The nature of planning and control

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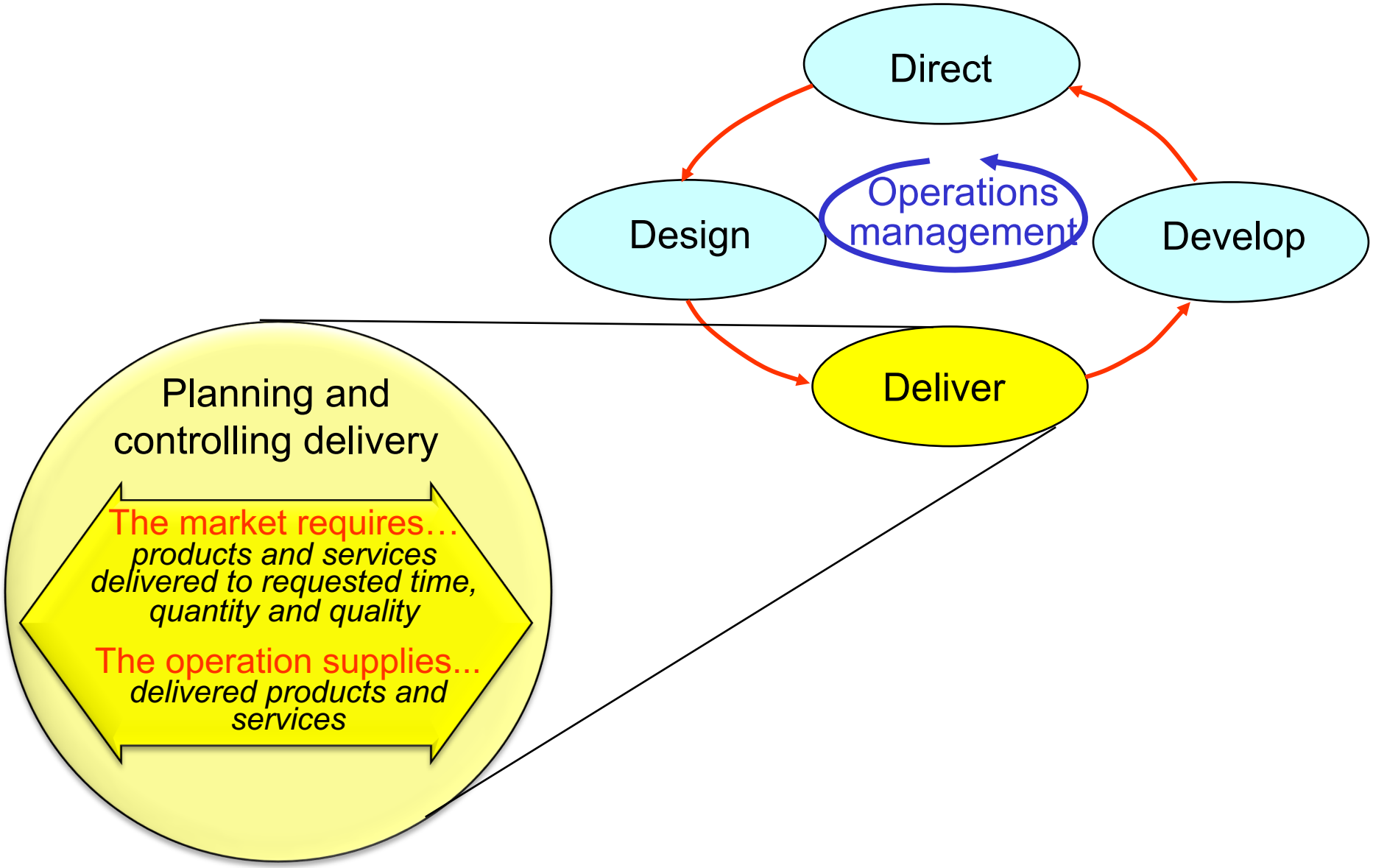


Key operations questions

In Chapter 10 - The nature of planning and control – Slack et. al. identify the following key questions…….

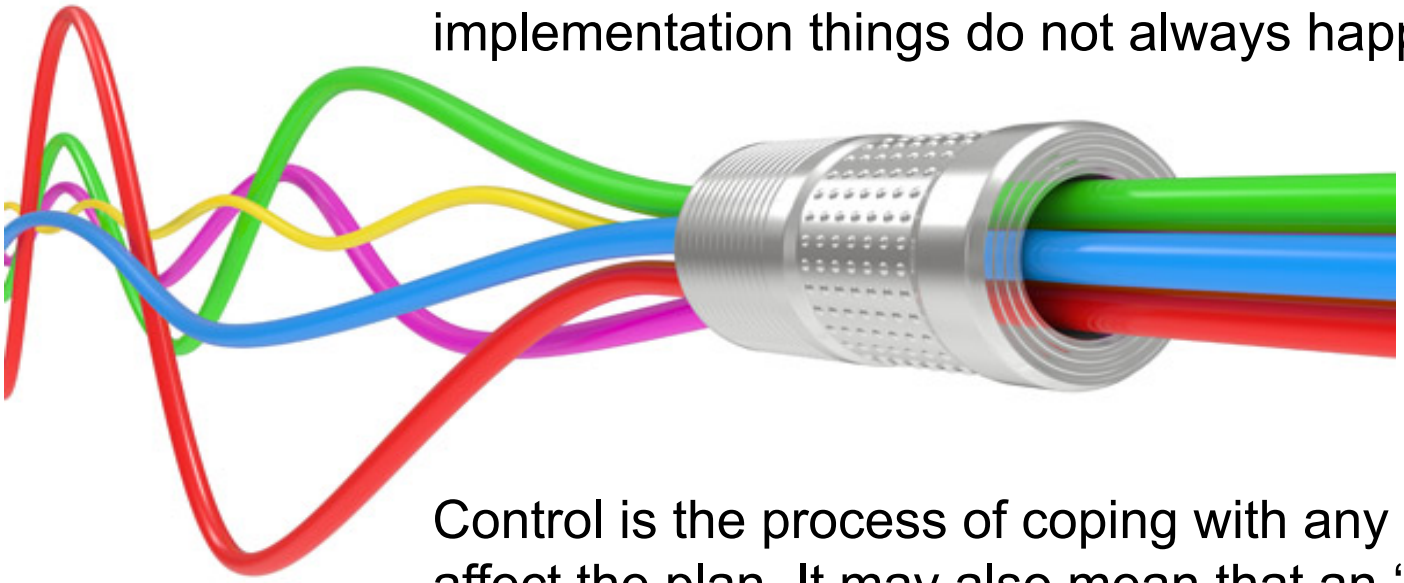
- *What is planning and control?*
- *What is the difference between planning and control?*
- *How do supply and demand affect planning and control?*
- *What are the activities of planning and control?*

Planning and control

Planning is a formalization of what is intended to happen at some time in the future

A plan does not guarantee that an event will actually happen, it is a statement of intention

Although plans are based on expectations, during their implementation things do not always happen as expected



Control is the process of coping with any changes that affect the plan. It may also mean that an ‘intervention’ will need to be made in the operation to bring it back ‘on track’

Planning and control

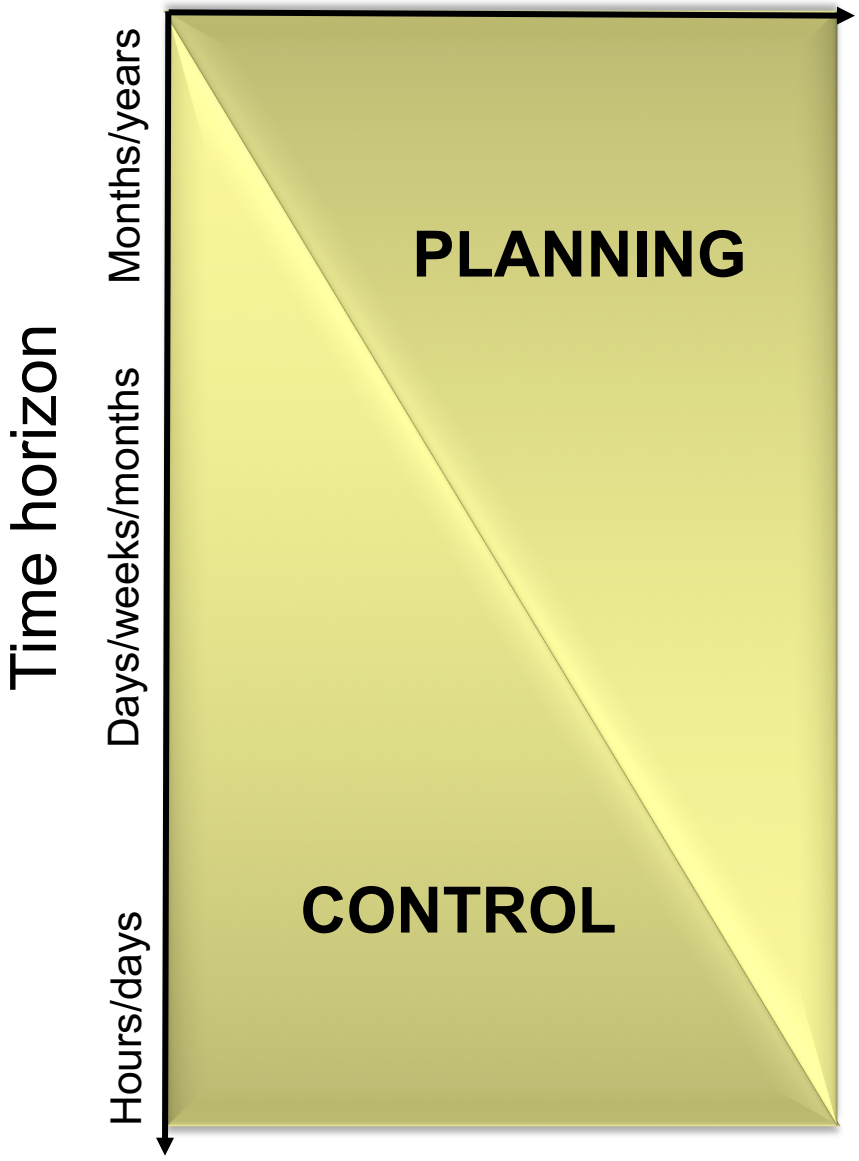
Planning is deciding

- what activities *should* take place in the operation
- when they should take place
- What resources should be allocated to them

Control is

- understanding what is actually happening in the operation
- deciding whether there is a significant deviation from what *should* be happening
- (if there is deviation) changing resources in order to affect the operation's activities

The balance between planning and control



Long-term planning and control

- Uses aggregated demand forecasts
- Determines resources in aggregated form
- Objectives set in largely financial terms

Medium-term planning and control

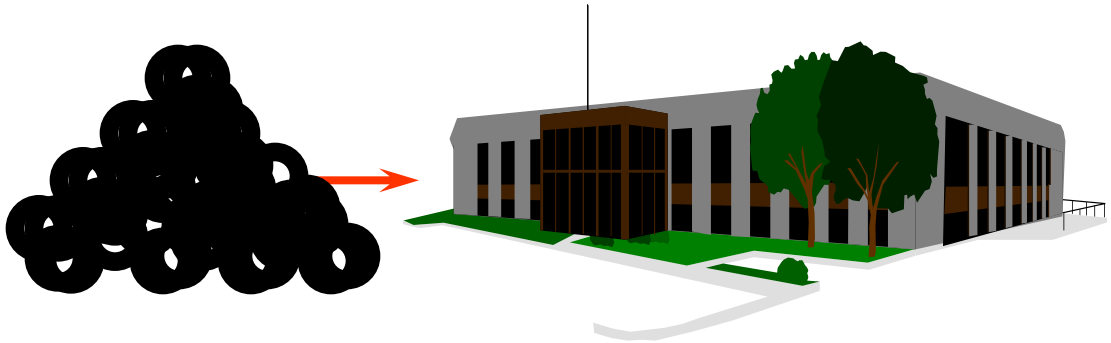
- Uses partially disaggregated demand forecasts
- Determines resources and contingencies
- Objectives set in both financial and operations terms

Short-term planning and control

- Uses totally disaggregated forecasts or actual demand
- Makes interventions to resources to correct deviations from plants
- Ad hoc consideration of operations objectives

Dependent and independent demand

Dependent demand
e.g. input tyre store in automobile plant

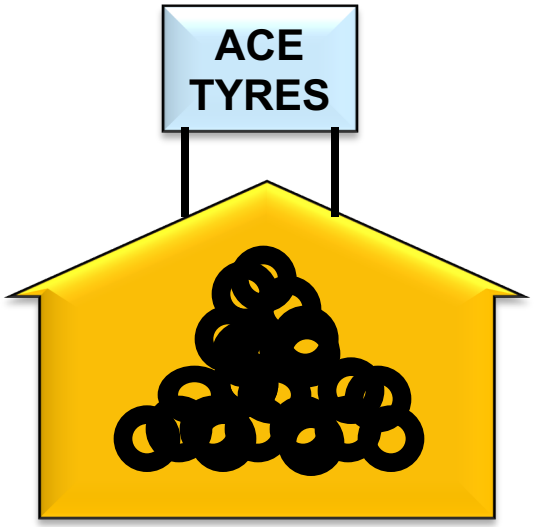


Demand for tyres is governed by the number of automobiles planned to be made

For every automobile that are planned to be made, five tyres will be needed

Dependent and independent demand

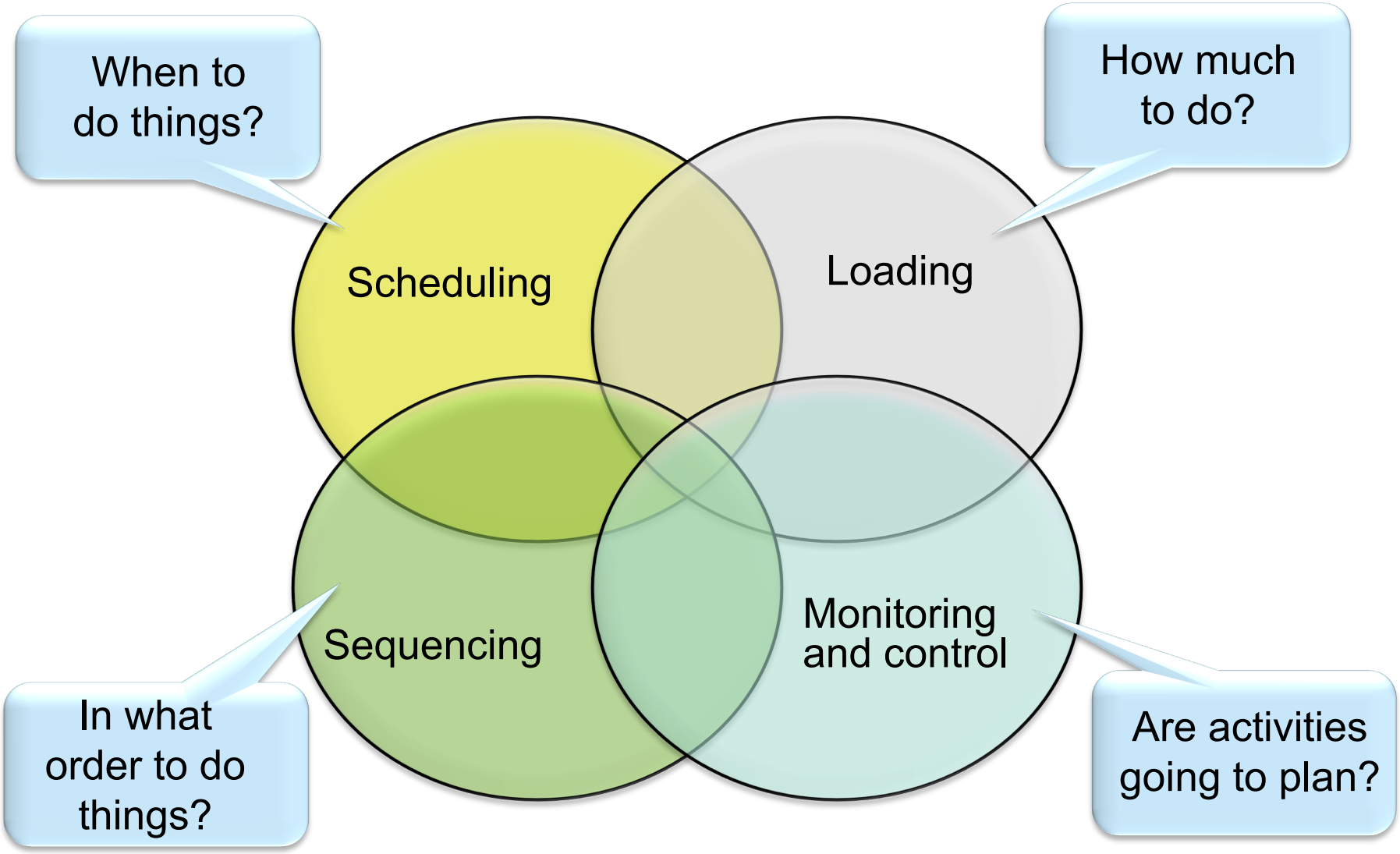
Independent demand
e.g. tyre fitting service



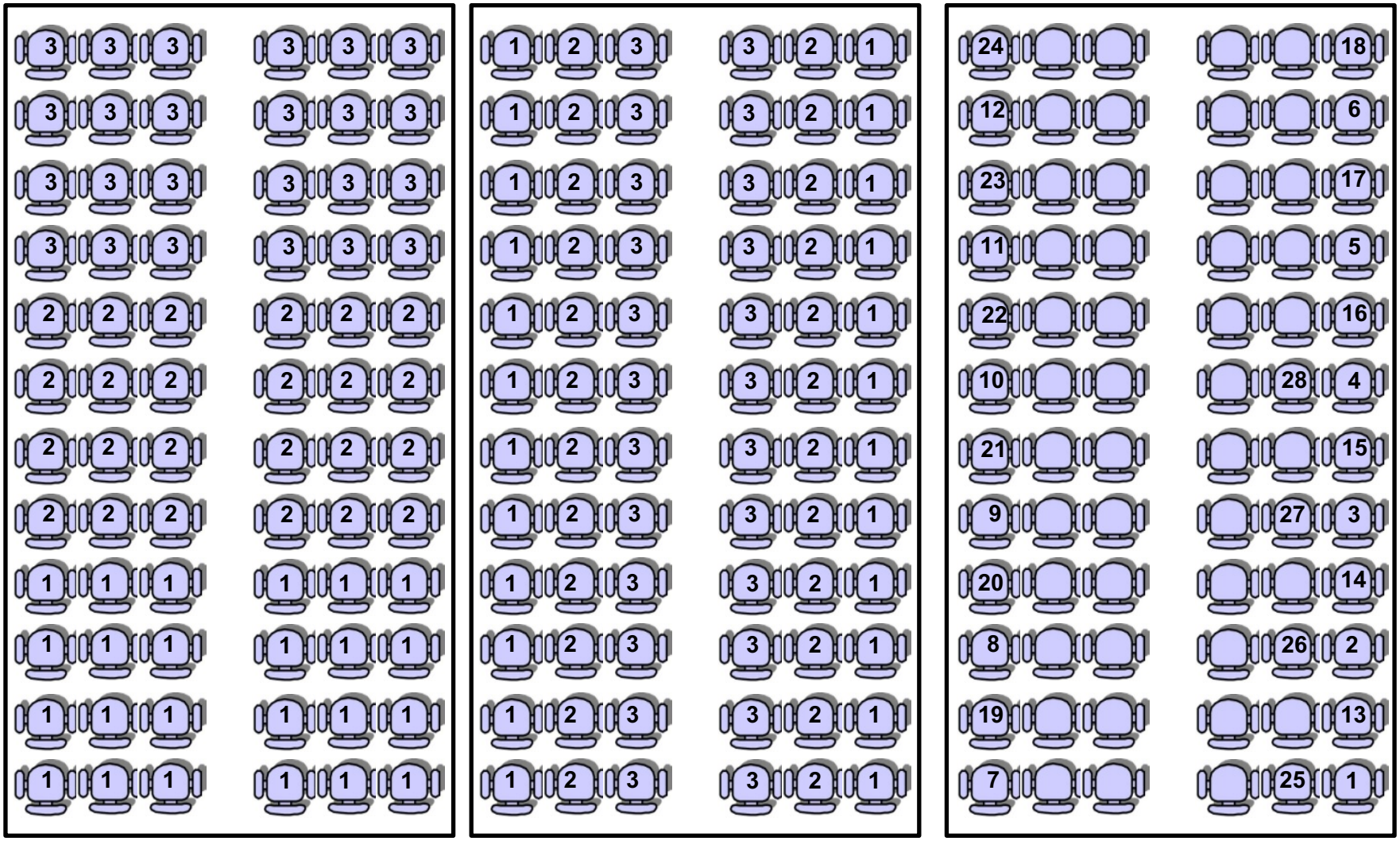
Demand for tyres is governed by the type of car arriving, the fluctuations in the number of cars arriving and how many tyres need replacing

Demand for tyres is largely governed by random factors

The activities of planning and control



The best way to sequence passengers onto an aircraft?



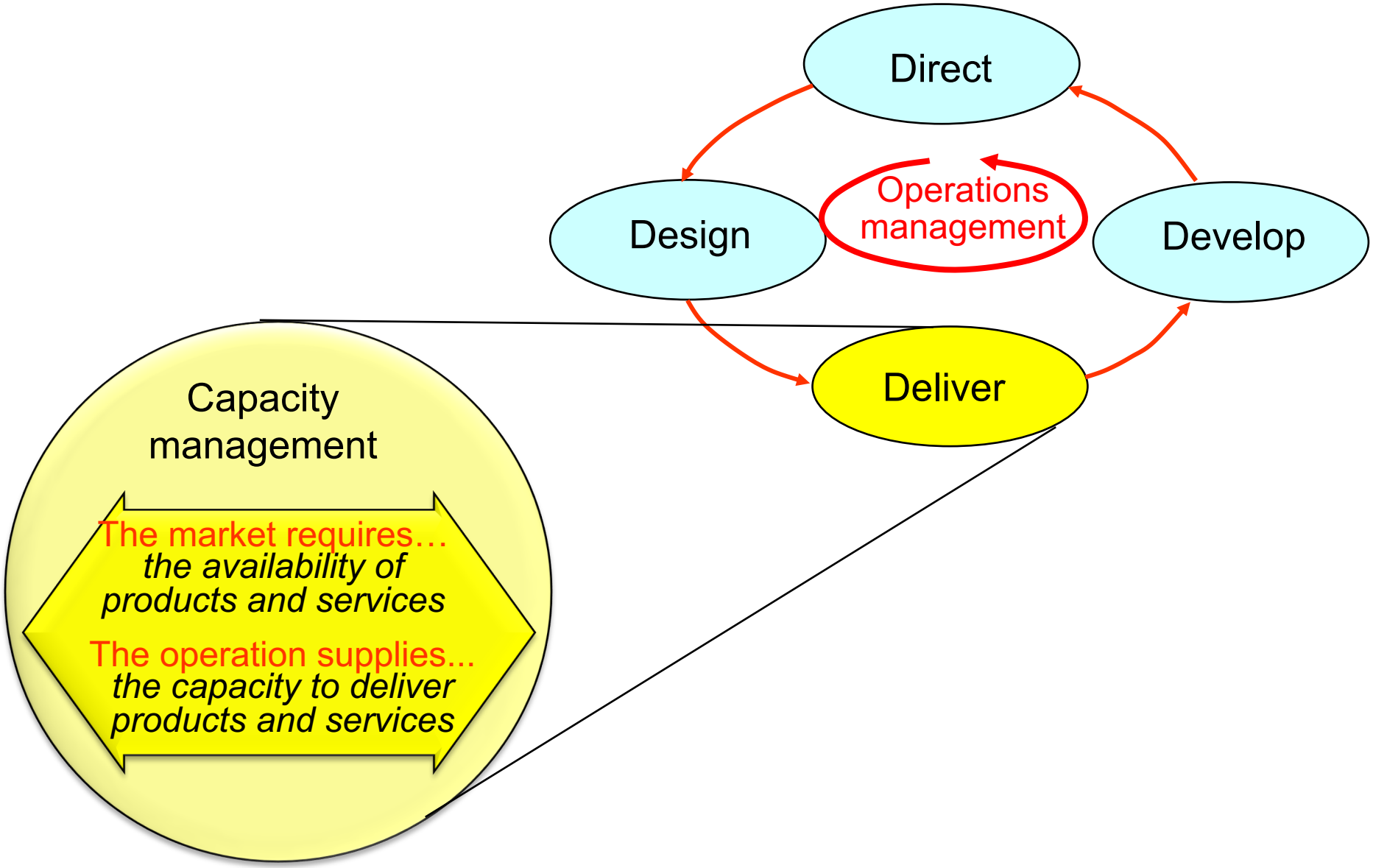
Block (conventional) method

Wilma method

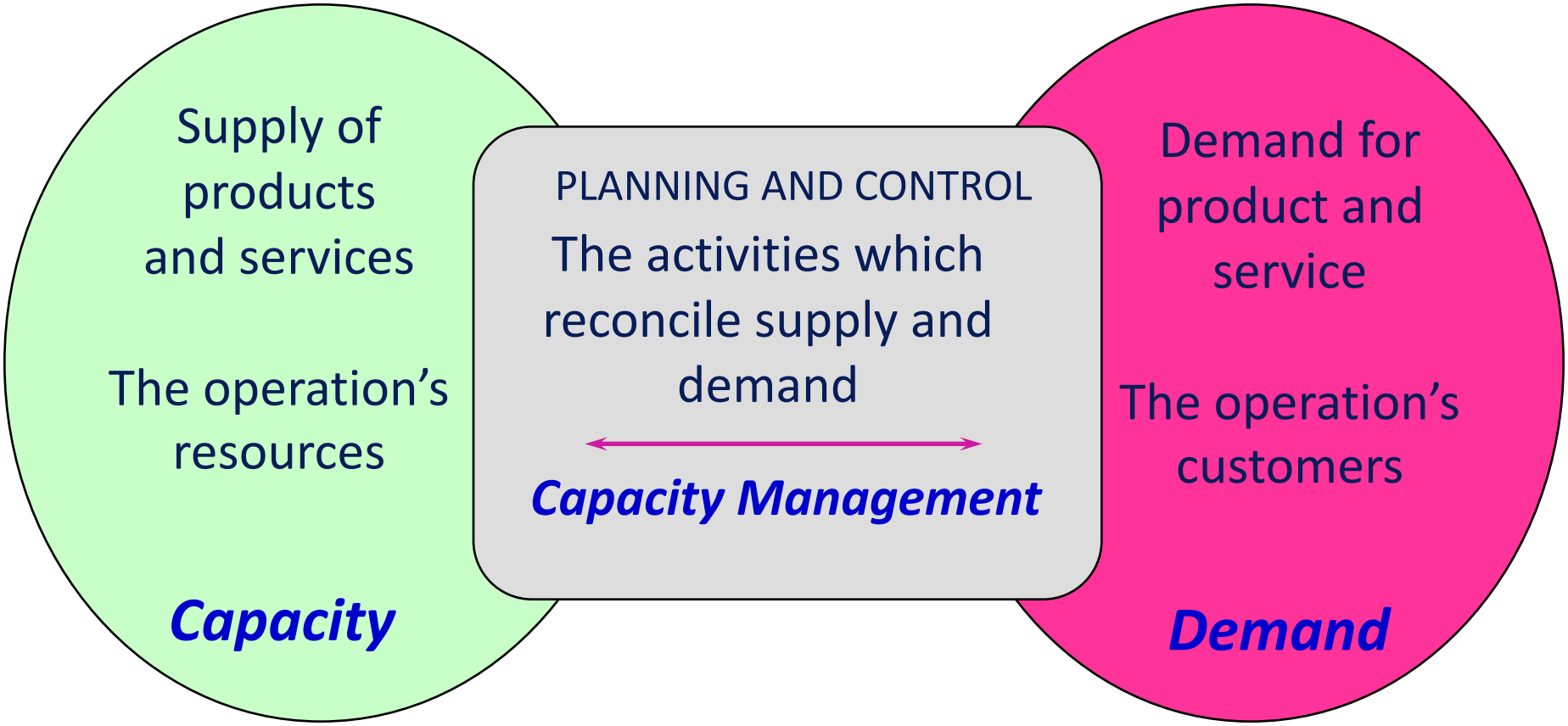
Steffen method

Capacity planning and control

Capacity management



The nature of capacity management



What is capacity?

- **Capacity** is in the static, physical sense means the ***scale*** of an operation,
- But this may not reflect the operation's processing capability
- So we must incorporate a *time* dimension appropriate to the use of assets.
  - For example 24 000 litres per day.
  - 10,000 calls per day
  - 57 patients per session
  - Etc.

The objectives of capacity management

To provide an "appropriate" amount of capacity at any point in time.

The "appropriateness" of capacity planning in any part of the operation can be judged by its effect on…...

- Costs
- Revenue
- Working Capital
- Service Level, in terms of….
  - Quality
  - Speed
  - Dependability
  - Flexibility

Input and output capacity measures for different operations

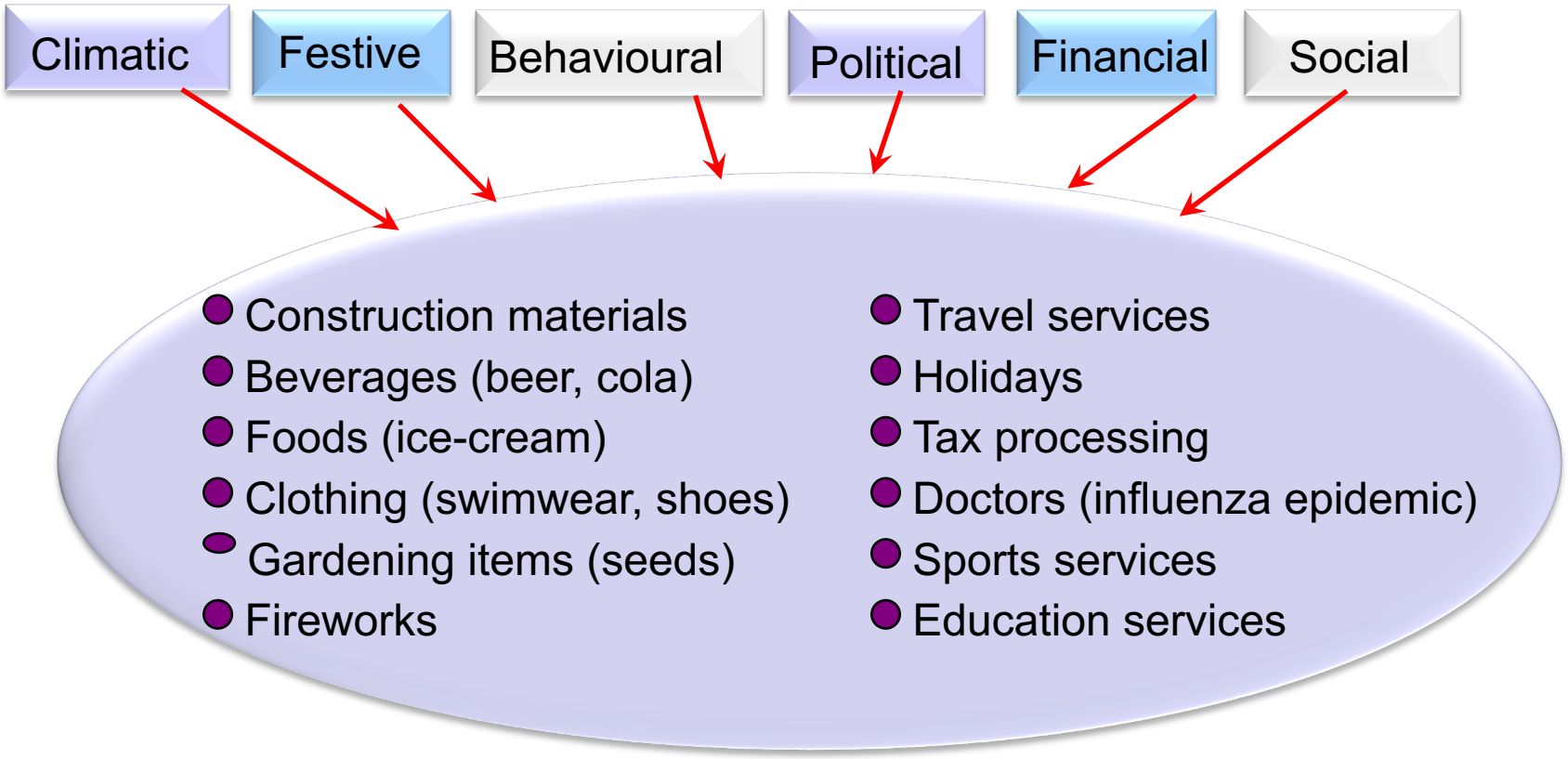
Operation	*Input measure of capacity*	*Output measure of capacity*
Air-conditioner plant	*Machine hours available*	**Number of units per week**
Hospital	**Beds available**	*Number of patients treated per week*
Theatre	**Number of seats**	*Number of customers entertained per week*
University	**Number of students**	*Students graduated per year*
Retail store	**Sales floor area**	*Number of items sold per day*
Airline	**Number of seats available on the sector**	*Number of passengers per week*

The nature of aggregate capacity

- Aggregate capacity of a hotel:
  - rooms per night;
  - ignores the numbers of guests in each room.

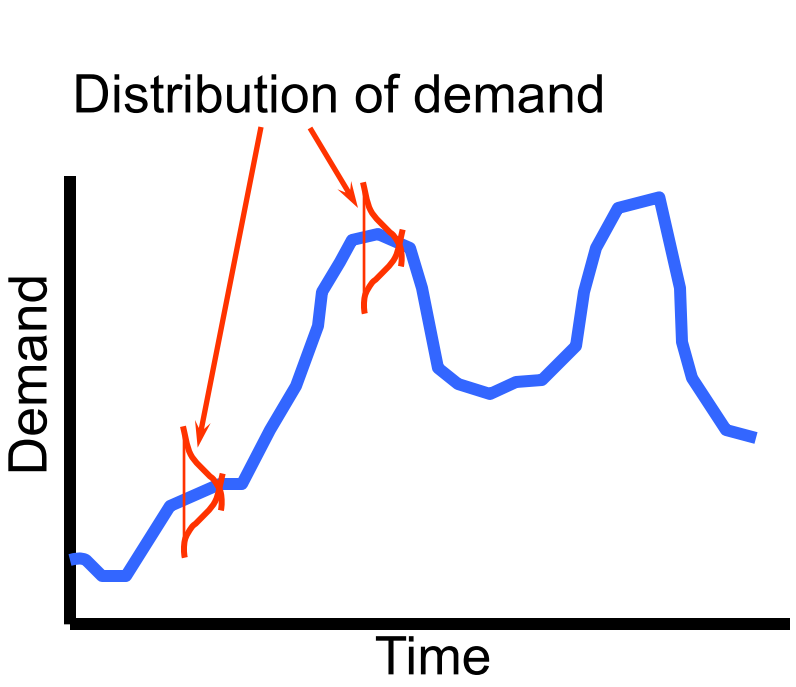
- Aggregate capacity of an aluminium producer:
  - tonnes per month;
  - ignores types of alloy, gauge and batch variations.

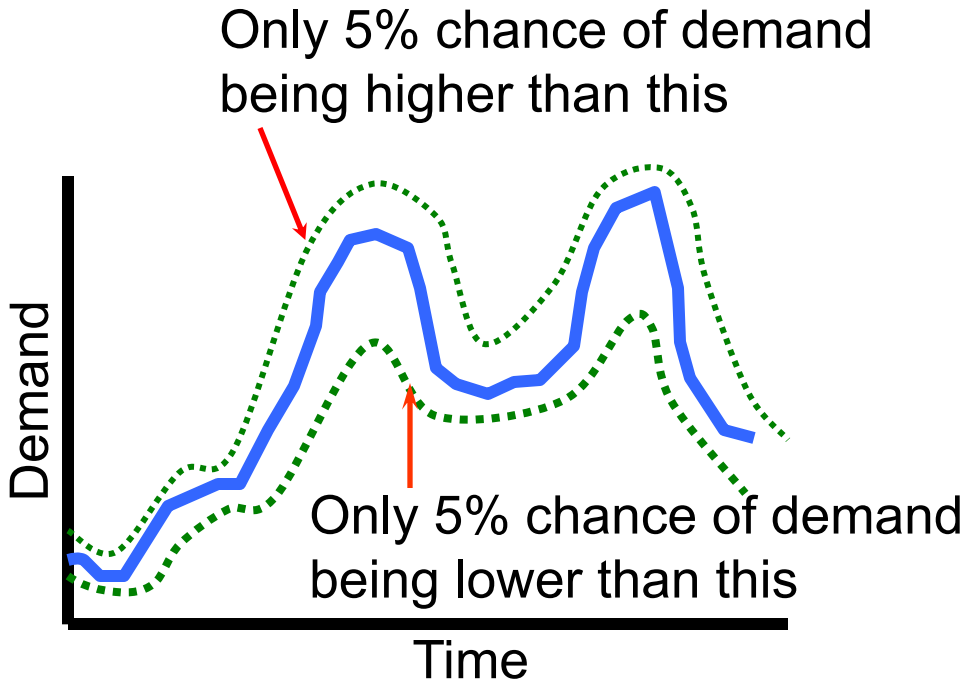
Causes of seasonality



Good forecasts essential for effective capacity planning

But so is an understanding of demand uncertainty because it allows you to judge the risks to service level.

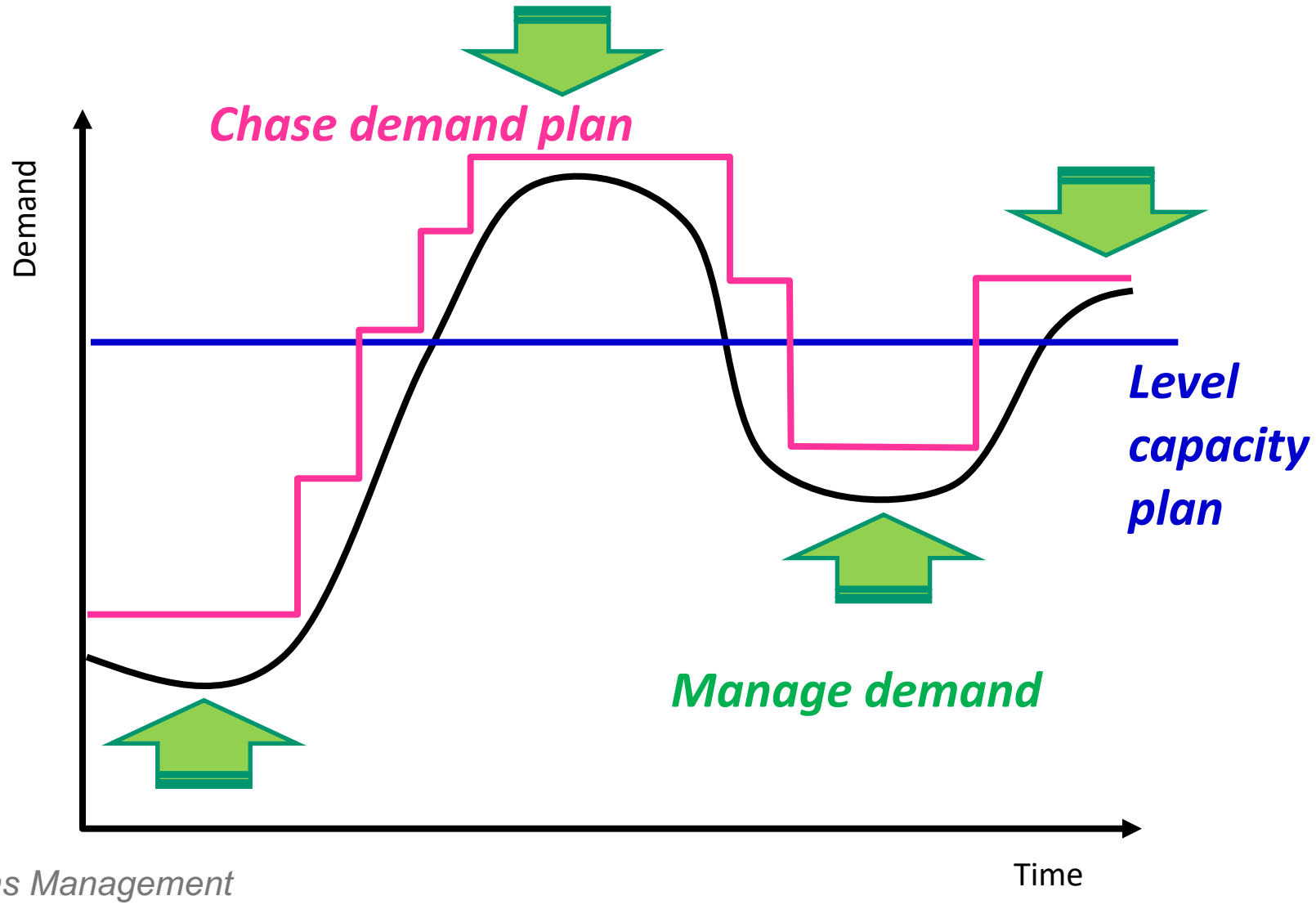




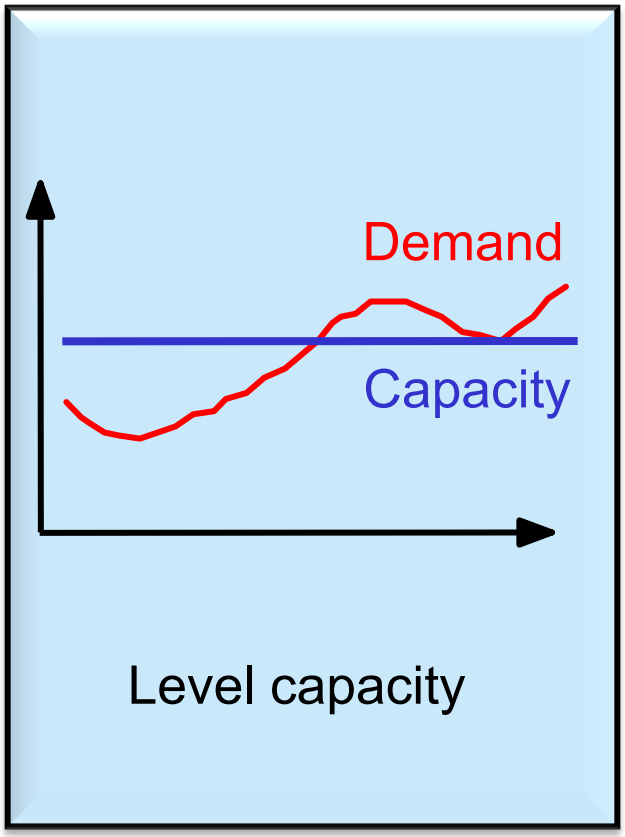
When demand uncertainty is high the risks to service level of under provision of capacity are high.

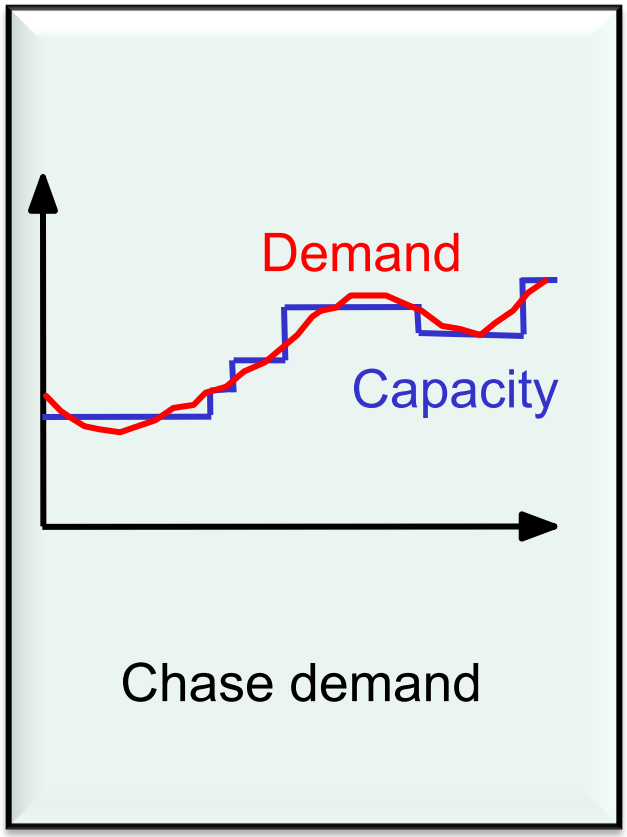
Three capacity management strategies

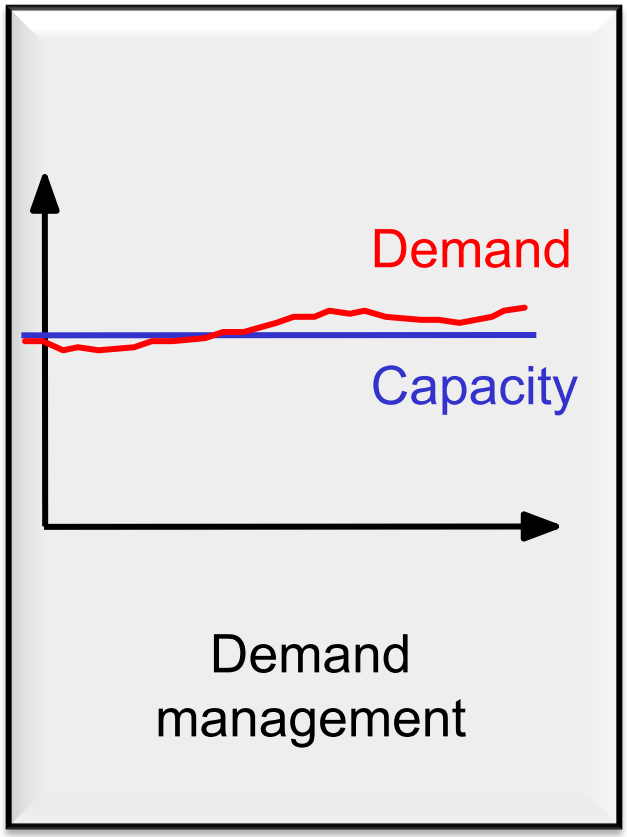
The capacity management strategies



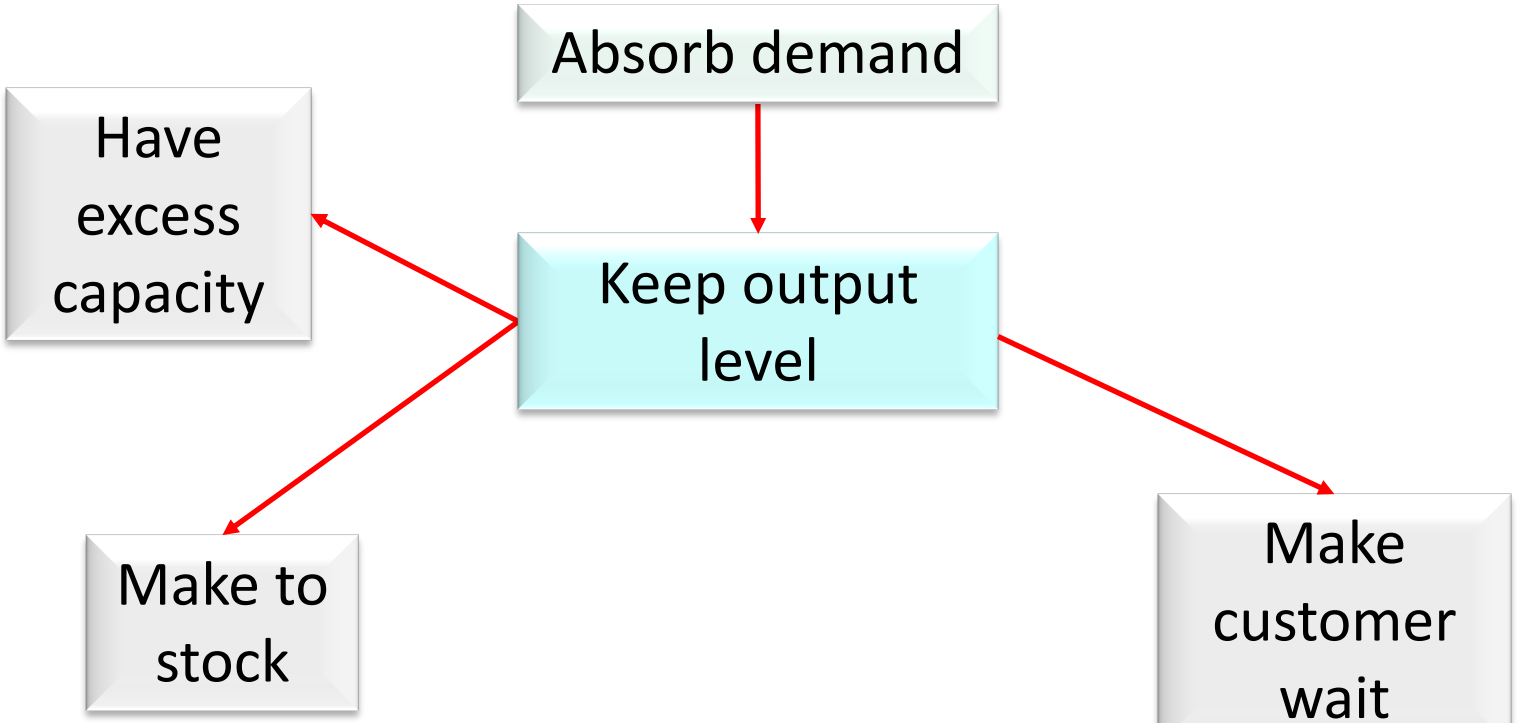
Ways of reconciling capacity and demand







Level capacity – How to?



- WIP
- Finished goods, or
- Customer Inventory

- Queues
- Backlogs

Level capacity – When and why?

Ignore demand fluctuations & keep activity levels constant

When appropriate:

- Capital intensive businesses where assets or facility utilization is a priority

Benefits

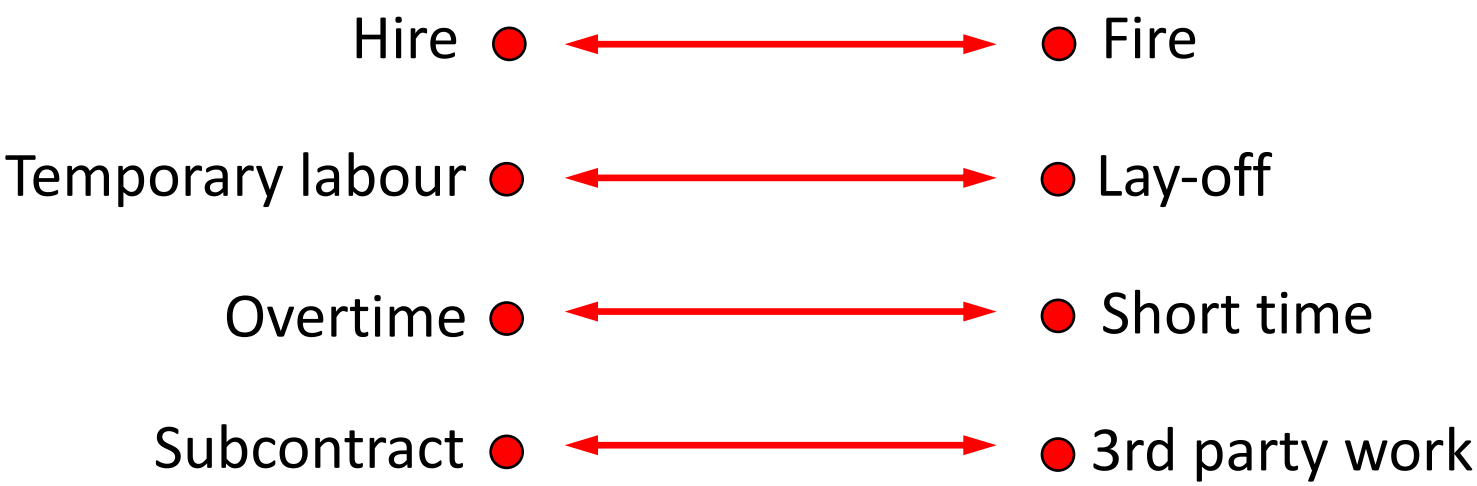
- High utilization
- Stable employment patterns
- Low unit cost

Costs

- High inventories
- Danger of over- and under-production

Chase demand – How to?

Adjust output to match demand



Chase demand – When and why?

Adjust capacity to reflect demand fluctuations

When appropriate:

- Operations which cannot store their output such as customer processing operations

Benefits

- Flexible operation
- Less over- or under-production
- Less wastage in terms of unused resources

Costs

- Reduced quality control?
- Difficult to plan and control

Manage demand – How to?

Change demand

- Change pattern of demand
- Develop alternative products and/or services

Manage demand – When and why?

Try to change demand to fit available capacity

When appropriate:

- Operations that respond to highly seasonal demand or to demand fluctuating on a predictable basis in the shorter term

Benefits

- Improved planning
- Improved utilization

Costs

- Loss of business?
- Discounts may devalue products/services

Capacity planning & strategy: National Grid

- What is Mr. Williams from National Grid most concerned of regarding their operations? Why?
- How does National Grid balance supply and demand?
  - Any ways to store energy?
- How is the balance affected by
  - Increasing use of electric cars?
  - Increasing wind energy production?
  - Smart grid/metering?

https://www.youtube.com/watch?annotation_id=annotation_564487&feature=iv&src_vid=FIxSaUXfbyM&v=vX0G9F42puY

nationalgrid

Research

- What happens when supply surpasses demand?
- Examples from energy industry

Summary

- Capacity refers to the scale of an operation
- Capacity management is concerned with managing the relationship between Demand & Capacity
- Dependent and independent demand
- Capacity is measured either by the availability of its inp resources or by the output which is produced
- 3 strategies to manage capacity