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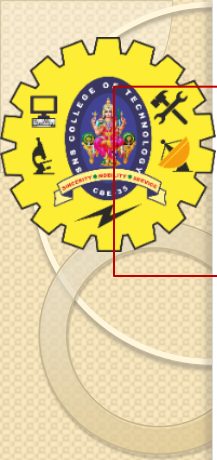
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DEPARTMENT OF AUTOMOBILE ENGINEERING

COURSE NAME : 19AUZ405 – LEAN MANUFACTURING

IV YEAR / VII SEMESTER

Topic – Dupont Model & Output based Measures



DuPont Model

DuPont Model

The DuPont model, which was developed by a French engineer in the 1940s.

It is an excellent tool to use to generate a “what if ” analysis utilizing a company’s income statement and the balance sheet.

It is time-honored instruments of the financial community are pivotal documents for reflecting the overall health of a company.

The “what if” scenario to determine whether improvement through a change in sales, an increase in asset turnover, or lower inventory levels will support operational objectives.



1. Also known as

- a) Du Pont Identity
- b) Du Pont Equation
- c) Du Pont Model
- d) Du Pont Method

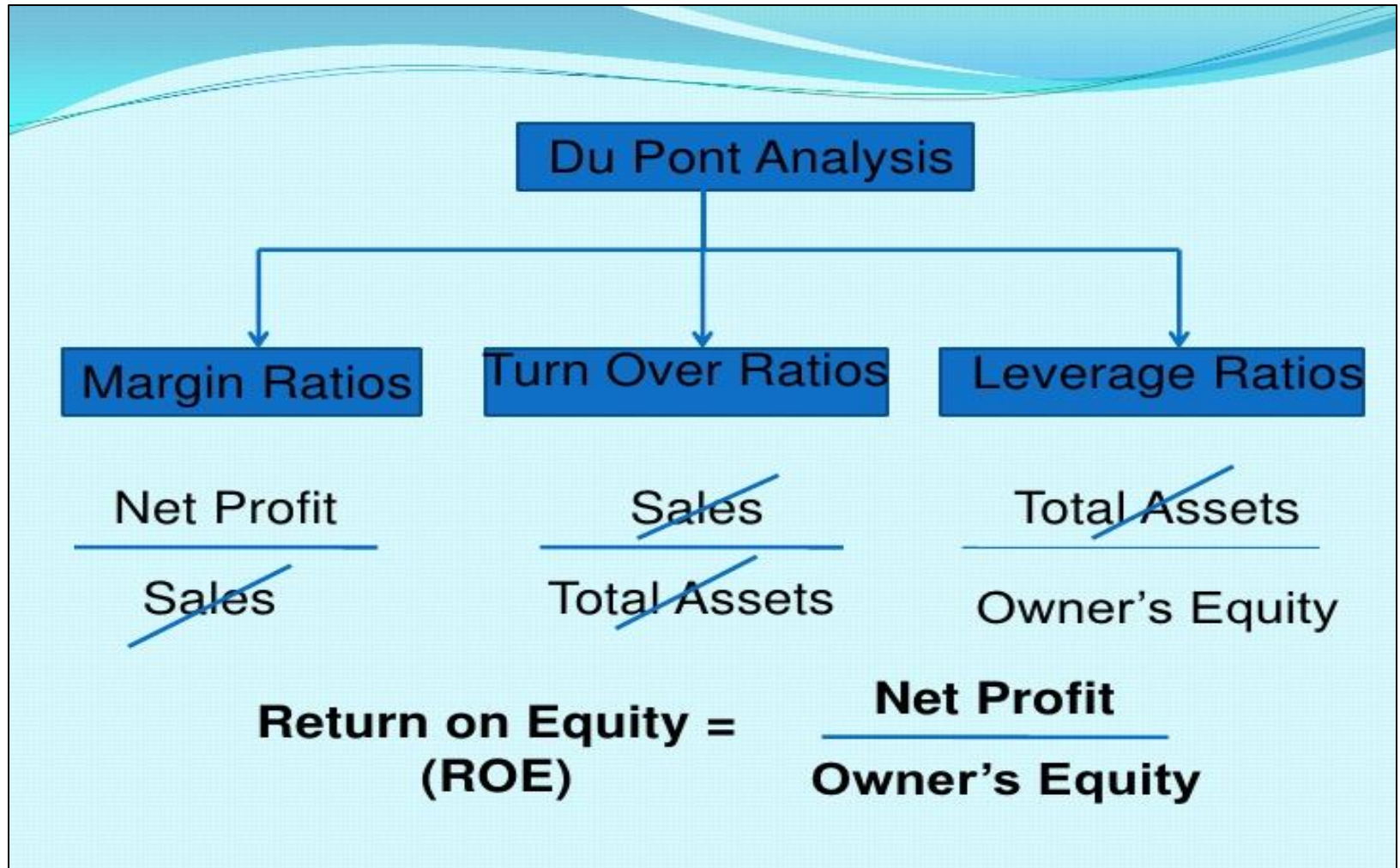
2. Pioneered by DU PONT Company of United States

3. It is a system of financial analysis which received wide spread recognition and acceptance

4. It was developed by DU PONT company for analyzing and controlling financial performance

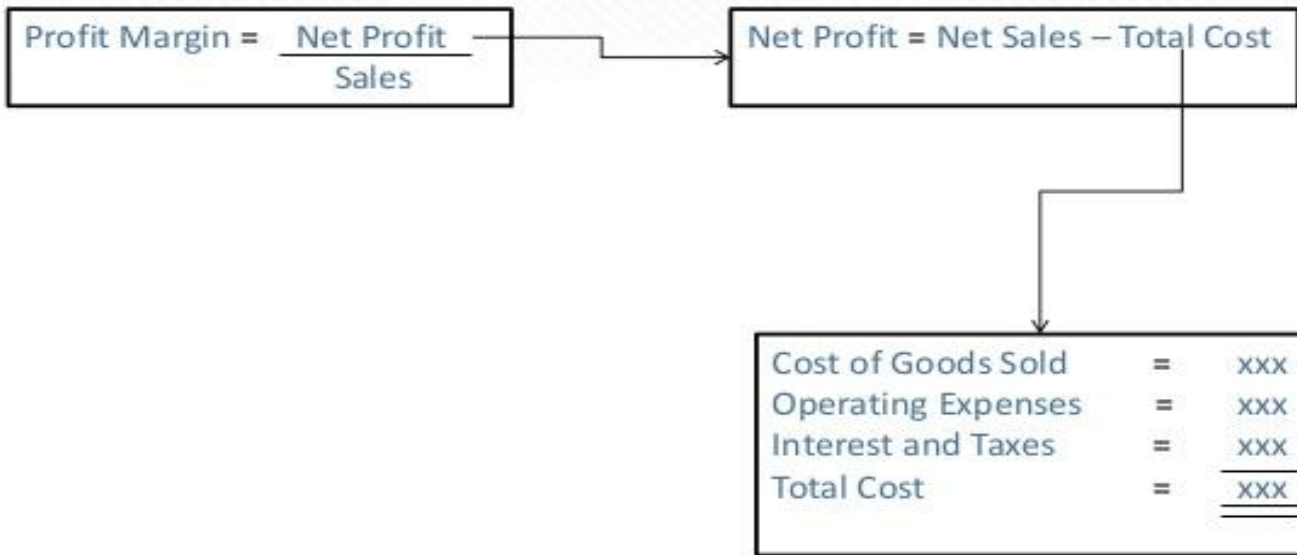
5. It is an expression which breaks Return on Equity into three parts :

- a) Profitability (Measured by **Profit Margin**)
- b) Operating Efficiency (Measured by **Asset Turnover**)
- c) Financial Leverage (Measured by **Equity Multiplier**)





Profit Margin





Asset Turnover

$$\text{Asset Turnover} = \frac{\text{Net Sales}}{\text{Total Assets}}$$

$$\text{Total Assets} = \text{Current Assets} + \text{Fixed Assets}$$

Inventory	=	xxx
Accounts Receivables	=	xxx
Cash and Bank Balance	=	xxx
Current Assets	=	<u>xxx</u>



Equity Multiplier

$$\text{Equity Multiplier} = \frac{\text{Assets}}{\text{Shareholder's Equity}}$$





Return on Equity

Return on Equity = Net Profit Margin X Asset Turnover X Equity Multiplier

$$\text{Return on Equity} = \frac{\text{Net Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Shareholder's Equity}}$$

$$\text{Return on Equity} = \frac{\text{Net Profit (or Profit after Tax)}}{\text{Shareholder's Equity}}$$





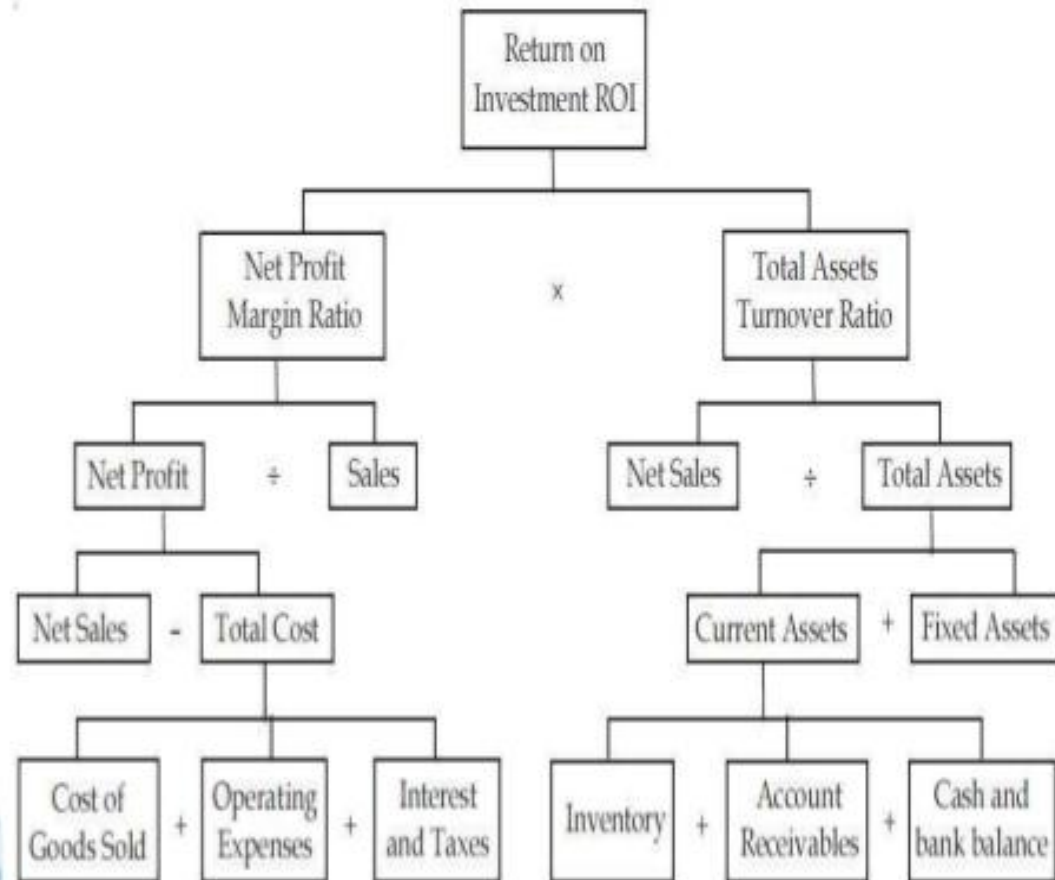
6. Helps in understanding How the net Return on Investment is influenced by the Net Profit Margin and Total Asset Turnover Ratio

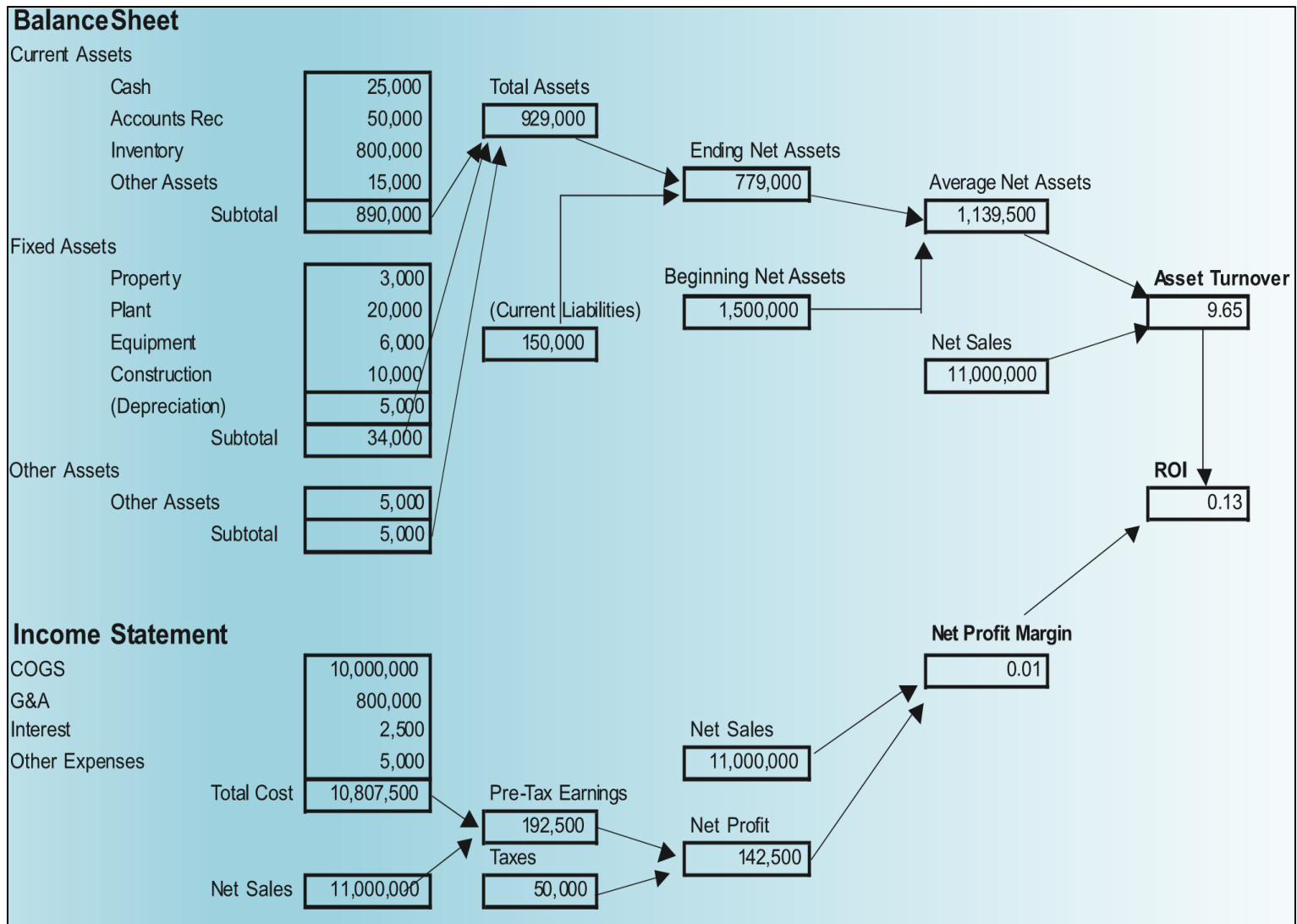
Return on Investment

Return on Investment = Net Profit Margin X Asset Turnover



DU PONT CHART





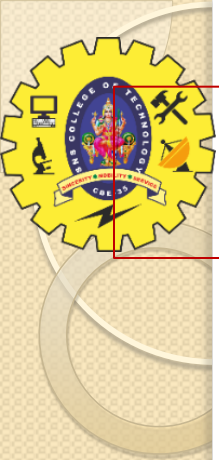


Example 1:

If the plant can reduce inventory by 21%, then total assets will decrease and the asset turnover ratio will increase by 9%. With all other elements remaining equal, this will improve the return on investment (ROI) calculation by 5%..

Example 2:

A second example would be if the cost of goods sold (COGS) is reduced by 7%, then total costs will decrease and net profit will improve by 4%. With all other elements remaining equal, this will improve the profit margin calculation by 2%.



Output-Based Measurements

Shop floor are measures:

It based on performance for a specific individual employee or piece of equipment.

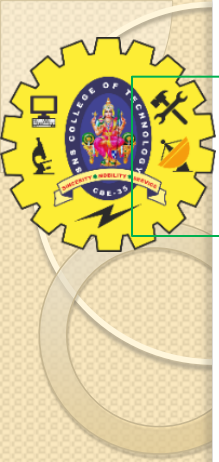
(E.g., How many hours were put in yesterday by Fred, or how many parts came off machine number 435 last shift, or what the yield of the drilling process was last hour).

Company monitoring :

Companies monitor individual operations in the manufacturing process and assign accountability and take corrective action based on them.

Example:

- (1) Drives the wrong behavior for continuous improvement.
- (2) Does not really have product accountability focused on the customer, and
- (3) Rewards optimization of the individual operation by sacrificing performance of the process as a whole.

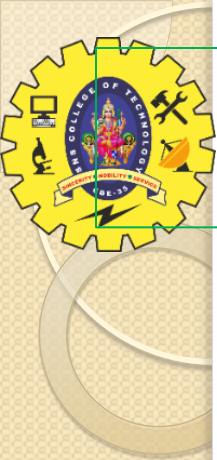


Output-Based Measurements

Measures on product-focused vs process-focused operations:

Product-focus:

- Its measures based on n shorter cycle times, faster response to market changes, less inventory, lower logistics costs, and, of course, lower overhead.
- The measures provide feedback on the performance of the overall process relative to the customer.
- Its measured based on customers performance of the product..
- Its measures based on product quality (e.g., yield, defects per unit, returns) and product delivery.
- Its measures based on product on cost or price.



Process-Driven Measures



Process metrics

- Process metrics are standard measurements that are used to evaluate and benchmark the performance of business processes. It is common for operational processes to be heavily optimized in a cycle of measurement.

Types of process matrices:

- **Efficiency:** The ratio of output to input.
- **Productivity:** Output in an hour worked.
- **Cycle time:** Duration of process from start to end.
- **Turnaround Time:** The amount of the time to fulfill a customer request. Measured from customer perspective and may span multiple business processes.
- **Takt time:** The time between starting one unit to starting the next.
- **Throughput :** Output in period of time.
- **Error rate:** The numbers of errors as a percentage of a total. For Example the number of products that fail quality control. Error rate is also commonly known as failure rate or defect rate.
- **Cost effectiveness:** The cost for a benefit



Thank You !