Course of «Operations and audit quality» Master degree in «Fashion, art and food management» Parthenope University of Naples

PART Three: Deliver

### **Planning and control**

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## A general model of operations management

**PART ONE: directing the operation** 

**PART TWO: designing the operation** 

**PART THREE: deliver** 

**PART FOUR: development** 

## PART THREE: deliver

- 1. Planning and control
- 2. Capacity management
- 3. Supply chain management
- 4. Inventory management
- 5. Planning and control systems
- 6. Lean operations

## Planning and control (Agenda)

- What is planning and control?
- What is the difference between planning and control?
- How do supply and demand affect planning and control?
- What are the activities of planning and control?

### What is planning and control?

**Operations principle**: customers' operations of an operation will partially be shaped by the customer interface of its planning and control system

- Planning and control is concerned with the activities that attempt to reconcile the demands of the market and ability of the operation's resources to deliver
- It provides the systems, procedures and decisions which bring different aspects of supply and demand together



**Operations principle**: planning and control are separate but closely related activities

• Planning is a formalization of what is intended to happen at some time in the future. But a plan does not guarantee that an event will actually happen. Rather it is a statement of intention!

• Control is the process of coping with the customers change about what they want and when they want it. Control activities make the adjustments which allows the operation to achieve the objectives that the plan has set, even when the assumptions on which the plan was based do not hold true

# Long, medium and short term planning and control

• The nature of planning and control actitivies changes over time!

### 1. IN THE VERY LONG TERM

 Operations managers make plans concerning what they intend to do, what resources they need and what objectives they hope to achieve

✓ The emphasis is on the planning rather that control, because there is little to control as such

✓ Operations managers will focus mainly on volume and financial aspects

Example:

«A Hospital will make plans for 2.000 patients, without necessarily going into the details of the individual needs of those 2.000 patients. Similarly, the hospital might plan to have 100 nurses and 20 doctors but again without deciding on the specific attributes of the staff

# Long, medium and short term planning and control (2)

### 2. <u>Medium-term planning</u>

- Medium-term planning and control is more detailed.
- ✓ It looks ahead to assess the overall demand which the operation must meet in a partially disaggregated manner

patients coming as accident and emergency cases will need to be distinguished from those requiring routine operations. Similarly, different categories of staff will have been identified and broad staffing levels in each category set. Just as important, contingencies will have been put in place which allow for slight deviations from the plants. These contingencies will act as «reserve» resources and make planning and control easier in the short term»

# Long, medium and short-term planning and control (2)

### 2. Short-term planning

 In short term planning and control, many of the resources will have been set and it will be difficult to make large changes

✓ However, short-term interventions are possible if things are not going to plan

#### Example:

«More importantly, individual patients will have been identified by name, and specific time slots booked for their treatment. In making short-term interventions and changes to the plan, operations managers will be attempting to balance the quality, speed, dependability, flexibility and costs of their operation dinamically on an ad hoc basis»

### The balance between planning and control activities changes in the long, medium and short



# The volume-variety effect on planning and control

**Operations principle**: The volumevariety characteristics of an operation will effect its planning and control activities

- The volume and variety characteristics of an operation will have an effect on its planning and control activities
- Operations which produce a high variety of services or products in relatively low volume will have customers with different requirements and use different processes from operations which create standardized services in high volume

Volume	Variety	Customer responsiveness	Planning horizon	Major planning decision	Control decisions	Robustness
Low	High	Slow	Short	Timing	Detailed	High
too	+	+	+	¥	+	ł
High	Low	Fast	Long	Volume	Aggregated	Low

### Case study

### **Operations control at Air France**

### Ho do supply and demand affect planning and control?

If planning and control is the process of reconciling demand with supply, then the nature of the decisions taken to plan and control an operation will depend on:

- the nature of demand;
- ✓ the nature of supply in that operation.
- 1. Uncertainty in supply and demand
- 2. Dependent and independent demand
- 3. Responding to demand
- 4. Sales and operations planning

## 1. Uncertainty in supply and demand

- Uncertainty is important in planning and control because it makes it more difficult. Some times the supply of inputs to an operations may be uncertain
- In other operations supply is relatively predictable, and the need for control i minimal

#### Examples

- 1. A fast-food outlet inside a shopping centre...
- 2. A school...

# 2. Dependent and independent demand

**Operations principle**: Planning and control systems should distinguish between dependent and independent demand

1. Some operations can predict demand with relative certainty because demand for their services or products is dependent upon some other factor which is known. This is know as **dependent demand. Dependent demand is derived from the demand for something else!** (For example, the demand for tyres in an automobile factory)



2. By contrast, some operations are subject to **independent demand**. They need to supply future demand without knowing exactly what that demand will be; or in the terminology of planning and control, they do not have firm «forward visibility» of customer orders. .... **Independent demand is more random**. Examples????

# 3. Respond to demand

It is clear then that the nature of planning and control in any operation will depend on how it responds to demand, which is in turn related to the type of services or proucts it produces



# 4. Sales and operations planning (S&OP)

- Sales and operations planning is a planning process that attempts to ensure that all tactical plans are aligned across the business's various functions and with the company's longer-term strategic plans
- It is a formal business process that looks over a period of 18 to 24 months forwards
- It is an aggregated process that does not deal with detailed activites, but rather focuses on the overall volume and output
- Generally, it is a process that happens monthly, amd tends to take place at a higher level, involving more senior management than traditional operations planning

!!!! Integrated Business Planning, Integrated Business Management, Integrated Performance Management, Rolling Business Planning and Regional Business Management!!!



# What are planning and control activities?

Planning and control activities include:

- 1. loading;
- 2. sequencing;
- 3. scheduling;
- 4. monitoring and control.

## 1. Loading

indicate the implications for the loading on any part of operation

**Operations principle**: for any given level of demand, a planning and control systems should be able to

Loading is the amount of work that is allocated to a work centre!



## Finite and infinite loading

- 1. Finite loading is an approach which only allocates work to a work centre (a person, a machine) up to set a limit. This limit is the estimate of capacity for the work centre. Work over and above this capacity is not accepted! Finite loading is particularly relevant for operations where:
  - ✓ it is possible to limit the load;
  - ✓ It is necessary to limit the load;
  - ✓ the cost of limiting the load is not prohibitive.
- 2. Infinite loading is an approach to loading work which does not limit accepting work, but instead tries to cope with it. Infinite loading is particularly relevant for operations where:
  - ✓ it is not possible to limit the load;
  - ✓ It is not necessary to limit the load;
  - ✓ the cost of limiting the load is prohibitive.

# 2. Sequencing (1)

Whether the approach to loading is finite, when work arrives, decisions must be taken on the order in which the work will be tackled. This activity is termed sequencing. The priorities given to work in an operatio are often determined by some predefinited set of rules.

Some of these are:

1. Physical constraints

# Case study- Can airline passengers be sequenced?

Case studies/lesson 11 can airline passengers be sequenced.pdf

# 2. Sequencing (2)

Some of these are:

- 1. Physical constraints
- 2. Customer priority
- 3. Due date (DD)
- 4. Last in, first out (LIFO)
- 5. First in, first out (FIFO)
- 6. Longest operation time (LOT)
- 7. Shortest operation time first (SOT)
- 8. Judging sequencing rules (dependability; speed; an element of cost; another element of cost)

# 3. Scheduling (1)

- Some operations require a detailed timetable showing at what time or date jobs should start and when they should end: this is schedule!
- Schedules of work are use in operations where some planning is required to ensure that customer demand is met

# Sequencing and scheduling at London's Heatrow airport

Case studies\Lesson 11 Sequencing and scheduling.pdf

## 3. Scheduling- The complexity of scheduling

• Schedulers must deal with several different types of resources at the same time

• The number of possible schedulers increase rapidaly as the number of activities and processes increases

For example, suppose one machines has five different jobs to process. Any of the five jobs could be processed first and, following that, any one of the remaining four jobs, and so on. This means that there are:

5 x 4 x 3 x 2 = 120 different schedules possible

In other words, for n jobs there are n! (factorial n) different ways of scheduling the jobs through a single process.

### 3. Scheduling-Gannt charts

- Gannt chart is a simple device which represents time as a bar, or channel, on a chart
- It provides a simple visual representation both of what should be happening and of what actually is happening in the operations
- It can be used to «test out» alternative schedules. It is relatively simple task to represent alternative schedules



### 3. Scheduling-Scheduling work patterns

- Where the dominant resource in an operation is its staff, then the schedule of work times effectively determines the capacity of the operation itself.
- The main task of scheduling, therefore, is to make sure that the sufficient numbers of people are working at any point in time to provide a capacity appropriate for the level of demand at that point in time. This is often called staff rostering
- In very large operations with many types of skill to schedule and uncertain demand the scheduling problem becomes extremely complex. Some mathematical techniques are available but mosrt scheduling of this type is solved usign heuristics, some of which are incorporated into commercially available software packages



# Monitoring and controlling the operation

**Operations principle**: a planning and control system should be able to detect deviations from plans whithin a timescale that allows an appropriate response





# Push and pull control

- In a push system control, activities are scheduled by means of a central systems and completed in line with central instructions sh and pull control
- •By contrast, in a pull system of control, the pace and specification of what is done are set by the "customer" workstation which pull work from the preceding (supplier) workstation

## Controlling operations is not only a routine

The degree of difficulty associated with control in any operation could be analyzed considering the following questions:

- 1. Is there consensus over what the operation's objectives should be?
- 2. Are the effects of interventions into the operation predictable?
- 3. Are the operation's activities largerly repetitive?

# Control is not always routine, different circumstances require different types of control



### Case Study

The life and times of a chicken salad sandwich (Part 1)