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SUBJECT: BUSINESS PROCESS ENGINEERING

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ANS1PART(a): GENRAL PROCESS CHART:Summarizes the current process the redesigned process and the expected improvements

CHARECTARIZE BY PROCESS:The number of activities per category

The amount of time spent in each activity category

The percentage of the total processing time spent on each category

CLEARLY INDICATE:Major problems with the existing process

How the redesigned process remedies these problems

Theses problems measured are in terms of the time and the percentage of time spent on value and non-value adding activities

PART(b): DISADVANTAGES OF PROCESS ACTIVITY CHART:Only considers average activity times

If the process includes several variants with different paths (i.e. multiple paths through the process) each variant needs its own activity chart

Cannot depict parallel activities

PART(C):

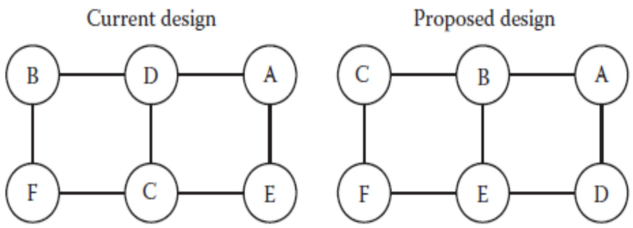

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TABLE 4.3

Example of a Load Matrix

	A	B	C	D	E	F
A		20		20		80
B			10		75	
C				15		90
D					70	

TABLE 4.4

LD Calculation for Two Designs

		Current Design		Proposed Design	
Centers	Load	Distance	LD Score	Distance	LD Score
(A,B)	20	2	40	1	20
(A,D)	20	1	20	1	20
(A,F)	80	3	240	3	240
(B,C)	10	2	20	1	10
(B,E)	75	3	225	1	75
(C,D)	15	1	15	3	45
(C,F)	90	1	90	1	90
(D,E)	70	2	140	1	70
Total			790		570

ANS2PART(a): consider an observation period of 1 h with four regular periods of 15 min in which 3, 6, 5, and 2 jobs where in process during each of the observed periods, respectively. The average WIP is given by:

Average WIP = 3 + 6 + 5 + 2\4 = 4 jobs

When the observation periods are irregular (i.e., they are not all of the same length), then the average WIP calculation must account not only for the number of jobs in each period but also for the length of the period. Suppose that the observation periods in our previous example were 10, 20, 20, and 10 min, respectively. In other words, the WIP was 3 jobs for 10 min, 6 jobs for 20 min, 5 jobs for 20 min, and 2 jobs for 10 min. Then, the average WIP is calculated as follows:

Average WIP = 3×10 +6 ×20 +5 ×20 +2 ×10\10+20+20+10 = 4.5 jobs

PART(B):

PROCESS CYCLE TIME:

The difference between a job's departure time and its arrival time = cycle time

One of the most important attributes of a process

Also referred to as throughput time

Because the CT is the total time a job spends in the process, the CT includes both value adding and non-value adding activity times

Processing time

Inspection time

Transportation time

Storage time

Waiting time

Cycle time is a powerful tool for identifying process improvement potential

Little's Formula

(Due to J.D.C. Little (1961)):States a fundamental and very general relationship between the average: WIP, Throughput (= ●) and Cycle time (CT)

The cycle time refers to the time the job spends in the system or process

Three basic relationships can be inferred from Little’s law:

WIP increases if the throughput rate or the CT increases.

The throughput rate increases if WIP increases or CT decreases.

CT increases if WIP increases or the throughput rate decreases

A related measure is (inventory) turnover ratio

Indicates how often the WIP is entirely replaced by a new set of jobs

$$\text{Turnover ratio} = 1/CT$$

FORMULA OF CT EFFICINECY:

$$\text{Cycle Time Efficiency} = \frac{\text{Theoretical Cycle Time}}{CT}$$

ANS3:

Resource Capacity Data for Example 5.11

Activity	Processing Time (Min)	Resource Requirements	Number of Jobs
A	2	R1	1
B	5	R1	0.3
C	8	R2	1
D	3	R2	1.1
E	4	R2	1.1
Inspection	4	—	1.1
F	2	R1	1
G	4	R3	1
H	2	R3	1

TABLE 5.3

Pool Capacity Calculation for Example 5.11

Resource	Unit Load (Min)	Unit Capacity (Jobs/Min)	Available Resources (Units)	Pool Capacity (Jobs/Min)
R1	$2 + 5 \times 0.3 + 2 = 5.5$	1/5.5	2	2/5.5 = 0.36
R2	$8 + 1.1 \times (3 + 4) = 15.7$	1/15.7	2	2/15.7 = 0.13
R3	$4 + 2 = 6$	1/6	1	1/6 = 0.17

ANS:4 STEP OF TOC METHODOLOGY: In the previous post, I told the story of a software engineering team at Microsoft who used the Theory of Constraints to produce dramatic improvements in productivity.

But I hope something bothered you: how exactly did they know which changes to make? What process did they use to develop that particular solution? Unless we know this, the best we can do is follow rigid prescriptions that are unlikely to work in different contexts.

Now we are finally reaching the very heart of TOC, the continuous improvement method to increase throughput in any system of value creation, known as the Five Focusing Steps:

Step 1: Identify the constraint

This tells us where to focus our improvement efforts, since we know that only an improvement at the constraint makes a difference.

Step 2: Optimize the constraint

Before adding capacity, we need to use the capacity we already have. "Optimize" in this sense means "doing everything possible to use the constraint to its fullest capacity."

Step 3: Subordinate the non-constraints

The job of all non-constraints is to subordinate their decisions to the constraint's needs. They should optimize for constraint (and thus system) performance, not their own individual performance, the results of which we witnessed in post #102.

Step 4: Elevate the constraint

Only once we've completed the previous steps does it make sense to add more constraint capacity, and thereby increase system performance. Because adding capacity is tremendously expensive in terms of time and money, we do it as a last resort, not a first resort.

Step 5: Return to step 1

The inevitable result of the first four steps, and the reason this is a "continuous" improvement method, is that the constraint moves somewhere else. This step insists that you start back at the beginning, and don't let inertia become the constraint.

Let's take a closer look at Step #1, and why it represents a significant shift in how we conduct improvement within organizations.

Identifying the constraint:

Because only improvements at the constraint make a difference to the company as a whole, identifying that constraint is the obvious first step.

The reassuring truth is that you don’t have to identify it perfectly from the very beginning. This is a self-correcting process, not a waterfall where small errors in the beginning become huge mistakes by the end. The advantage of working with a dynamic, interconnected system is that it responds very quickly to changes. The behavior of the system tells you whether you chose correctly.