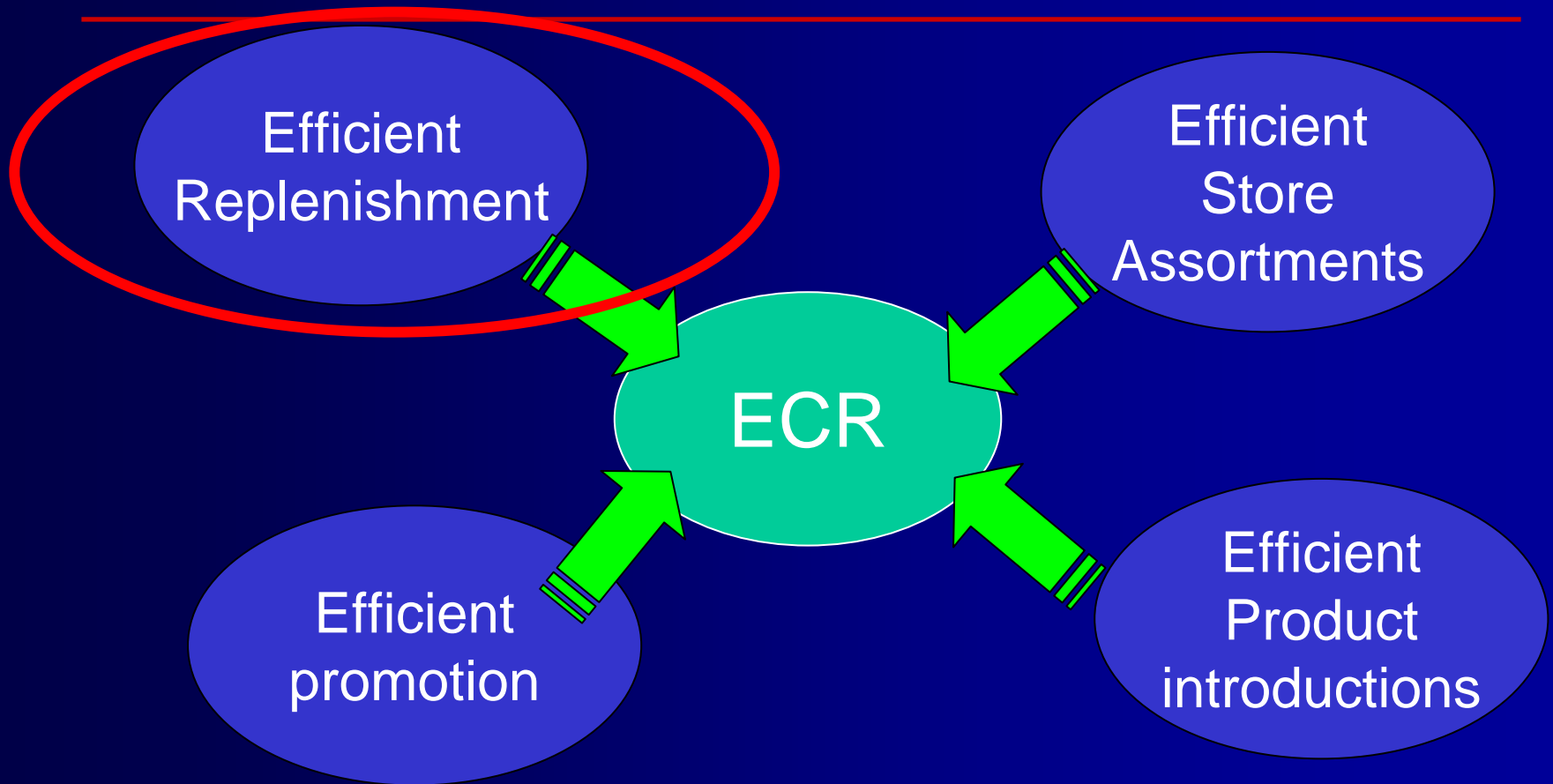




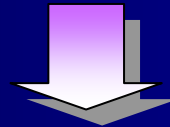
The Supply Chain and Consumer Value

Kate Bailey, David Simons, Keivan Zokaei



Efficient Replenishment

‘ Provide the right product, to the right place, at the right time, in the right quantity AND in the most efficient manner possible’



Efficient delivery of value to customer through the whole supply chain



***High levels of in-store availability
Lowest cost***

Our Research ...

■ Research Programmes

- Tesco Lean Delivery ('96-02)
- Value Chain Analysis ('02-)
 - Red Meat
 - Dairy
 - Organic Produce
 - Cereals

■ Data

- Value Chain Analysis Cases
- Small sample surveys
- Computer Systems
- Interviews

Value Chain Analysis

Value Chain

All the steps currently required to move the product from raw material to end consumer

Value Chain Analysis

- **A structured & systematic way to analyse processes across the whole value chain**
 - Physical flow of product
 - Information flow
 - Time dimension – total lead time of the chain

Objectives

- **Key Performance Indicators**
 - Perfect Food Encounter
 - Basket Fulfilment Update
- **Lean in Retail**
 - Example Retail Cases
 - Lean in the Last 50m
- **Customer Value in the UK Public Sector**
 - Example Public Sector Case
 - Step by Step improvement of the information process

Overall Equipment Effectiveness

- Availability
- Performance
- Quality

$OEE = \text{Availability} \times \text{Performance} \times \text{Quality}$

OEE Example

Minutes

Shift
Length = 480
Planned
Meeting = 20
Loading
Time = 460

Availability

Breakdowns = 40
Set-Ups = 20
 $460 - 60 = 400$ Mins
 $(400 / 460) = \underline{87\%}$

Performance

Machine Rating 0.5 mins/unit
Units Made = 410
 $(0.5 \times 410) / 400$
 $= \underline{51.25\%}$

Quality

Defects & Reduced Yield = 10 units
 $(410 - 10) / 410$
 $= \underline{97.5\%}$

OEE

$87\% \times 51\% \times 97\%$

\equiv
 43.4%

**World
Class
= 85%**

OEE Six Losses

- **Availability**
 - Breakdowns, Changeovers
- **Performance**
 - Minor Stoppages, Reduced Speed
- **Quality**
 - Defect, Startup & Yield Loss

How about the

Perfect **F**ood

Encounter?

Perfect Food Encounter

■ Availability

- Non-orders, Non-delivered

■ Performance

- Cooked incorrectly, Served incorrectly

■ Quality

- Defective Product, Wrong Labelling.

Perfect Food Encounter

- **Availability 95% +**
 - Imported Product
 - 8000 miles
 - Strict Maturation regime
 - Distribution System
- **Performance 65% success**
 - Customer orders A – D Cooking Style
- **Quality 99% +**
 - Weight
 - Colour
 - Dimensions

PFE

95% x 99% x 65%

= 61%

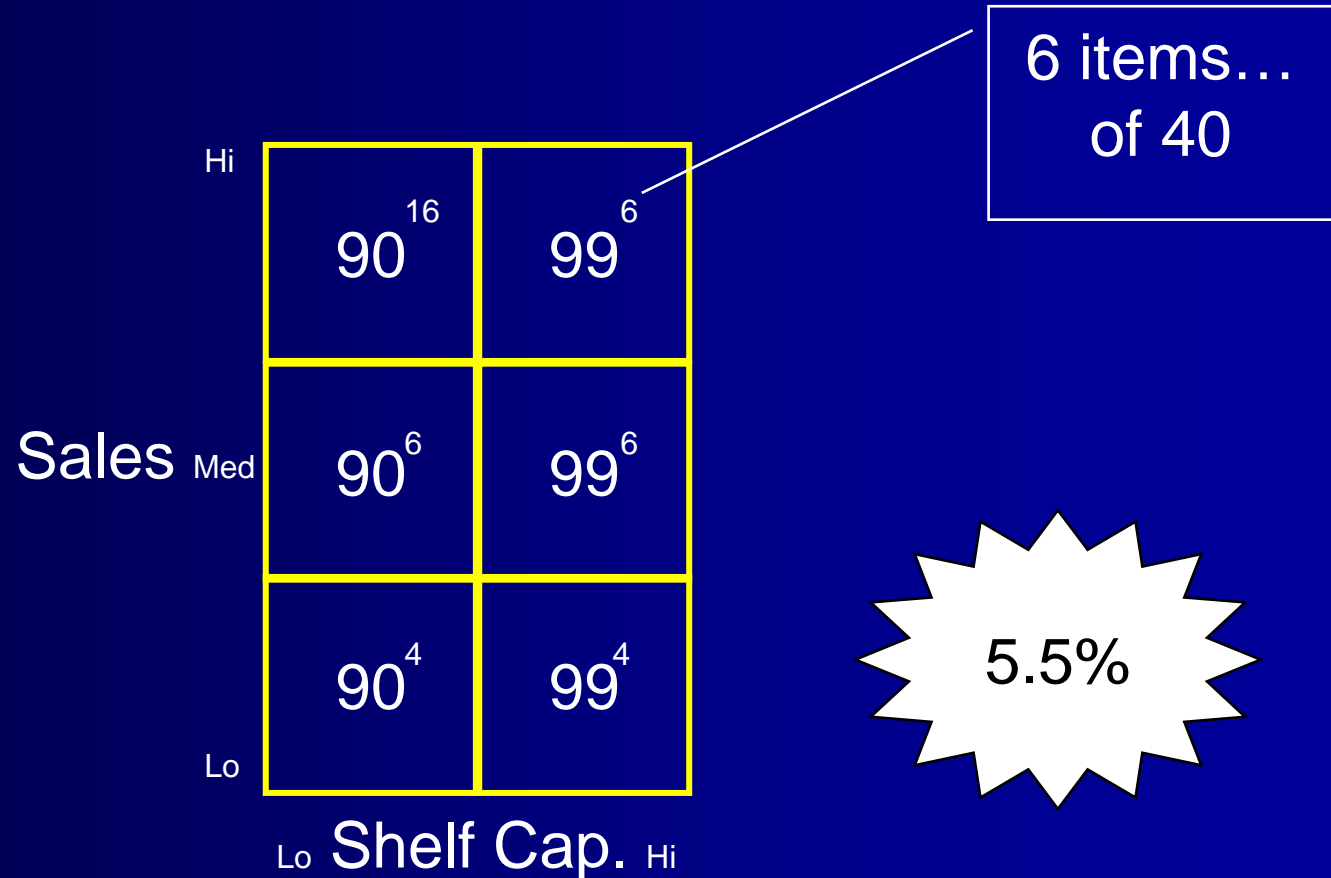
Basket Fulfilment (Dan Jones & David Simons '98 – 02)

- Forty Item Family Shop
- Systems estimated excellent as 98.5 to 99% on shelf
- Basket Fulfilment 99% x 99% x 99% ... = 67%
- Home Shopping
 - Revealed substitutions and Basket Fulfilment for the first time

Value Chain Analysis

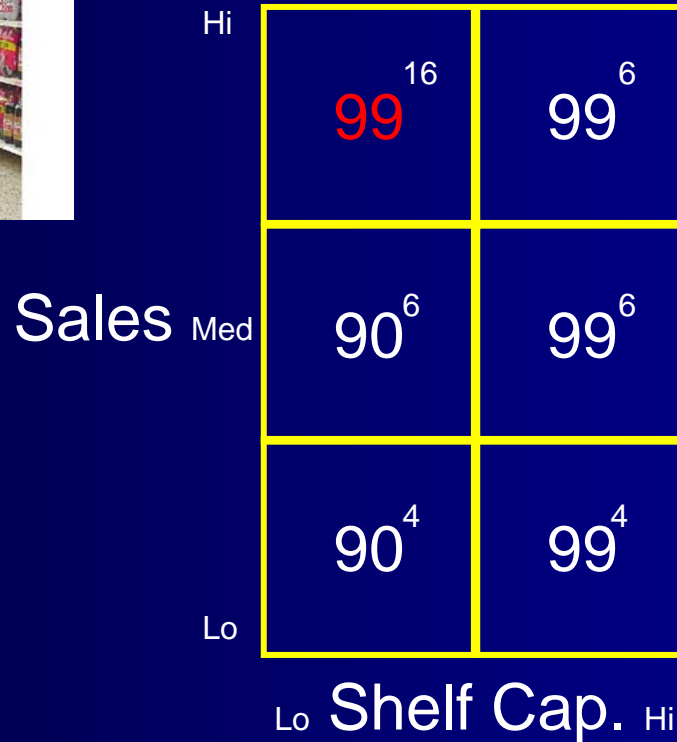
- **Availability varies by product line**
99% x 90% x 92% ...
- **Main Factors**
 - Shelf Space Time
 - Sales Volume
- **New work is based on actual data from ...**
 - Store Visits
 - Home Shopping Data
 - Mapping Interviews

Basket Fulfilment '96 revised...



Fast Mover Improvements 2000...

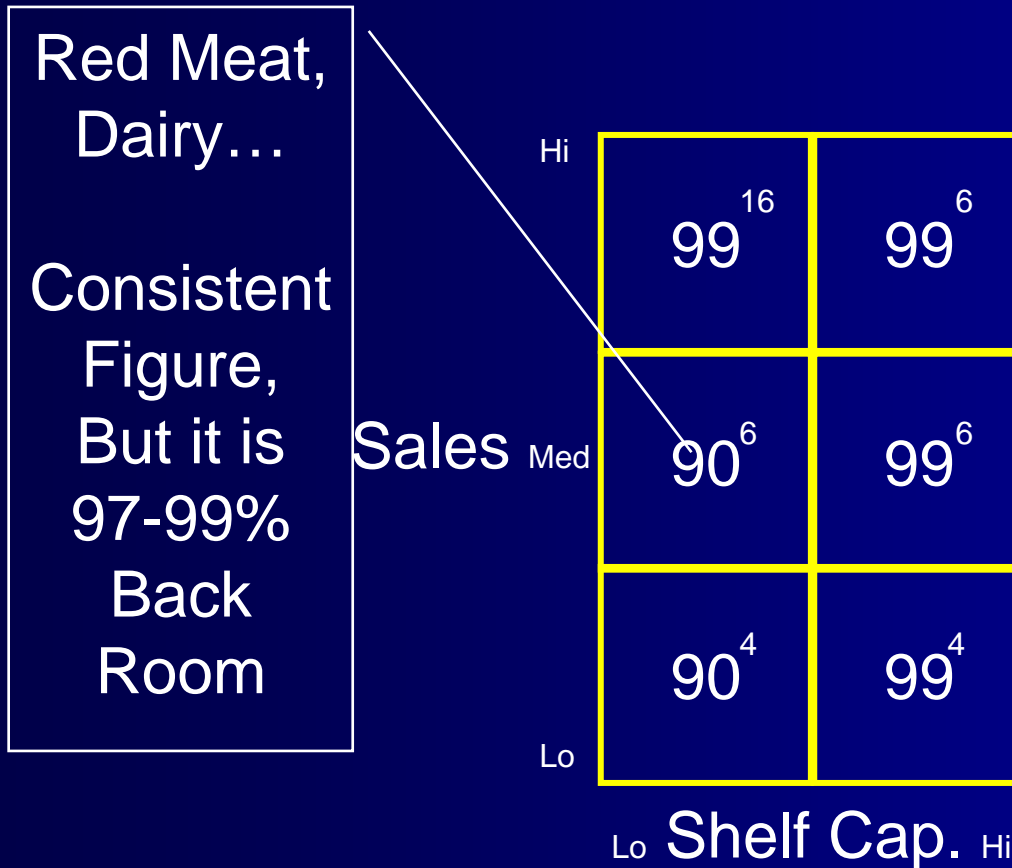
2



27%

Medium Mover Data 2003...

2



Back Room Chaos...

- 1996 to 2003
- Walked major UK retailer backrooms
- No system
- Poor housekeeping
- Complete contrast with distribution system
- Just one back room that was good!
 - Applied company system
 - Only Medium Score!
- Basic Steps
 - Central Returns
 - Industrialised System

Capacity Imbalance

- Shoppers empty too fast at peak times
- Staff allocated to checkout
- Must be able to prioritise limited resource at these times
- Is it possible to apply Distribution type industrial process?
 - Warehouse Management System
 - Fill Cycles

Objectives

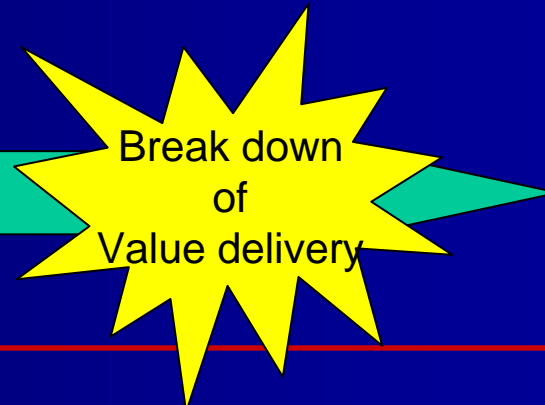
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Why focus on the last 50 metres?

Information Flow



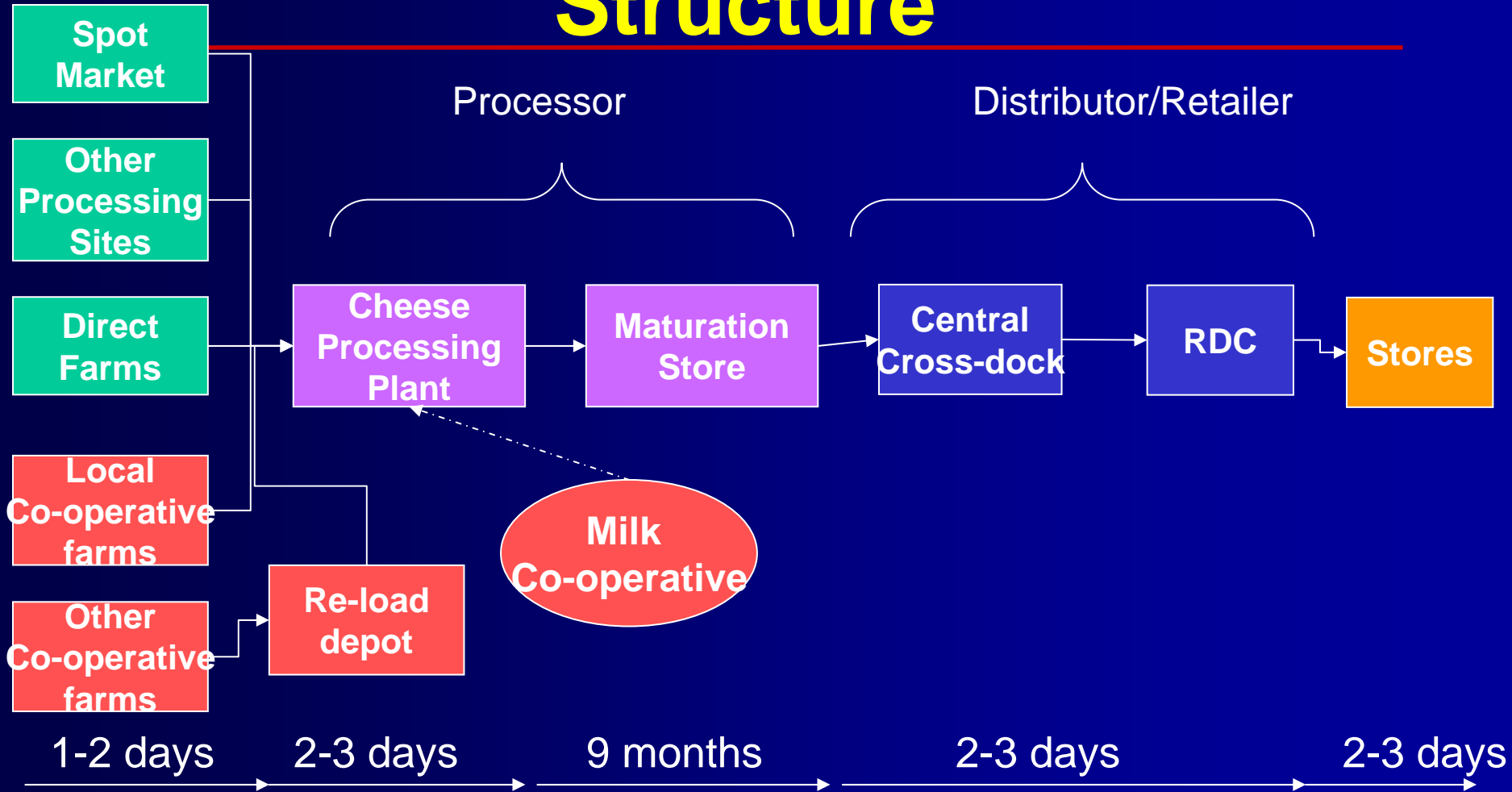
Product Flow



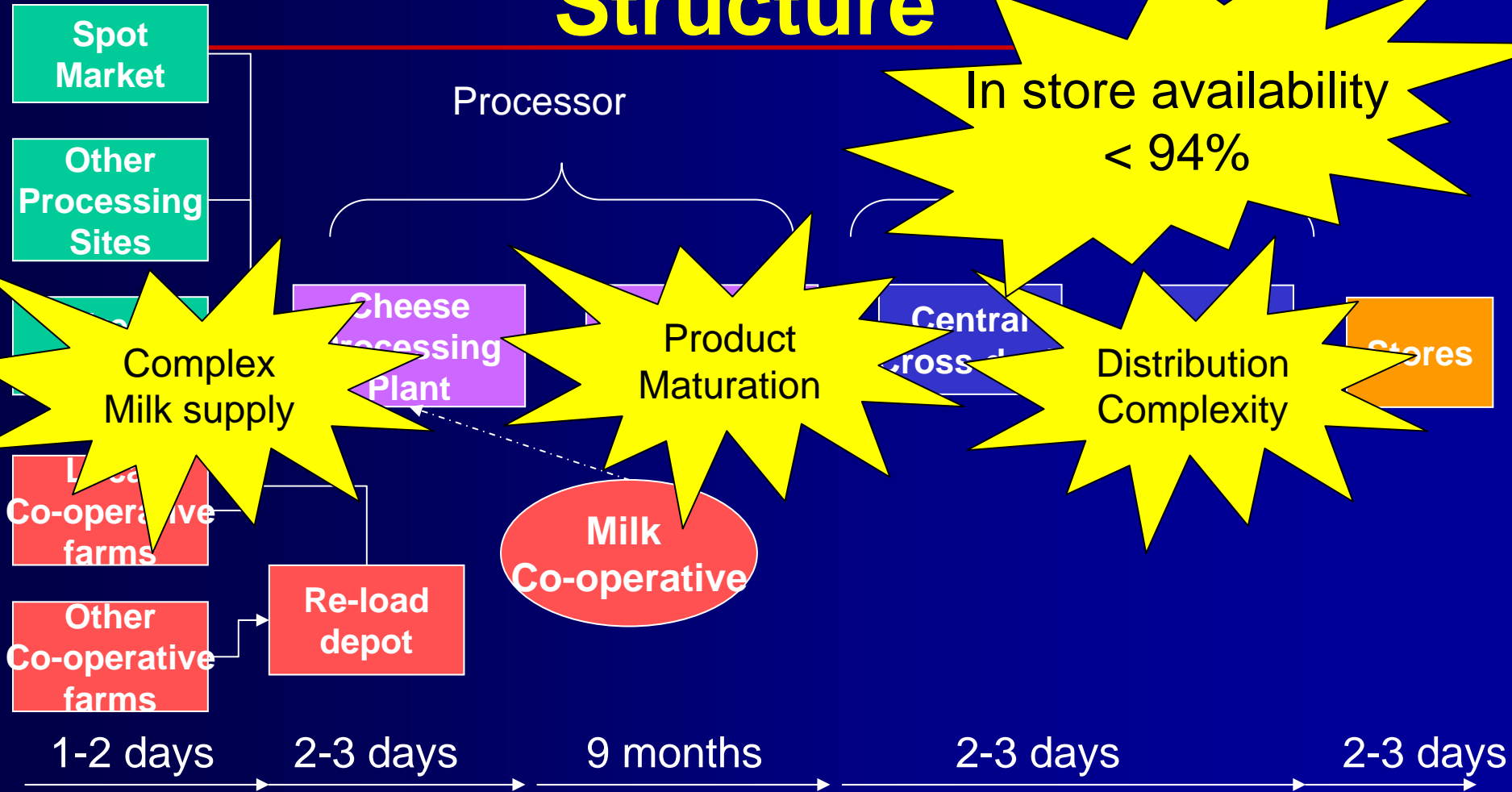
Value Chain Analysis Project

- **Map product from farm to retail outlet**
 - Representative farm
 - Milk co-operative representative
 - Cheese processor
 - Retailer
- **Team chosen from each enterprise**
- **Mapped own brand mature cheddar product**
 - Non-promotional item
 - Each team member walked the whole process

Example Supply Chain Structure



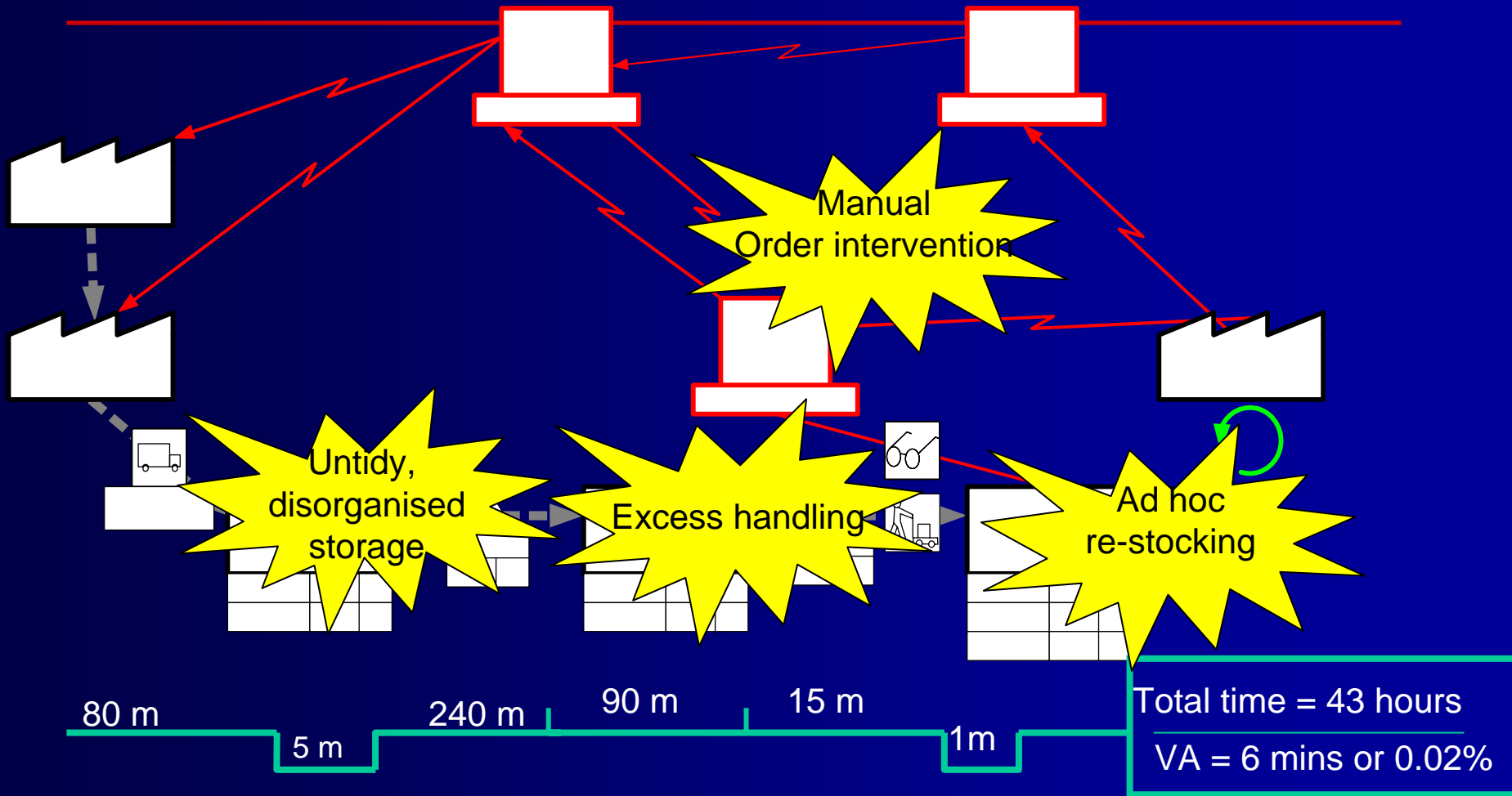
Example Supply Chain Structure



Process Map

Op No	Operation	Time (mins)	Distance (m)	Type
1	Lorry arrives	85	10	T
2	Unload pallets			O
3	Check quantity of pallets			I
4	Wait			D
5	Move pallets into chiller area	15	25	T
6	Wait Break down pallets onto	240		D
7	dollies	90	0	O
8	Dollies taken out into store	5	50	T
9	Wait	10		D
10	Fill chiller space with product	1	1	O
11	Wait/store			D

Store – Current State



Storage and handling processes

- **Untidy, disorganised storage areas**
 - Poor storage of stock – no dedicated areas, poor labelling
 - No dedicated storage space for cardboard and empty pallets
 - Increased wastage/'lost' stock
 - Potential for incorrect perpetual inventory counts

- **Decanting of pallets**
 - Inefficient use of labour

Good, the Bad and the Ugly



Back of Store



Chiller stock



Decanting of pallets

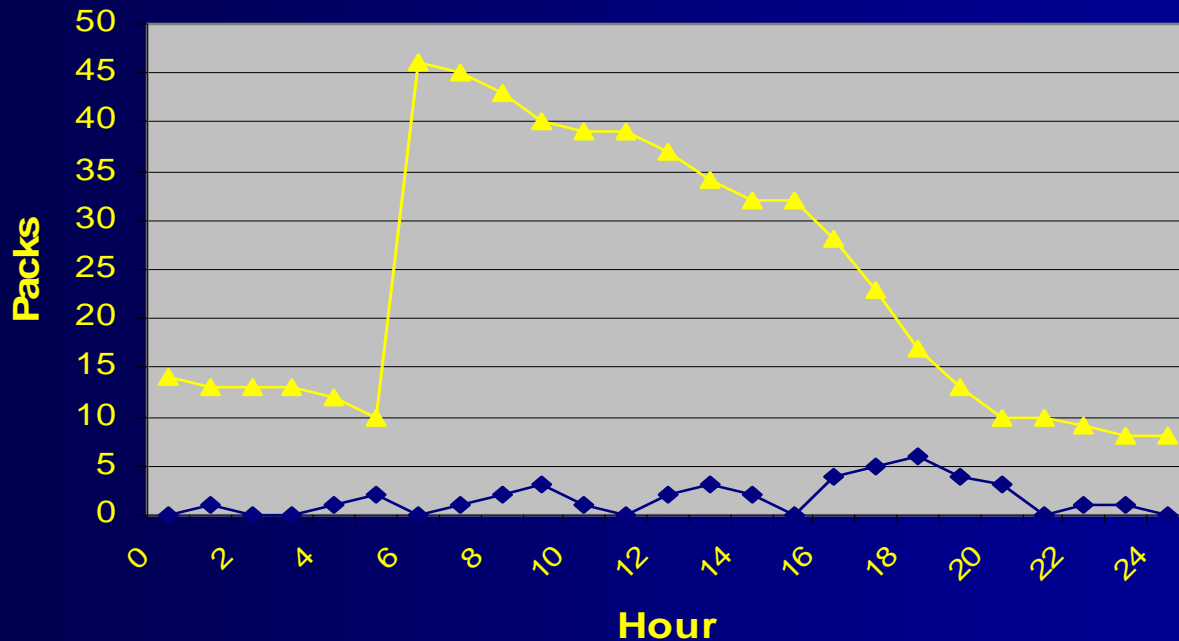


Replenishment Process

- No visible standards for re-stocking display unit
- Ad hoc route and process for replenishment
- Confusing stocking information

A	B	C
1	12	6

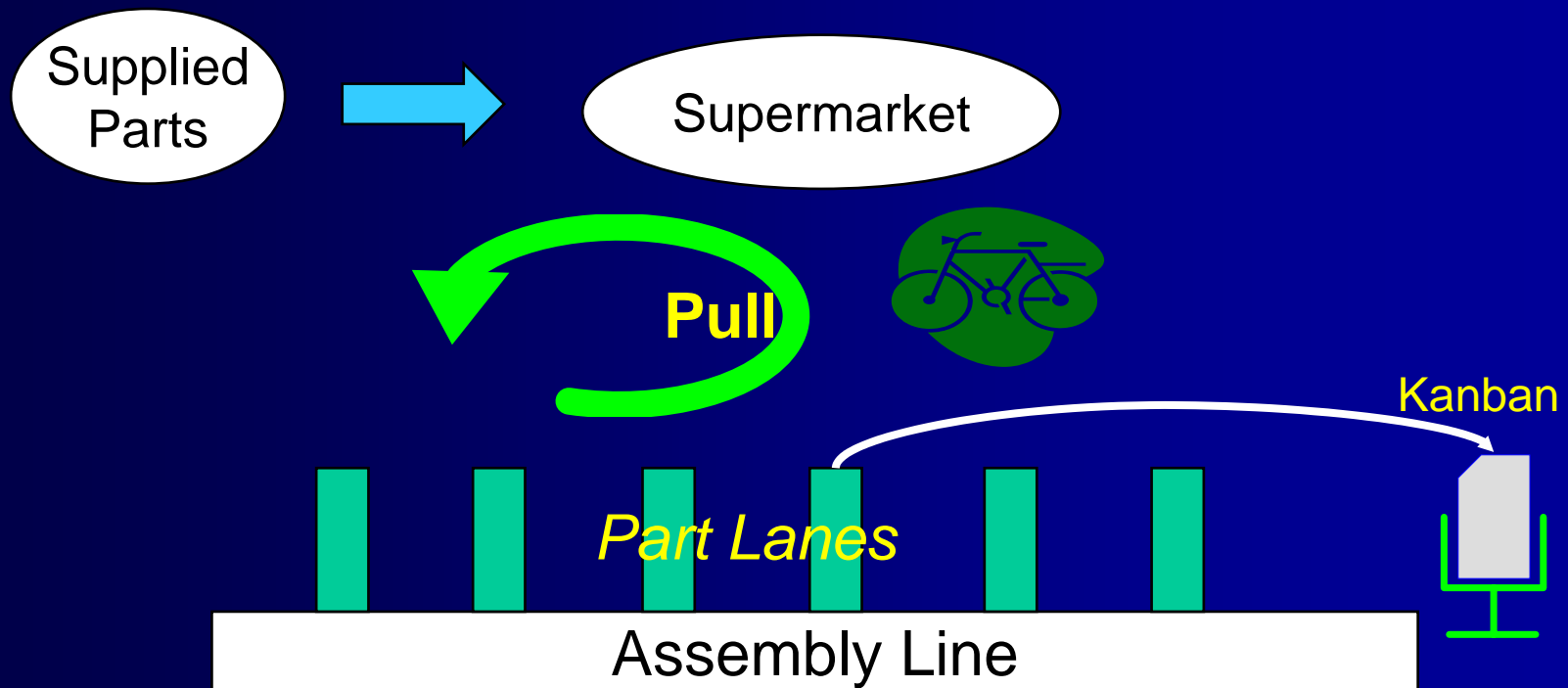
Remember the Filling/Shopping Imbalance



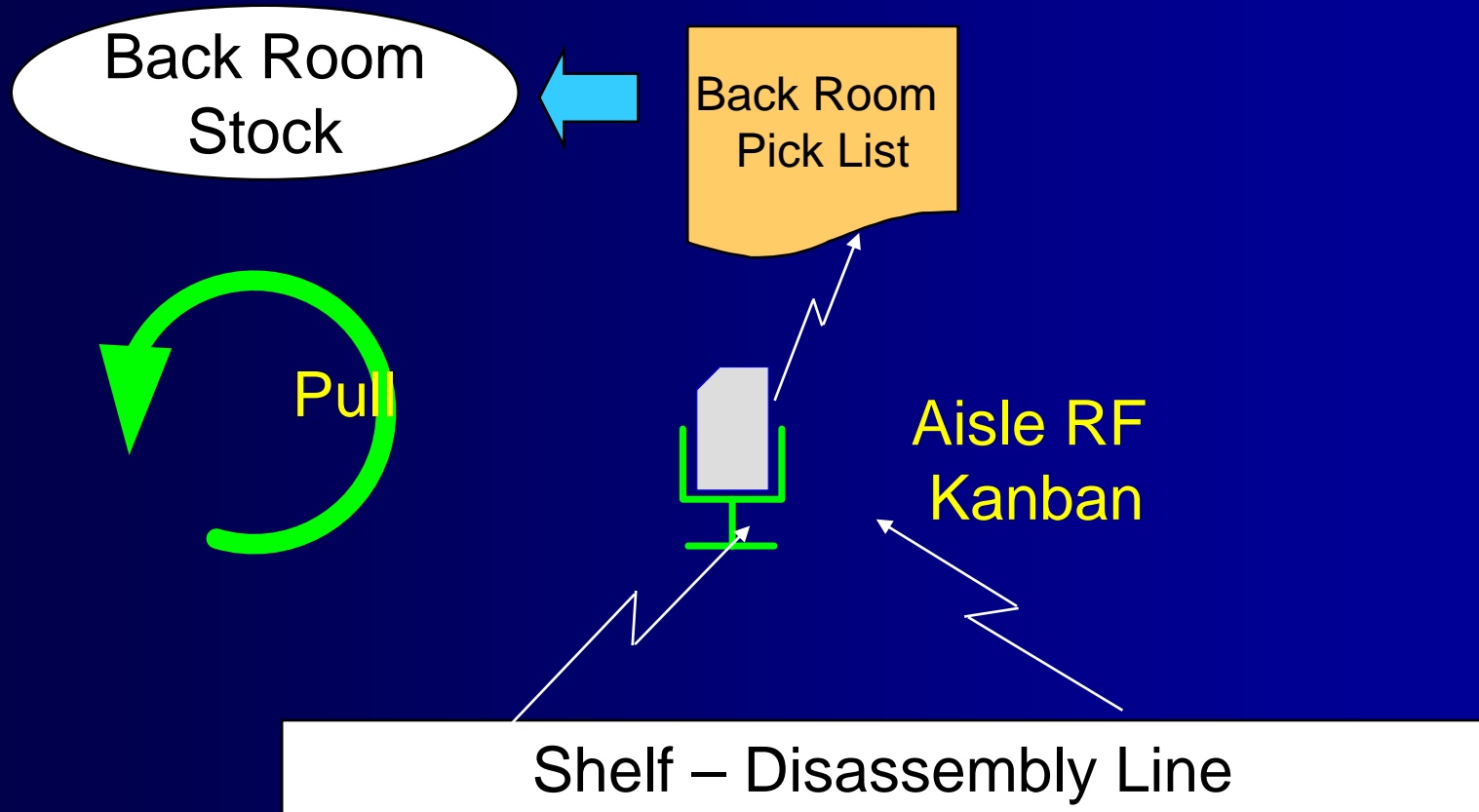
A system to target limited resource on availability

Let's go back 50 years...

- Taiichi Ohno visited US supermarkets to devise Toyota Materials Management System



Radio Frequency Kanban



Radio Frequency

- Eventually replaces barcode when it reaches a few cents
- Meantime simple processes...
 - Security
 - Case marking
 - Shelf Kanban?

Summary

- Basket Fulfilment still in 50% to 60% range
- Fast movers have improved
- Key area is back room for medium movers
- Back Rooms
 - Consistent management across network
 - Industrialised filling regime
 - Could this be a Shelf Kanban returning to retail from whence it came?

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Customer Value in the UK Public Sector

- **Case study of a UK red meat value chain from a food service company into a public sector catering establishment**
- **Inefficiencies in the information flow**
 - Great cost saving potentials
 - Potentials for more reliable delivery
- **Quick improvements - no capital investment required**

Value Chain Analysis

Methodology:

- **The VCA team**
 - Consists of senior managers from each firm along the supply chain
- **Together walk the whole value chain and map the extended value stream for two selected products using standard mapping tools**
- **This case study illustrates a cross cut of the whole mapping effort**

Value Chain Analysis

■ Current State Map

- Entire value stream is mapped for a single product, looking for value and waste (from the consumer's viewpoint)
- Raises consciousness on the level of supply chain efficiency in delivering the value to the customer

■ Future State Map

- Introducing incremental change
- No need for capital investment

■ Ideal State Map

- 'Provides a North Star for collectively steering toward the perfect value stream with zero waste' (Jones & Womack, 2001)

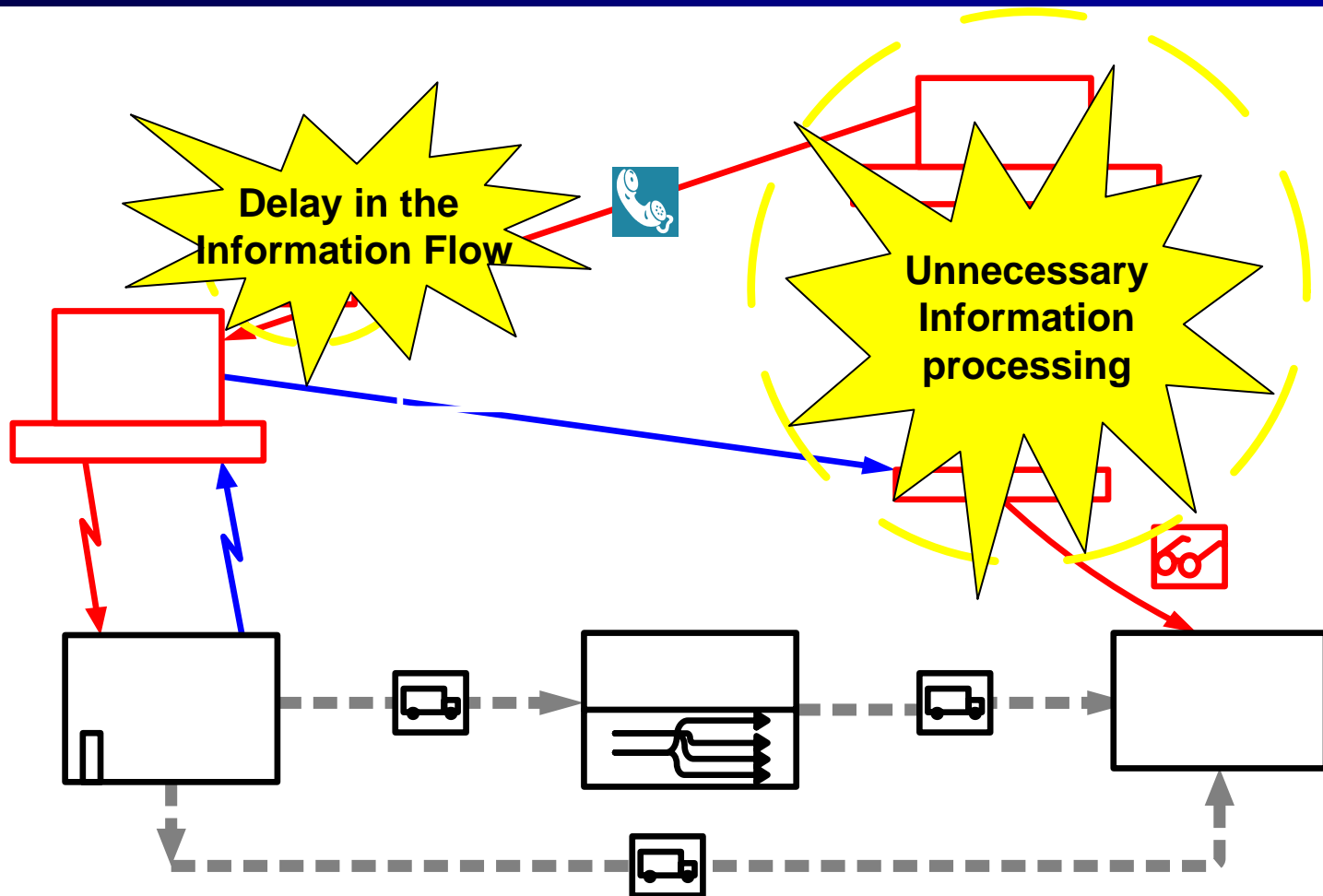
Problems Revealed

- **Excessive, duplicated and unnecessary information handling**
- **The orders from three chefs are consolidated in the central planning system of the catering establishment**
- **The food service company supplies the three divisions of the public sector organization each using a different information system**

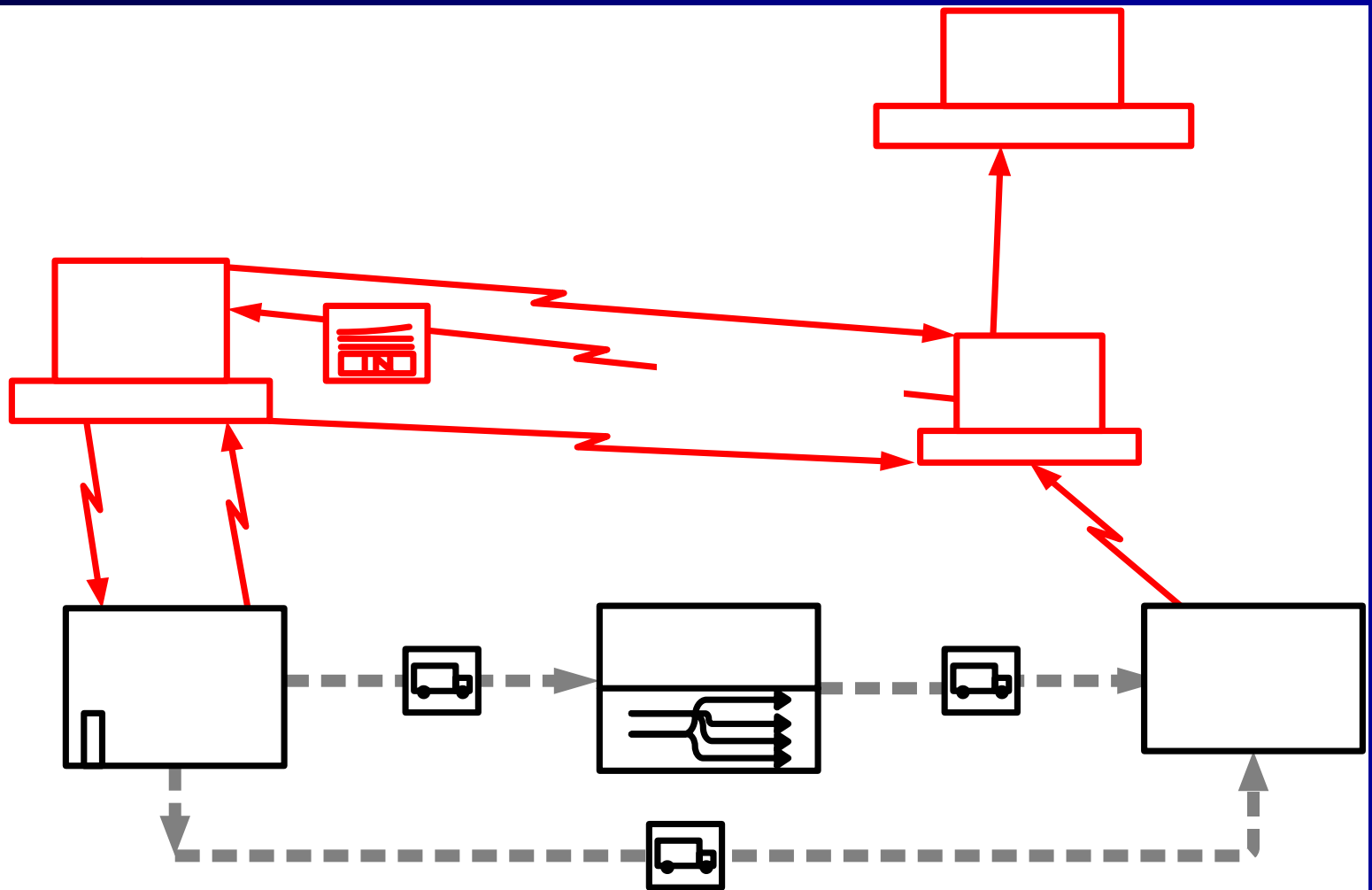
Problems Revealed

- Orders received at the food service company are not acted upon for up to 48hours.
- The 48hrs lead time helps capacity smoothing at the food service company.
- High level of availability at the canteen. However, food service company has the freedom of substitution.

Areas for Improvement



Future State Map



Future State

- Estimated cost savings of 400K GBP/year – 20+ staff become redundant at the food service company's telesales department
- Visibility of the catering establishment's stock levels
- Vendor managed stock – suggestions for each delivery
- Food service company requires less order inventory since the 'vendor managed' mechanism and visibility of public organization's stock levels helps capacity balancing
- Order queue reduced to 24hrs
- Less need for substitution

Ideal State

- **Currently public sector organization places order 5 times a week and food service company delivers 5 times a week; but there is a 48hrs delivery lead time. So goods are pushed to the customer**
- **A pull system could be introduced**
 - Zero order inventory at the supplier
 - When the items in the canteen's fridge reach certain levels replenishment order is automatically placed and red meat shipped (pulled)

Summary

■ Customer Value

- Still some way to go on Perfect Food Encounter and Basket Fulfilment

■ Faster and Simpler uses of existing Technologies can improve Customer Value

- No need for complicated information systems
- Simple solution using existing resources
- No need for further investment



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