	2010-11	2011-12	Average	CV
Z-score	3.38	3.65	3.84	4.82	4.91	4.12	17%

Sources: annual report of ERL for the year from 2008-12 and computation have been made by the researchers

Table-4 depicts that the average Z score stood at 4.12 which is upper than the standard norm of 2.675. It indicates that ERL was in safe zone from the risk of bankruptcy and their financial position was sound.

14. Factors affecting Productivity and Profitability: Importance of factors that affecting the productivity and profitability performance, on the basis of the opinion of the ERL executives are considered to be the crucial criterion for problem identification. As such the following table arranged by using Likert's 5 point scale regarding importance of factors for performance of ERL:

Table-12
Factors considered in determining the profitability and productivity performance of ERL

Factors	Response Scale					Weighted importance	Rank
	Strongly agree	Agree	Indifferent	Disagree	Strongly Disagree		
	5	4	3	2	1		
1. Capacity Utilization	7	3	-	-	-	4.7	1
2. Production policy	8	-	-	2	-	4.4	4
3. Mgt-employee Efficiency	5	-	3	2	-	3.8	5
4. Growth of revenue & production	1	4	5		-	3.6	6
5.Innovation and expansion	6	2	2	-	-	4.4	4
6. Debt management	7	3	-		-	4.7	1
7.Asset Management	7	3				4.7	1
8. Tax policy	2	5	-	3	-	3.6	6
9. Decision making authority	8	1	1	-	-	4.7	1
10. Cost control system	5	5	-	-	-	4.5	3
11. Budgetary control	6	4	-	-	-	4.6	2

Note: Weighted importance is calculated using weights of 1 'strongly disagree to 5 for strongly agree.'

Source: Field Investigation.

Table-12 depicts the factors considered in determining the profitability and productivity performance of ERL. The position of factors according to their weighted importance are given below:

a) Capacity utilization (weight 4.7)
b) Debt management (weight 4.7)
c) Asset management (weight 4.7)
d) Decision making authority (weight 4.7)
e) Budgetary control (weight 4.6)
f) Cost control system (weight 4.5)
g) Production policy (weight 4.4)
h) Innovation and expansion (weight 4.4)
i) Management employee efficiency (weight 3.8)
j) Growth of revenue and production (weight 3.6)
k) Tax policy (weight 3.6)

According to the table-12 it is clear that respondents opinion regarding capacity utilization, debt management, asset management and decision making authority factors have considered highly important factors which would influence the productivity and profitability of ERL.

15. Problems in management of productivity and profitability of ERL:

1. From the primary data, it is seen that the organization does not have knowledge and ability of the people for the management of cost for the organization.
2. Yearly production of ERL is restricted by the production budget of Bangladesh petroleum corporation (BPC).

3. Processing fee and other fees of ERL's products are determined by the BPC which are not rationally increase since long time.
4. The aim and objectives set in the administrative manual for the organization are all directed to BPC, but it does not state how the fund will be generated for its survival.
5. The organization does not have structure cost management system to control cost and to maximize revenue.
6. Though the main function of the company is to refine the crude oil, but ERL has no process costing techniques.
7. ERL has no practiced on activity budgeting, JIT technique.
8. ERL does not ensure the compliance of cost management, which is most important aspect in the present scenario.

16. Policy implications for ERL:

The study suggests the following policy implications for ERL:

a) The pricing rules should be practical and flexible so that ERL independently run the business.
b) In order to increase the processing capacity of ERL, Balancing, Modernization and expansion (BMRE) of ERL, as accepted by the Government should be implemented as soon as possible.
c) Construction of several other tanks for product storage is required to be done soon. Sometimes lack of storage area for a particular product may lead to plant shutdown.
d) ERL should invest more money in Research and Development for long run sustainability.
e) For increasing the revenue ERL might use intensive strategic marketing programs for the long term sustainability of ERL
f) Efficiency should be developed for proper financial management techniques of ERL.
g) The power generation capacity is required to be increased for improving productivity.

Conclusion:

This paper is a pragmatic study where the main intension was to analyze the profitability and productivity of ERL and to find out the ways to optimum utilization of resources towards the price satiability of petroleum products in Bangladesh. The study found that the profitability performance of this selected company was not in satisfactory position. The overall productivity of ERL was not found reasonable although productivity in terms of per employee sales, profit and total asset assets found satisfactory. The study also found that non financial performances in case of customer perspective, internal business perspective and growth and innovation perspective. ERL achieved their target to a great extent. Discussion made so far lead us to conclude that further research might be taken to explore the performance evaluation of ERL and current study will act as a guideline in this regard.

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Appendix-1:

Table-13
Regression analysis of total productivity against output

Model	R	R square	Adjusted r square	Std Error of estimate
1	0.7709	0.594286978	0.459049303	0.041929581
a. predictor: (Constant), output				

Table-14
'F' test of the regression analysis of total productivity against output

Model		Sum of square	d.f	Mean square	F	Sig.
1	Regression	0.007725731	1	0.007726	4.394389	0.127014
	Residual	0.005274269	3	0.001758		
	total	0.013	4			
a. predictors:(constant), output b. dependent variable: total productivity						

Table-15
'T' test of the regression analysis of total productivity co-efficient against output

		Un standardize co-efficient		t	sig
model		B	Std. error	B	Std. error
1	Constant	1.000078473	0.149027995		
	Output/sales			2.09628	0.00001376
Dependent variable: total productivity Source:					

Appendix-2:

Table16
Regression analysis of total productivity against total debt

Model	R	R square	Adjusted r square	Std Error of estimate
1	-0.29344	0.594287	0.459049	0.04193

a. predictor: (Constant), total debt

Table-17
'F' test of the regression analysis of total productivity against total debt

Model		Sum of square	d.f	Mean square	F	Sig.
1	Regression	0.007726	1	0.007726	4.394389	0.127014
	Residual	0.005274	3	0.007726		
	total	0.013	4			

a. predictors:(constant), total debt
b. dependent variable: total productivity

Table-18
'T' test of the regression analysis of total productivity t co-efficient against total debt

		Un standardize co-efficient		t	sig
model		B	Std. error	B	Std. error
1	constant	6.710675	0.149028		
	borrowing	0	0	2.09628	0.0000137

Dependent variable: total productivity
Source:

Appendix-3:

Table-19
Regression analysis of net profit against sales/ output

Model	R	R square	Adjusted r square	Std Error of estimate
1	0.309444	0.095756	-0.20566	4.148765
a. predictor: (Constant), Sales				

Table-20
'F' test of the regression analysis of net profit against sales/ output

Model		Sum of square	d.f	Mean square	F	Sig.
1	Regression	5.468126	1	5.468126	0.317688	0.612385
	Residual	51.63675	3	17.21225		
	total	57.10488	4			

a. predictors:(constant), output
b. dependent variable: profitability

Table-21
'T' test of the regression analysis of net profit co-efficient against sales/ output

		Un standardize co-efficient		t	sig
model		B	Std. error	B	Std. error
	Constant	-0.03711	14.74573		
		0	0	0.563638	0.001362
Dependent variable: profitability Source:					

Appendix-4:

Table22
Regression analysis of net profit against total debt

Model	R	R square	Adjusted r square	Std Error of estimate
1	(0.93)	0.86	-0.331567925	4.360017963

a. predictor: (Constant), total debt

Table-23
'F' test of the regression analysis of net profit against total debt

Model		Sum of square	d.f	Mean square	F	Sig.
	Regression	0.075610078	1	0.07561	0.003977	0.95368
	Residual	57.02926992	3	19.00976		
	total	57.10488	4			

a. predictors:(constant), total debt
b. dependent variable: profitability

Table-24
'T' test of the regression analysis of net profit co-efficient against total debt

		Un standardize co-efficient		t	sig
model		B	Std. error	B	Std. error
	Constant	0.725966	9.771955893	0	0
		0	0	0.063067	0.002370747

Dependent variable: profitability
Source:

Appendix-5:

Table-25
Regression analysis of net profit against total productivity

Model	R	R square	Adjusted r square	Std Error of estimate
1	0.535552	0.286816	0.049088	0.04056

a. predictor: (Constant), total productivity

Table-26
'F' test of the regression analysis of net profit against total productivity

Model		Sum of square	d.f	Mean square	F	Sig.
1	Regression	0.001985	1	0.001985	1.206489	0.35228
	Residual	0.004935	3	0.001645		
	total	0.00692	4			

a. predictors:(constant), total productivity
b. dependent variable: profitability

Table-27
'T' test of the regression analysis of net profit co-efficient against total productivity

		Un standardize co-efficient		t	sig
model		B	Std. error	B	Std. error
	Constant	1.010617	0.045124	22.39655	
		0.005895	0.005367	1.098403	

Dependent variable: profitability
Source: