FMC Technologies

Globalising System Engineering and Lean Principles

Einar Jørgensen 9.-10. June 2011

We put you first.
And keep you ahead.

Globalising system engineering and Lean Principles

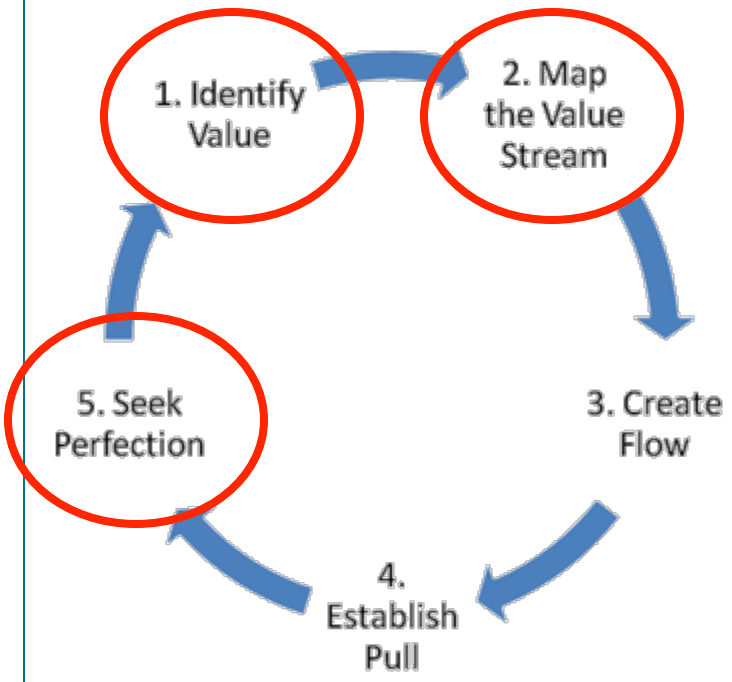
- What is systems engineering
- Lean principles – Based on lean production
- Lean product development – too early
- Context of globalisation
- Mapping of processes – globally agreed
- Remaining work – reaching for perfection...
- Summary

What is systems engineering

- Systems Engineering Management Process
- Systems Engineering Technical Process
- Systems engineering focuses on
  - analyzing and eliciting customer needs and required functionality early in the development cycle
  - documenting requirements
  - then proceeding with design synthesis and system validation while considering the complete problem, the system lifecycle
- Systems engineering is a holistic view

Lean principles – Waste – Standardize – Competence

Lean principles

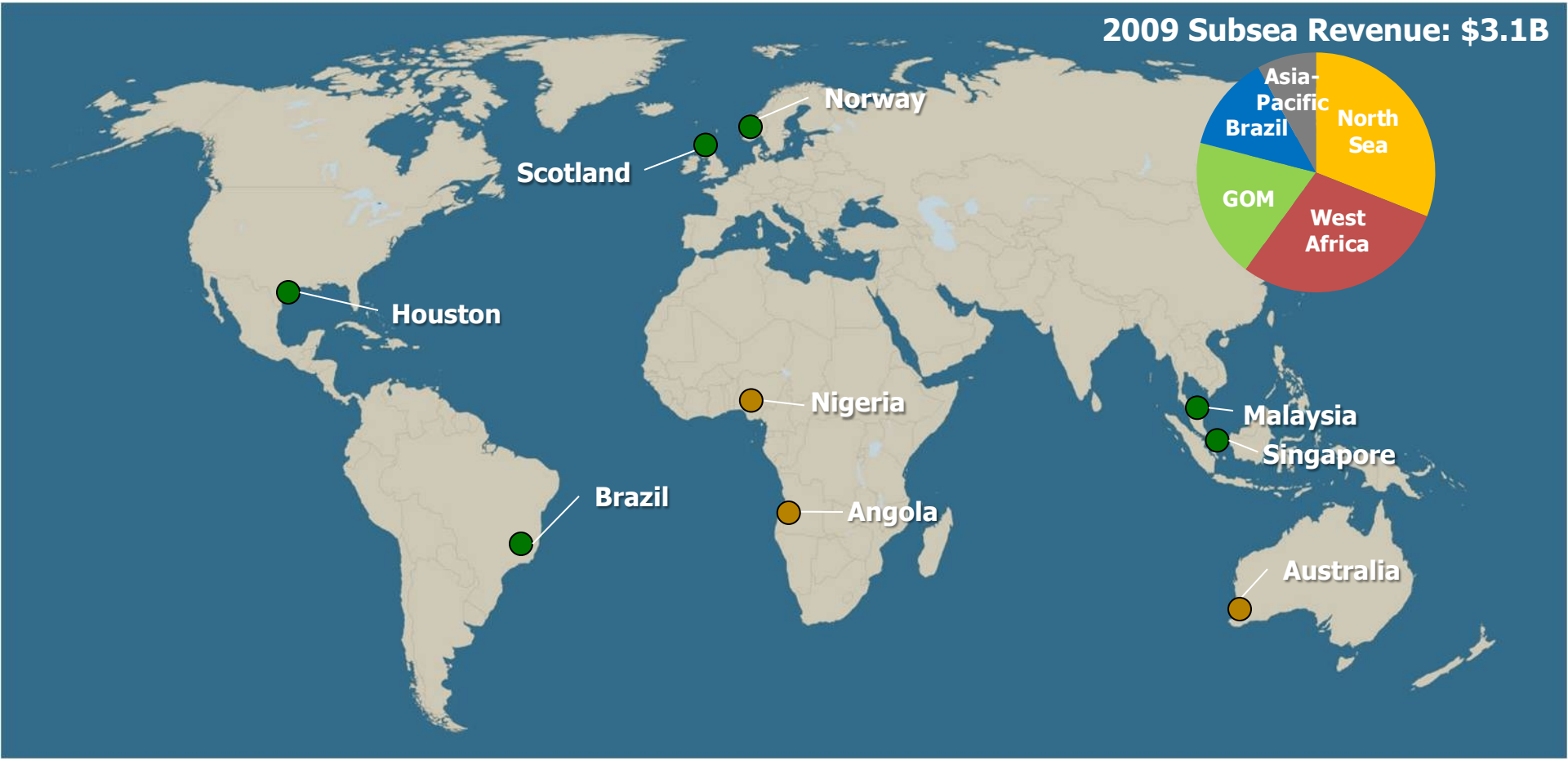


Waste types

1. Overproduction
2. Waiting
3. Unnneccesary Transportation
4. Overprocessing
5. Unnecessary Inventory
6. Unnecessary Motion
7. Defects
8. Underutilized people

Context – Global Subsea Presence

Capabilities in all major deepwater basins



● Manufacturing Facility & Service Base ● Service Base

Context – Complexity

- Complex systems
  - Project
  - Technical
  - Supply
- Tailormade systems and products
- Different maturity level globally
  - Technical
  - Organizational
  - Competence
- Cultural differences
  - Client project models
  - Social structures
  - Languages
  - Cultural diversity
- Global product lines
- ISO 9000
  - Global Quality Manual
- ISO 15288

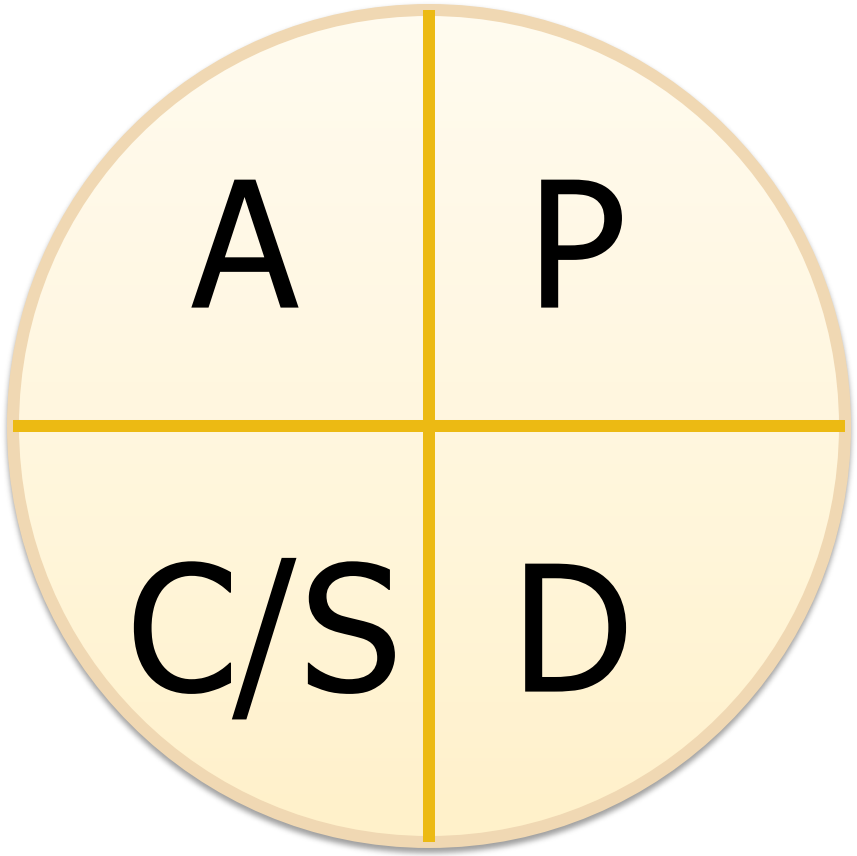
Context –
Alignment with corporate initiatives

- Quality improvements
  - Global leadership development
  - Zero Defects
- One face to customer
  - Global tender processes
  - Global project execution processes
- Global workshops to design processes

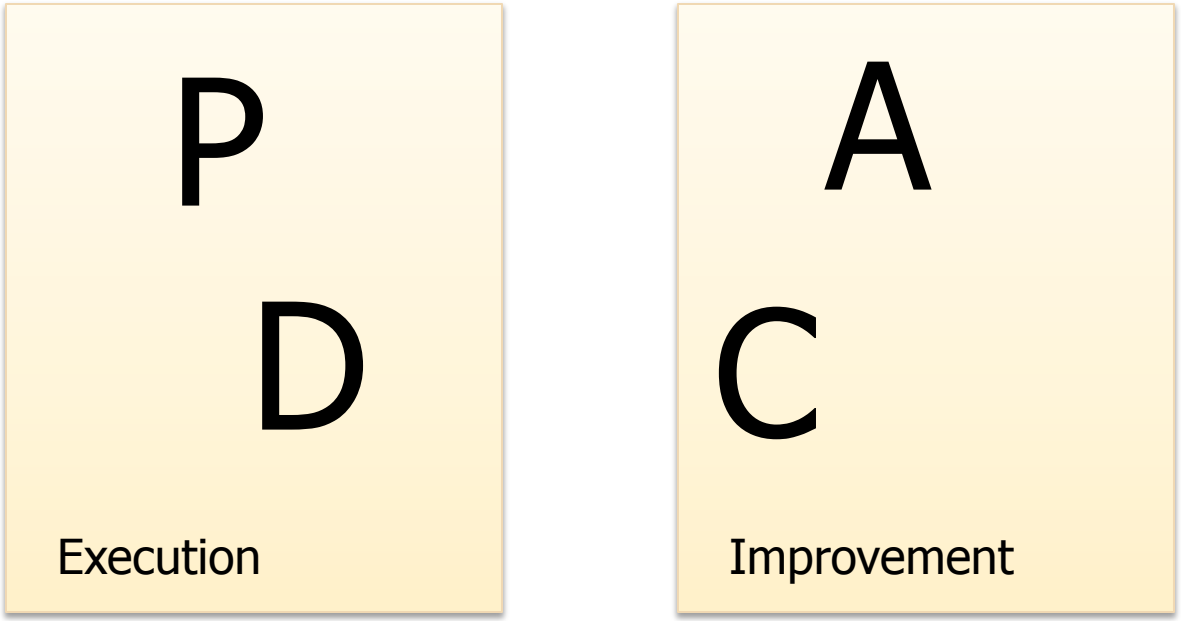
”Perfection”

”Value stream maps”

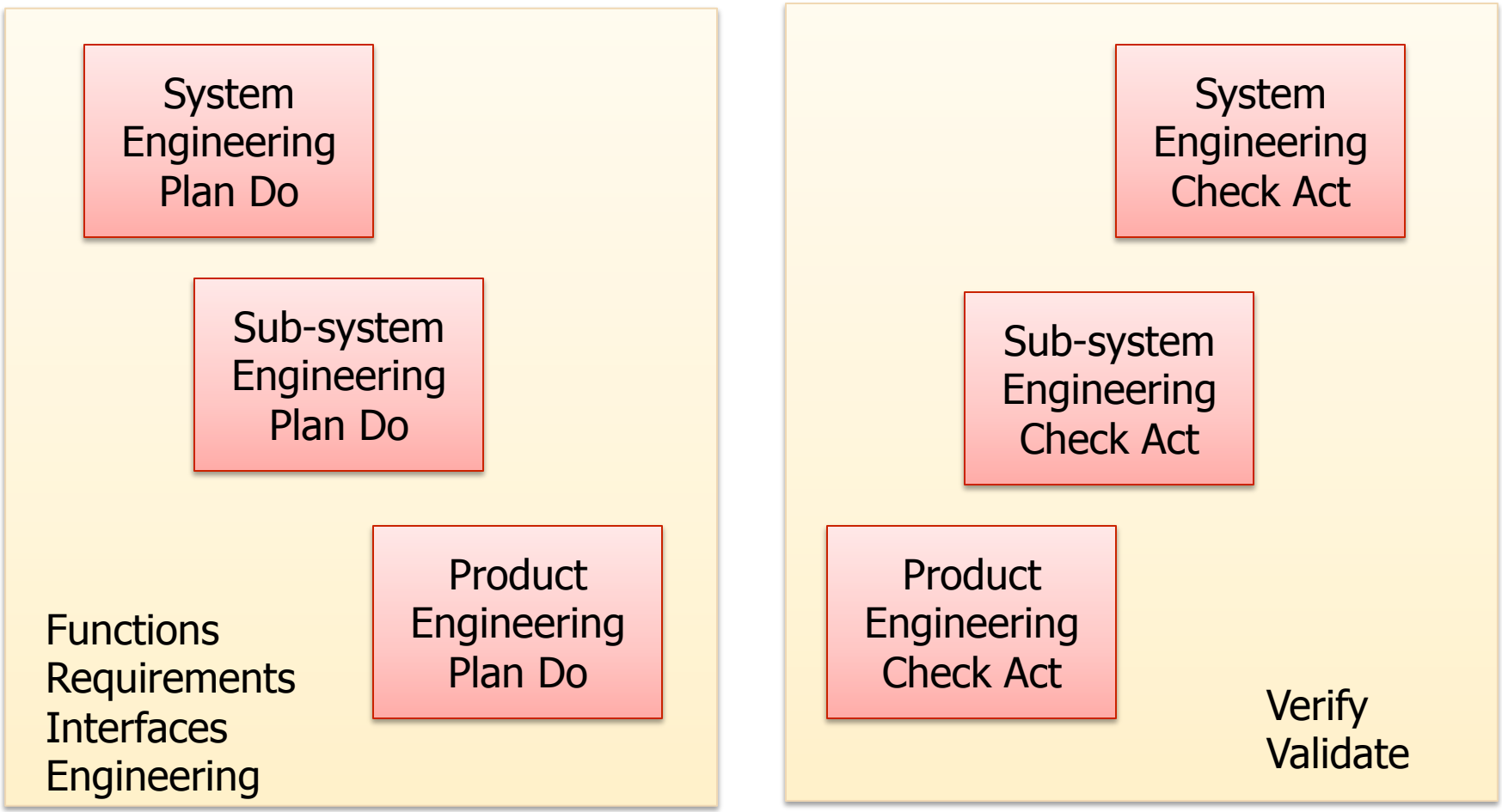
Demings Plan-Do-Check/Study-Act Circle



Rearranging the PDCA circle

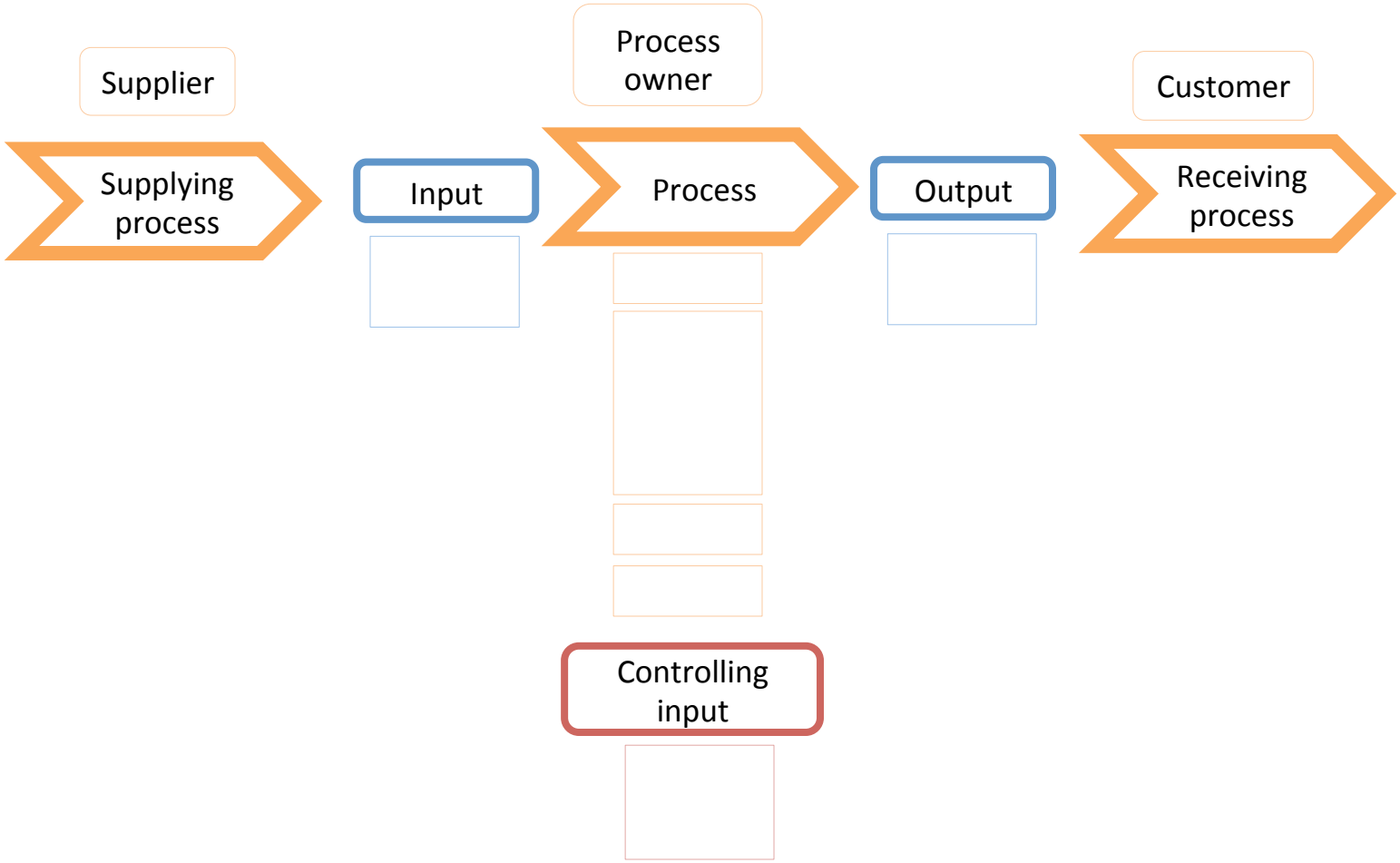


PDCA applied to a system engineering



SIPOC – Basis for Process mapping

Adding detail – Process to create processes



Mapping processes – QualiWare

FMC Technologies

My page | Organization | Manage Business | Enable Business | Policies&Manuals | Our Core Values | Execution list | Core Processes

You are here: Business Management System > Execute Project > Execute System Project > Execute Project Deliveries

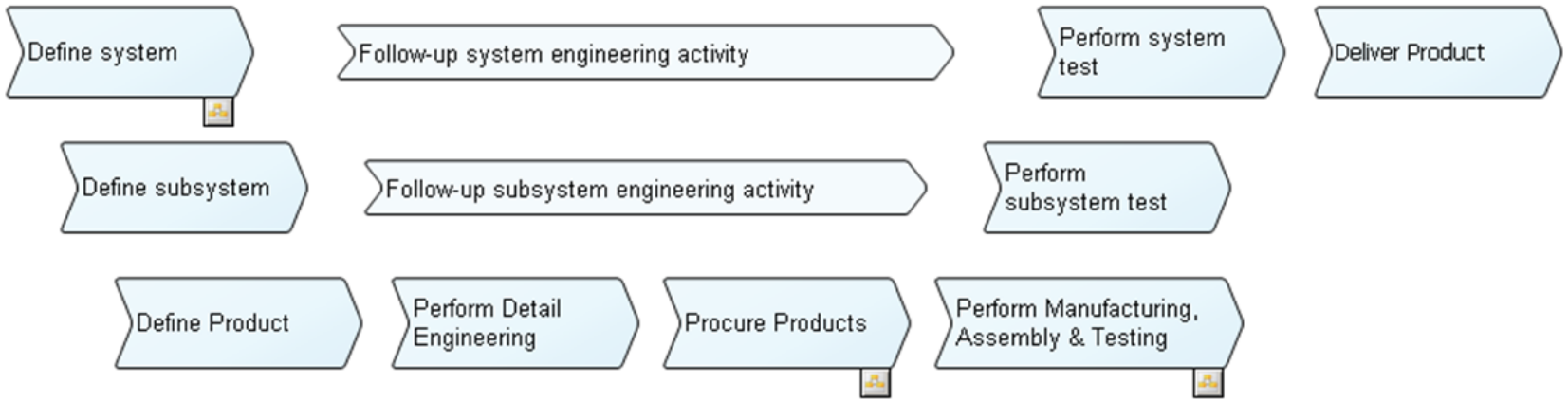
Execute Project Deliveries

Globally agreed processes

Based on Kongsberg system engineering competence and project model

Standardized

Diagram | Roles | Change history



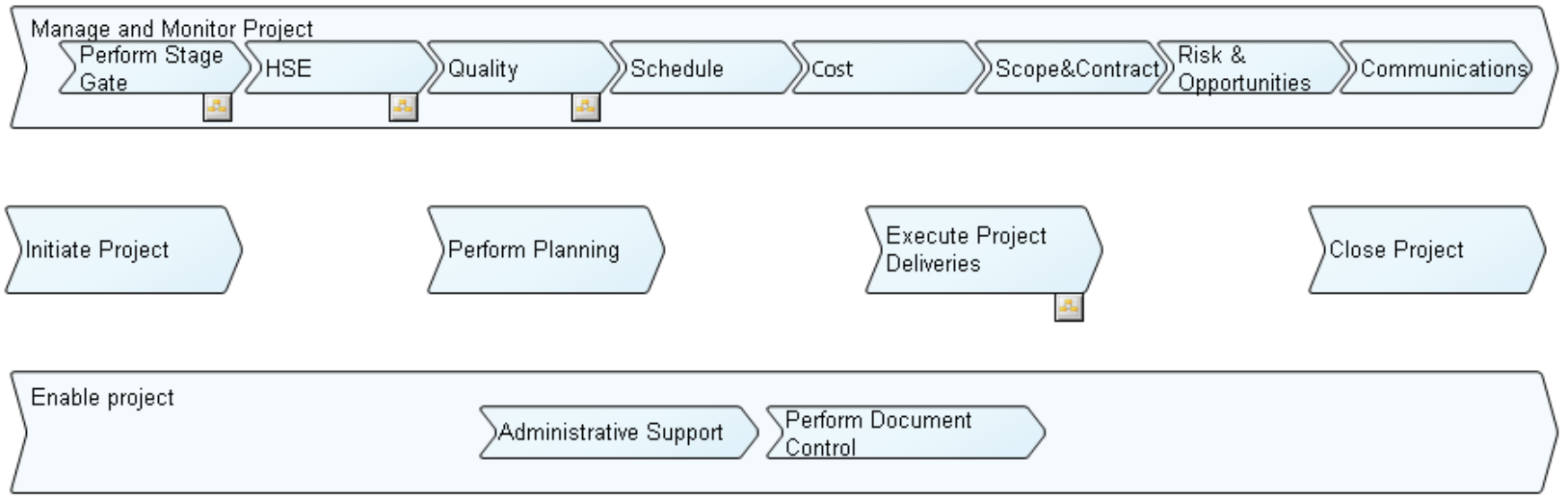
Revision 0
Modified: 31.03.2011
Ann Christin Gjerdseth

Purpose:
The purpose of these processes is to create the project deliveries.
Description:
Engineering:
Define system

And keep you ahead.

Execute System Project

Diagram | Roles | Change history



Revision 0
31.03.2011

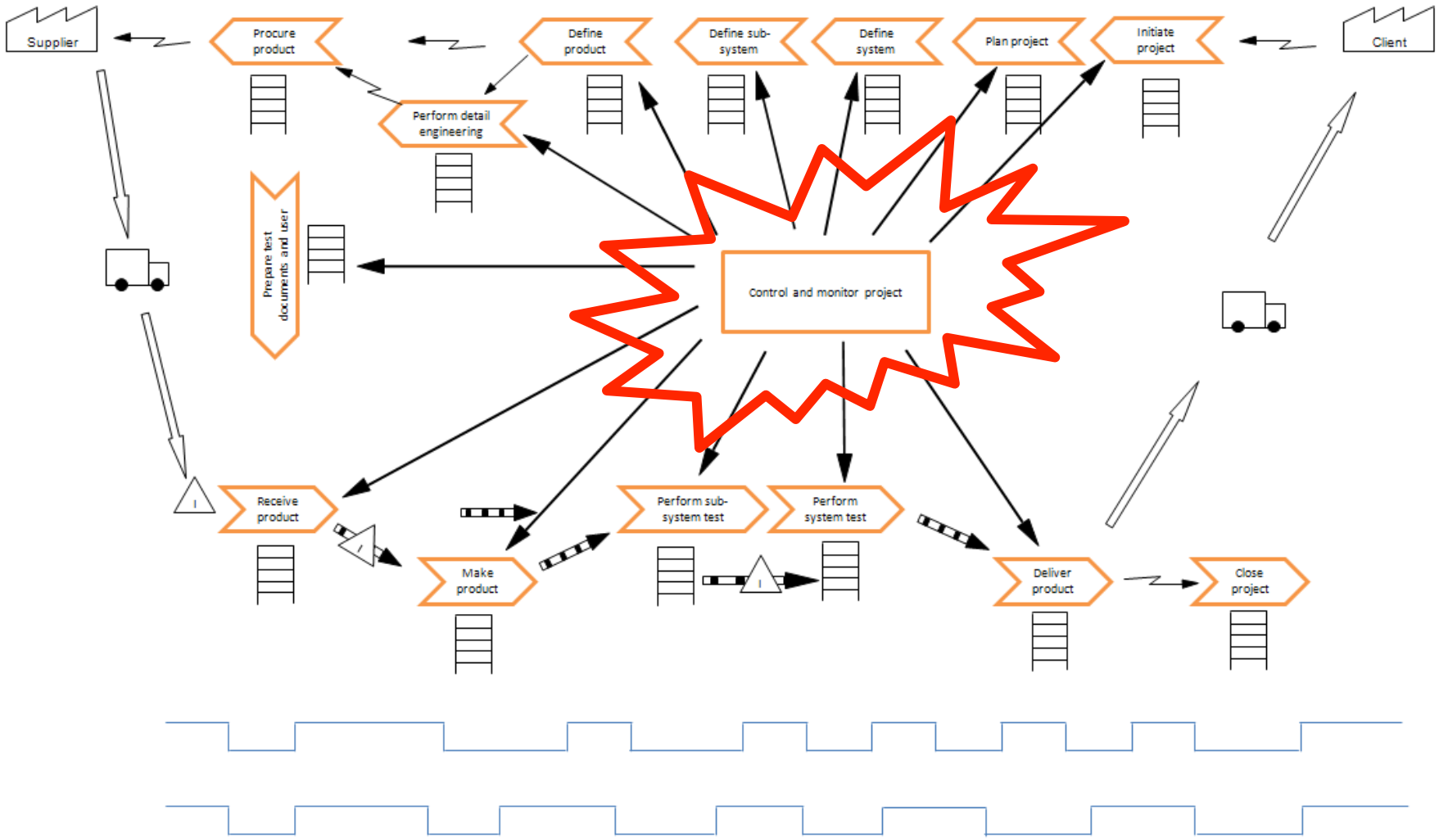
Ann Christin Gjerdseth

Purpose:
The purpose of these processes is to deliver products to customer in accordance with the customer contractual requirements, on time and in the most cost effective manner for FMC.

Description:
This describes management and execution of EPC projects, including project management, contract administration, risk management, management of changes (variations and other changes to scope and plan), close-out and handover of the project to customer support.

LACTI Chart GPEP

Value stream map – current state



Reduced waste

- FMC is in a growth phase -> Average level of competence is reduced until competence gap is closed
- Standardising to support new employees
  - True value chain based processes: All disciplines are integrated into the process –> makes it easy to see what roles and activities are involved upstream, in and downstream of a process
  - Checklists
  - Forms
  - Templates
  - Master documents
- Measuring status of processes
  - Identify under-performing processes
- Agreeing input/output between processes

Remaining work

- Establish/revise workflows aligned with global processes
- Move to operate and manage stage
  - Training
  - Monitoring – PPI / KPI
  - Continuous improvements
- Continue
  - Requirements management
  - Functional architectures
  - Interface systems

Summary

- Global process mapping projects – Long Kaizen
- Global processes
  - Standardized processes
  - Standardized templates and forms
  - Standardized competence
- Reduce waste
- Measure processes – PPI/KPI
- Process governance

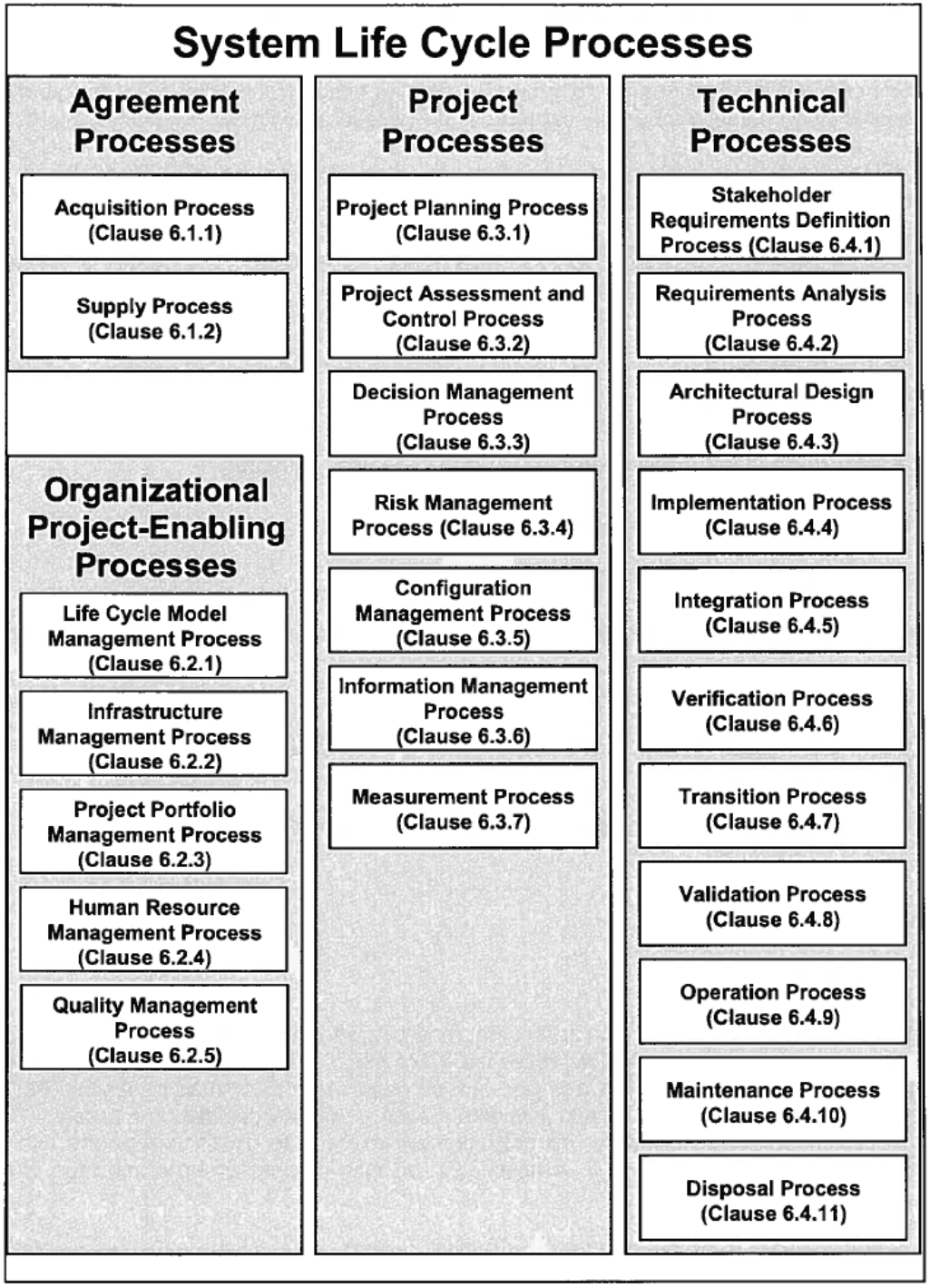
Questions?

End of presentation

Supporting slides

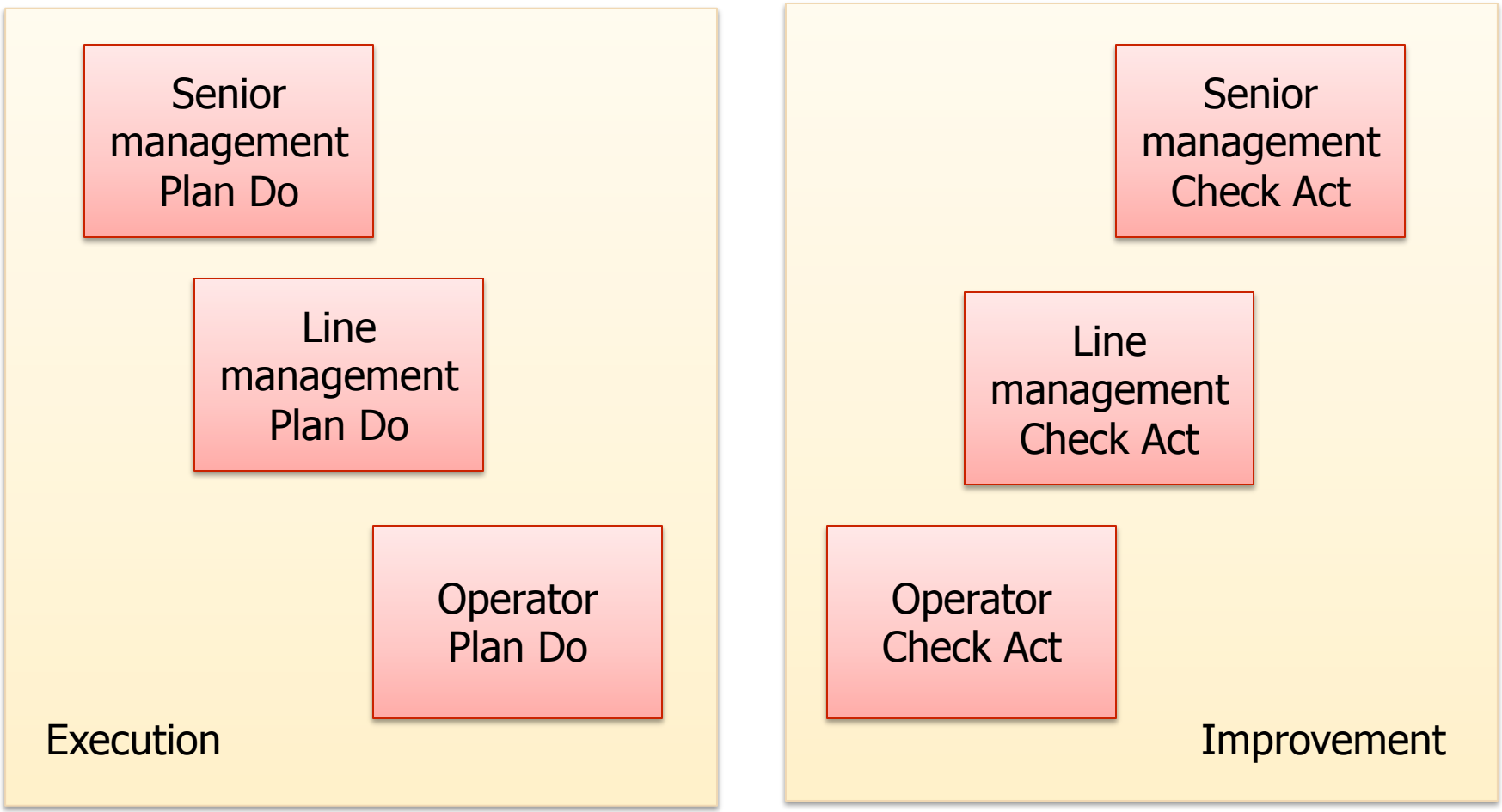
What is Requirement Management – RM

- Requirements Management according to ISO15288
  - ”common process framework covering the life cycle of man-made systems”
  - ”Technical Processes are used to:
    - define requirements for a system
    - transform the requirements into an effective product
    - permit consistent reproduction
    - use the product to provide the required services...”

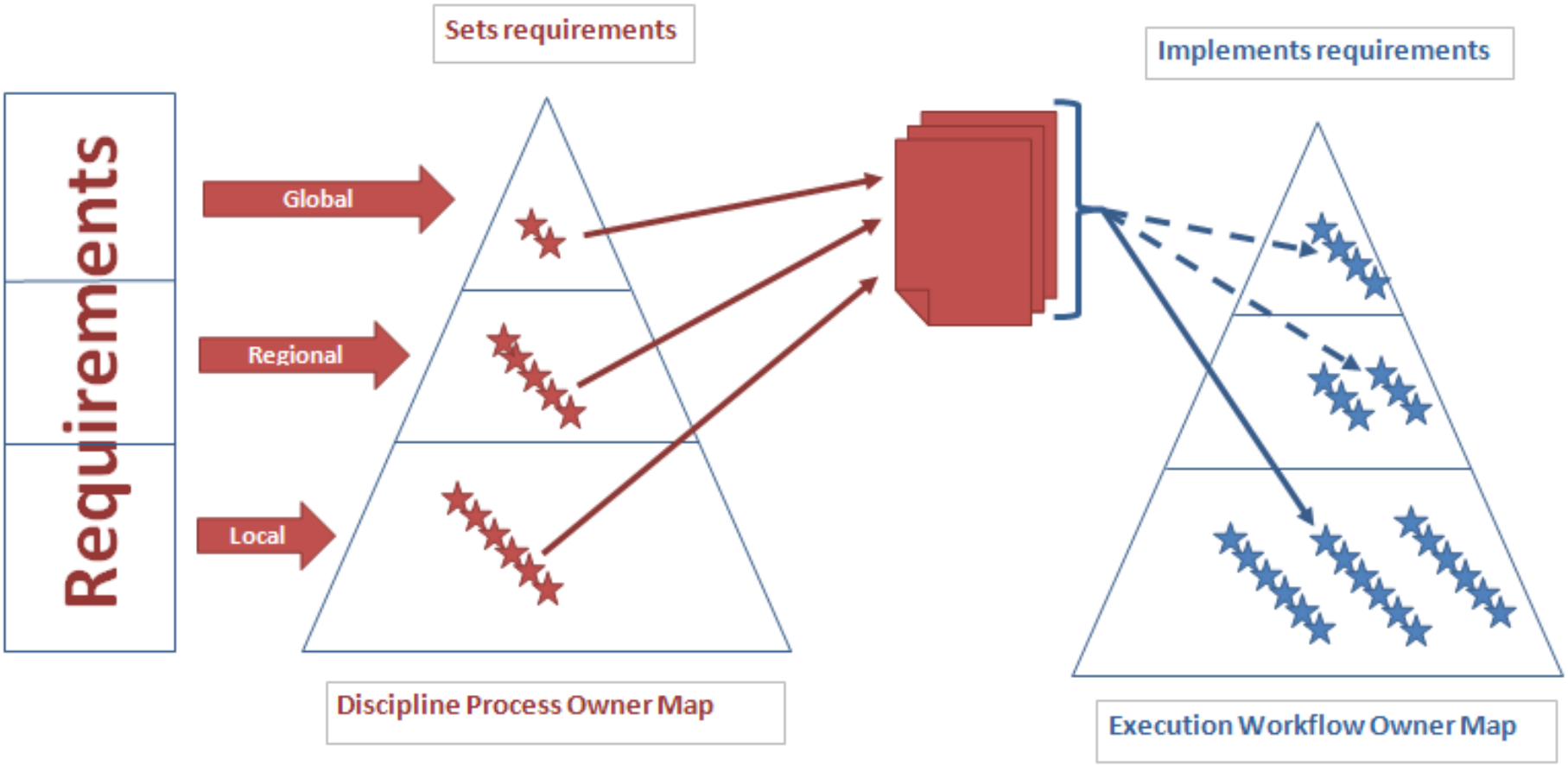


- System engineering competence
  - Management of engineering
  - System engineering

PDCA applied to an organisation



Process owner interactions to set up and maintain Business Management System



Governance structure