wbs
WARWICK BUSINESS SCHOOL
THE UNIVERSITY OF WARWICK

For the Change Makers

Week 2: Process Improvement LEAN (1)

Agenda

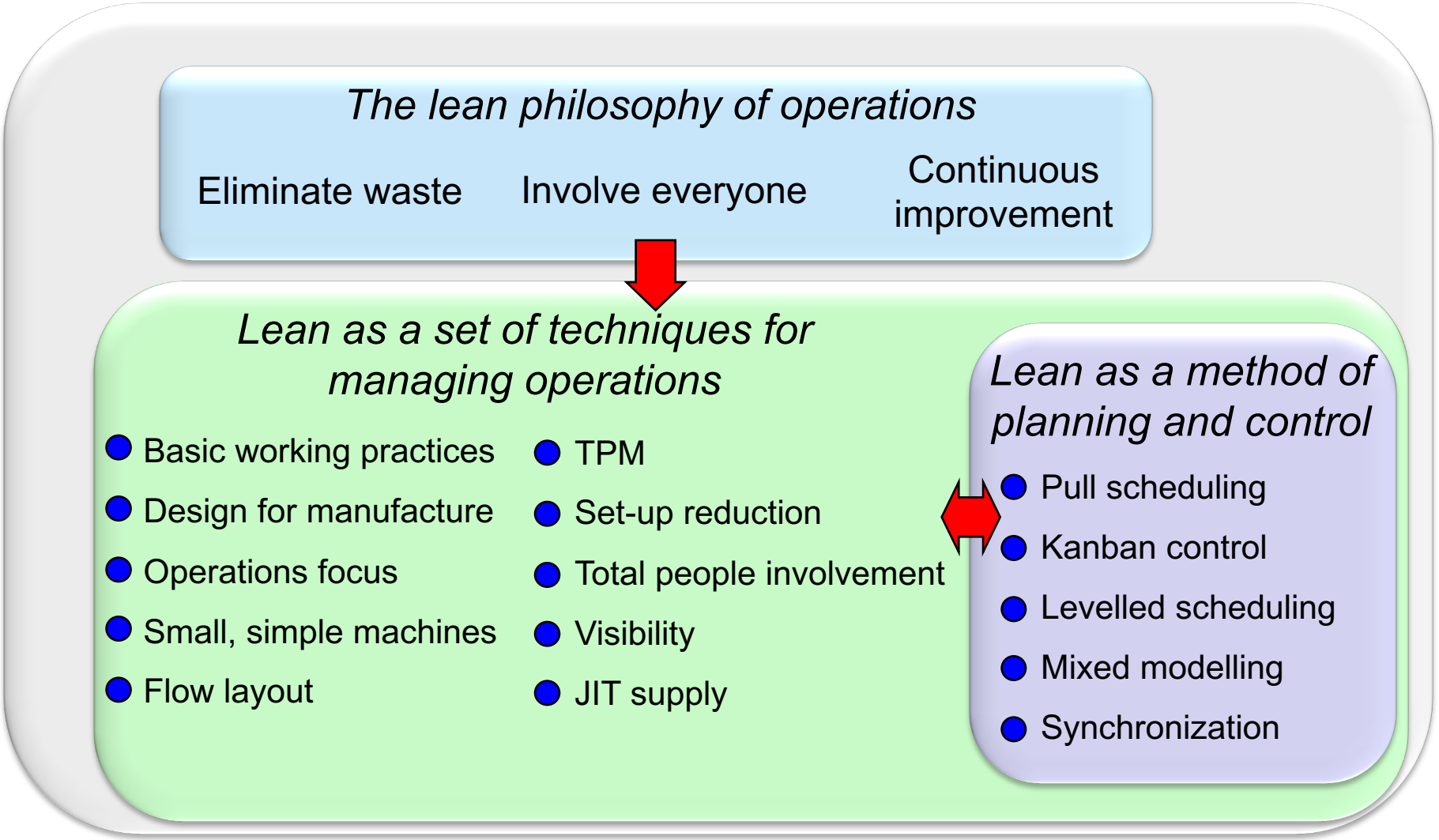
- ***What** is lean?*
- *What are the sources and types of waste in operations?*
- *How does lean synchronisation **eliminate waste**?*
- *How does lean synchronisation can be applied to **service and manufacturing operations**?*
- *What are the **issues** raised from lean practices?*

Agenda: Lean Operations

Lean synchronization

‘The key principle of **lean synchronization** is relatively straightforward to understand, it means moving towards the **elimination of all waste** in order to develop an operation that is faster, more dependable, produces higher quality products and services and, above all, operates at low cost’.

Lean synchronization



The Toyota Production System

Toyota truck factory during Korean War:

Machine	Original set-up time (minutes)	New set-up time (minutes)
Bolt machine	480 (8 hours)	1
Cogwheel cutting	390 (6.5 hours)	15
Form melting	90 (1.5 hours)	4
Drilling	1440 (24 hours)	3
Aluminium casting	132 (2 hours 12 mins)	8
Cylinder block	558 (9 hours 18 mins)	9
Total Set up time	**3090 (51.5 hours)**	**40 mins**

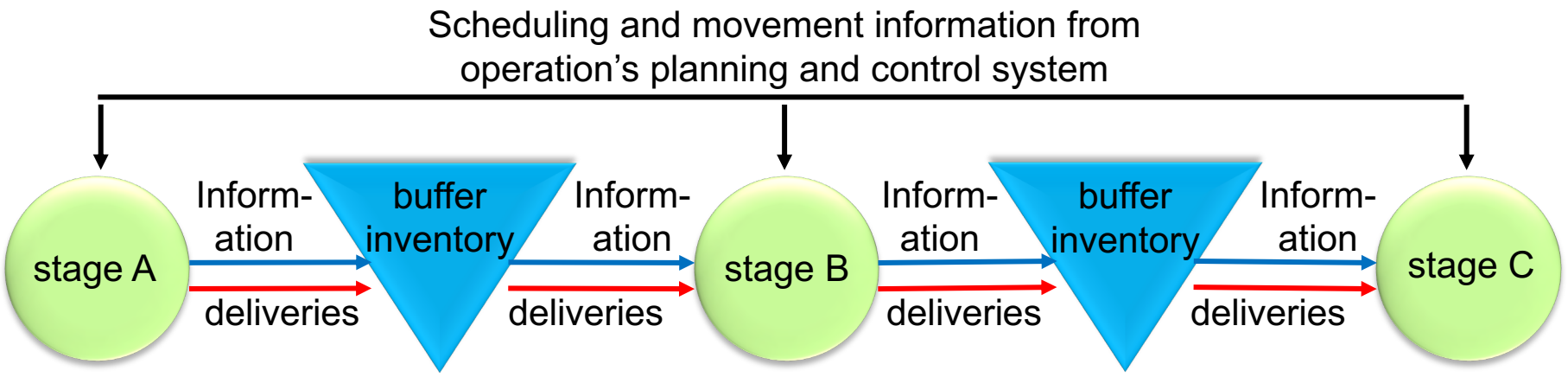
Lean synchronization

Synonyms

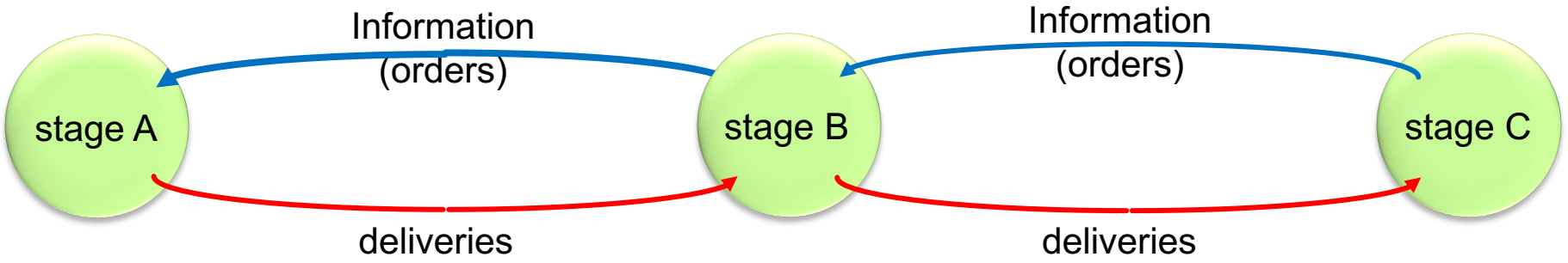
- *continuous flow manufacture*
- *high value-added manufacture*
- *stockless production*
- *low-inventory production*
- *fast-throughput manufacturing*
- *lean manufacturing*
- *Toyota production system*
- *short cycle time manufacturing*

Lean synchronization

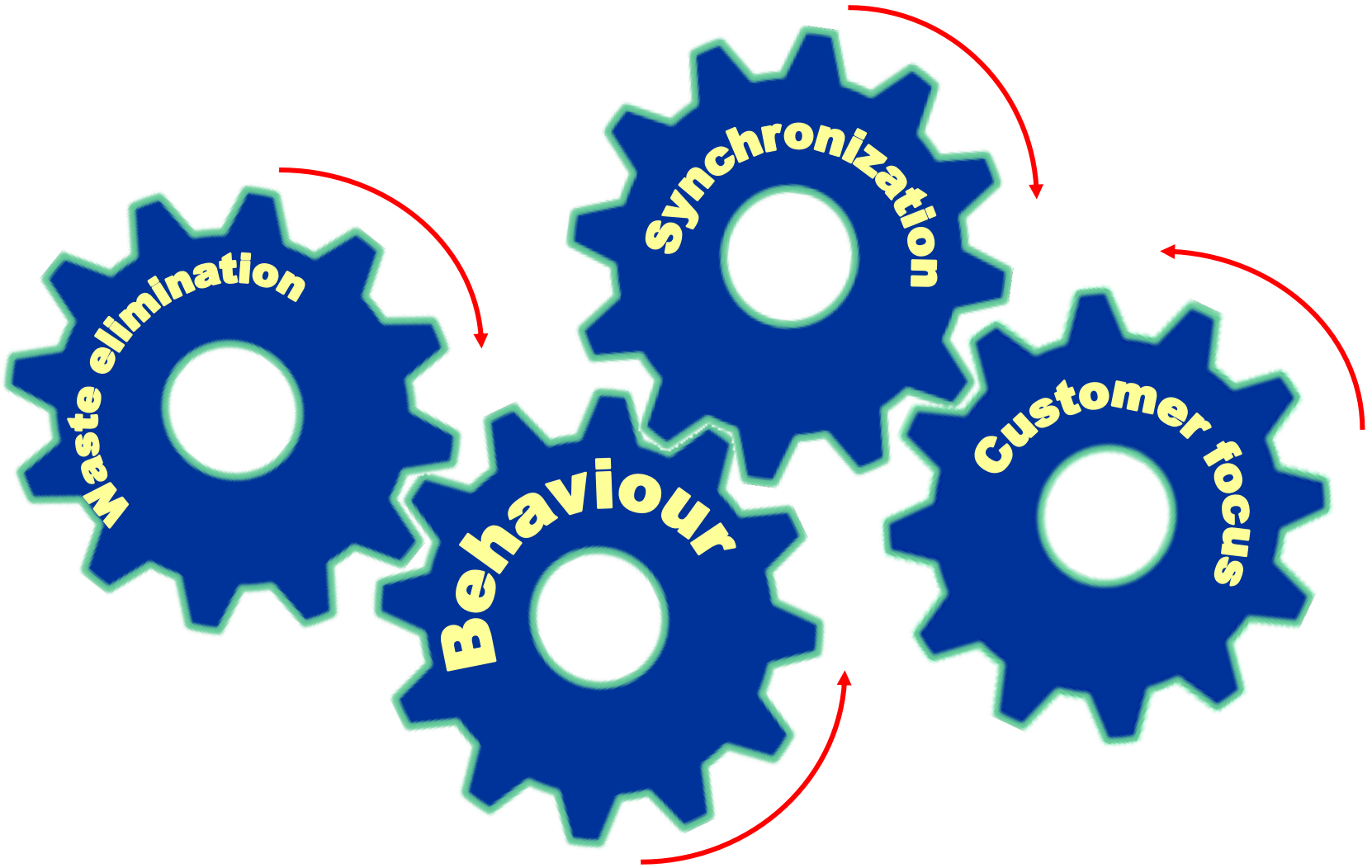
Traditional approach:



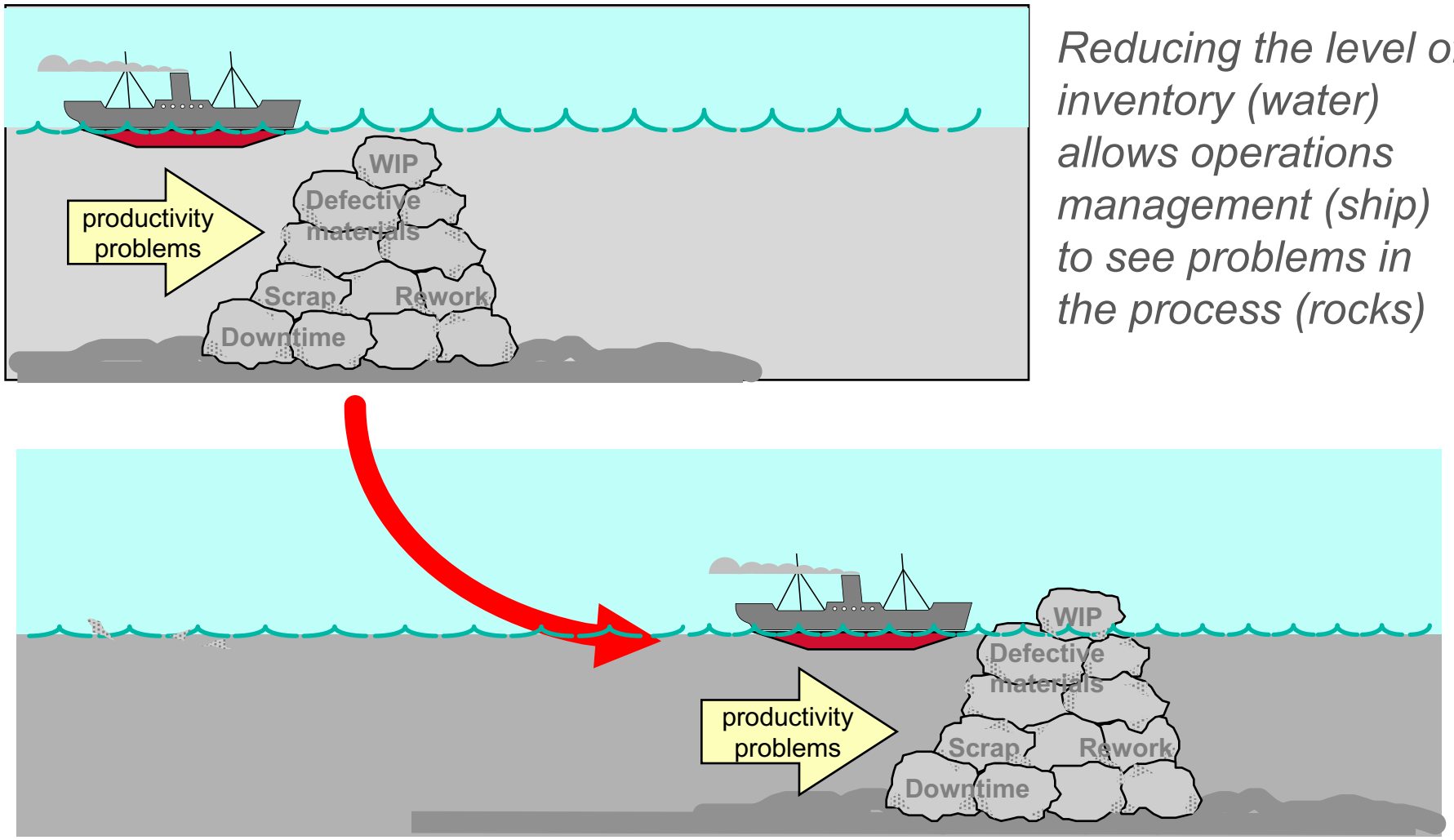
Lean approach:



The four underlying elements of lean



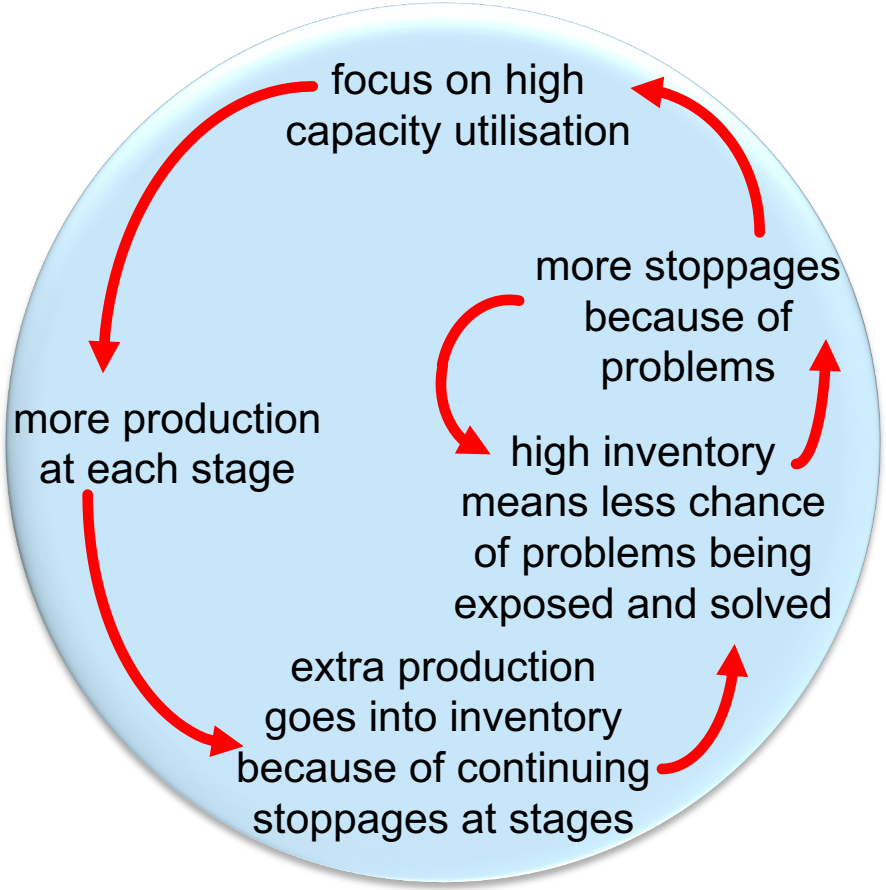
The ‘river and rocks’ analogy



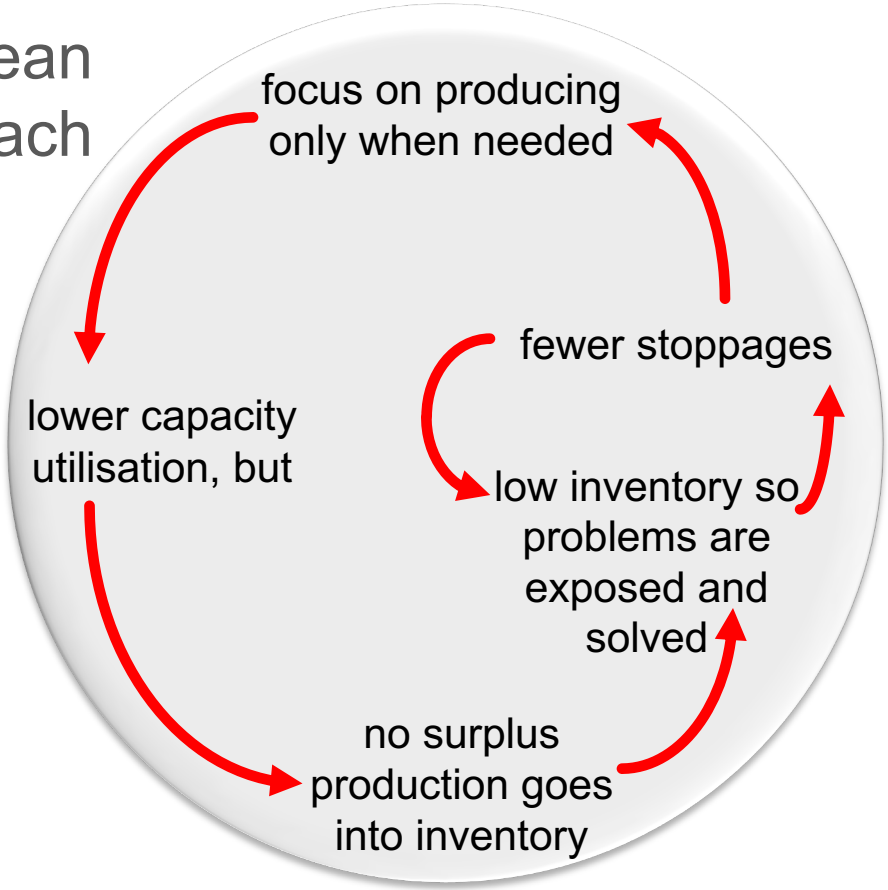
Reducing the level of inventory (water) allows operations management (ship) to see problems in the process (rocks)

Lean synchronization

Traditional approach



Lean approach



Any questions?

Causes of Waste: Mura, muri, muda

Mura, muri, and muda are japanese words conveying three causes of waste

- Mura – means 'lack of consistency' or unevenness that results in periodic overloading of staff or equipment.
- Muri – means absurd or unreasonable. It is based on the idea that unnecessary or unreasonable requirements put on a process will result in poor outcomes.
- Muda – are activities in a process that are wasteful because they do not add value to the operation or the customer.

These three causes of waste are related. Inconsistent processes (mura) leads to overburdening resources (muri) which causes non value adding activities (muda).

Seven types of waste

Waste activities consume time, resources and space, but do not contribute to satisfying customer needs.

- Over-production.
- Waiting time
- Transport
- Process.
- Inventory
- Motion
- Defects

Waste

Over production

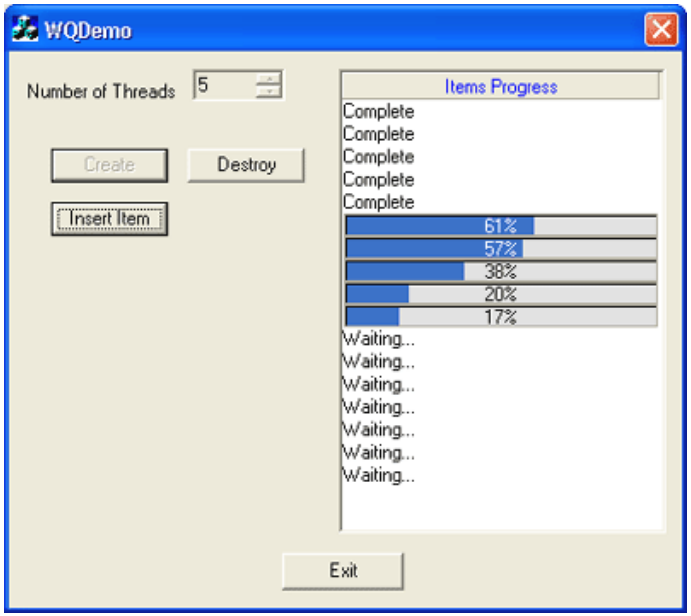
Make more than is required by the customer, or to make it earlier than required.

- Taking multiple copies of the document which are not required.

Waiting time

Any delay between when one process step/activity ends and the next step/activity begins.

- Waiting for a manager to approve an application.

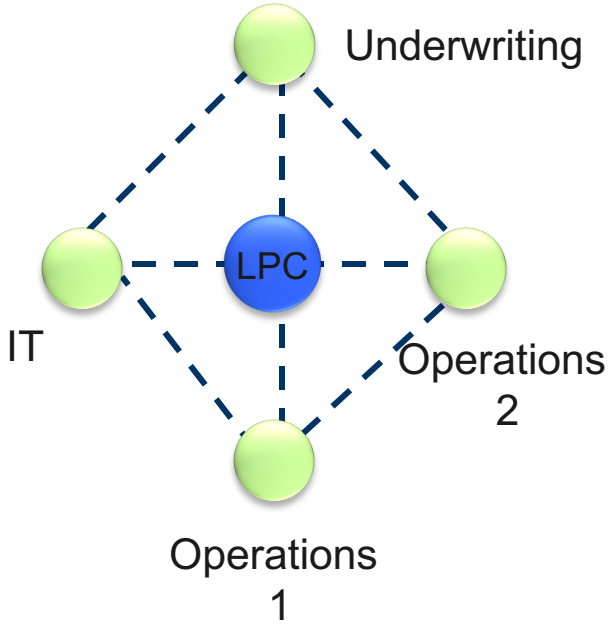


Waste

Transport

Movement of work between departments or offices that does not add to the value of the product or service.

- Multiple approvals across different departments



(Over) Processing

Adding more value to a service or product than customers want or will pay for.

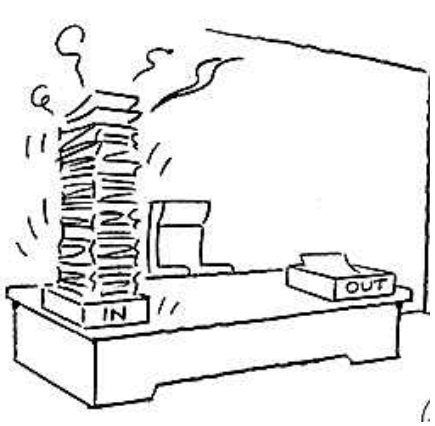
- Capturing extra information from the customer which is not used.

Waste

Inventory

More materials or information on hand than is currently required

- 100 applications waiting together for data entry

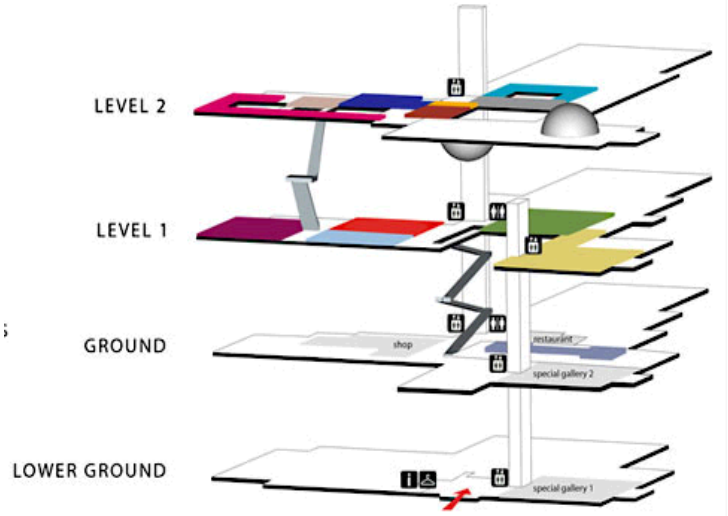


Motion

Needless movement of people

While "transportation" refers to the movement of the work, "motion“ involves movement of workers

- Running to a printer on a different floor for a printout.

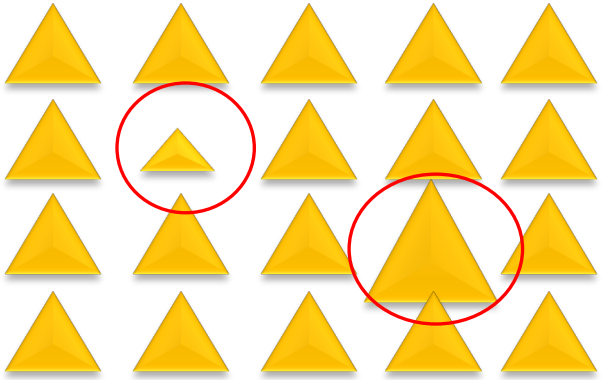


Waste

Defects/ Inspection

Any aspect of the product/service that does not conform to customer needs.

- Incorrect customer details captured in the system.



Some examples of waste in Hospitals

1

Over-production
- requesting unnecessary tests from pathology
- keeping investigation slots 'just in case'

2

Waiting - Patients, theatre, staff results, prescriptions and medicines
- doctors to discharge patients

3

Transport – documents carried out to be signed by various wards and managers

4

Over-processing
- duplication of information
- asking for patients' details several times

5

Inventory – excess stock in storerooms
- patients waiting to be discharged
- waiting lists

6

Rework
- readmission because of failed discharge
- repeating tests because correct information was not provided

7

Motion - unnecessary staff movement looking for paperwork
- not having basic equipment in every examination room

End of Part 1