Capability development at the Embedded Systems Institute

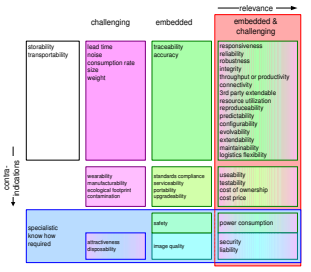
by *Gerrit Muller* Embedded Systems Institute
e-mail: gerrit.muller@embeddedsystems.nl
www.gaudisite.nl

Abstract

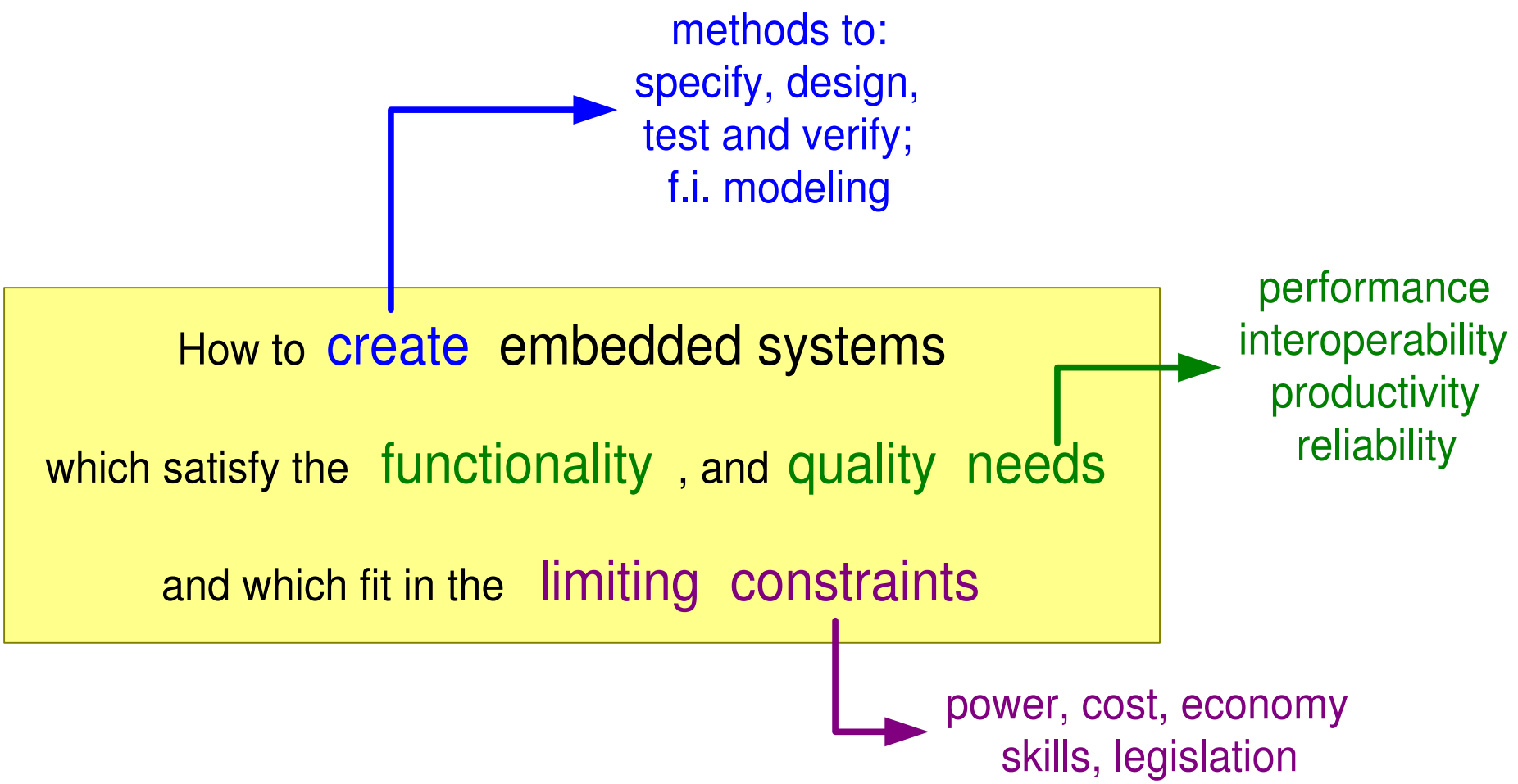
The *systems* discipline is decomposed in views and qualities and complemented with a framework to integrate again. The qualities are taken as starting point to define system design capabilities. These capabilities are analyzed and a set of embedded system capabilities is proposed.

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.

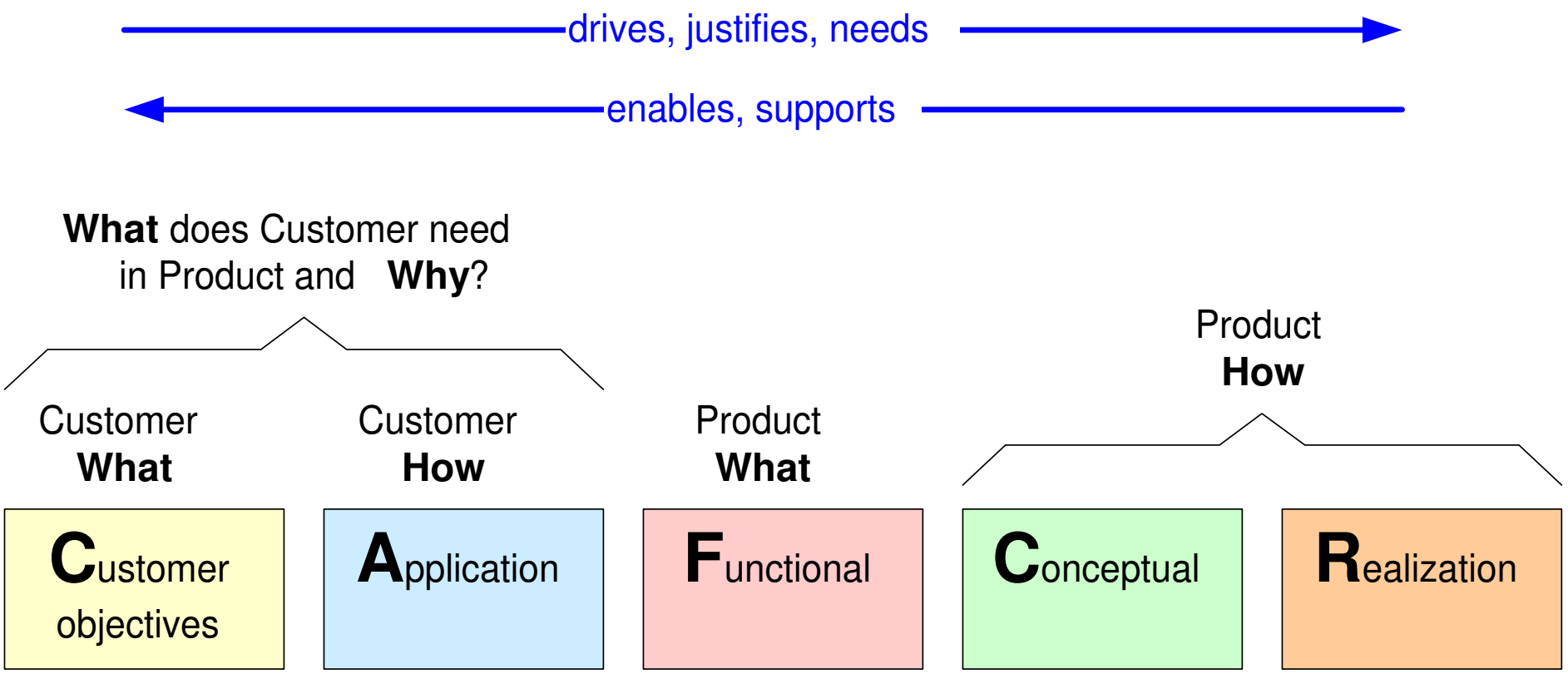
February 10, 2011
status: draft
version: 1.0



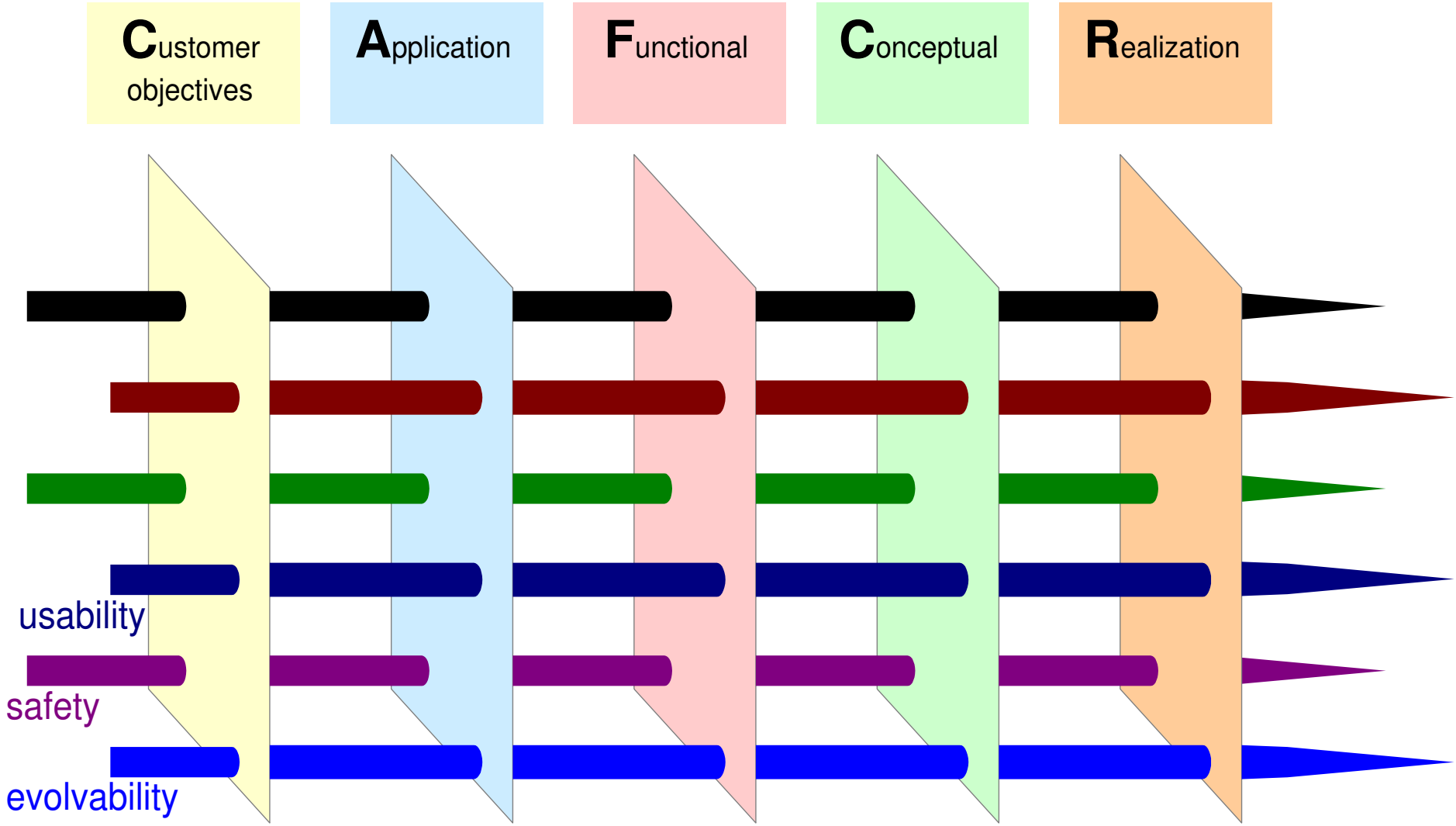
Role of Embedded Systems Institute ESI



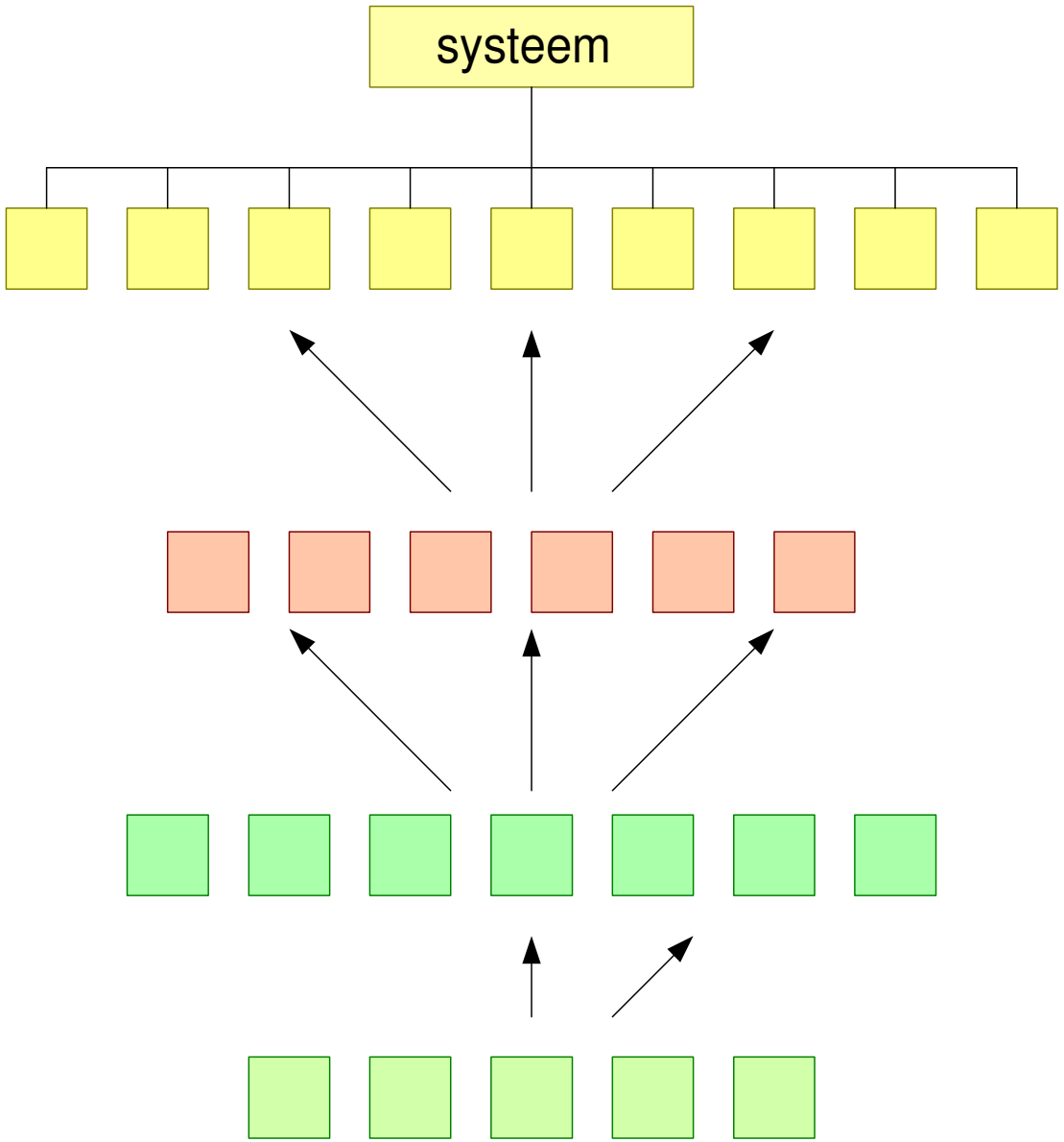
The ”CAFCR” model



Qualities as basis for capabilities



Multi Disciplinary Builds on Mono Disciplinary



system

has attributes

qualities

designed by
emerging from

multi disciplinary
design methods

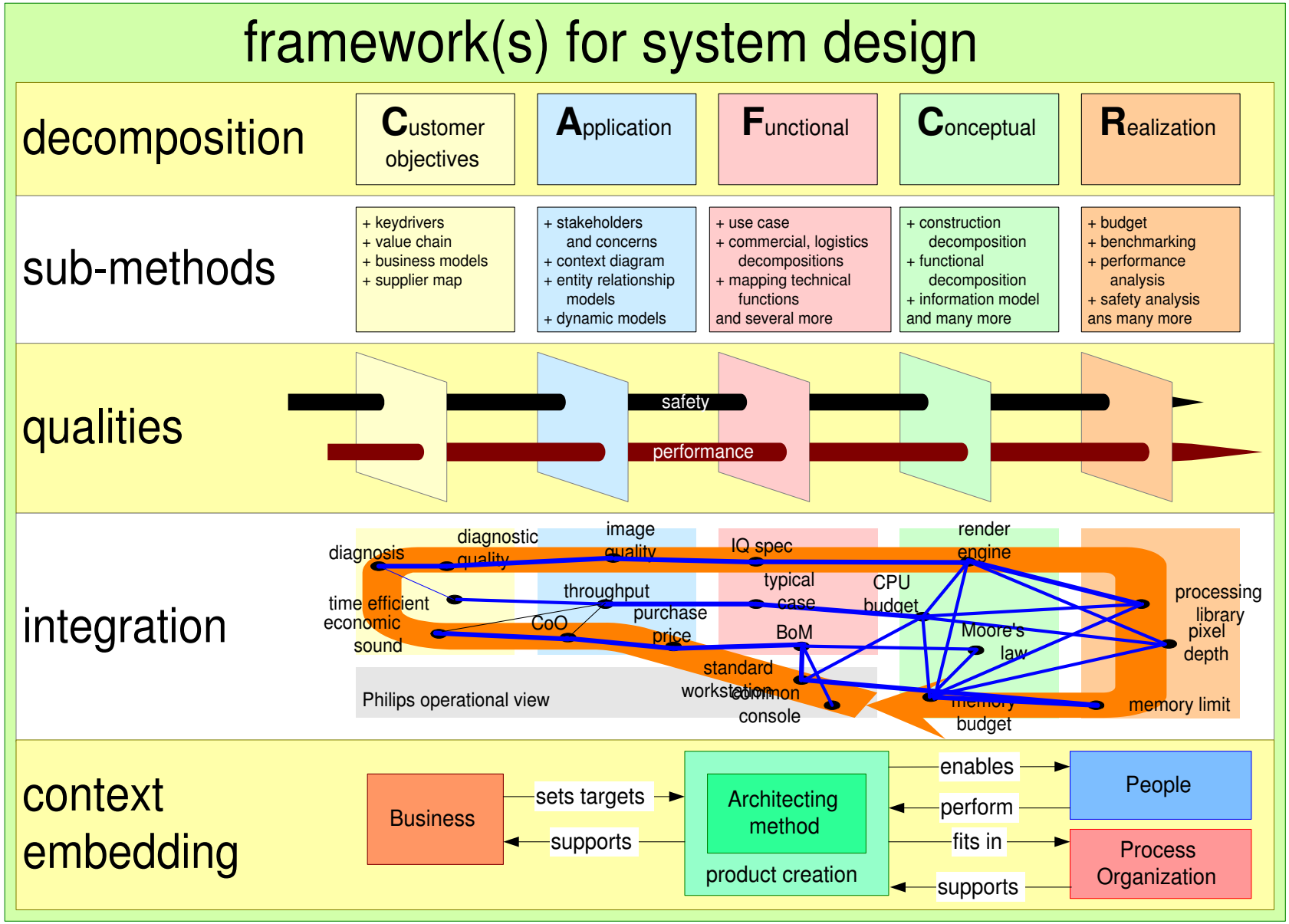
builds on top of

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
- 3rd party extendable

liable

- liability
- testability
- traceability
- standards compliance

efficient

- resource utilization
- cost of ownership

consistent

- reproduceability
- predictability

serviceable

- serviceability
- configurability
- installability

future proof

- evolvability
- portability
- upgradeability
- extendability
- 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, etcetera)
- size, weight
- accuracy

Preferred profile for ESI capabilities

domain specific

embedded
(software intensive, electronics)

process, organisation, soft skills

specialistic

challenging

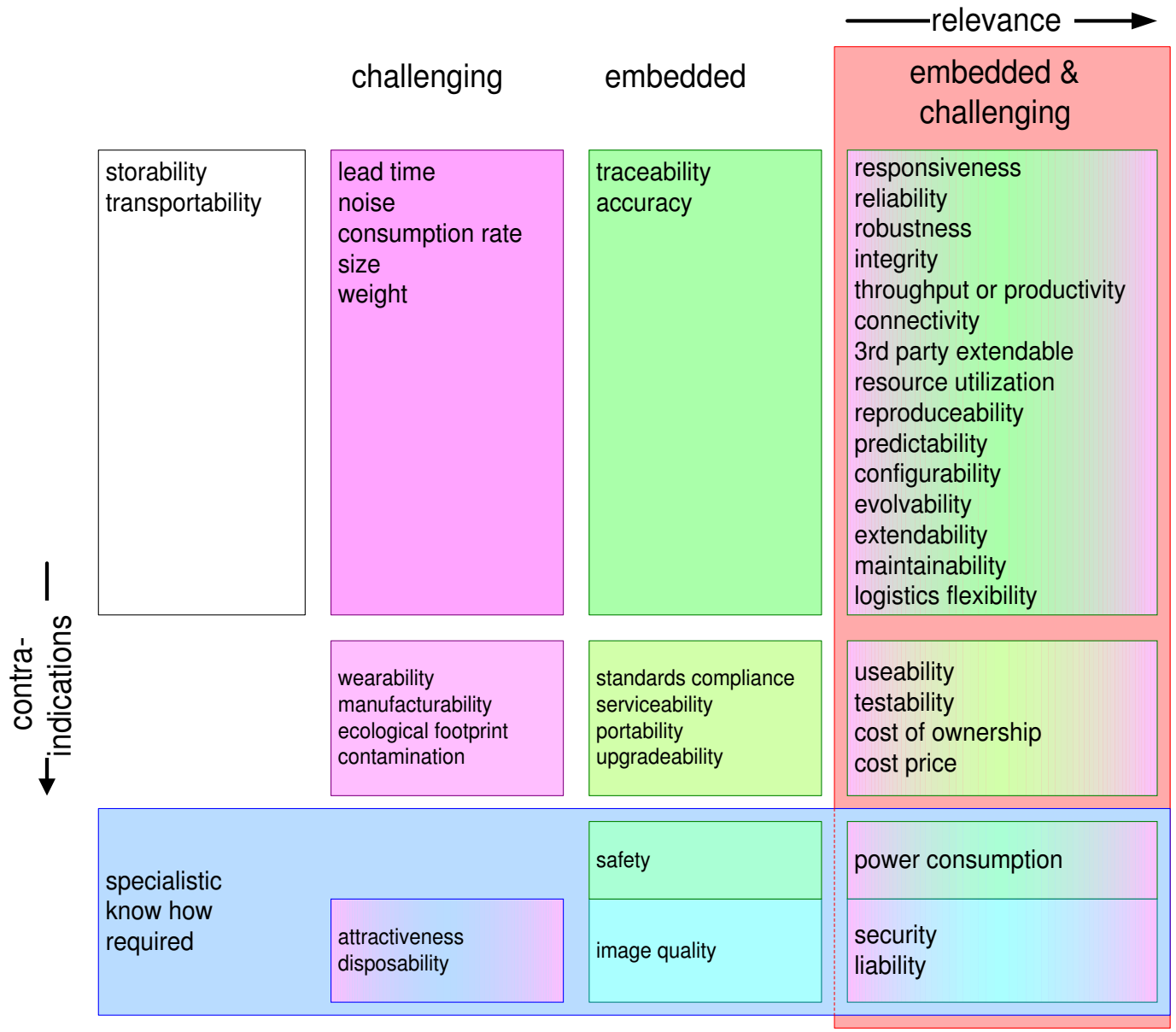
preferred profile:

-1 4 -1 -3 2

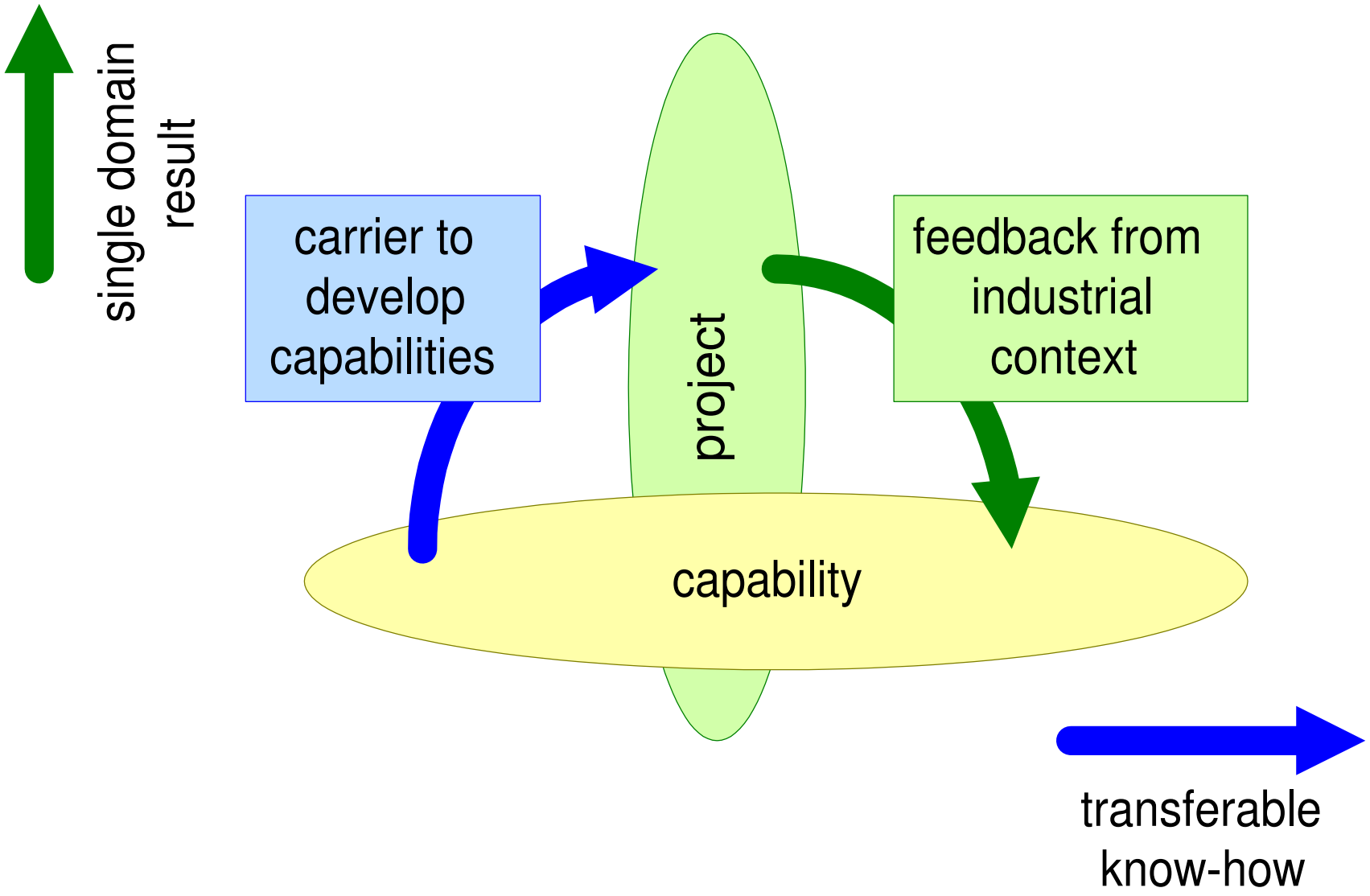
Ranking of all criterions

- usable
  - useability
  - attractiveness
  - responsiveness
  - image quality
  - wearability
  - storability
  - transportability
- reliable
  - safety
  - security
  - reliability
  - robustness
  - integrity
- effective
  - throughput or productivity
- interoperable
  - connectivity
  - 3rd party extendable
- liable
  - liability
  - testability
  - traceability
  - standards compliance
- efficient
  - resource utilization
  - cost of ownership
- consistent
  - reproduceability
  - predictability
- serviceable
  - serviceability
  - configurability
  - installability
- future proof
  - evolvability
  - portability
  - upgradeability
  - extendability
  - 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, etcetera)
  - size, weight
  - accuracy

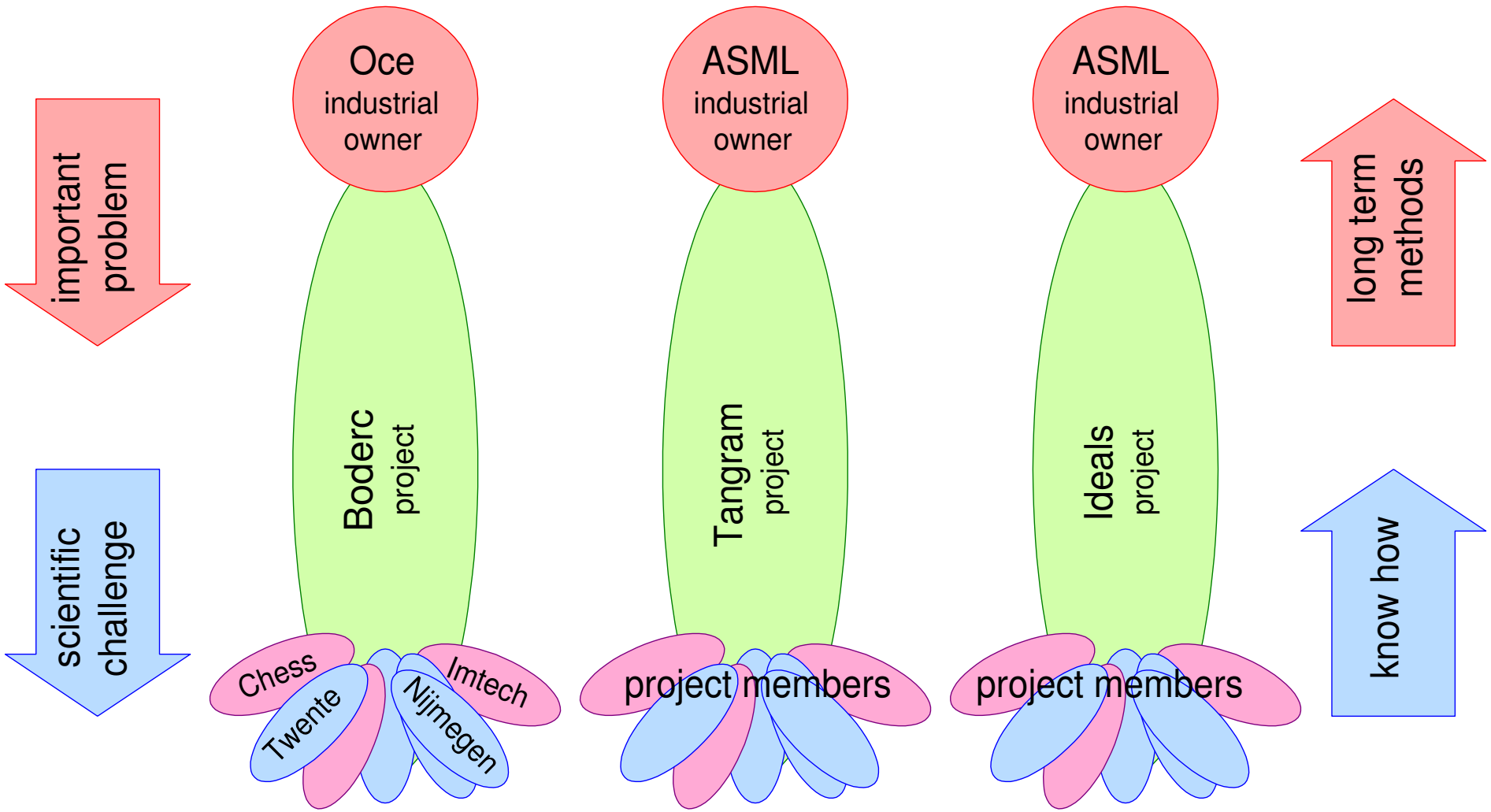
Relevance for ESI quality map



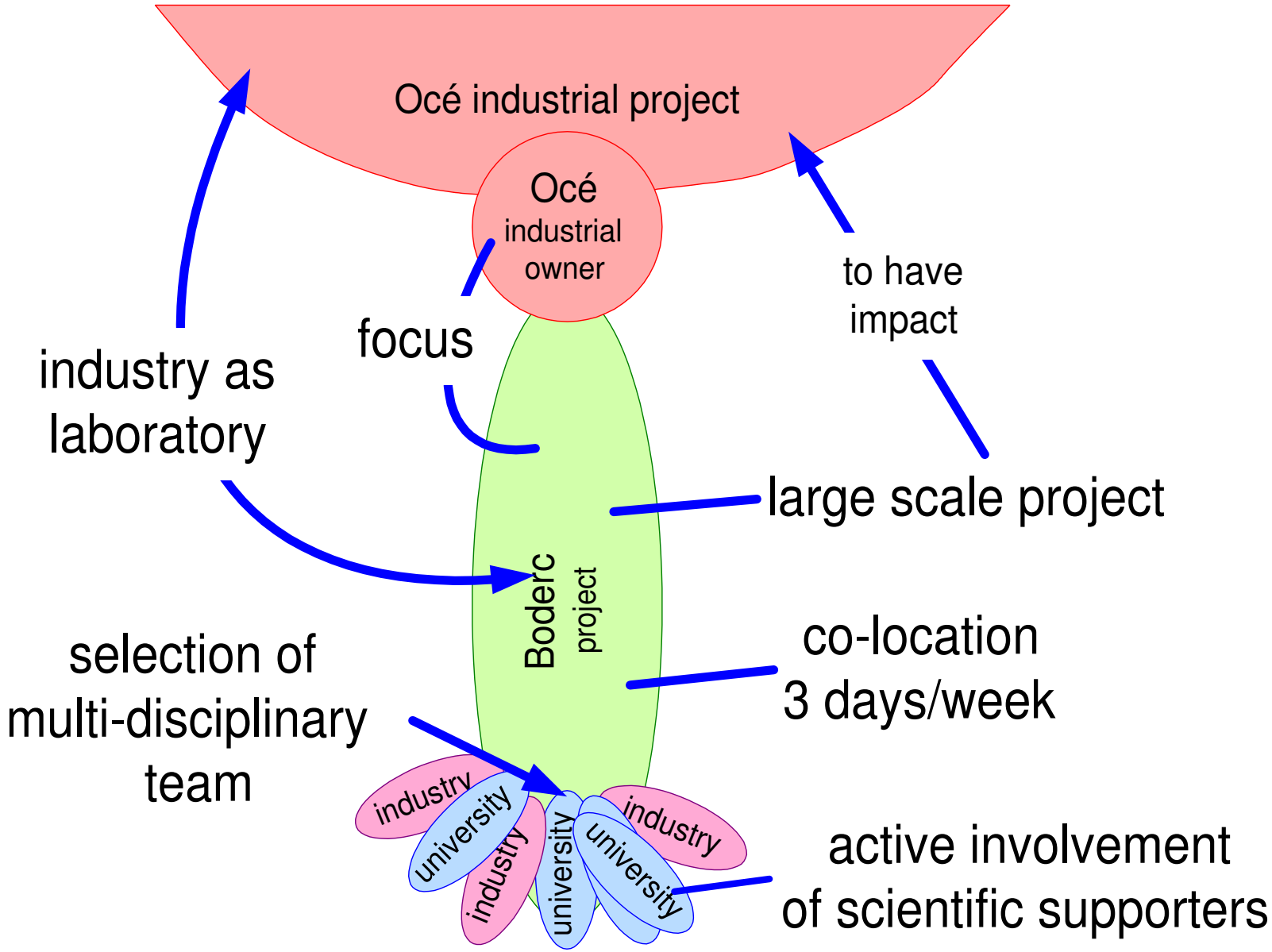
Project as carrier for capability development



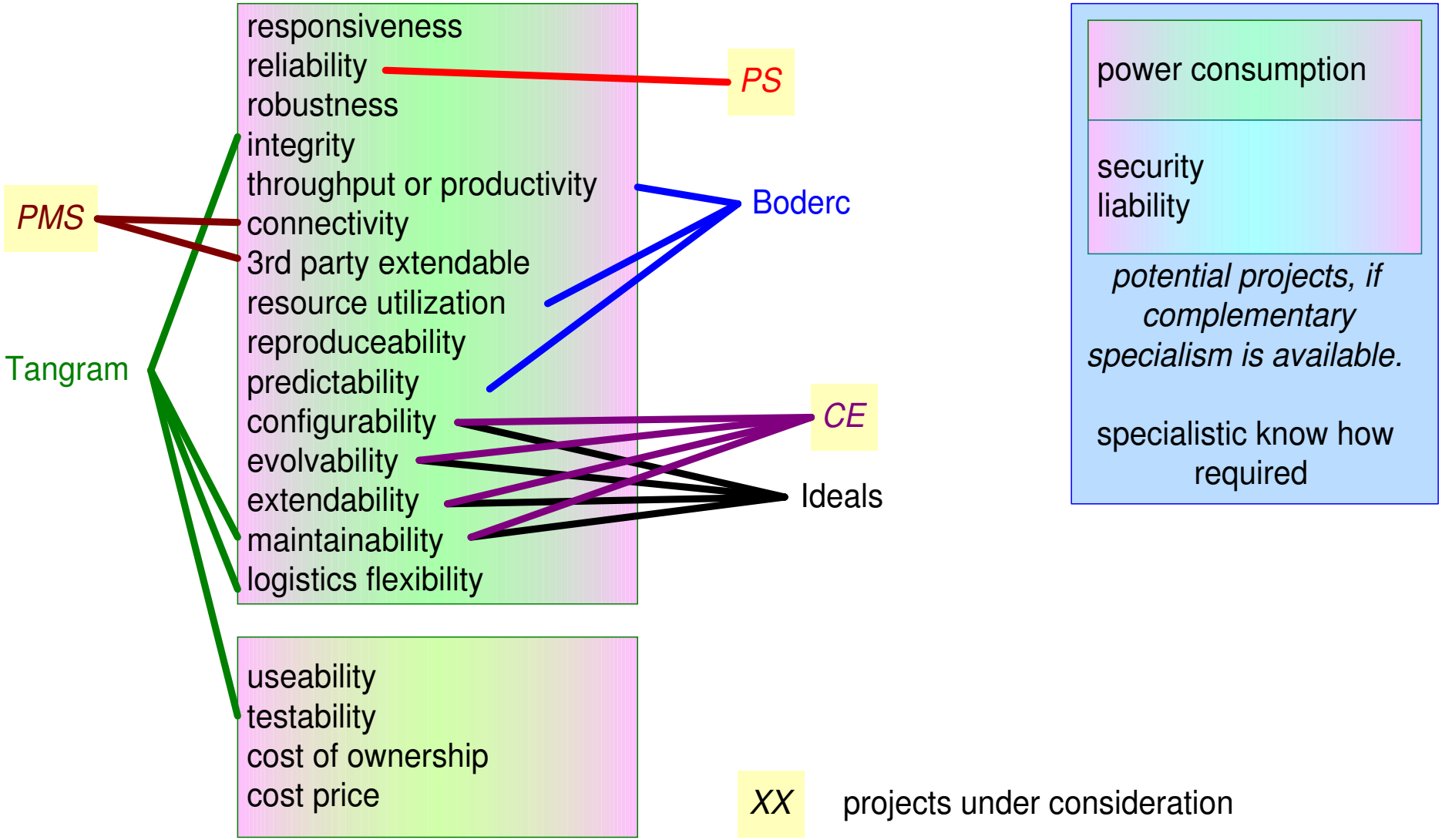
ESI project approach



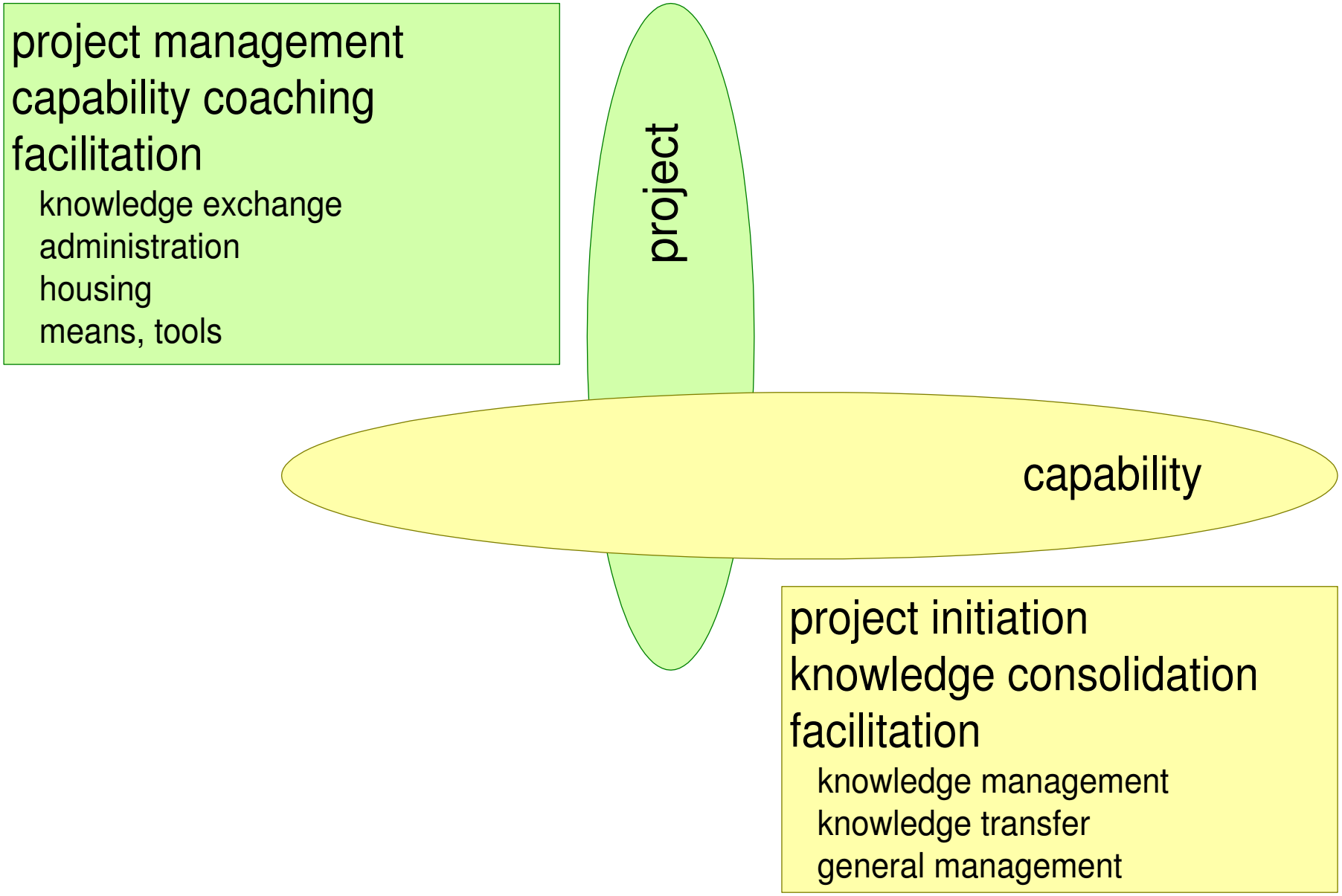
Critical Success Factors for projects



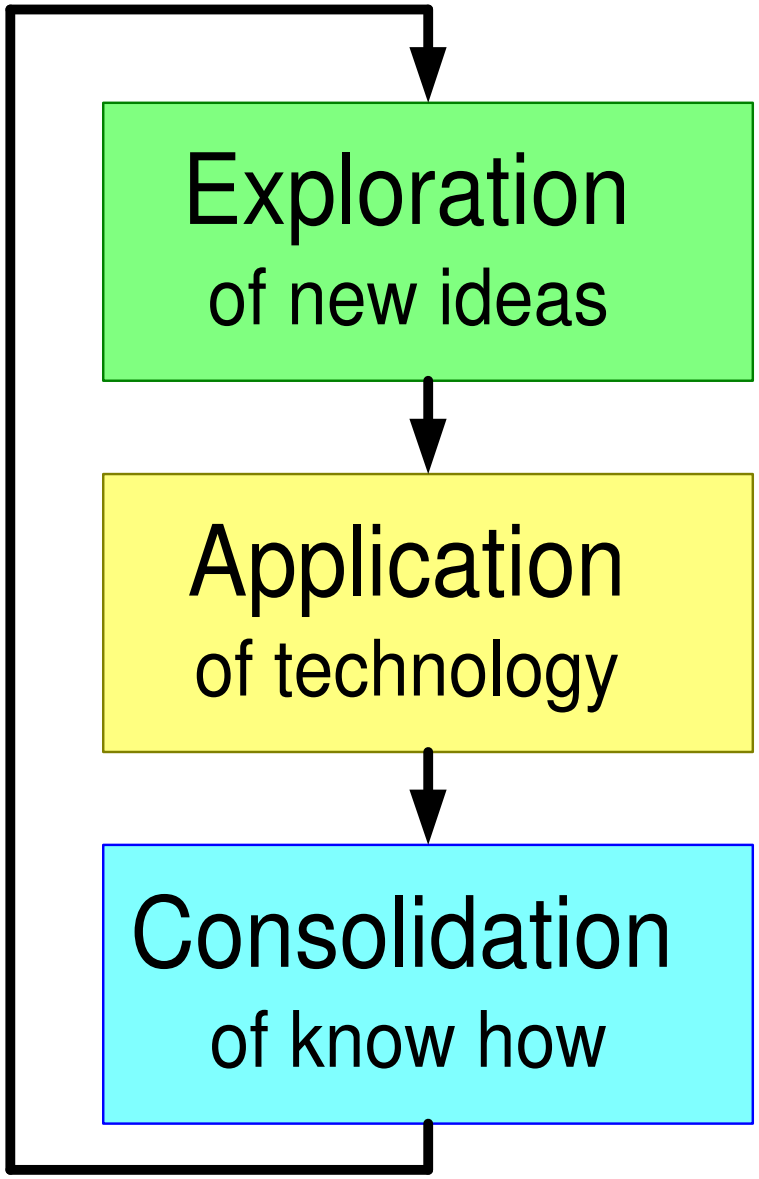
Mapping of capabilities to projects



Role of Embedded Systems Institute 2



Technology Management Cycle

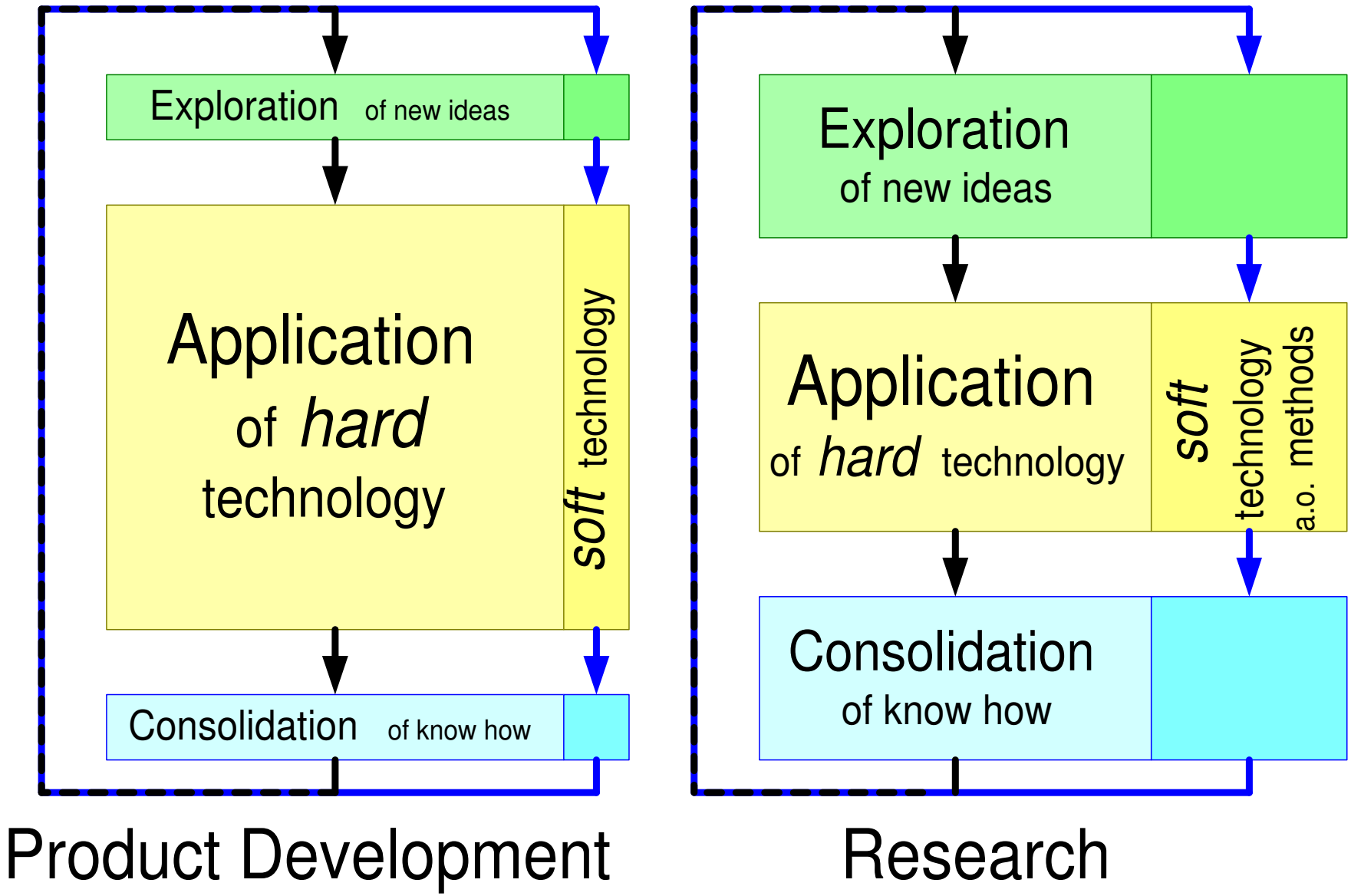


Literature search
Creative option generation
Try out

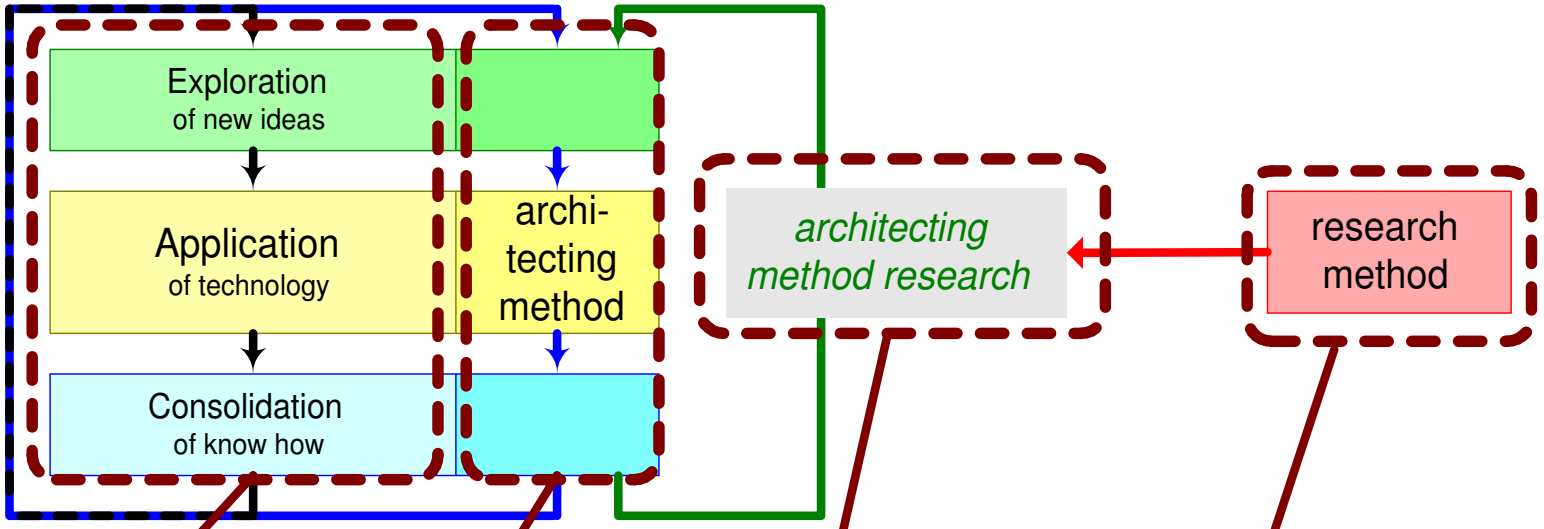
Industry as laboratory

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

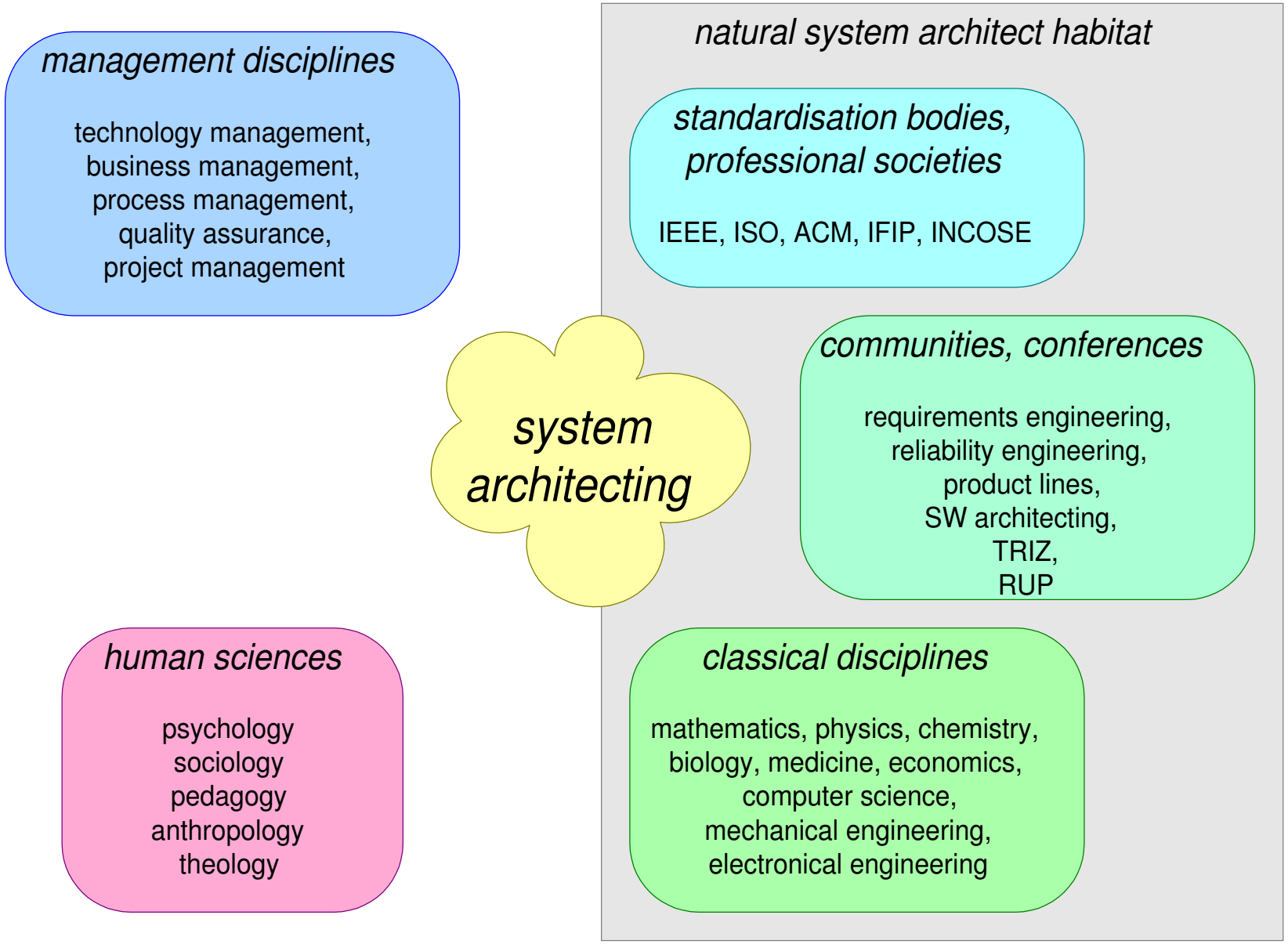
ESI

meta 3

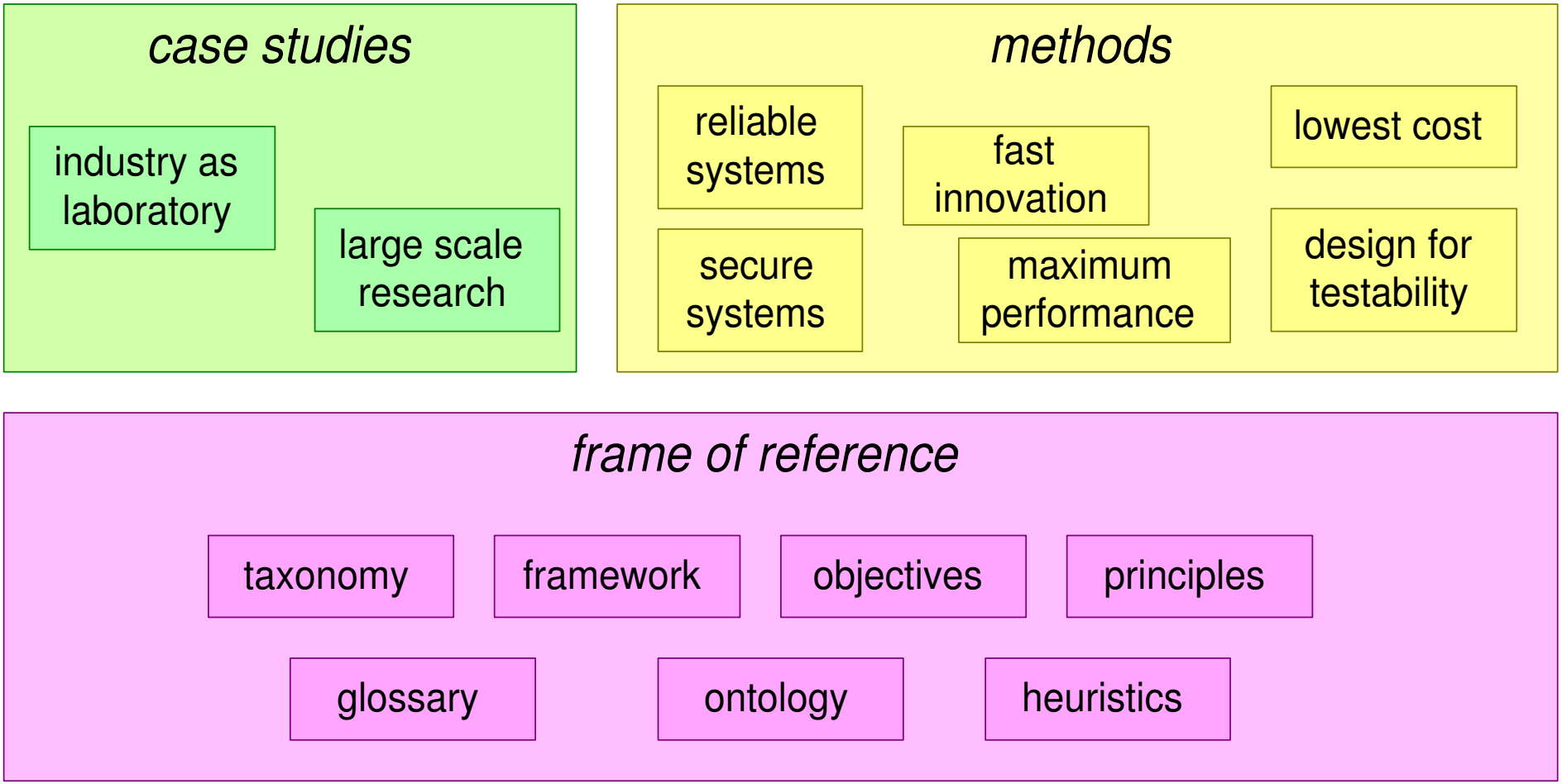
scientific foundation:
method to research
architecting methods

see www.extra.research.philips.com/natlab/sysarch/ArchitecturalReasoningBook.pdf

The context of architecting



System architecting research: to do



Curriculum system architecting