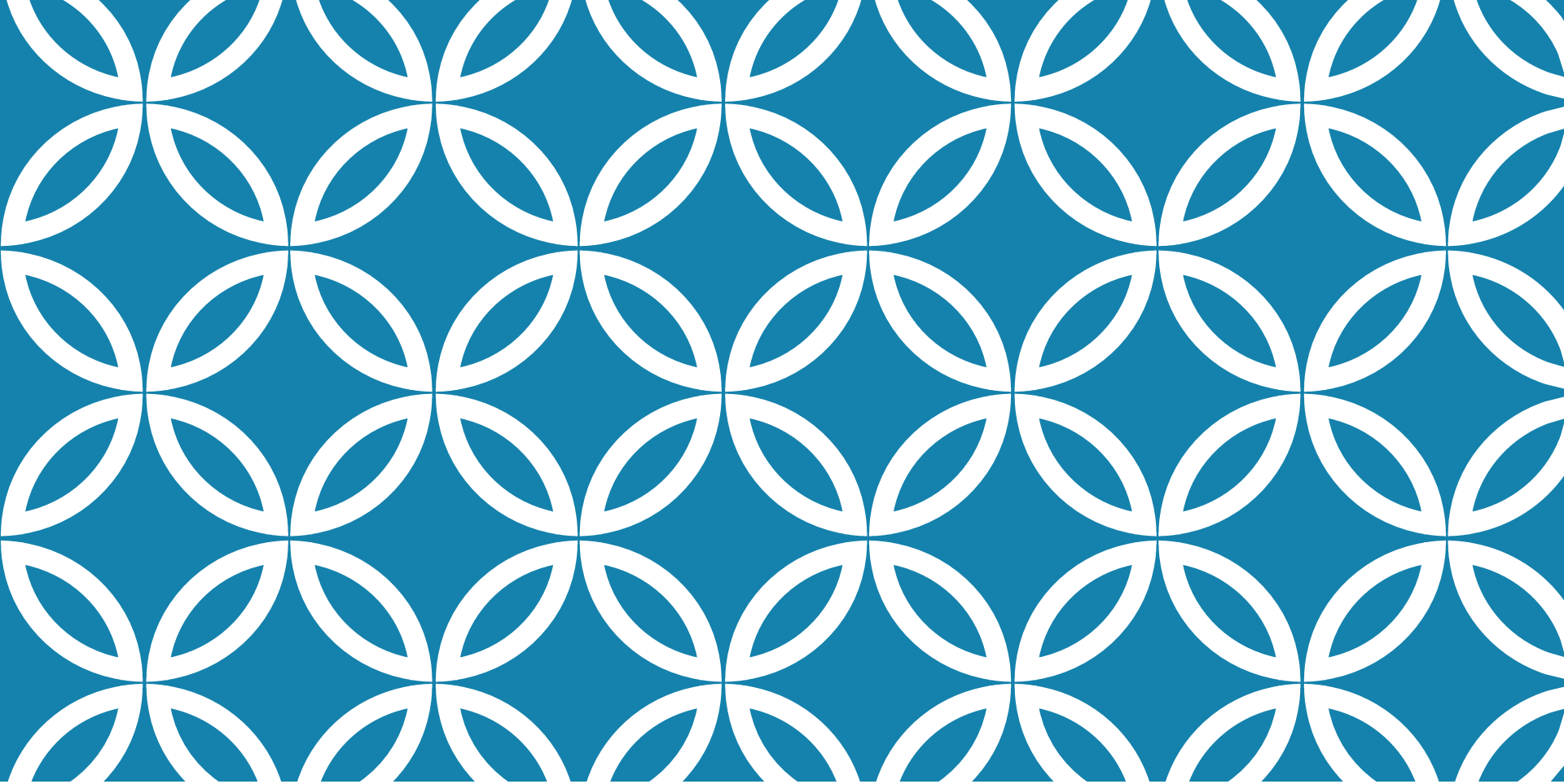

ENGINEERING BUSINESS PROCESS

Measuring process performance

PERFORMANCE MEASUREMENT

The establishment & use of performance measures are **fundamental** requirement for **redesigning processes**,

Three types of performance measures :

1. *Efficiency*
2. *Effectiveness*
3. *Outcome*

EFFECTIVE, EFFICIENCY AND CUSTOMER SATISFACTION

	Terminology	Explanation
1	**Process or Efficiency**	Resources consumed in the process relative to minimum possible level
2	**Output or Effectiveness**	Ability a process to deliver products or services according to specifications
3	**Outcome or product/service effectiveness and customer satisfaction**	Ability of output to satisfy the needs of customers

EFFICIENCY

1) ***Cost*** : try to minimize the resources consumed in the process
2) ***Variation*** : try to eliminate the waste associated with spare capacity and contingency into plans and design that serve to cushion uncertainty
3) ***Cycle Time*** : try to reduce the total elapsed time required to transform inputs into outputs

COST OF QUALITY

Type	Example Costs
1. Prevention (good)	Planning, Training, design, analysis
2. Detection (bad)	Appraisal, inspection, auditing, verifying, checking
3. Failure (ugly) :	
a. Internal Failure	Rework, and repair prior to delivery to customers
b. External Failure	Repair, , replacements, refunds, recalls, and warranties after deliver to customers
c. Exceeding requirements	Features provided that are not valued by the customer
d. Lost opportunity	Revenue lost when customers purchase from competitors

COST OF QUALITY

The business goal of minimizing costs is achieved by **finding the point at which the sum of three component is minimized.**

Each component should be included in a comprehensive set of efficiency measures.

CYCLE TIME

The total elapsed time in processes is labeled as *cycle time*

Cycle time is defined as "the actual time taken to *transform inputs into outputs*" (Harrington, 1991)

Cycle Time = Processing Time + delay

CYCLE TIME CATEGORY: RVA (REAL VALUE ADDED)

1. ***Real Value Added*** **(*RVA*),**
   include ***essential processes*** *that transform inputs into outputs that are necessary to* ***meet customer's requirements*** *and have perceived value to the customer.*

   Example:

   a. *Product development*
   b. *Material procurement*
   c. *Design*
   d. *Fabrication*
   e. *Assembly*
   f. *Finishing*
   g. *Packaging*
   h. *After-sales service*

CYCLE TIME CATEGORY: BVA (BUSINESS VALUE ADDED)

2. ***Business Value Added*** **(*BVA*),**

   include processes that are ***installed by management*** *and deemed necessary internal business function but have little* ***to support, control, and monitor*** *or no perceived value to the customer*

   Example:

   a. *Scheduling*
   b. *Invoicing*
   c. *Marketing*
   d. *Career planning*
   e. *Filing*
   f. *Selling*
   g. *Recruiting*
   h. *Auditing*
   i. *Record keeping*

CYCLE TIME CATEGORY: NVA (NON VALUE ADDED)

3. ***Non Value Added*** **(*NVA*),**

   include ***nonessential processes*** *that contribute to neither customer satisfaction nor improved business operations.*

   NVA activities ***increase cycle time*** *and* ***add costs*** *rather than value.*

   Example: (waste)

   a. *Redundant inspections*
   b. *Filling in forms*
   c. *Rework*
   d. *Excessive transit*
   e. *Waiting*
   f. *Storage*

EFFICIENCY IN CYCLE TIME

$$T_n = \frac{RVA}{T}$$

Where

Tn = ***Cycle time efficiency***

RVA = ***Real Value Added time***

T = ***Total cycle time*** = ***RVA + BVA + NVA***

IMPROVING EFFICIENCY IN CYCLE TIME

1. **Eliminate** all non-value-added activities
2. **Minimize** business value added activities
3. **Streamline** the real value-added activities

IMPROVING EFFICIENCY IN CYCLE TIME *(STREAMLINING)*

1. *Bureaucracy elimination*
2. *Duplication elimination*
3. *Value-added assesment*
4. *Simplification*

IMPROVING EFFICIENCY IN CYCLE TIME *(STREAMLINING)*

5. *Process cycle-time reduction*
6. *Error proofing*
7. *Upgrading*
8. *Simple language*

IMPROVING EFFICIENCY IN CYCLE TIME *(STREAMLINING)*

8. ***Standardization***
9. ***Supplier partnership***
10. ***Big picture improvement***
11. ***Automation and/or mechanization***

CRITERIA TO CATEGORIZE CYCLE TIME

1. **To develop criteria for categorizing activity**
2. **To ask the external customer whether this task necessary**

Ask the *customers* ?

→***These people ultimately pay for all processing and non processing steps***

Is the customer willing to pay for this step ?

*If the answer : **YES**, then the activity can be categorized as **adding value***

VALUE-ADDED ASSESSMENT

challenge	response
Real Value-Added	
Is this step needed to meet a customer's demand ?	Can this step be done faster or cheaper ? Streamline value-added activities by : a. Automating, b. Improving, or c. Performing them in parallel with other steps
Does this step add value to the final product or service that is delivered to the customer ?	
Does the step contribute directly to the customer's satisfaction ?	
Is the customer willing to pay for this activity ?	

VALUE-ADDED ASSESSMENT

challenge	response
Business Value-Added	
Is this step performed to control or manage the business ?	Challenge this step with the thought of eliminating or performing it temporarily until the process is redesigned
Is the step a review, an inspection, or approval ?	Eliminate the step by ensuring the performance of previous activities
Is the step performed because of a trade practice ?	Challenge the step with the thought of eliminating it if it is not completely justified

VALUE-ADDED ASSESSMENT

challenge	response
Non Value-Added	
Is this step one of storage, waiting, or queuing time ?	Identify and eliminate the root cause of the delay
Does this step include unnecessary transportation or movement of raw materials or products ?	Rearrange or relocate processing activities or sequencing
Is the step performed to overcome an organizational problem ?	Correct the organizational problem, and then eliminate the step
Is the step necessary to correct errors caused earlier ?	Eliminate the step by improving previous activities that are generating errors