# Capability development at the Embedded Systems Institute

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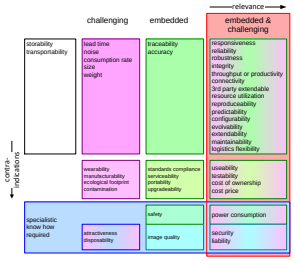
## Abstract

The *systems* discipline is decomposed in views and qualities and complemented with a framework to integrate again. The qualities are taken as starting point to define system design capabilities. These capabilities are analyzed and a set of embedded system capabilities is proposed.
The ESI approach with projects and capabilities is described. The contribution of ESI is explained. Some background is provided about the technology management and research method aspects.



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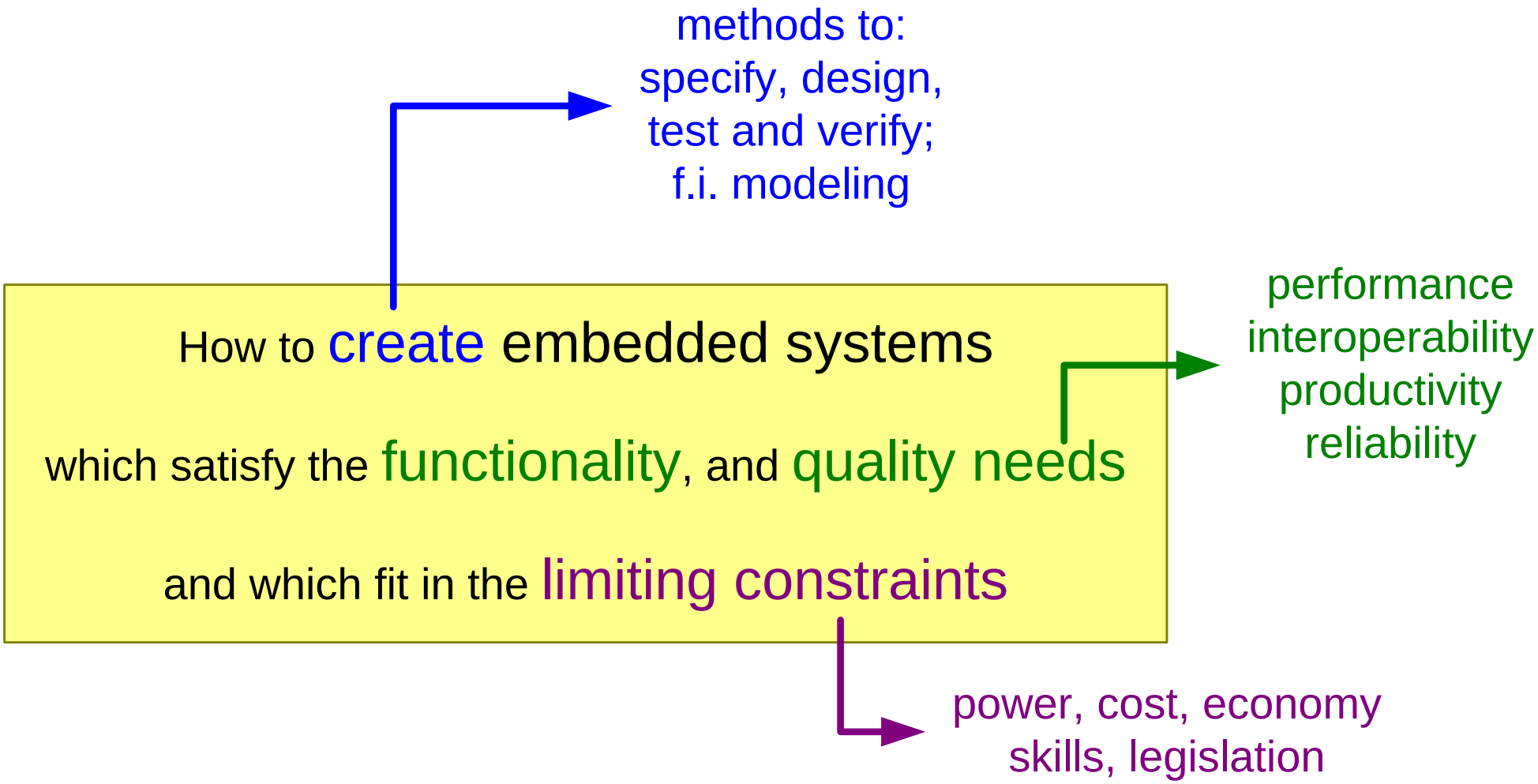
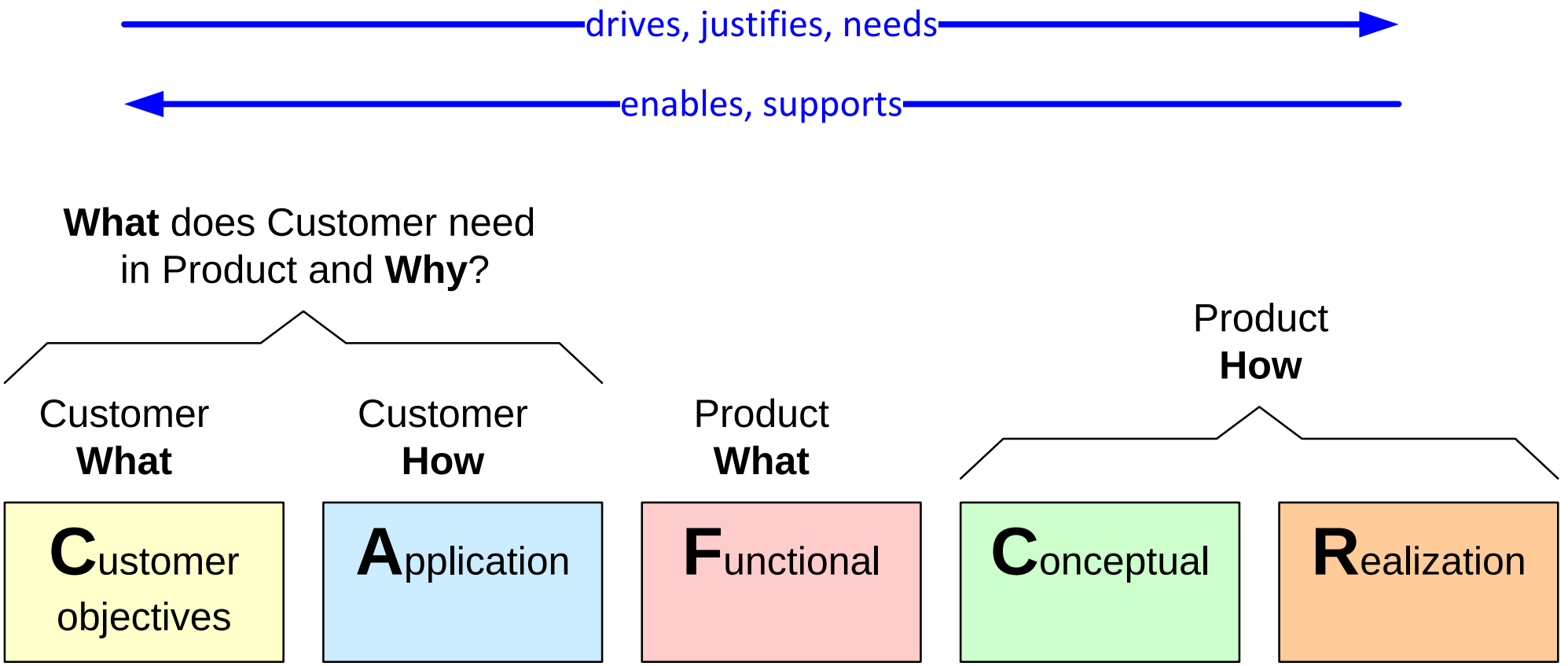
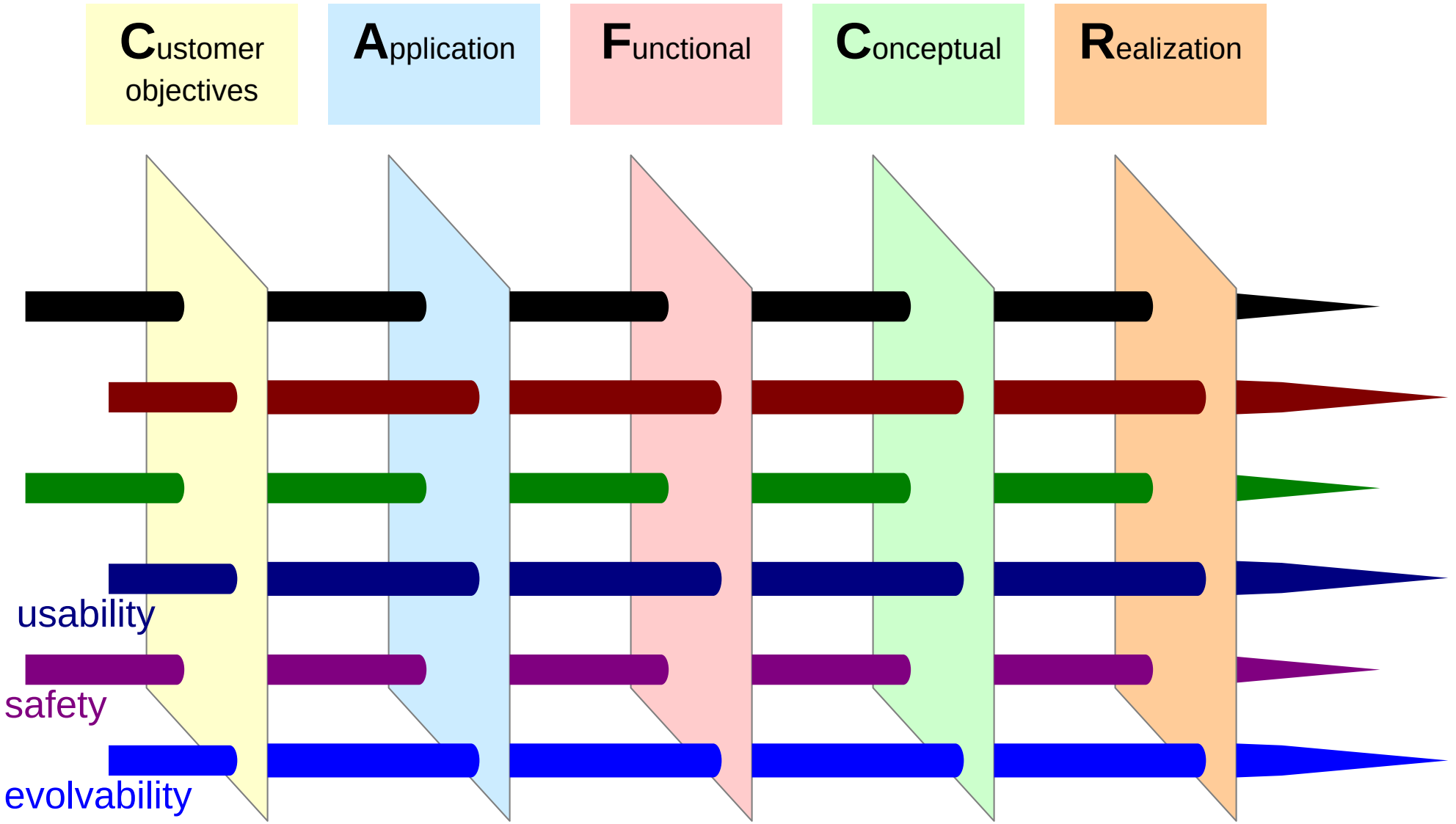
# Role of Embedded Systems Institute ESI



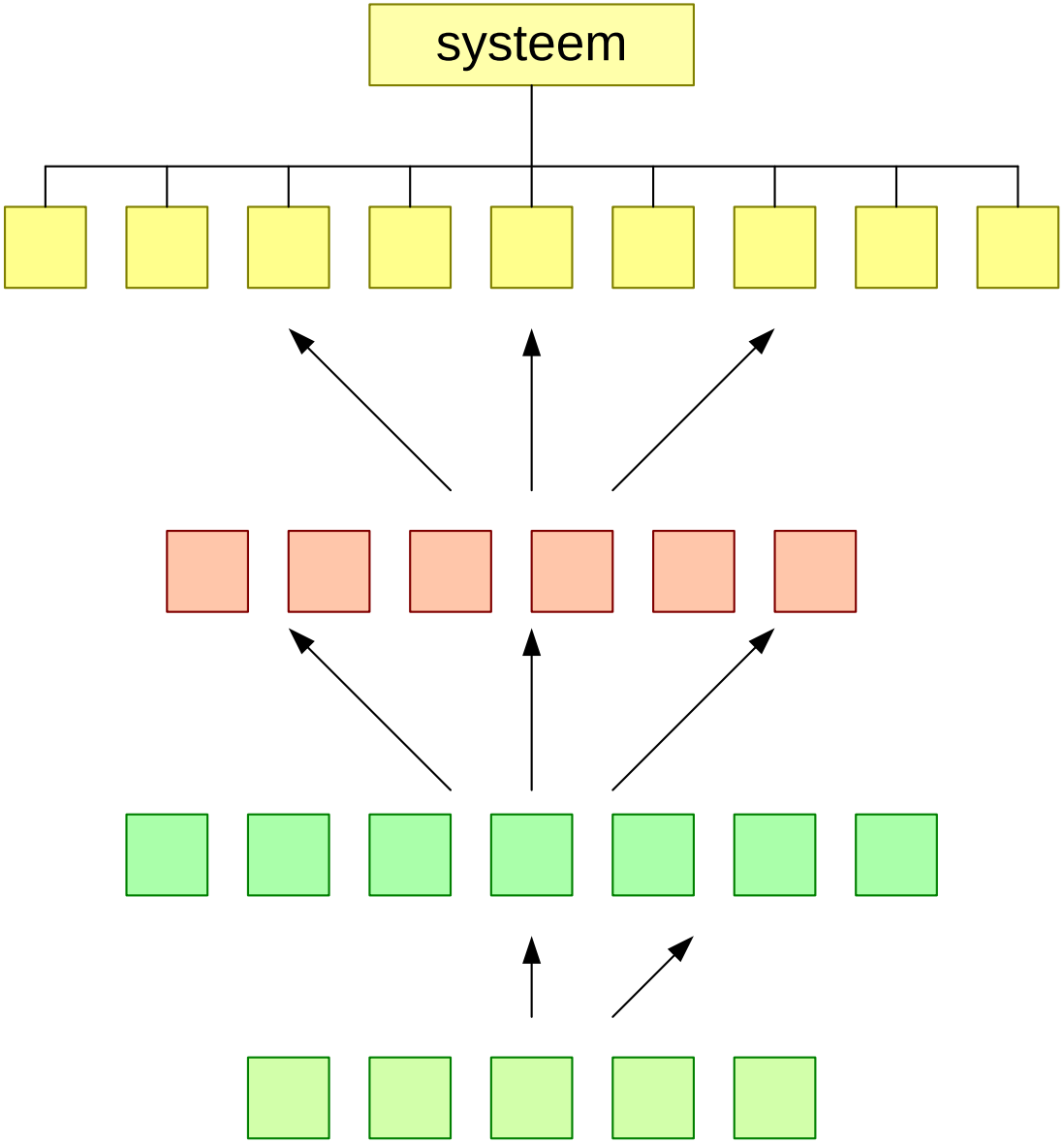
# The ”CAFCR” model



# Qualities as basis for capabilities



# Multi Disciplinary Builds on Mono Disciplinary




system

*has attributes*

qualities

*designed by*
*emerging from*

multi disciplinary
design methods

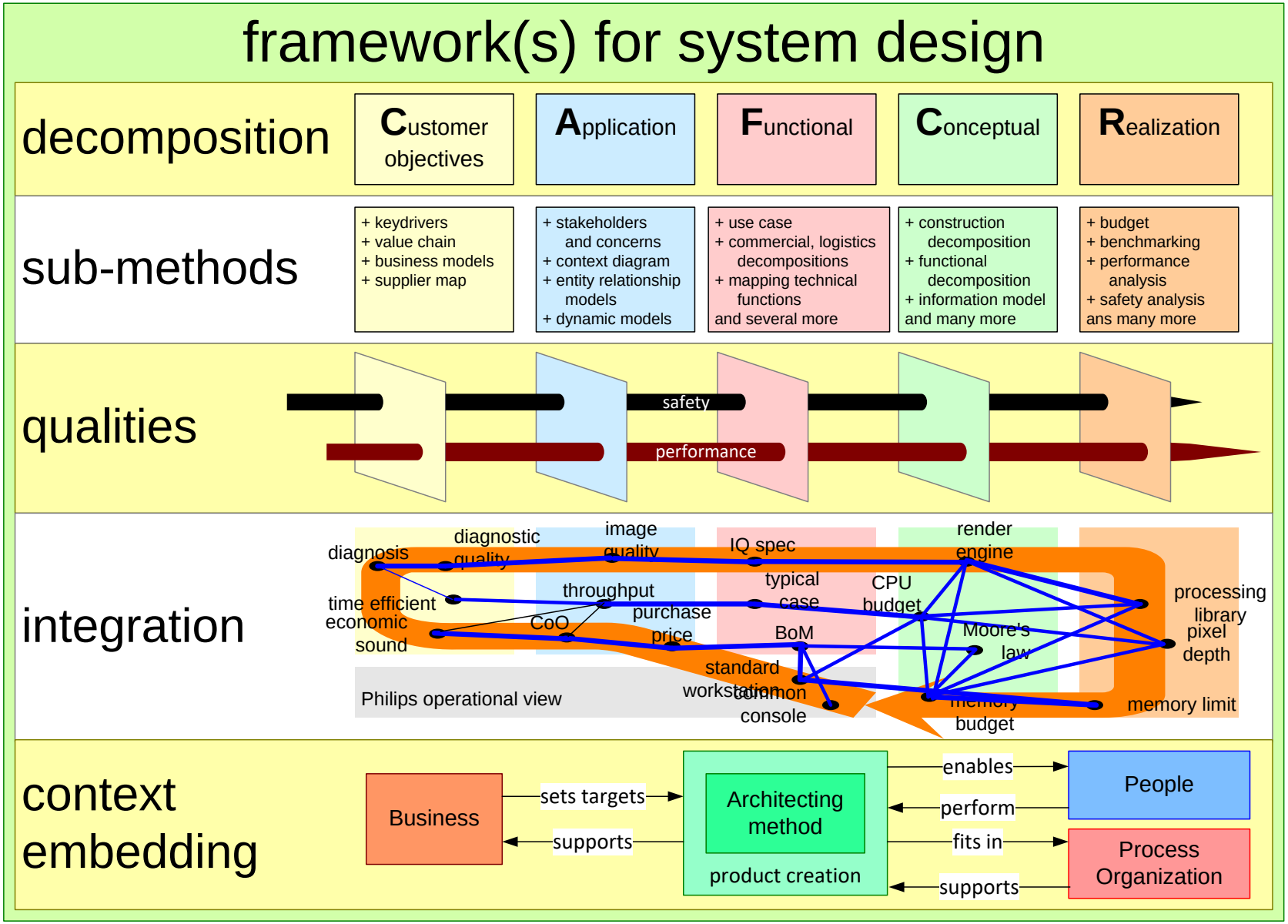
*builds on top of*

mono disciplinary
design methods

*unlocks potential of*

technologies

# Overview of methods in relation with context



# Checklist of system qualities

## usable
- usability
- attractiveness
- responsiveness
- image quality
- wearability
- storability
- transportability

## dependable
- safety
- security
- reliability
- robustness
- integrity
- availability

## effective
- throughput or productivity

## interoperable
- connectivity
- 3rd party extendible

## liable
- liability
- testability
- traceability
- standards compliance

## efficient
- resource utilization
- cost of ownership

## consistent
- reproducibility
- predictability

## serviceable
- serviceability
- configurability
- installability

## future proof
- evolvability
- portability
- upgradeability
- extendibility
- maintainability

## logistics friendly
- manufacturability
- logistics flexibility
- lead time

## ecological
- ecological footprint
- contamination
- noise
- disposability

## down to earth attributes
- cost price
- power consumption
- consumption rate (water, air, chemicals, et cetera)
- size, weight
- accuracy

# Domain specific aspects

## usable

- useability
- attractiveness
- responsiveness
- image quality
- wearability
- storability
- transportability

## reliable

- safety
- security
- reliability
- robustness
- integrity

## effective

- throughput or productivity

## interoperable

- connectivity
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- liability
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## efficient

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# Preferred profile for ESI capabilities

domain specific

embedded
(software intensive, electronics)

process, organisation, soft skills

specialistic

challenging

preferred profile:

-1 4 -1 -3 2

# Ranking of all criterions

## usable
- useability
- attractiveness
- responsiveness
- image quality
- wearability
- storability
- transportability

## reliable
- safety
- security
- reliability
- robustness
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## effective
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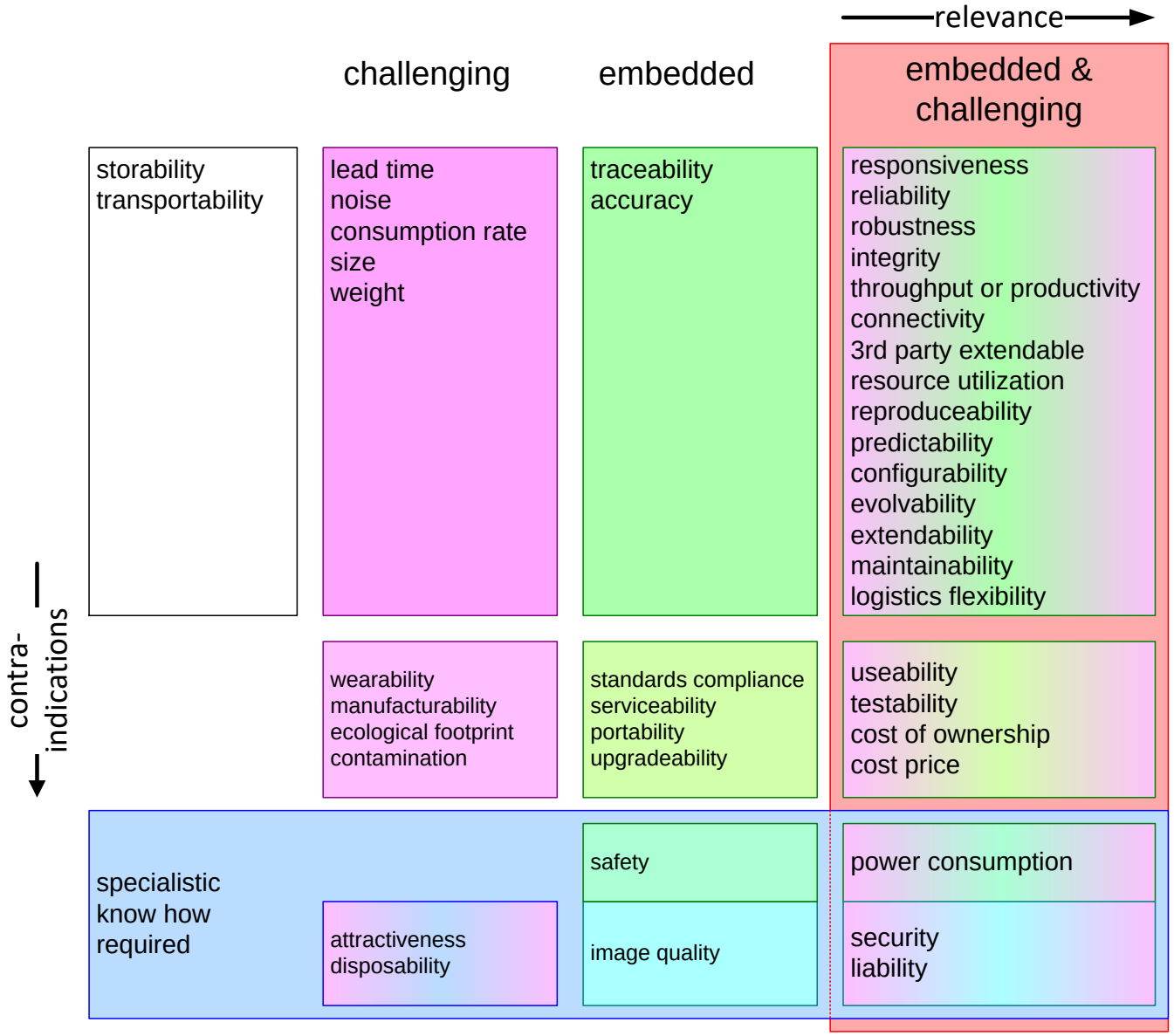
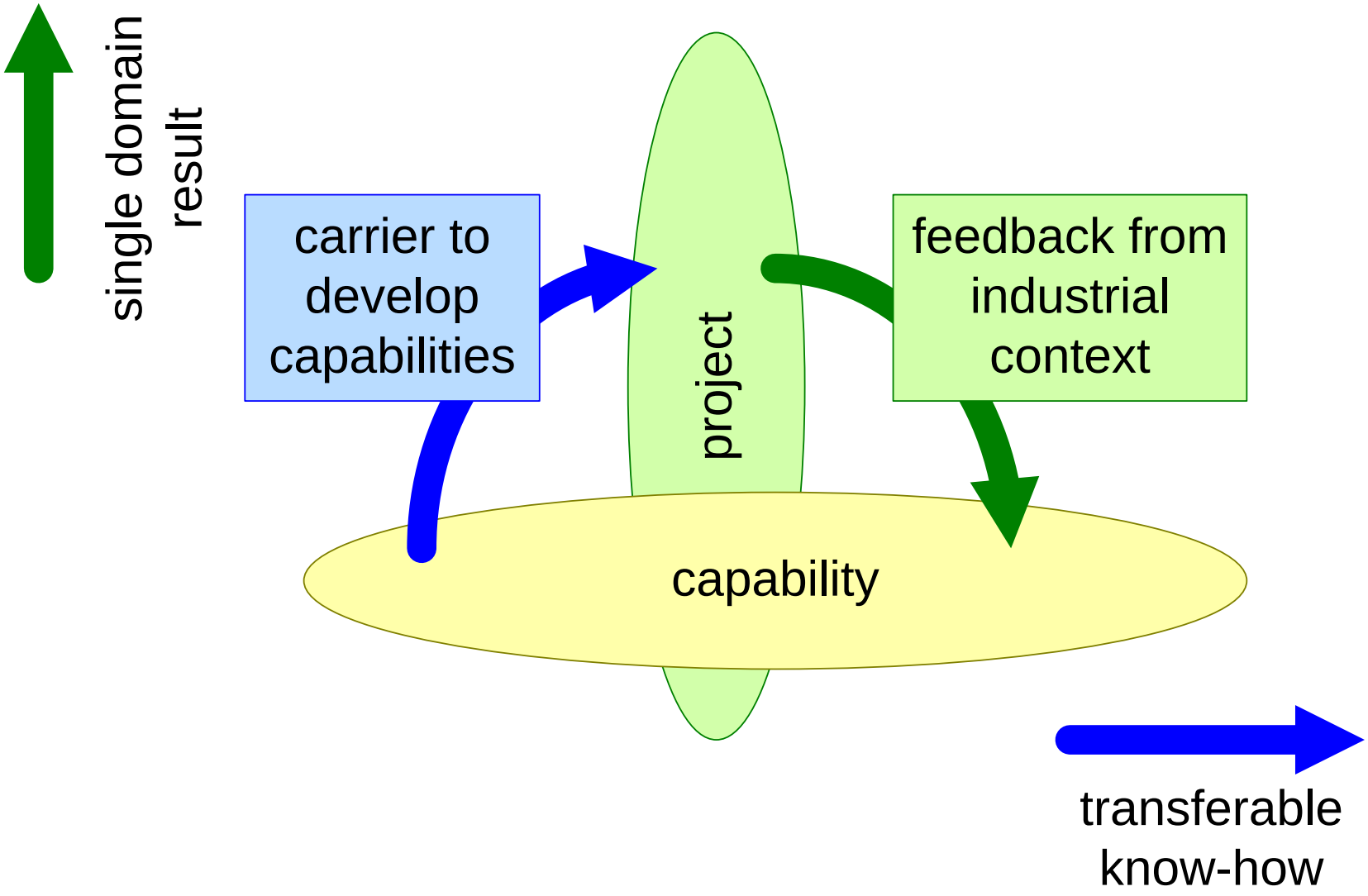
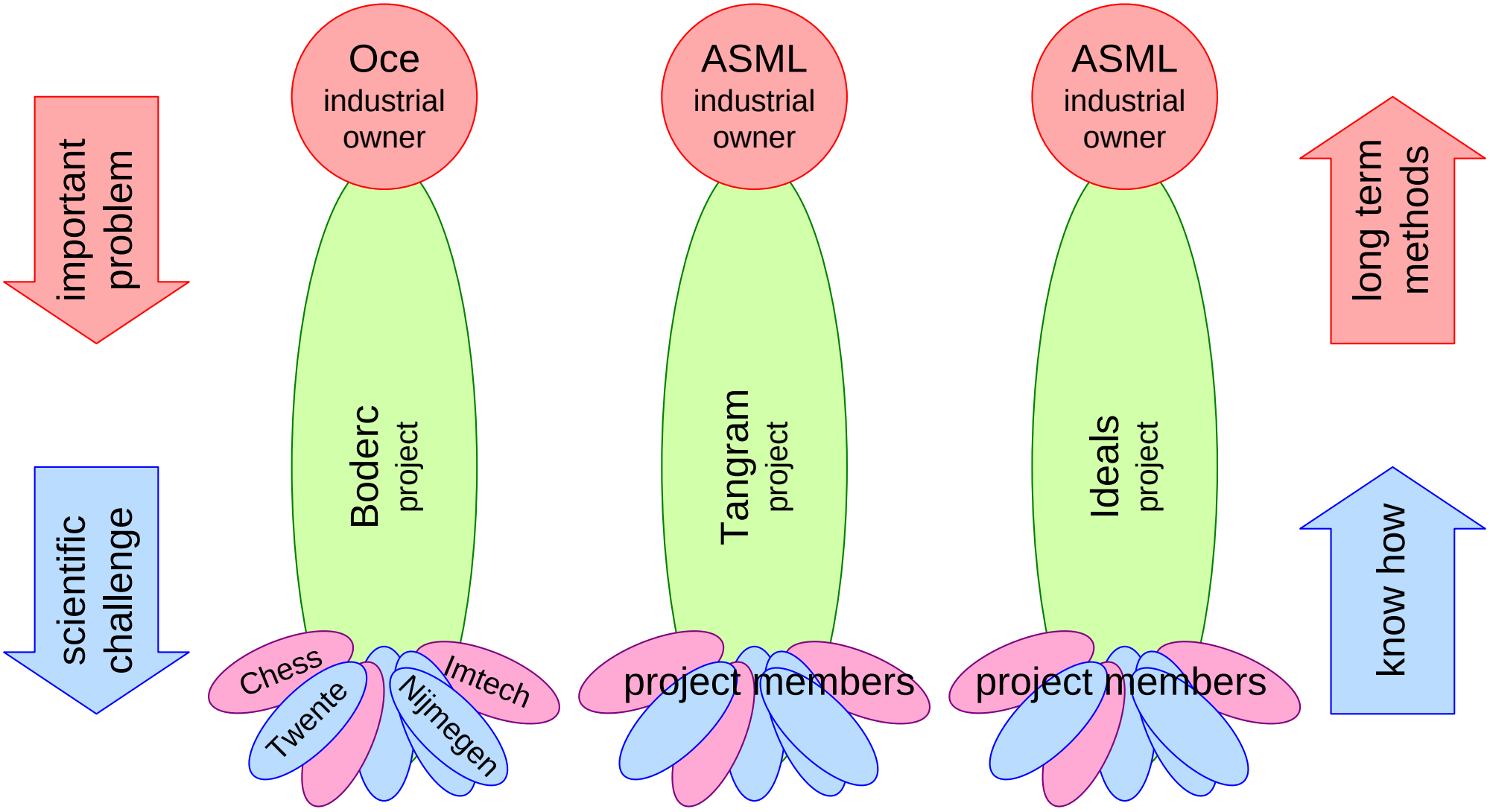
# Relevance for ESI quality map



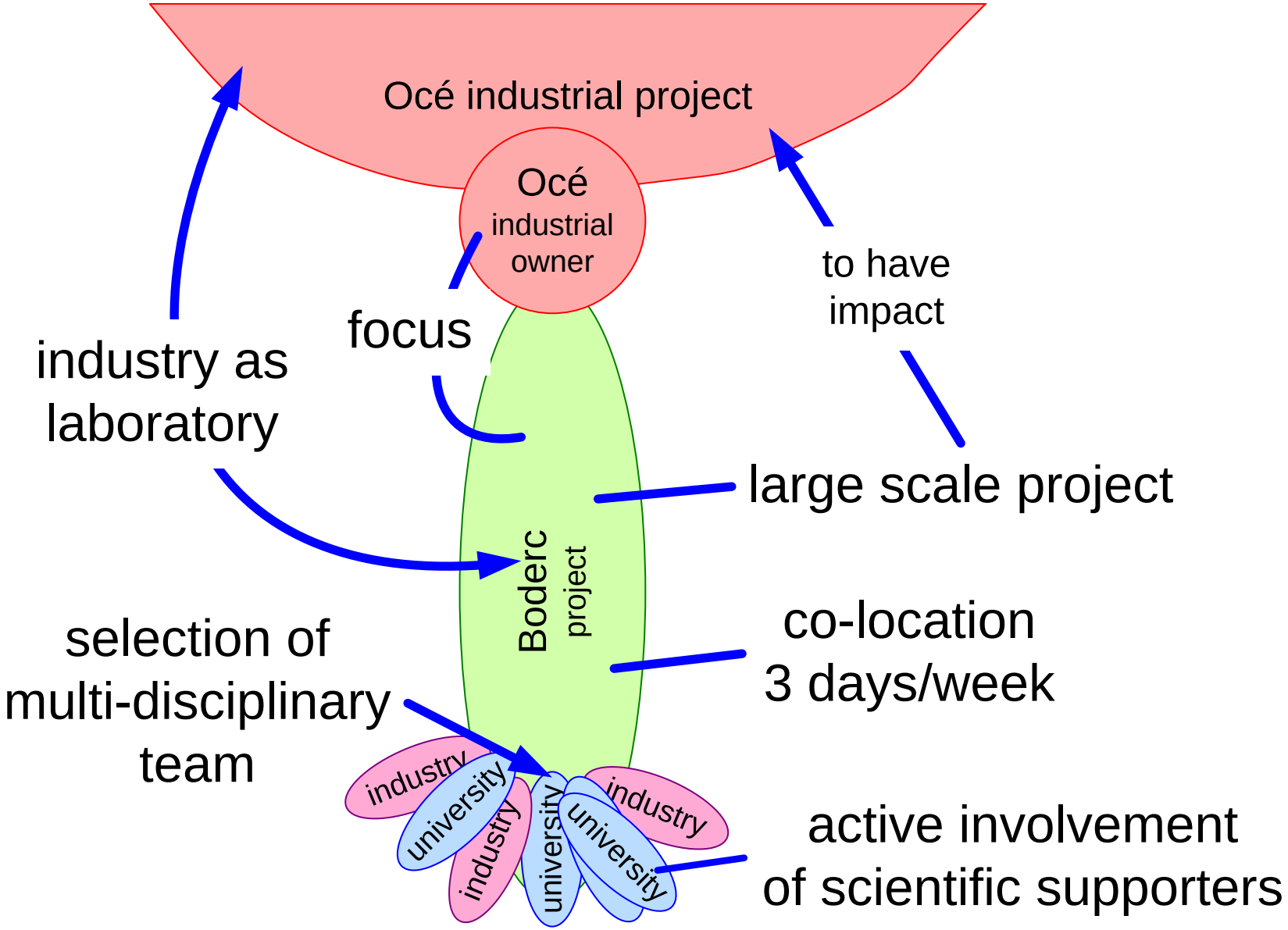
# Project as carrier for capability development



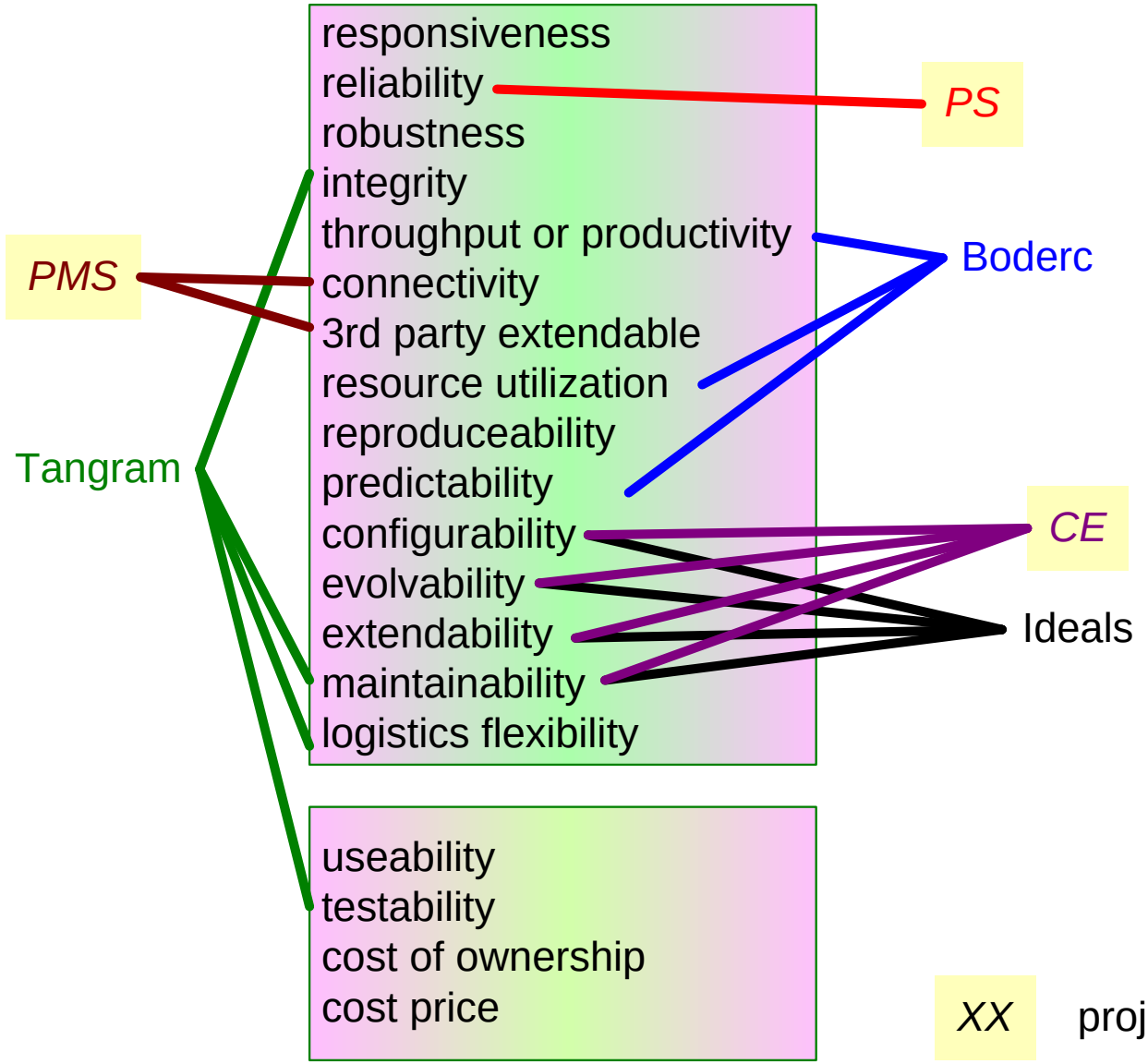
# ESI project approach



# Critical Success Factors for projects



# Mapping of capabilities to projects




power consumption

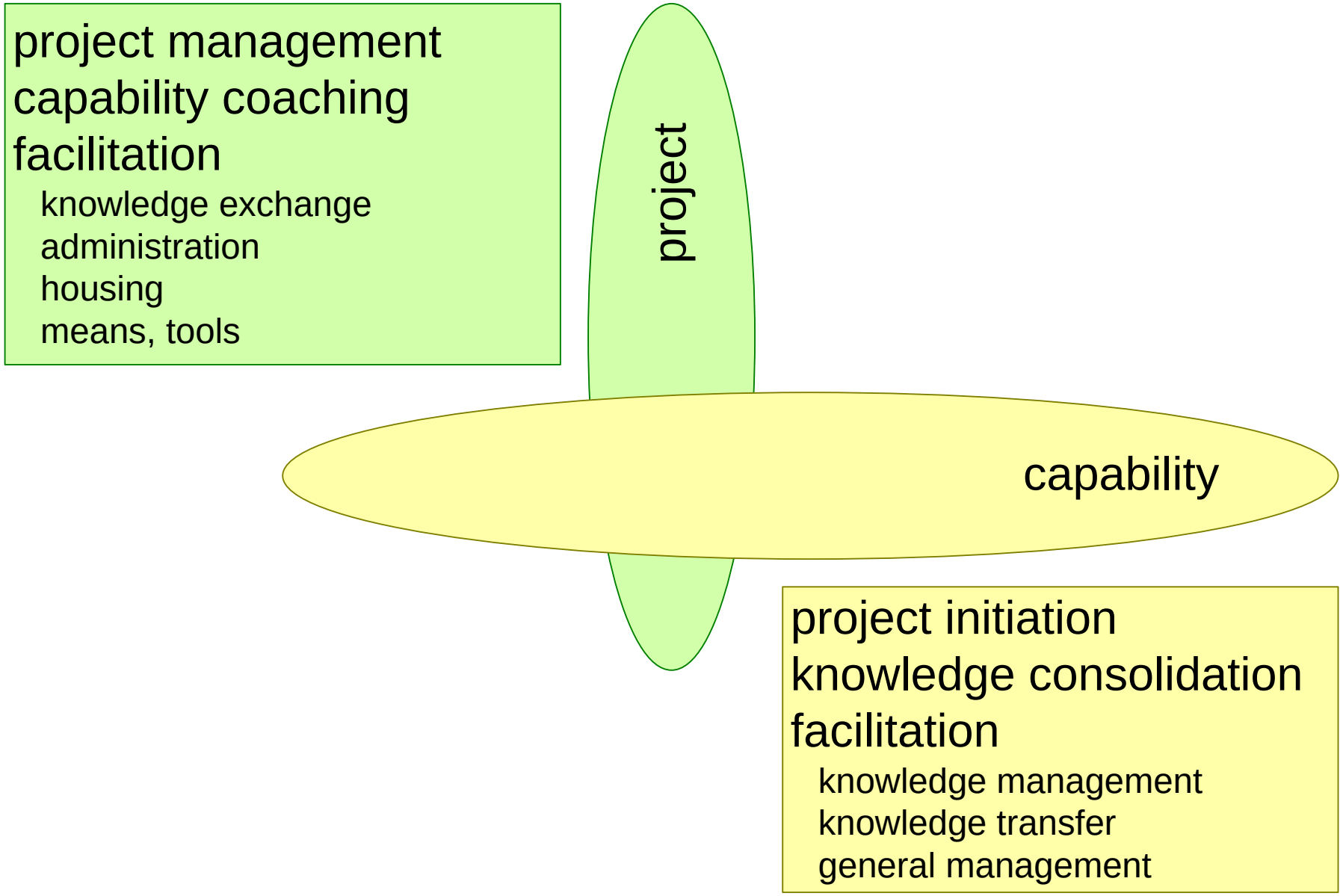
security
liability

*potential projects, if complementary specialism is available.*

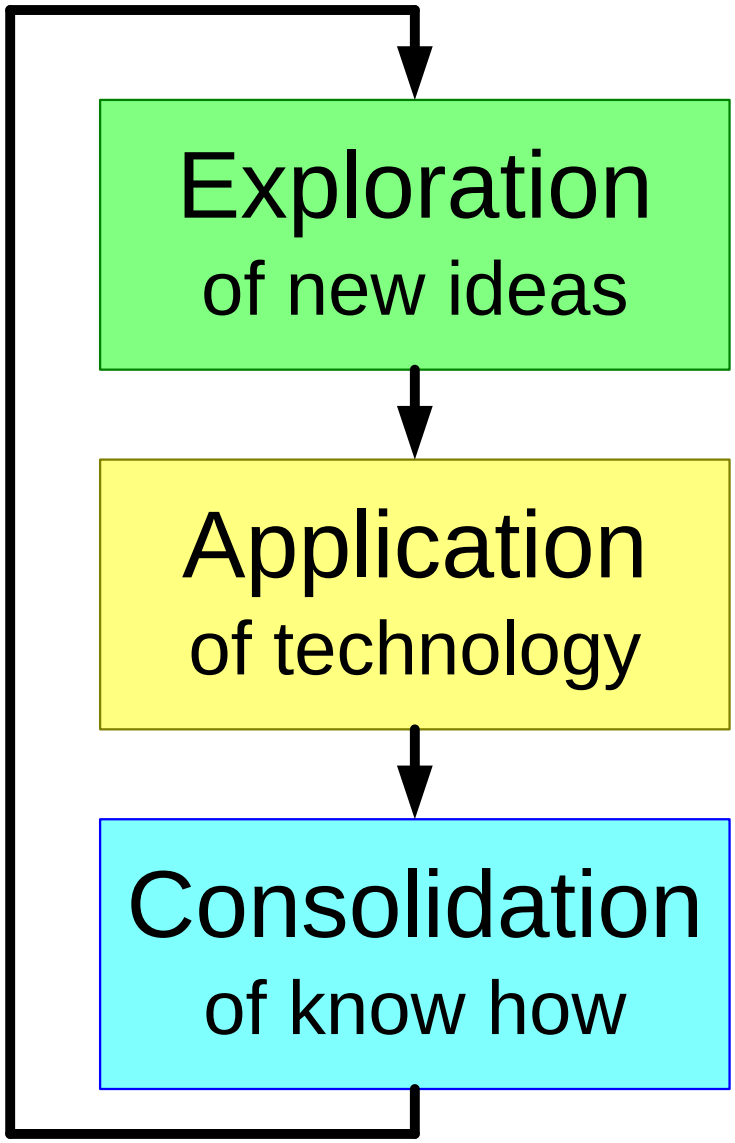
specialistic know how required

*XX* projects under consideration

# Role of Embedded Systems Institute 2



# Technology Management Cycle

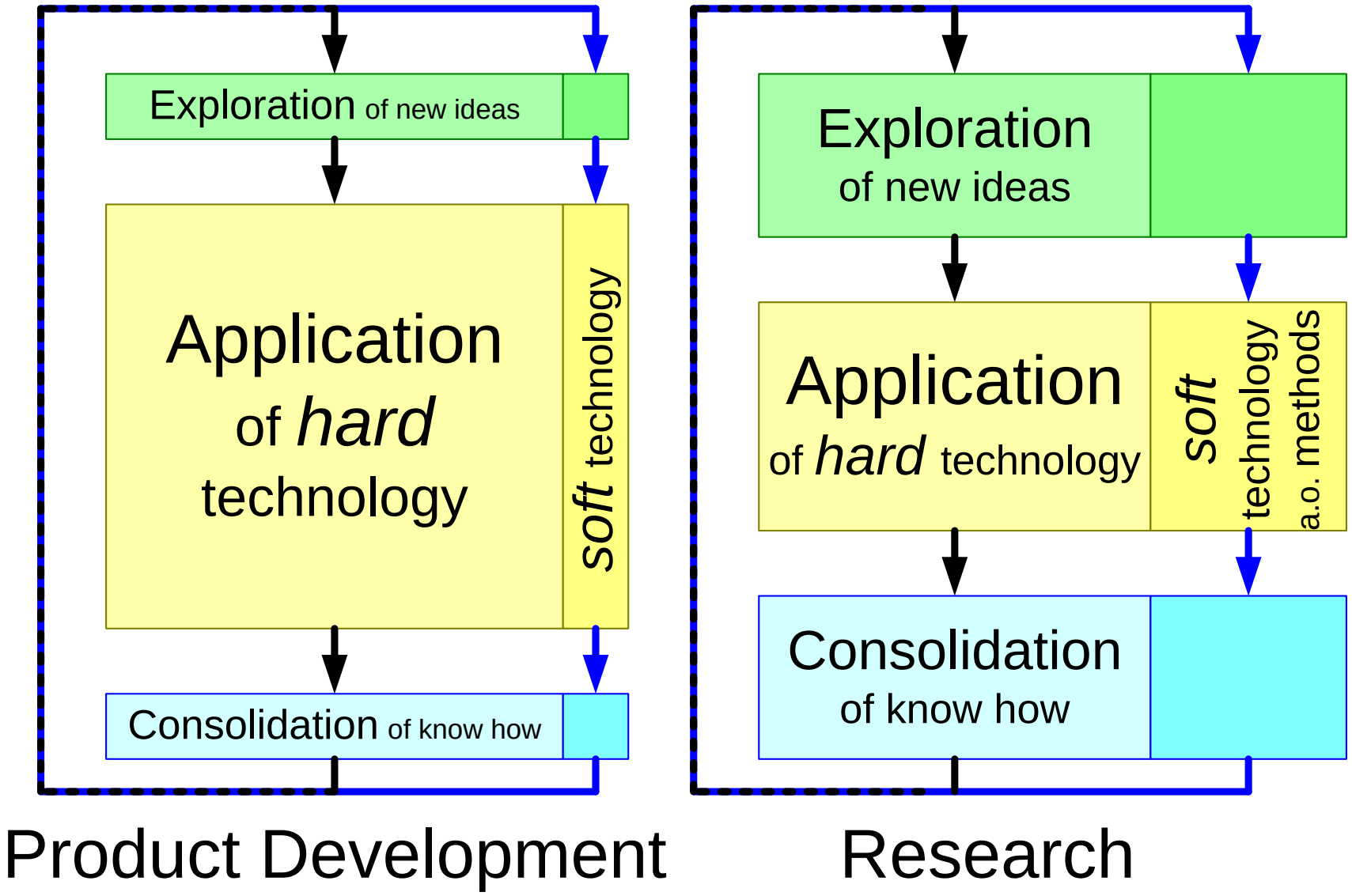



Literature search
Creative option generation
Try out

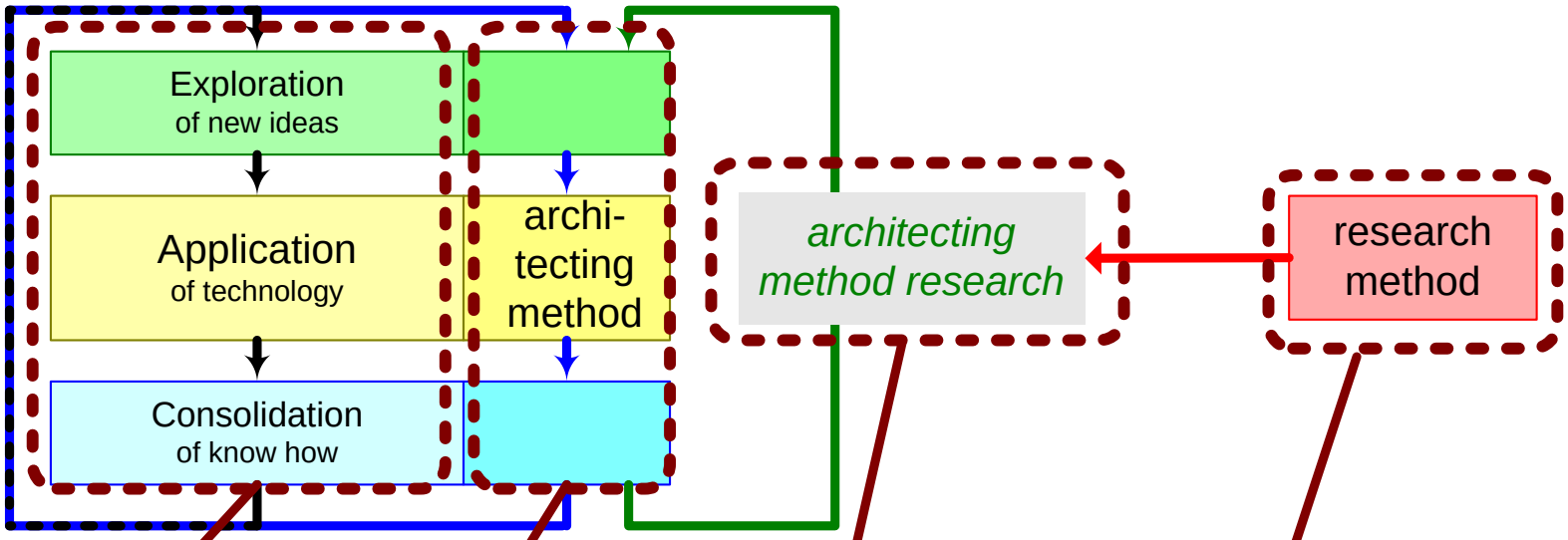
Industry as laboratory

Reflection
Write articles
Create courses

# Industry as laboratory



# Moving in the *meta* direction



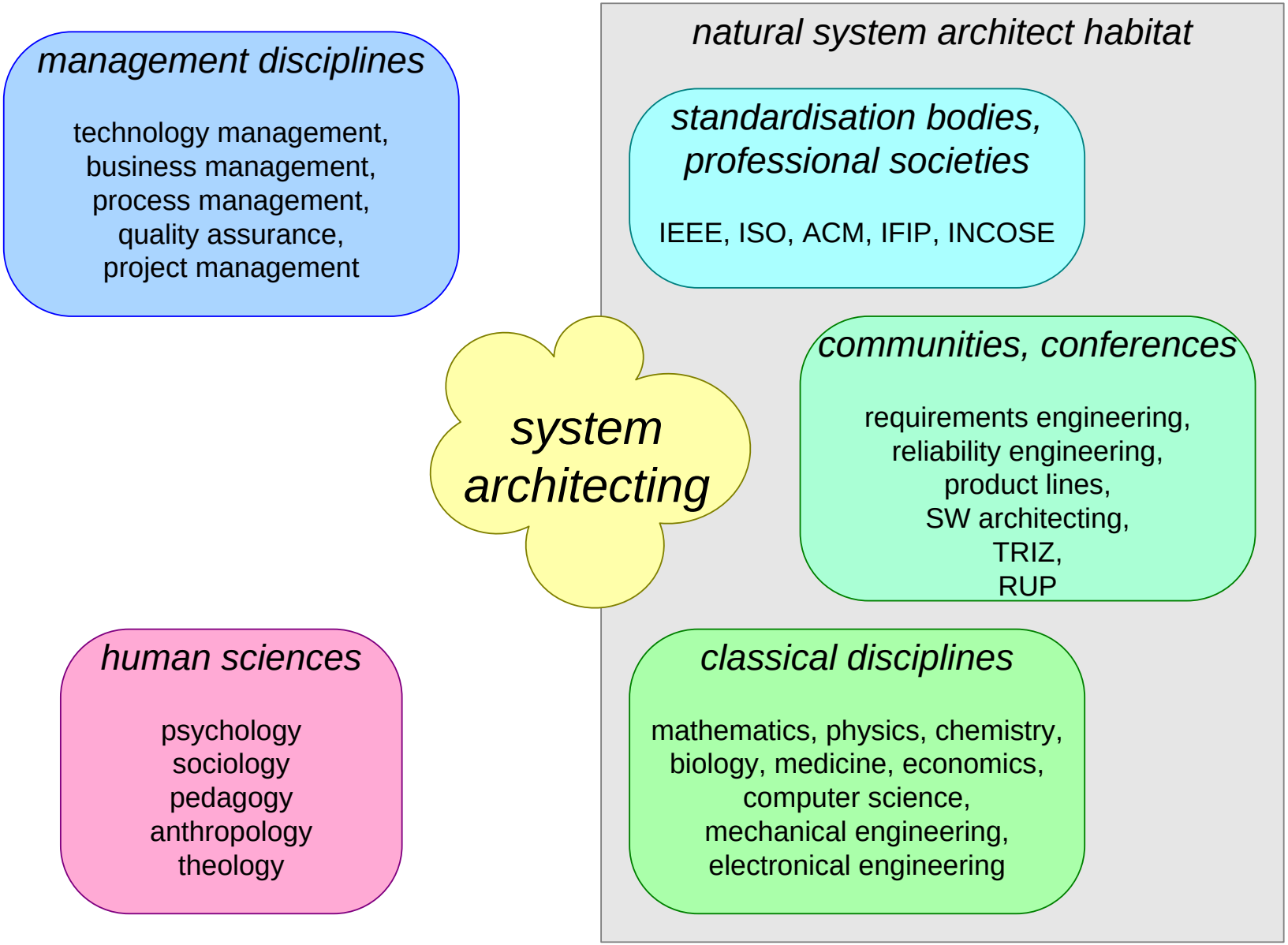

**meta$^0$**
*bottom line:*
product
creation
industrial
carrying
partner

**meta$^1$**
*enabling:*
architecting
method
ESI

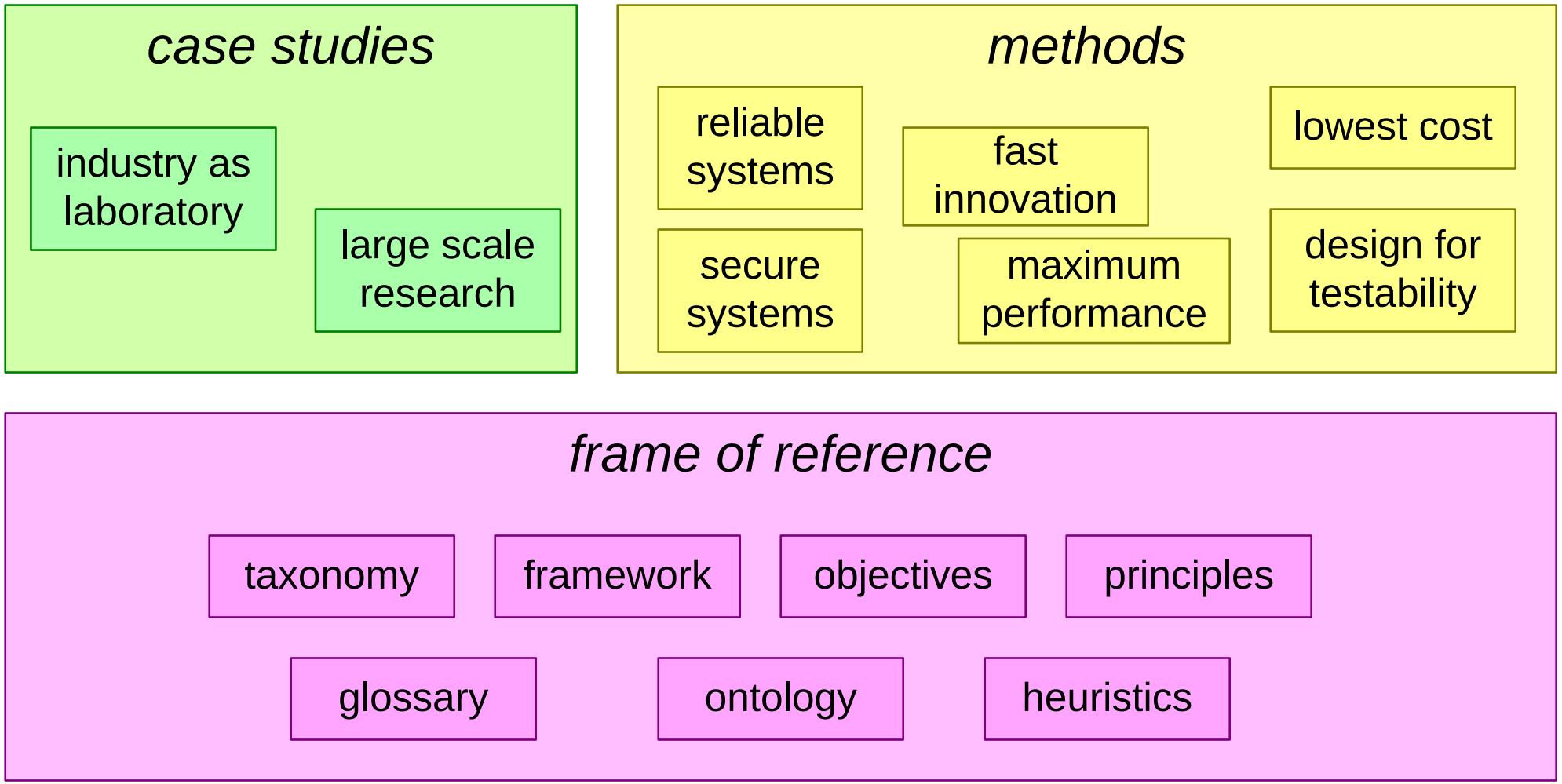
**meta$^2$**
*pro-active:*
research of
architecting
method
ESI

**meta$^3$**
*scientific foundation:*
method to research
architecting methods
see www.extra.research.philips.com/
natlab/sysarch/
ArchitecturalReasoningBook.pdf

# The context of architecting



# System architecting research: to do



# Curriculum system architecting