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OVERVIEW

- **Research - purpose and outline**
- **Review of mechanisms to cushion delivery systems**
- **Insights on managing supply chain**

RESEARCH - PURPOSE AND OUTLINE

- To examine how companies cushion their delivery systems from the instability of their markets
- Case-based research: 7 reviews
- Illustrate using 3 case analyses

OVERVIEW

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REVIEW OF MECHANISMS TO CUSHION DELIVERY SYSTEMS

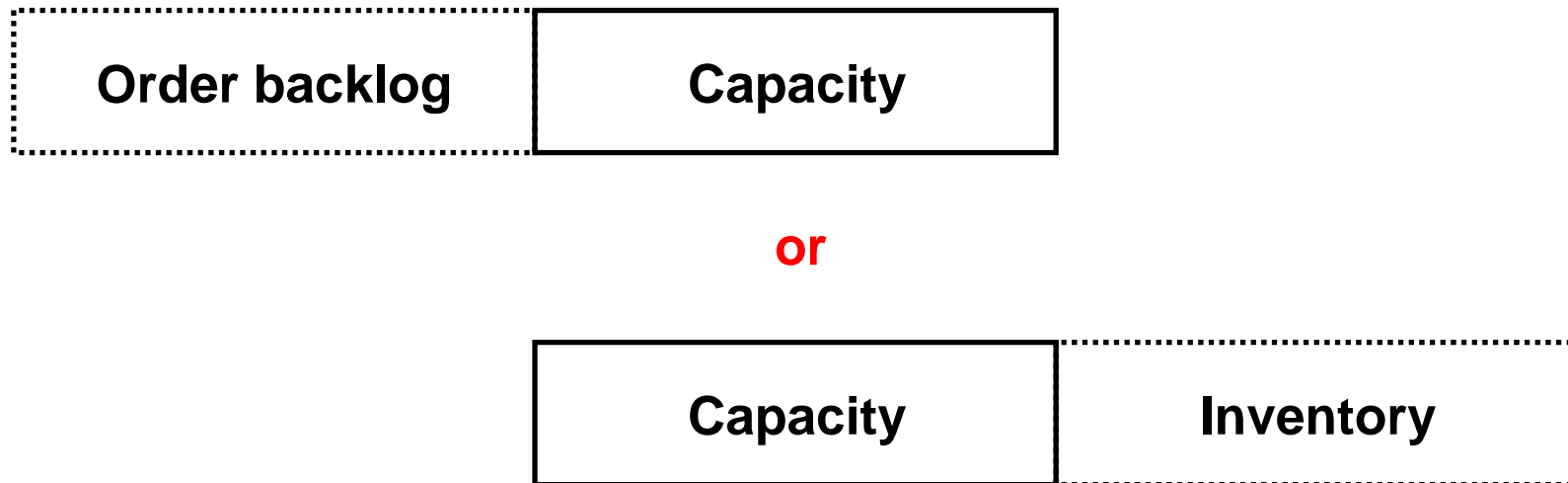
- Overall delivery system design
- One element - how to cushion it from inherently unstable markets
- Consensus in literature - companies use some combination of
 - Inventory
 - Order backlog
 - Capacity

CUSHIONING OUTCOMES

- **Identified three categories:**
 - Basic category
 - Secondary category
 - Supplementary category

BASIC CATEGORY

As never sell and make exactly in the same period need to decide the basic category of cushioning mechanism



STRATEGIC TRADE OFFS

- **Order backlog** : lead-time vs delivery speed
- **Inventory** : costs vs cash flow

SECONDARY CATEGORY

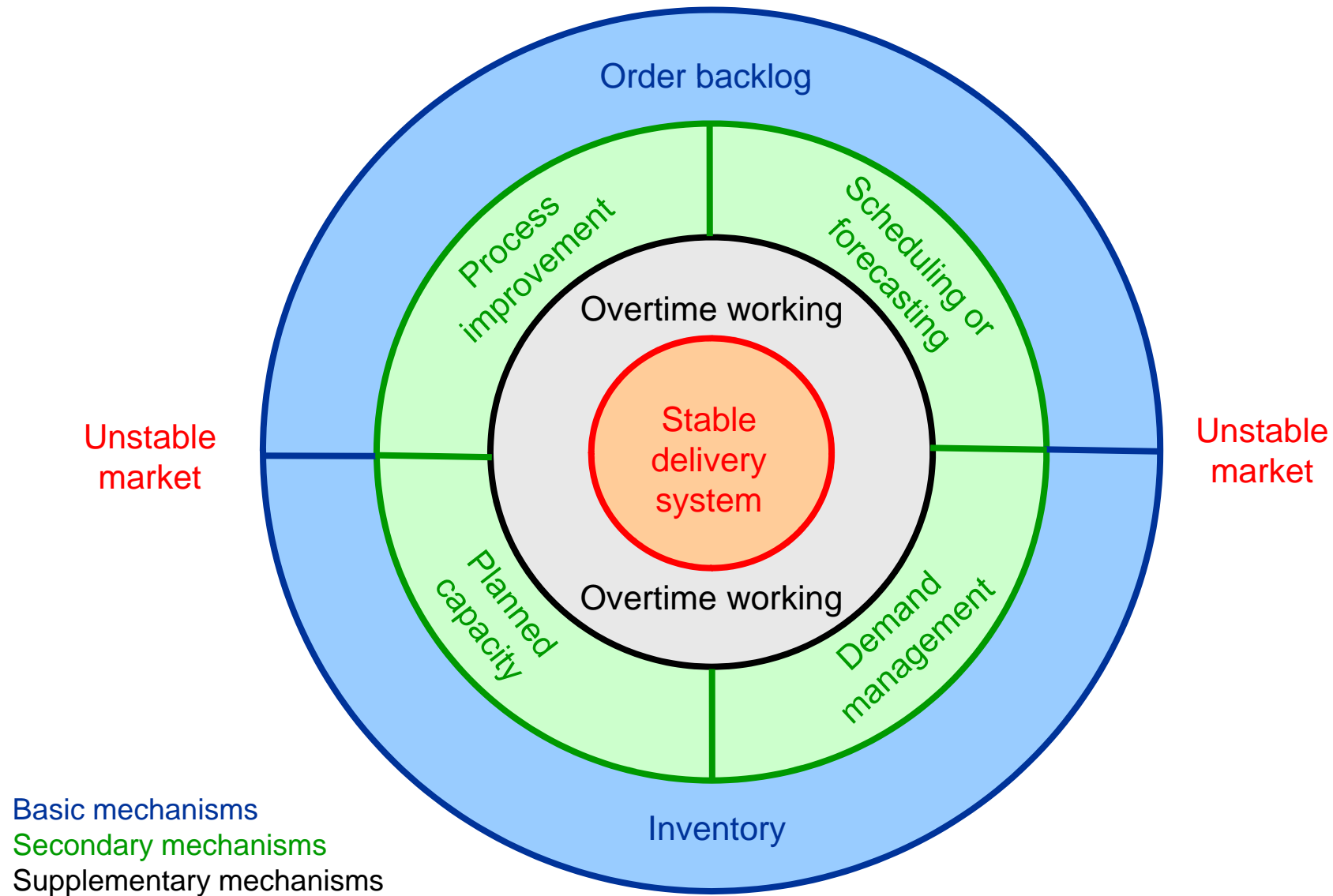
■ Range of options

- Forecasting
- Demand management
- Scheduling
- Process improvement
- Planned capacity

SUPPLEMENTARY CATEGORY

- **Overtime**
 - Unplanned
 - As needed
 - Last resort

CUSHIONING OUTCOMES



COMPANY USE OF MECHANISMS

Case	Basic		Secondary				Supplementary	
	Inventory	Order backlog	Planned capacity	Forecasting	Scheduling	Demand management	Process improvement	Overtime
1	✓	✓	✓		✓		✓	✓
2		✓		✓	✓			✓
3		✓			✓			✓
4		✓	✓	✓	✓			✓
5		✓	✓		✓			✓
6		✓		✓	✓			✓
7		✓			✓			✓

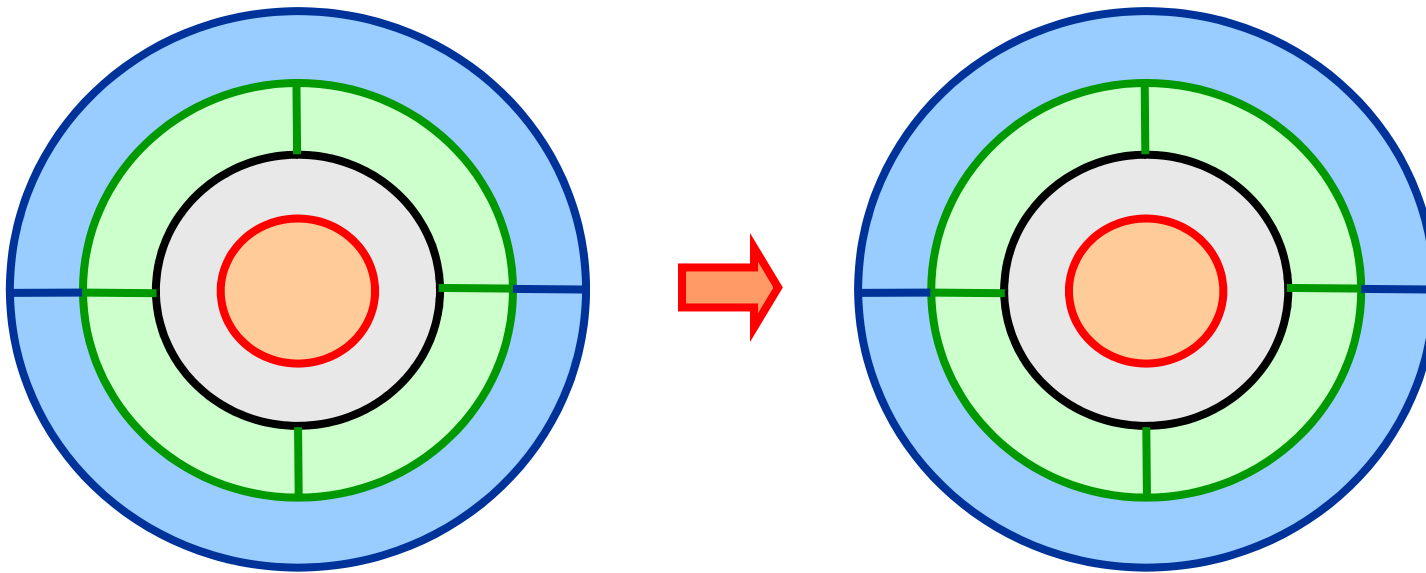
OVERVIEW

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MANAGING SUPPLY CHAINS

- 1. Many dimensions of task - one is to recognise that company's suppliers also wish to cushion their delivery systems from market instability**
- 2. Will choose from the same mechanisms**

MANAGING SUPPLY CHAINS



MANAGING SUPPLY CHAINS

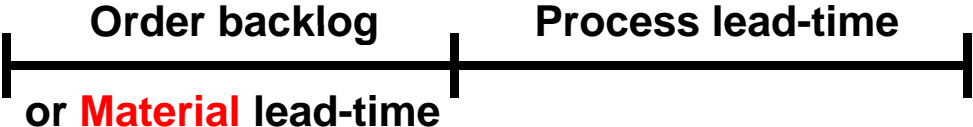
- Look to cushion
- Same list
- Instability in a supplier's market is its customer
- Supplier choice from list is in response to a company's own behaviour

AN ILLUSTRATION

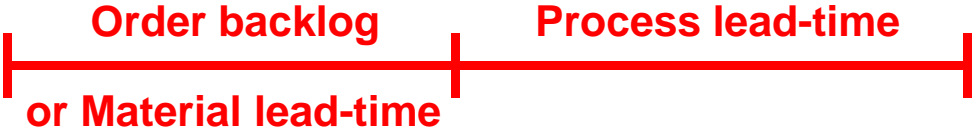
- **Uncertain demand = make-to-order response = increase in material lead-time**
- **Operations lead-time comprises same elements for both customer and supplier**

AN ILLUSTRATION

← Company's operations lead-time →



← Supplier's operations lead-time →



RESEARCH FINDINGS

(Firm A)

- **Automotive component supplier**
- **Major customer is UK-based car plant**
- **Customer provided:**
 - 3 month / 1 month forecast
 - 1 week firm schedule
- **Car enters assembly stage - data fed back - synchronised manufacture**
- **Off-line assembly parts provision**
- **Company's process improvements**
 - E.g. 22 parts per million

RESEARCH FINDINGS

(Firm A)

■ Inventory outcomes

- Decreased by 75%
- 2 days of components
- 2 hours off-line assembled units

RESEARCH FINDINGS

(Firm A)

- To better handle own unstable demand patterns, car plant introduced annualised hours
- Result
 - De-stabilised supply chain
 - Increased supplier's overtime and costs

RESEARCH FINDINGS

(Firm B)

- **European manufacturer of OE pumps for oil, chemical and water industries**
- **Moved to focused unit based on customers' industrial sector**
- **Led to sales growth in all business units**

RESEARCH FINDINGS

(Firm B)

- **Originally, Firm B manufactured own machined castings, purchased other components and assembled pumps**
 - High and low volume pump sales
 - Make-to-order with 6 week lead-time
 - 4 weeks for castings/components plus 2 weeks to assemble

RESEARCH FINDINGS

(Firm B)

- **Group set up casting plant in India**
- **Pressure for subsidiary companies to source castings from India**
 - Underpin investment rationale
 - Result in overall lower units costs per casting

RESEARCH FINDINGS

(Firm B)

■ Result

- Closed casting facility
- Sourced high volume castings from India
- Sourced low volume castings locally

RESEARCH FINDINGS

(Firm B)

- **Outcome for high volume business**
 - Increased casting lead-time from 4 to between 16 and 24 weeks
 - Pump lead-time 18 weeks (at best)
 - Potential loss of sales and market share

RESEARCH FINDINGS

(Firm B)

■ To overcome problems

- Decided to hold unmachined casting inventories
- Make-to-order with a 6 week lead-time
 - 4 weeks machining and components
 - 2 weeks assembly
- Pressure by Group to reduce inventory levels
 - Holding costs
 - Cash flow

RESEARCH FINDINGS

(Firm B)

■ Low volume business

- Castings sourced locally
- Unit costs 4 to 5 times that of high volume castings
- Local suppliers = MTO = order backlog
- Increase in material lead-time from 4 to between 6 and 10 weeks
- Low volume business = 13% sales but about 35% profit

RESEARCH FINDINGS

(Firm B)

- **Outcome of low volume business**
 - Buy supplier capacity by guarantee of use
 - In times of below forecast orders use capacity for high volume castings = increased unit costs

RESEARCH FINDINGS

(Firm C)

- **Make-to-order, engineered products**
- **Existing business**
 - Order-winners : technical capability
 - Qualifiers : price, delivery reliability and quality conformance
- **New business**
 - Order-winners : technical capability and delivery speed
 - Qualifiers : as for existing business

RESEARCH FINDINGS

(Firm C)



RESEARCH FINDINGS

(Firm C)



To decrease operations lead-time need to decrease material lead-time

RESEARCH FINDINGS

(Firm C)

← **Company's operations lead-time** →
21 days

Material lead-time | **Process lead-time**
18 days | 3 days



← **Supplier's operations lead-time** →

**Order backlog or
Material lead-time** | **Process lead-time**
12 days | 6 days

RESEARCH FINDINGS

(Firm C)

← **Company's operations lead-time** →
21 days

Material lead-time | **Process lead-time**
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← **Supplier's operations lead-time** →

**Order backlog or
Material lead-time** | **Process lead-time**
12 days | 6 days

**To decrease supplier lead-time need to
decrease order-backlog or material lead-time**

RESEARCH FINDINGS

(Firm C)

- **Way forward**

- Guarantee supplier's material inventory holding
- Guarantee capacity use

REFLECTIONS

- **Recognise which mechanisms by type, role and impact**
- **Understand behaviour and impact on supplier**
- **Help manage supplier's own cushioning mechanisms**

