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

PART TWO: design the operation

#### **Process design**

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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 TWO: designing the operation

1. Process design

- 2. The layout and look of facilities
- 3. Process technology
- 4. People in operations

#### Process design (Agenda)

- What is the process design?
- What should be the objectives of process design?
- How do volume and variety affect process design?

## What is process design?

- To «design» is to conceive the looks, arrangement and workong of something before it is created
- Design is also an activity that can be approched at different levels of detail
- At the start of the process design activity it is important to inderstand the design objectives, especially when the overall shape and nature of the process is being decided
- The most common way in doing this is by positioning it according to its volume and variety characteristics



- Often we will treat the design of services and products, on the other hand, and the desing of the processes to make them, on the other, as though they were separate activities. Yet they clearly interreleted!
- Small changes in the design of products and services can have profound implications for the way the operation eventually has to produce them
- However, the overlap between the two design activities is generally greater in operations that produce service. Because many services involve the customer in being part of transformation process, the service, as far as the customer sees it cannot be separeted from the process to which the customer is subjected

### What should be the objectives ( of process design?

Operations principle: the design of any process should be judged on its quality, speed, dependability, flexibility, cost and sustainability performance

• The whole point of process design is to make sure that the performance of the process is appropriate for whatever it is trying to achieve

• Some kind of logic should link what the operation as a whole is attempting to achieve, and the performance objectives fo its individual processes

# The impact of strategic performance objectives on process design objectives and performance (1)

Operations performance objective	Typical process design objectives	Some benefits of good process design
Quality	<ul> <li>Provide appropriate resources, capable of achieving the specification of products or services</li> <li>Error-free processing</li> </ul>	<ul> <li>Products and services produced «on specification»</li> <li>Less recycling and wasted effort within the process</li> </ul>
Speed	<ul><li>Minimum throughput time</li><li>Output rate appropriate for demand</li></ul>	<ul><li>Short customer waiting time</li><li>Low in process inventory</li></ul>
Dependability	<ul> <li>Provide dependable process resources</li> <li>Reliable process output timing and volume</li> </ul>	<ul> <li>On-time deliveries of products and services</li> <li>Less disruption, confusion and rescheduling within the process</li> </ul>

# The impact of strategic performance objectives on process design objectives and performance (2)

Operations performance objective	Typical process design objectives	Some benefits of good process design
Flexibility	<ul> <li>Provide resources with an appropriate range of capabilities</li> <li>Change easily between processing states (what, how or how much is being processed?)</li> </ul>	<ul> <li>Ability to process a wide range of products and services</li> <li>Low cost/fast product and service change</li> <li>Low cost/fats volume and timing changes</li> <li>Ability to cope with unexpected events</li> </ul>
Cost	<ul> <li>Appropriate capacity to meet demand</li> <li>Eliminate process waste in terms of:</li> <li>✓ Excess capacity</li> <li>✓ Excess process capability</li> <li>✓ In-process delay</li> <li>✓ In process-errors</li> <li>✓ Inappropriate process inputs</li> </ul>	<ul> <li>Low processing costs</li> <li>Low resources costs (capital costs)</li> <li>Low delay/inventory costs (working capital costs)</li> </ul>
Sustainability	<ul> <li>Minimizing energy usage</li> <li>Reduce local impact on community</li> <li>Produce for easy disassembly</li> </ul>	<ul> <li>Lower negative environmental and societal impact</li> </ul>

# How do volume and variety affect process design?

Operations principle: the design of any process should governed by the volume and variety it is required to produce

- Usually the two dimensions of VOLUME and VARIETY go together, <u>BUT IN A</u> <u>REVERSED WAY!!</u>
- •\_Low-volume processes often produce a high variety of products and services
- Thus, there is a continuum from low volume-high variety through to high volume-low variety, on which we can position processes. And within this single operation there could be processes with very different positions on this volume-variety spectrum

• DIFFERENT PRODUCTS OR SERVICES WITH DIFFERENT VOLUME- VARIETY POSITIONS REQUIRE DIFFERENT PROCESSES

#### Different process types imply different volumevariety characteristics for the process (process type)



#### MANUFACTURING PROCESS TYPE

#### Project processes

- Project processes have low volume and high variety
- Project processes deal with discrete, usually highly cusomeized products, often with a relatively long time scale between the completition of each item, where each job has a well-defined start and finish
- Activities involved in the process can be ill-defined and uncertain. Transforming resources may have to be organized especially for each item (**beacause each item is different**)



The major construction site shown in the picture is a PROJECT PROCESS. Each item (building) is different and poses different challenges to those running the process (civil engineers)

## Jobbing processes

- Jobbing process also deal with high variety and low volumes. However, while in project processes eacg item has resources devoted more or less exclusively to it, in jobbing processes each product has to share the operation's resources with many others
- Jobbing process could be relatively complex, however they usually produce physically smaller products and, although sometimes involving considerable skill, such processes often involve fewer unpredictable circumstances



#### Batch processes

- Batch processes may look like jobbing processes, but do not have the same degree of variety. As the name implies, batch processes produce more than one item at time
- If the size of the batch is just two or three items, it is little different to jobbing. Conversely, if the batches are large, and especially if the products are familiar to the operation, batch processes can be fairly repetitive. Because of this, the batch type of process can be found over a wide range of volume and variety levels



services process there are provide high texclant vertemizant order to meet individual ousrement needs). Professional serequipment based, and usually staff are given consider Professional services include management consultants, laws ies, auditors, health and safety inspectors and some compu

In this kitchen food is being prepared in batches. All batches go through the same sequence (preparation, cooking and storage) but each batch is of a different dish.

#### Mass processes

• Mass processes are those which produce items high volume and relatively narrow variety

• The activities of mass processes are usyally repetitive and largely predictable



#### Continuous processes

- Continuous processes have even higher volume and usually lower vairiety than mass processes. They also usually operate for longer periods of time
- They often have relatively inflexible capital-intensive technologies with highly predictable flow and, and although products may be stored during the process, their predominant charasteristics is of smooth flow from one part of the process to another



This continuous water treatment plant almost never stops (it only stops for maintenance) and performs only one task (filtering impurities). Often we only notice the process if it goes wrong.

#### Different process types imply different volumevariety characteristics for the process (process type)



#### SERVICE PROCESS TYPE

#### Professional services

- Professional services are high-contact processes where customers spend a considerable time in the service process. They can provide high levels of customization
- Professional services tend to be people-based rather than equipment-based, and usually staff are given considerable discretion in servicing customers



Here consultants are preparing to start a consultancy assignment. They are discussing how they might approach the various stages of the assignment, from understanding the real nature of the problem through to the implementation of their recommended solutions. This is a process map, although a very high level one. It guides the nature and sequence of the consultants' activities.

#### Service shop

- Service shops have levels of volume and variety between the extremes of professional and mass services
- Service is provided via mixes of front and back-office activities



The health club shown in the picture has front-office staff who can give advice on exercise programmes and other treatments. Although every client has a unique fitness programme, certain activities (for example, safety issues) have to follow defined processes.

#### Mass services

- Mass services have many customer transactions, involving limited contact time and little cusotmization. Staff are likely to have a relatively defined division of labour and have to follow set procedures
- Coping with a very high volume of enquiries requires some kind of structuring of the process of communicating with customers. This is often achieved by using a carefully desgined enquiry process



This is the 'back office' of part of a retail bank (the type that we all use). It is a call centre that deals with many thousands of calls every day. Staff are required to follow defined processes (scripts) to make sure customers receive a standard service.