Chapter 5

Process Management/Measurement and Analysis

Introduction

Process: A specific ordering/sequence of structured work activities that include a beginning, an end, and clearly defined inputs and outputs.

Business process: A collection of related, structured business activities or tasks in a specific order that produce a specific service or product for a customer. Where such processes cross departmental boundaries, their interaction is normally referred to as Value Chain.

Categories of Business Processes

- **Upper-management processes** – Processes involved in governing entire organization. E.g. Strategic management processes
- **Operational processes** – Core processes in creating value. E.g. Purchasing, production, sales.
- **Supporting processes** – Functions that support core processes. E.g. Accounting, HR, I.T

O.S.U

Managerial Issues

Imperative: All functional managers must:

- View every set of activities as a process to be managed
- Know that functional processes are inter-linked
- Choose critical performance measures to monitor processes and take necessary corrective actions
- Use benchmarking to improve design, production and delivery to world-class standards.

Process Improvement

- Process improvement is a systematic method of continuously improving how organizations conduct businesses and projects to:
- Satisfying customers
- Producing products with almost no defects,
- Eliminating waste
- Implementing successful projects.

Selecting a Process

- In selecting a process, OM managers must identify each process' S & W in supporting firm strategy in particular market segments by considering:
- Standardization
- Flexibility
- Customization
- Speed of delivery

Why Measure Process?

- Is the basis / pre-requisite for management
- To determine if strategic goals are being achieved.
- Basis of comparism with competing firms.

Types of Performance Measures

Output categories

1) Volume – quantity
2) Standards – quality

Productivity

- Index/ratio of operational efficiency i.e. output (goods and services) relative to inputs (lab., mat., energy, others). Used for periodic internal and external comparism.
- Can be measured partially - per input (E.g. lab. Mat. etc) and combined to create a product.
- **Productivity = $\frac{\text{Output}}{\text{Input}}$**

Productivity

Productivity Implications:

- Business – competitiveness
- NGOs – lower costs
- Nations – growth of economy

Productivity growth – relative change in rate

$$\frac{\text{Current period prod'ty - Previous period prod'ty}}{\text{Previous period productivity}}$$

Computing Productivity

- Single input – Partial productivity
- 2 or more inputs - Multifactor productivity
- All inputs – Total productivity

- The choice depends on purpose for measurement.
- Partial measure -of greatest use in OM

Some Productivity Measures

- **Partial Measure: E.g.**

$\frac{\text{Output}}{\text{Energy}}$	$\frac{\text{Output}}{\text{Labour}}$	$\frac{\text{Output}}{\text{Machine hrs}}$	$\frac{\text{Output}}{\text{Capital}}$

- **Multi factor: E.g.**

$$\frac{\text{Output}}{\text{Labour + Machine}} \qquad \frac{\text{Output}}{\text{Capital + Material + Labour}}$$

- **Total Measure =** $\dfrac{\text{Goods or Services produced}}{\text{All inputs used to produce them}}$

Presentation of Results

- Numerator: Output in the form given –

Eg. No. of products; packs of products; Length of Material; An amount etc.

- Denominator: Input in measure given –

E.g. Lab. Hrs; Mach. Hrs; An amount etc.

- Solution: E.g. 200 packs per lab hr; 100 metres per mach. Hr; 50 boxes per $1. etc.

Que: Kenta & Swazi Ltd.

Soln (iv): Yr 1 productivity ratio – used as standard.

Hence:

- Calculate standard input for Yr 2 output.
- Deduct actual input from above
- Multiply difference by actual input price
- Repeat for all inputs and sum up.

Capacity

- Barnes (2008) -Level of activity or output achievable by an operation (facility or organisation) in a given period of time under normal working condition.

- Slact, et al (1995) -Maximum level of value added activity achievable by a process under normal operating condition.

Capacity

Output of a process in a given period (i.e. unit of output per unit of time) of time can be assessed via:

- Design capacity - The ideal output rate desired by firm under normal circumstances and for which the system was designed.
- Maximum capacity - The maximum potential output rate achievable when productive resources are used to their maximum.
- Capacity Utilization - Percentage of available capacity actually used. Design capacity (Ideal) versus maximum capacity

Capacity Decisions

Made at two levels:

Long term - capacity plans dealing in investment in new facilities and equipment

Short term - focusing on work force size, overtime, budget, inventories and decisions

Factors affecting Capacity

- Technology
- Resource constraint
- Management policy
- Location (size)
- Degree of variability of demand and processing time

Importance of Capacity Decisions

- Involves long term commitment of resources - modification decisions may be costly
- Affects operational cost
- Appropriate capacity decisions makes management easier
- Affects competitiveness - excess or 'quick-add' capacity scare new entrants.

Quality

Usually **measured** by the **defect rate** of products produced. Assessed via:

- Speed of Delivery - Product's lead time – from ordering to shipment
- Inventoried versus customized products
- Variability/Uncertainty in delivery time – The Less, the better.

Flexibility

- Measure of 'ready' adjustability of transformation process to changes in customer demand. Assessed via:
- Speed of conversion of a production process from one product to another.
- Speed of How adjustability to changes in volume.
- Capability of process producing more than one type of product.

Process Analysis in Manufacturing

Analysis may take various forms such as:

- Multistage Process - Consists of more than one step.
- Hybrid Process - A multistage process, consists of more than one type of process.
- Make-to-Stock – Process: Making highly standardized products for finished goods inventory.
- Make-to-Order – Process: Making customized products for individual requirements

Process Analysis in Mfg. (cont'd)

- Modularization - Using standard components and subassemblies to produce customized products.
- Tightness and Dependence - The degree of relation/dependence of the various stages of production. Highly dependent – 'tight'. Buffer stock – 'loose'
- Bottleneck - Stage with lowest output capacity, limiting total output of process.
- Capacity versus Demand - Firm's output capability vrs market demand

Process Analysis in Service

Comes in various forms such as:

- Process Flowcharts - A schematic diagram describing a process, indicating:
    - What the official or documented method is.
    - How the work is actually being performed.
    - What the proper procedures should be.

Process Analysis in Service (Cont'd)

- Service Blueprinting - Process of flowcharting for services including the customer:
  - Identifying (mapping) processes
  - Isolating fail points
  - Establishing a time frame
  - Analyzing profitability

Process Analysis in Service (Cont'd)

Service Blue printing (cont'd)

- Line of Visibility
  - Above the line: - Stages in process in direct contact with customer – focusing on rendering good service
  - Below the line: - Stages in process – not in contact with customer – focusing on process efficiency

- 'Failsafing' - Creating a control condition where the customer, server, or process can take only the correct (or desired) action while engaged in a service process.

Improving Productivity

Key steps toward improving productivity:

- Develop productivity measures for all operations – first step.
- Select most critical operations from the system – e.g. bottleneck operations – (slow stage) where improvements will have a marked impact on overall productivity.
- Develop methods for achieving productivity improvements – E.g. soliciting ideas from workers (organize teams of workers, engineers and managers); studying how other firms have increased productivity, re-examine the way work is done.
- Examining the way work is done.
- Establish reasonable goals for improvement.

Improving Productivity (cont'd)

- Make it clear that management supports and encourages productivity improvement. Consider incentives to reward workers for their contributions.
- Measure improvements and publicize them.
- Don't confuse productivity with *efficiency*. Efficiency – narrower - i.e. getting the most out of a *fixed* set of existing resources. Productivity - broader - effective use of overall resources including upgrading or replacing present equipment with more effective ones.

Business Process

A logical set of tasks or activities that crosses functional boundaries and recognizes its interdependence with other processes or businesses. A typical set making up the value chain will include:

- R & D
- Product design
- Manufacturing
- Marketing
- Distribution
- Customer service

Business Process Analysis

Involves:

1. Defining the process boundaries by:

- Identifying where process begins and ends (its boundaries).
- Determining its inputs and outputs.
- Recognizing other processes that impact on the process.

2. Linking the Process to the Corporate Strategy by:

- Understanding how process contributes to firm's competitive advantage.
- Identifying key measures to be used evaluate the process.

Business Process Analysis

3. Mapping the Process - developing a process flow chart to provide a visual context for analyzing it:

- Specific ordering of the process steps
- Length of time each step takes
- Resources required by each step
- Cross-functional relationships and others

Benchmarking

Involves or connotes:

- Comparison of a company's measures of performance with those of firms that are considered to be world class.
- "The search of the best practices that leads to superior performance."
- Continuous monitoring/measurement.

It is applicable/covers areas such as:

- Goods and services
- Business processes
- Performance measures

Key Steps in Benchmarking

- Planning - Determining where we should bench mark.
- Analysis - Obtaining an in-depth understanding of the firm.
- Integration - Defining target areas for change.
- Action - Incorporating findings into current processes.
- Maturity - Having best practices at all organizational levels.

Types of Benchmarking

- Internal Benchmarking - Comparison of similar operations within the firm
- Competitive Benchmarking - Comparison with like operations of competitors
- Functional Benchmarking - Comparison with the "best of breed" in a specific function, regardless of industry
- Generic Benchmarking - Adopting the innovative processes of industry leaders in commonly-held practices

Business Process Reengineering

The process of rethinking and restructuring an organization holistically.

X'tics of Reengineering Process

- Several jobs are combined into one.
- Workers make decisions.
- The steps are performed in a natural order.
- Processes have multiple versions (flexibility).
- Work is performed where it makes the most sense.

Issues with Reengineering

- Management's inability to link reengineering efforts to overall corporate strategy.
- The regard for reengineering as a tactical rather than a strategy issue for the entire organization.
- Lack of commitment and participation by top management

Self Assessment Questions

1. Differentiate between productivity and capacity
2. Write short notes on the following terms:

- Business process
- Service blueprinting
- Benchmarking

3. BMS club has two employees who work on lead generation. Each employee works 50 hours a week and is paid GHs 18.50 an hour. Each employee identifies an average of 520 possible leads a week. 7.5% of the leads become members and pay a onetime fee of GHs 145.00. Material costs are GHs 235.00 per week and overhead costs are GHs 2000.00 per week**.**

Calculate the Multifactor productivity for the operation.

Self Assessment Questions (cont'd)

4. As the operations manager of a large manufacturing and retailing firm, you have been requested by your managing director to make a 25 – minute presentation on the theme "Production and Operations Management" to some newly recruited executives. Prepare your notes for the presentation along the following:

- The meaning and importance of production and Operations Management
- Measures to improve productivity in the organization
- Just-in –time systems in operations

Self Assessment Questions (cont'd)

5. PD Financial service employs three loan officers, each working eight hours per day. Each officer processes an average of five loans per day. The bank's payroll cost for the officers is GHs820 per day, and there is a daily overhead expense of GHs500.

a. Compute the labor productivity.

b. Compute the multifactor productivity, using loans per cedis cost as the measure.

The Financial service is considering the purchase of new computer software for the loan operation. The software will enable each loan officer to process eight loans per day, although the overhead expense will increase to GHs550.

c. Compute the new labor productivity.

d. Compute the new multifactor productivity.

e. Should PD Financial service proceed with the purchase of the new software? Explain.

Self Assessment Questions (cont'd)

6. Compute the multifactor Productivity measure for an eight hour day in which the usable output is 300 units produced by three workers who used 600 pounds of materials. Workers have an hourly wage of Ghs 20.00 and material cost of Ghs 1.00 per pound. Overhead is 1.5 times labour cost

7. Student tuition at UCC is GHs 500 per semester credit hours. The Government of Ghana supplements the school revenue by matching student tuition, cedis per cedis. Average class size for typical three credit course is 200 students. Labour costs are Ghs 4000 per class, material costs are GHs 350 per student, and overhead costs are GHs 56,000 per class

- a. what is the multifactor productivity ratio.
- b. if instructors work an average, estimate the labour productivity ratio
- (keep in mind that professor delivering the lecture work 14 hours per week, the semester last for 16 weeks)