

NEAR EAST UNIVERSITY Economics & Administrative Sciences

1988

**Department of Business Administration** 

# **MAN 400**

# **Graduation Project**

# "Productivity and Its Measurement Case of Fernas Ltd."

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Nicosia 2004

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# ACKNOWLEDGEMENTS

Preparing a project needs a wealth of accumulation of knowledge. I wish to sincerely extend my graduation to all my lecturers who contributed to my education, helped and guided me. In particular I am very grateful to my project supervisor Mr. Ali MALEK for his help and guidance. I would also like to extend my appreciation to my friend Ahmet Gürbüz who did his best to help me prepare this project.

I wish to extend my greatest respect and appreciation to my family who has never hesitated to support me during whole of my life.

#### **1. INTRODUCTION**

Principal in the last decade productivity management plays in important role in success of a business. Productivity provides to cost advantages of a organization. In other words competition advantages.

Firstly we give to general information productivity and component factors. Then we select to FERNAS LTD in construction firms.

We researched to performance management, measurement, key performance indicators, productivity in construction, factors affecting construction productivity, productivity measurement, and productivity improvement during design and construction.

In result we made to recommendation to FERNAS ltd. And explained to research of this study.

# 1.1. General information of productivity

Productivity is a process of continuous improvement in the productivity, supply of quality output service through efficient effective as of inputs with emphasis an teamwork for the betterment of all, (according to National trade union congress. Definition)<sup>1</sup>

In other words I don't have enough time. I wish. I had a twin. I feel like I'm going no where fast. All of as have felt this way at same point in our lives. In most of these situation. We felt like this because we had no direction, no final destination or no path to achieve our final destination.

Productivity will give you same tools to help you formulate plans. This plan will help you identify your goals and research them by helping you define a specific plan. Many different companies provide expensive tools to help you do this but all of them equate to what you will learn here.

As the definition of productivity above indicates Productivity can be achieved in both production establishments and services establishments. Productivity must not be confused with production. It is not simply the quantity of output. Some of the main objectives of productivity improvement plans in an establishment are to:<sup>2</sup>

- Satisfy customers' needs.
- Create a 'learning culture'.
- Eliminate wastage.
- Improve management effectiveness.
- Keep up to date with technology.

<sup>&</sup>lt;sup>1</sup> Prokopenko, J. (1987) "Productivity Management: A Practical Handbook" International Labour Organization, Geneva

<sup>&</sup>lt;sup>2</sup> Iyaniwura, O. and Osoba, A.M. (1983) "Measuring Productivity; Conceptual and Statistical Problems: Improvement of Statistics" in Osoba A.M. (ed.) 'Productivity in Nigeria' Proceedings of a National Conference' NISER, Ibadan.

In order to achieve good productivity in any establishment there are several tools that can be used. In some cases more than one tool is used, often in succession moving from one to the next as the programmed develops and expands within the organization

### 1.1.1. Component elements product

GOAL- the and toward which effect is directed.

OBJECTIVE- something toward which effort is directed.

TASK- assigned piece of work often to be finished within a certain period of time: something hard or unpleasant that needs to accomplish.

In order to achieve the best result we use to various element

- setting goals
- setting objectives
- setting task
- prioritizing
- just say

### 1.2. The objective of the study

In the last decade productivity factor has become of business successfully The purpose of this study was to find measures of productivity which could be used to evaluate site performance. Such measures should be cheap, understandable, and univocal and be possible to relate to company objectives.<sup>3</sup>

<sup>&</sup>lt;sup>3</sup> Lawlor, A. (1985) "Productivity Improvement Manual" Aldershot, United Kingdom.

In the results from productivity measurements, a process of internal benchmarking could be initiated at construction companies. This could make it possible to find sites with excellent performance investigate the factor of importance for such performance and try to use these results in a process of continuous improvement finding such determinants of site.

Productivity is of vital importance for the improvement of the performance of a company.

### 2. PRODUCTIVITY IN CONSTRUCTION

The construction industry since decades has been experiencing chronic problems such as low productivity, poor safety, inferior working conditions and insufficient quality. These problems have been viewed as factors that affect construction performance. It is also noticed that the construction performance affect productivity across all sectors of the economy.

The productivity of the systems is a dominant issue of the present era, is playing a critical role, and considered to be a vital parameter for the success of any business. Productivity has a variety of meanings. It may be the cost per unit of output produced by the facility or a naught measure of percentage in view of the various project participants. All approaches no matter what ever the meanings they carry, fundamentally attempt to measure the effectiveness with which the resource are employed to produce quality at the lowest feasible cost.<sup>4</sup>

Productivity growth has received greater attention since last decade. Productivity is based on the economics at this most basic level. It's measured as the ratio of output to input.

Oglesby. G.H., parker.H.W. And Howell, G.H (1989 Productivity improvement in construction, McGraw

Productivity is historically expressed as the ratio of output to the most critical input with all the other inputs held content. In construction industry that requires skilled labor, which is often in relative shortage, output per worker is considered as the most appropriate measure of productivity. The data for generating measures of productivity growth should include as many output and inputs of the construction method as possible in order to reflect all production and cost. Output is usually measured as an aggregate of all types of activities. The categories of input generally identified are capital, labor, energy, and sometimes purchased services. with the increasing recognition that productivity growth is the key to sustained economic expansion, measuring productivity is becoming important. The accurate measurement of productivity growth plays an important role in providing the information need to put forth better policy recommendation and to make the right decisions.

#### 2.1 The reasons for measurement

Such measurements of productivity can also be used for strategic as opposed to project control. Should a new style of development, or new method of team organization, or the use of a new tool, or the use of new programming language be proposed: productivity metric will be essential? The effects, either beneficial or harmful, of the proposal could be measured by predicting the productivity using established techniques and measuring the actual productivity when using the new techniques. For this to be possible then the management structure of the developing organization must have available historical information concerning the complexity and productivity of the established techniques which have been gathered over a number of projects.<sup>5</sup>

We know that many of the promises of the new economy really did make sense, and were adopted even as the recession loomed. The result is that today there's an even better case for productivity gains from technology.

<sup>&</sup>lt;sup>5</sup> Scott, S. (1983) "Much Ado About Productivity: Where Do We Go From Here?" Industrial Engineering, vol. 15, no. 10, October

Every company is finding wars to use technology to improve production planning and turnaround times, lower inventories, improve economies of scale, design more capacities effective training, create better business processes, tighten automation between partners. Etc.

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The fact is, enterprise software is making real headway in improving productivity lowering costs and streamlining operation. Not to mention facilitating new market. In other words, 3 years post-hype we're finding that greens on comments seen tooth prescient and conservative. The improvement had had an impact across the board, from the boardroom to the shop floor, from midsized regional players to global giants. While for from perfect, the fact remains that. With 2004 on the June, it's time to say that enterprise software is beginning to hit its stride.

Ni response, management began the process of designing a strategy was management's expectation that operational productivity would also improve. This was on expectation, but not a goal, of the strategy the goal was to create a system which would give customers exactly what they wanted, when they wanted it

The first stage of the strategy involved reengineering the company's processes and produces to increase transactional speed, reduce handling and eliminate non-value-added tasks. The first stage took almost two years to complete. The second stage focused on the installation of management information. System capable of serving the needs of the processes that had been reengineered and supporting the concepts of synchrous manufacturing, or as it also called ,demand-flow manufacturing. User teams selected the required.<sup>6</sup>

<sup>&</sup>lt;sup>6</sup> Oglesby. G.H., parker.H.W. And Howell, G.H (1989 Productivity improvement in construction, McGraw

Software and hardware conversion of all management information to the new, totally integrated system was colleted in a relatively short time frome,15 month, although, debugging took another eight months to complete.

But something was amiss from the employee's point of view. The company's traditional measurements of factory efficiency indicated that production was becoming less efficient yet from a financial perspective, profitability was improving and from a service perspective, customer satisfaction was improving. Notwithstanding these positive indicators factory managers were reluctant to continue pursuing a productivity improvement program that made their performance appear poor. They were tempted to return to the traditional methods of allowing long production runs which built unneeded inventory and weeding short product runs demanded by the daily booking of customer orders.

The improvement team reinforced the benefit to both the customer and the company of producing only what is required and no more. Top management agreed to test the efficiency performance measurement system that world unite customer satisfaction and factory performance. In the same measurement system, the team set up a committee to how demand-flow performance measures were designed and implemented.

The measurement committee tackled the challenge of deigning a performance measurement system that would help drive continuous productivity improvements and increase customer satisfaction. Committee members kept four objectives in mind as they pieced together Brown's new measurements system. These four objectives were considered essential for focusing the measurement system so that it would deliver the desired productivity result.

The system had to be truly strategic. I.e. sit had to focus on activities that directly affect the business performance of the total company-today and in the future.

The system had to be relevant, i.e. it had to focus on performance behaviors that are directly linked to a customer satisfaction measurement customer do not buy a company's internal efficiency results. They buy product that are delivered on time; The system had to robots, i.e. it had to simple to understand, easy to use, demonstrate its merits quickly, and vigorously support a transition to a demand-flow operating environment and the system has to facilities task of holding individuals accountable for making a measurable contribution to a company side objective so satisfying customer, i.e. it had to tie manufacturing and supporting deponents together in a was that clarified the interrelationship of all departments of the company-individual employees and entire departments were expected to learn how to take only those actions which had a positive affect on customer service.

The new system of measurements the committee desired was a radical departure from the past. Instead of processing were to maximize earned hours, factory managers and employee were retrained to shift their decision making and behavior to measure up to a new yardstick on-time delivery of complete orders that meet customer due dates. This shift provided the focus desired by both the customer and management.

The essence of this new approach is balancing on-time delivery with operating costeffectiveness. The performance measurement that unfailingly points decision-makers in the direction of continuous improvements toward this balance is the classic synchronous manufacturing measurement of the throughput over inventory.

#### 2.1.1. Changing operating culture

The improvement team recognized that changing the organization's performance measurement system to be based on the flow in the face of the eamed-hour mindset. Factory management was not used to treading labor as a fixed cost and exec dating human resources to making only parts that meet demand. Under the new performance measurement system if the market orders 180 parts, the organization most respond by making 180 parts. Whereas in the past on operator who set up for that part may have made 1000 pieces, now he or she must make only what the market orders. There is an enormous assistance of unnecessary cost on this approach, but they are a by-product of focusing on faster, more reliable delivery yon customers. The objective was and is customer satisfaction.<sup>7</sup>

# 2.1.1.1. What is productivity

A general definition is that productivity is the relationship between the output generated by a production or service system and the input provided to create this output. Thus, productivity is defined as the efficient use of resources – labor, capital, land, materials, energy, information – in the production of various goods and services.

Higher productivity means accomplishing more with the same amount of resources or achieving higher output in terms of volume and quality for the same input. This is usually stated as:

Output

\_\_\_\_\_ = Productivity

#### Input

Above all else Productivity is an attitude of mind; a mentality of progress, of constant improvement of that which exists; it is the confidence of being able to do better today than yesterday, and less well that tomorrow.

"Productivity is the point where human skills and interests, technology, management and the social and business environment all converge." <sup>8</sup>

<sup>&</sup>lt;sup>7</sup> Olomolaiye, P.O., Jayavarde.AKW. And Harris, F.C (1998) construction productivity management, Addison Wesley Longman. UK

<sup>&</sup>lt;sup>8</sup> Prokopenko, J. (1987) "Productivity Management: A Practical Handbook" International Labour Organization, Geneva.

"It measures the extent to which the given inputs are transformed into outputs. Higher productivity means accomplishing more with the same or lesser amount of input resources."<sup>9</sup>

"Technically, productivity is defined as the relationship between the amount produced and the resources used in its production; e.g. how much output (value added for companies or Gross Domestic Product (GDP) for the economy) is produced by the economic unit using its various inputs."

#### 2.1.1.2. Measurement of Productivity

Productivity in its simplest form is the ratio of output generated to the inputs consumed, which is expressed by the following formula

#### PRODUCTIVITY = OUTPUT/INPUT

Where:

**Output** = goods produced by the enterprise. It can be measured in terms of value of **production** or added value

**Input** = factors of production, namely, labour, man hours, materials, energy, capital (fixed capital asset, depreciation etc) and other resources, such as managerial skills.

Lawlor, A. (1985) "Productivity Improvement Manual" Aldershot, United Kingdom.

# 2.1.1.3. Types of Productivity measurement:

1. Partial factor productivity measure: productivity is measured by the ratio of output to **one input** only (examples: ratio of output per unit of labour, or of capital, land, raw materials, fuels and other utilities)

2. Multi-factor productivity measure or total factor productivity measure: productivity is measured by the ratio of output to more than one factor input

Partial factor productivity measure is widely used and some common measurements are Labour productivity and Capital productivity

**Labour productivity** examines the output or the added value in relation to the number of persons employed in the production process or man hours. Labour productivity measures the efficiency and effectiveness of each employee in generating <u>added value</u> or total output.<sup>10</sup>

# 2.1.1.4. RATIO one for Labour Productivity:

# Labour Productivity = Added Value/ Number of Employees

Unit: RM per employee

Reflects the amount of wealth created by the company, relative to the number of employees it has. It is influenced by :

<sup>&</sup>lt;sup>10</sup> Antle, M. J.and Capalbo, S.M. (1988) "An Introduction to Recent Development in Production Theory and Productivity Measurement" in Capalbo, S.M. and Antle, M.J. 'Agricultural Productivity: Measurement and Explanation' Resources For the Future, Inc., Washington, DC.

-Management efficiency -Work Attitudes -Price effects -Demand for the products A high ratio indicates the favorable effects of the labour factor in the wealth creation process. A low ratio means unfavorable working factors such as: -High bought-in materials and services -Time and materials wastage -Inadequate salary/wage rates

#### 2.1.1.5. RATIO two for Labour Productivity:

#### Total Output Per Employee= Total Output/Number of Employees

#### Unit: RM per employee

The size of output generated by each employee of the enterprise.

Gives an indication of efficiency and /or marketing capability.

A high ratio reflects a good marketing strategy adopted by the enterprise.

A low ratio indicates:

-Deliberate business policy of having low turnover but high profit margin/added value. -Low product profile and quality.

**Capital productivity**: the measure used in determining the value generated per unit of capital employed.

Capital productivity =

Nofaa Velaa Output or added value capital input employed

Capital Productivity = Output/Capital Input Employee

#### 2.1.1.6. RATIO one for Capital Productivity:

Capital Productivity(CP) = <u>Added value</u> Fixed Assets

Capital Productivity (cp) = Added Value/Fixed Assets

Unit: Pure Number

Indicates the degree of utilization of tangible fixed assets high ratio indicates efficiency of assets utilization low ratio reflects poor assets utilization

#### 2.2.1.7. RATIO two for Capital Productivity::

Capital Turnover = Total Output Fixed Assets

#### Capital Turnover = Total Output/Fixed Assets

Unit: Pure Number

This ratio indicates the efficiency in capital utilization and of a marketing system A high ratio indicates efficiency in capital utilization and a good marketing system A low ratio means low turnover of materials, high work-in-progress and fixed assets.

#### 2.2.1.8. RATIO three for Capital Productivity

Capital Intensity(Ci) = Fixed Assets
Number of Employees

#### Capital intensity = Fixed assets/number of employees

Unit: RM per employee

This ratio indicates whether an enterprise adopts a capital-intensive or labour-intensive policy

A high ratio indicates high capital intensity.

A low ratio means:

-Dependence on labour-intensive methods -Low technological inputs.

#### **3. ADDED VALUE**

Added value measures the wealth generated by the collective efforts of those who work in an enterprise (namely, the employees) and those who provide the capital (namely the investors and shareholders). It represents the net output as produced by an enterprise used to pay those who have contributed to its creation in terms of wages and salaries for the employees, interest and loans, taxes, dividends and retained earnings to the shareholders and depreciation of the fixed assets investment.<sup>11</sup>

#### 3.1 Methods of added value computation

Added value is the difference between total output and bought-in materials and services. The bought-in materials and services are also referred to as intermediate inputs.

There are two ways to calculate added value:

Method 1

Added value=

Total

Output

subtract

Bought-In materials and services

Added value is used to pay labor cost, interest, taxes, depreciation and profit.

#### Method 2

**Added** value = Labor cost + Depreciation + Taxes (indirect) + Interest + Profit

G.N. (1962) "Planning for Increased Productivity in Industries" Butterworths, Sydney, London.

**Total Output** = {Net Sales + Closing stocks of Finished Goods- Opening Stock of Finished Goods} + {Work-in-process (WIP) (Closing)} - {Work-in-process (WIP) (Opening)} + {Own Construction} + {Income from sales of goods purchased in same condition} + {Income from services rendered}.

**Bought-in Materials and Services** = {Materials consumed + supplies, consumables, printing and lubricants} + {Cost of goods sold in same condition} + {Utilities (water, electricity, fuels)} + {Payment to contractors} + {Payment for industrial work done by others and stores and supplies} + {Payment for non-industrial services}

Labour cost = wages and salaries (including commissions, allowances, bonuses and benefits)+ remuneration paid to working directors/proprietors/partners + fees paid to non-working directors for their attendance at the Board of Director's meetings+ payments in kind to paid employees + value of free wearing apparel provided + employer's contribution to government funds.

# 4. HOW TO MEASURE A COMPANY'S PRODUCTIVITY

The flow chart below shows briefly the steps by which a company can measure and assess its productivity

#### 4.1. Measuring and assessing a company's productivity



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#### **5. COMPETITIVENESS**

Competitiveness in terms of labour cost indicates the comparability of the industry in producing products or services at the lowest possible labour cost.<sup>12</sup>

5.1. The four competitiveness ratios.

**5.1.1. RATIO one for Competitiveness:** 

Labour cost competitiveness(LCC) =  $\frac{\text{Added Value}}{\text{Labour cost}}$ 

**UNIT:** Pure Number

This ratio indicates how competitive the enterprise is in terms of labour cost. A low ratio indicates high labour cost which does not commensurate with added value creation.

#### 5.1.2. RATIO two for Competitiveness:

Labour cost per employee(LCE) = Labour cost Number of employees

**UNIT:** Remuneration per employee

What is tells:

This ratio measures the average remuneration per employee.

A high ratio means high returns to individual workers and vice-versa

<sup>&</sup>lt;sup>12</sup> Scott, S. (1983) "Much Ado About Productivity: Where Do We Go From Here?" Industrial Engineering, wol. 15, no. 10, October.

5.1.3. RATIO three for Competitiveness:

Unit Labour cost(ULC) = Labour cost Total Output

**UNIT:** Pure number

This ratio indicates the proportion of labour cost to total output a high ratio indicates high labour cost due to labour scarcity and lack of skilled labour or poor labour-mix. It could be due in addition to high labour turnover

5.1.4. RATIO four for Competitiveness:

% Labour Cost in Total Input =  $\frac{\text{Labour cost}}{\text{Total Output}} \times 100\%$ 

UNIT: Per Cent

This ratio indicates the amount of labour cost as a percentage in total input. A high ratio indicates large portion of labour cost in the total input and reflects employment of skilled and/or experienced workers, excessive overtime, reworks and high labour intensity and vice versa.

#### Profitability

Profitability is measured by surplus per unit of output produced.

Profitability = Total output - Total input Total Output

**RATIO** for profitability:

Profitability = Operating Profit x 100% Total Output x 100%

#### **UNIT:** Per Cent

This ratio reflects the proportion of operating profit in total output A high ratio means that the enterprise is getting high returns. A low ratio normally implies high costs

#### 6. BUSINESS RETURNS

Business Returns measure the performance of an enterprise in terms of economic returns, both from the business and financial point of view.

#### 6.1. RATIO one for Business Returns:

Return on Assets (ROA) = Operating Profit Fixed Assets x 100%

**UNIT:** Per Cent

This ratio indicates the return on fixed assets of an enterprise High ratio indicates high return on investment in fixed assets and vice-versa.

#### 6.2. RATIO two for Business Returns:

Total Productivity Measure = Total Output Total Input

**UNIT:** Pure Number

**This** ratio indicates the amount of total output generated by each unit of input. **A high** ratio indicates a better performance of the enterprise and vice-versa

#### 7. BACKGROUND OF FERNAS

Fernas ltd is a civil engineering company specialized in gas pipeline business. According to my case are choices to Fernas ltd. Its construction company main strategic target is always favorable management productivity all operation process in a business.<sup>13</sup>

# 7.1. Methods used by Fernas ltd. For production and Measurement of Productivity

The efficient use of construction resources is essential to effective project management. This course provides knowledge of the modern techniques used for assessing the level of productivity forecasting optimum levels of productivity and deciding how to reach productivity goals through strategic management action.

Strategic management, performance management and measurement, key performance indicators, budget allocation systems, productivity in construction, factors affecting construction productivity, productivity measurement, productivity improvement during design and construction.

Fernas makes efforts to develop a performance management system and use the application of performance management to improve productivity.

Fernas use a Life cycle of a performance measurement system. They keep and make balanced scorecard, key performance indicators

As part of their strategic management they make identification of vision, mission strategic, goals and objectives levels and types of strategies. Strategy formulation and translation strategic budgeting system.

www.fernas.com.tr



Following are some of the factors effecting the productivity of the Fernas company:

- On-site factors; job conditions, preplanning, management condition human factors equipment utilization, material handling site organization.
- Off-site organizations government regulation, financial status organizational and contractual constraints, supplier etc.

#### 7.2 Construction Productivity Measurement

- direct productivity measurement: production units/input
- Indirect productivity measurement: work sampling five-minute rating time-motion study, etc.

#### 7.3 Construction Productivity Improvement

Design stage value engineering, constructability study, selection of designer, contractor, and construction management firm.

Construction stage; data gathering for on-site productivity improvement working condition improvement site-organization improvement, preplanning for an site productivity improvement, worker motivation on site communication, material and equipment management etc. serration modeling; use of operation modeling for productivity improvement such as aim planning and scheduling line of balance models, areas balance charts etc. land and buildings-rental for hiring machinery and equipment other operating expenses.

#### 8. PRODUCTIVITY MEASURES OF THE FERNAS

Fernas make the following calculations in order to measure productivity.

#### **8.1 PROFITABILITY**

Profitability is the difference between the value of goods produced and the cost of the resources used in their production. In addition, it is the most important determinant of long-term business performance. An increase in profits will overtime result in an improvement in all the ratios.

Source - Income Statement Value - Market

#### **Profitability Ratios**

#### 8.1.1 Net Income

This represents the return to the labor, management, and equity invested in the business. It is the producer's reward for investing their unpaid labor, management and money in the business instead of elsewhere. Anything left in the business and not used for living and taxes, will increase business net worth next year.

Calculation Net income is taken from

Gross income

360 000 > \$60 000

Good Acceptable \$60 000 \$20 000

Poor < \$20 (

the income statement =	Expenses	- 300 000	-
(Gross cash income -Total cash	Inventory change	$+20\ 000$	\$60 000
expenses + Inventory changes - Depreciation and other capital	Depreciation Net	-40 000	
	income	= \$40	
		000	

#### 8.1.2. Rate of Return on Assets

- measures the rate of return on all (producer's and creditor's) investments in the

Business.

allation			Good	Acceptable	Poor
on assets	Net income	40 000	> 5 %	1 - 5 %	< 1 %
timcome +	interest	$+20\ 000$			
₩ -*Value of	Op. labor and 1	ngt25 000			
s labor	Return on asse	$ts = $35\ 000/$			
gement)	Average assets	\$850 000			
total	2				

#### Rate of return = 4.1%

• The "value of operator's labor and management" represents the returns to employees for investing their time and management skills in the business. Because net income is defined as returns to labor, management, and equity capital, a charge for equity capital must be subtracted to arrive at the returns to labor and management.

Labor and Management Earnings = Net Income - Interest on Net Worth

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## 8.1.3 Rate of Return on Equity

- measures the rate of return on the producer's investment in the. If it is higher than rate of return on assets, a positive leverage is being employed.

Calculation			Good	Acceptable	Poor
Return on equity	Net income	40 000	> 10 %	5 - 10 %	< 5 %
(Net income -Value of operator's	Op. labor and mgt.	-25 000 =			
labor and management) Average	Return on equity	\$15 000/			
total equity over the year	Average equity	\$550 000			
(Total assets - Total liabilities)	Rate of return	= 2.7%			

## 8.1.4. Operating Profit Margin Ratio

- shows the operating efficiency, or profitability of the business.

Calculation			Good	Acceptable	Poor
Return on assets	Return on assets	\$35 000/	> 35 %	20 - 35 %	< 20 %
Value of production	(Gross income	360 000			
(Gross cash income + Inventory	Inventory change	$+20\ 000$			
changes in crops, feed, market and breeding livestock + Changes in	Receivable	+ 5 000 -			
receivables and other income items -	changes Feeder	55 000 -			
	lvst. purch. Feed	70 000)			
	purch.				
Feeder livestock purchased -					
Purchased feed)	Value of prodn.	= \$260			
		000			
	Op.				
	profit	= 13.5%			
No ang Sin Si Ng Ting Ng Ting	margin				

#### 8.2. LIQUIDITY

Liquidity is the ability of the business to meet financial obligations as they come due - to generate enough cash to pay living expenses and taxes, and make debt payments on time. With the greater volatility in costs and market prices, liquidity is becoming increasingly important.

Source - Balance Sheet Value - Market

**Liquidity Ratios** 

#### 8.2.1 Current Ratio

- measures the extent to which current assets would cover current liabilities, if liquidated within a one-year period.

	<b>Current</b> ratio	= 1.57			
Total current liabilities	Current liabilities	140 000			
Total current assets	Current assets	220 000/	> 2.0	1.0 - 2.0	< 1.0
Calculation			Good	Acceptable	Poor

#### 8.2.2. Working Capital

- determines the operating capital available in the short term from within the business.

Calculation			Good	Acceptable	Poor
Total current assets -	Current assets	220 000	> 25 % of	> 0	< 0
Total current liabilities	Current liabilities	-140 000	operating		
	Working cap.	= \$80 000	expenses		

### **8.3 FINANCIAL PRODUCTIVITY**

Financial Efficiency shows how effectively the business uses assets to generate income. Past performance could well indicate potential future accomplishments. It also answers the questions:

• Are all available assets being used to their fullest potential?

• What are the effects of production, purchasing, pricing, financing, and marketing decisions on gross income?

Source - All Financial Statements <u>Financial Efficiency Ratios</u>

#### 8.3.1 Asset-Turnover Ratio

- measures capital usage efficiency, or capital productivity.

Calculation			Good	Acceptable	Poor
Value of production Average total assets over the	Value of prodn. Average assets	\$260 000/ \$850 000	> 25 %	15 - 25 %	< 15 0
year					

Asset/turnover = ratio 30.6%

## **8.3.2 Operating-Expense Ratio**

- shows the proportion of income that is used to pay operating expenses, excluding principal and interest.

Cost

Calculation Total operating	(Operating expense	280 000	Good < 65 %	Acceptable 65 - 80 %	Poor > 80 %
nterest)	Interest = \$260 000/	- 20 000)	o		
Bross income	Gross income Operating/exp. ratio	360 000 = 7 <b>2.2%</b>			

# 8.3.3 Depreciation-Expense Ratio

- indicates how fast the business wears out capital. It shows the proportion of income needed to maintain the capital used in the business. This ratio should be looked at over time. It will be misleading during major expansions and contractions.

Value - Cost

adjustments Gross income	Gross income <b>Depr./exp. ratio</b>	360 000 = <b>11.1%</b>			
Calculation Depreciation and other capital	Depreciation	40 000/	Good < 10 %	Acceptable 10 - 15 %	Poor > 15 %

8.3.4 Interest-Expense Ratio

- shows how much of gross income is used to pay for borrowed capital.

Value - Cost

Calculation			Good	Accentable	Deer
interest	Interest	20 000/	< 10 %	10, 20 %	> 20  W
Gross income	Gross income	360 000	10 /0	10 - 20 70	> 20 %

### 8.3.5. Net Income Ratio

- compares profit to gross income. It shows how much is left after all expenses, except for unpaid labor and management, are paid.

Value - Cost

Calculation		Good	Acceptable	
Poor				
Net income	Net income 40 000/	> 20 %	10 - 20 %	< 10 %
Gross income	Gross income 360 000 NFI ratio = 11.1%			

### **CONCLUSION**

It is always important to continually improve production records, so as to be better able to identify problem areas.

It is possible that a weakness in one of the above ratios, or areas may be offset by strengths in other areas. Variations may occur between different types of manufacturing operations, in terms of what may be considered an acceptable, or unacceptable ratio. Age, as well as the stage of business (beginner, near retirement, etc.), will also result in variations.

The value of financial ratios improves when they are used over time. In this way they will reveal the trends that are occurring. In addition, they will be more reliable because they will not be distorted by the effect of a single isolated situation.

Unfortunately, if all the preceding avenues have been explored and all solutions exhausted, it might be time to consider more drastic measures such as retirement, or bankruptcy.

#### Recommendations

There are mixed results regarding the productivity ratios. For example the rate of return ratio is 4.1. This is acceptable but in order to improve the figure above 5% there is a need to increase the net income or reduce the average assets. Both the rate of return on equity and operating profit margin ratio are below average and is poor. There is a need for improving gross and net incomes in order to achieve better results. In order to improve the situation all the employees and the management should be fully employed. Debt must be restructured (lengthen term, or reduce interest rate) to reduce interest costs, interest costs should be reduced by obtaining lower rates, assets should be sold in excess of their cash-generating potential.

In respect of financial productivity, it is seen that the asset-turnover ratio is at 30.6%. this is higher than the average and it seems top be very efficient. But the operating-

expense ratio is acceptable at 72.2%. Net income ratio is also acceptable at 11.1%. this can be improved by increasing the net income.

Overall, in order to improve the total productivity the company must obtain batter income without Increasing the cost of production.

#### References

Ahluwalia I. J. (1991) "Productivity and Growth in Indian Manufacturing" Centre for Policy Research, Oxford University Press, Delhi.

Amadi, A.O. (1991) "Recipe for Productivity Improvement" in Umeh, P.O.C. et al (1991) "Increasing Productivity in Nigeria" Proceedings of the First National Conference on Productivity 1sty-3<sup>rd</sup> December 1987, National Productivity Centre, Macmillan, Nigeria. Pp. 98 -106.

Antle, M. J.and Capalbo, S.M. (1988) "An Introduction to Recent Development in Production Theory and Productivity Measurement" in Capalbo, S.M. and Antle, M.J. 'Agricultural Productivity: Measurement and Explanation' Resources For the Future, Inc., Washington, DC.

Berndt, E. R. and Christensen, L. R. (1973) "The Translog Function and the Substitution of Equipment, Structures, and Labour in U. S. Manufacturing: 1929-1968" Journal of Econometrics, vol. 1, no. 1, pp. 81-114,

Construction productivity. UK. Http://www.ciriz.org.uk

David, L. S. (1972) "International Encyclopedia of the Social Science" (Ed.) Reprint edition, vol. 12, pp. 522-536.

Diewert, W. E. (1976) "Exact and Superlative Index Numbers" Journal of Econometrics, vol. 4. Pp115-145.

Eatwell, J.M. and Newman, P. (1991) "The New Palgrave: A Dictionary of Economics" vols. 3, 4 .& 12, Macmillan, Tokyo.

Foley, G.N. (1962) "Planning for Increased Productivity in Industries" Butterworths, Sydney, London.

Grosskopf, S. (1993) "Efficiency and Productivity" in Fried, H.O, Knox, C. L. L. and Shelton, S. S 'The Measurement of Productive Efficiency: Techniques and Applications' Oxford University Press, pp. 160-194, New York.

Iyaniwura, O. and Osoba, A.M. (1983) "Measuring Productivity; Conceptual and Statistical Problems: Improvement of Statistics" in Osoba A.M. (ed.) 'Productivity in Nigeria' Proceedings of a National Conference' NISER, Ibadan.

Klitgaard, R. (1989) " Incentive Myopia" World Development, vol. 17, no. 4 pp. 477-459.

Krugman, P. (1990) " The Age of Diminished Expectations" MIT Press., Mass., Cambridge

Lawlor, A. (1985) "Productivity Improvement Manual" Aldershot, United Kingdom.