

# Tutorial How to Orchestrate in Ecosystems?

by *Gerrit Muller* USN-SE and TNO-ESI

e-mail: `gaudisite@gmail.com`

`www.gaudisite.nl`

## Abstract

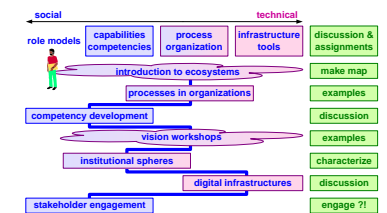
This tutorial discusses the challenge that societal capabilities tend to be a result of more interacting sociotechnical systems. The consequence is that we have to learn to operate in extensive ecosystems with many different stakeholders and considerations, where most players have limited mandate and influence. We propose Orchestrating as essential competence.

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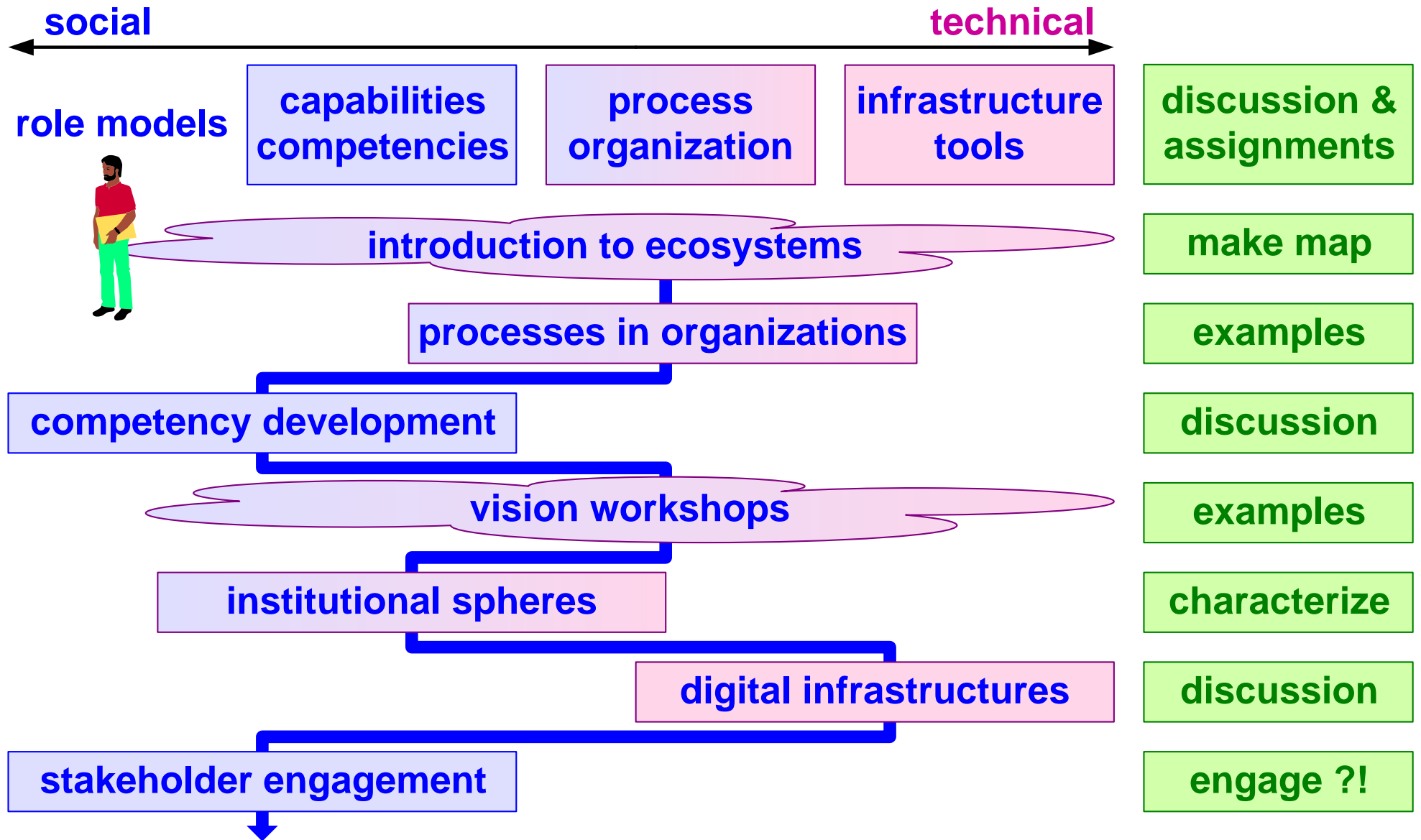
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# Figure Of Contents™



# Introduction to Ecosystems

by *Gerrit Muller* USN-SE

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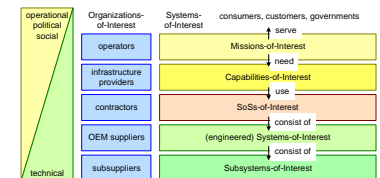
## Abstract

This presentation shows how various players across an ecosystem behave. It uses a simple layering model to explain the various roles.

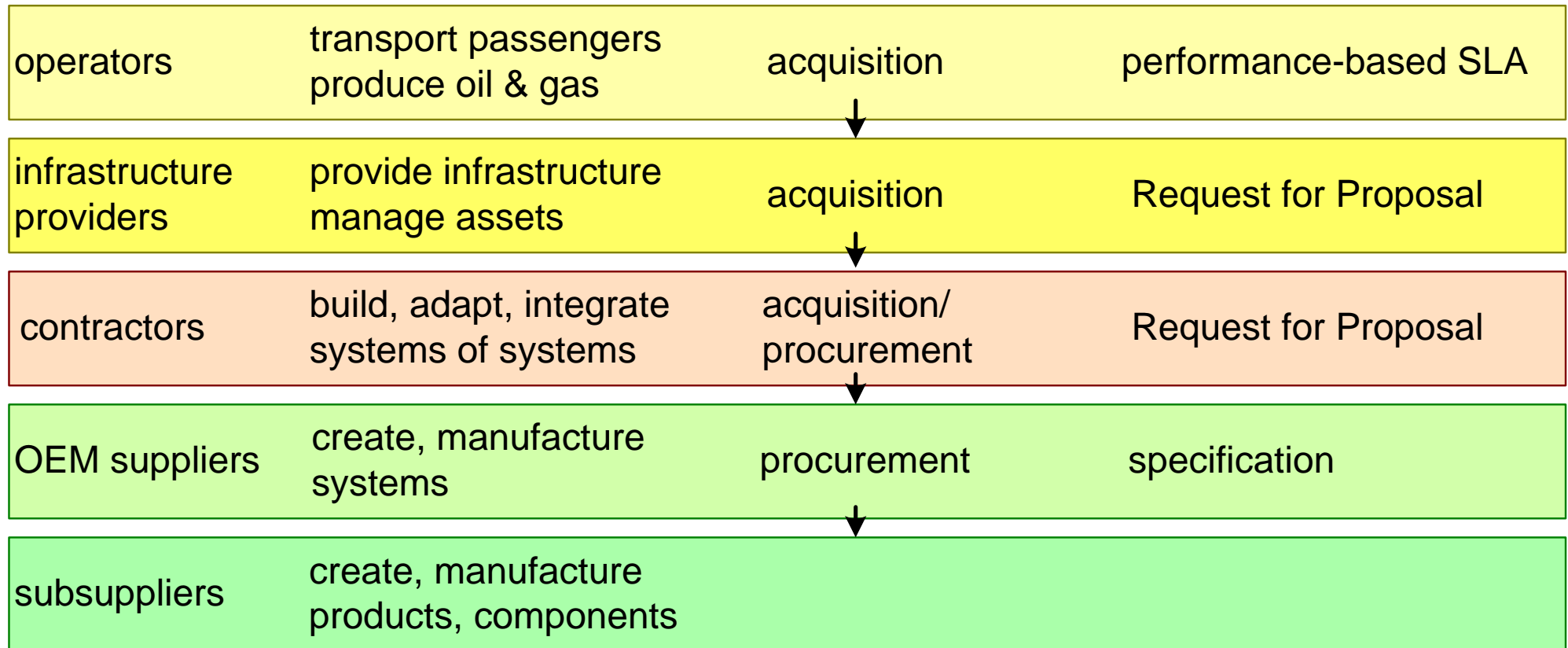
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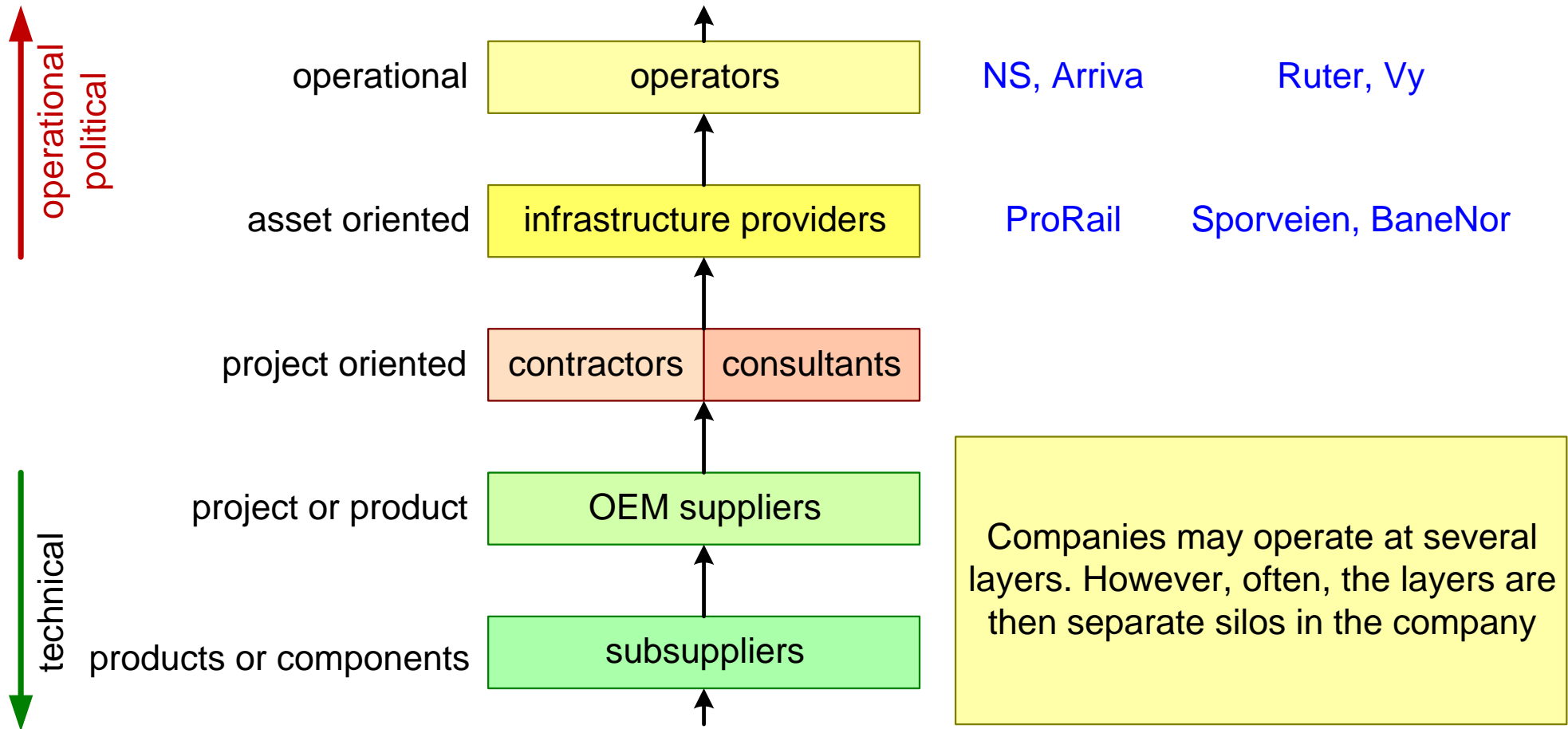
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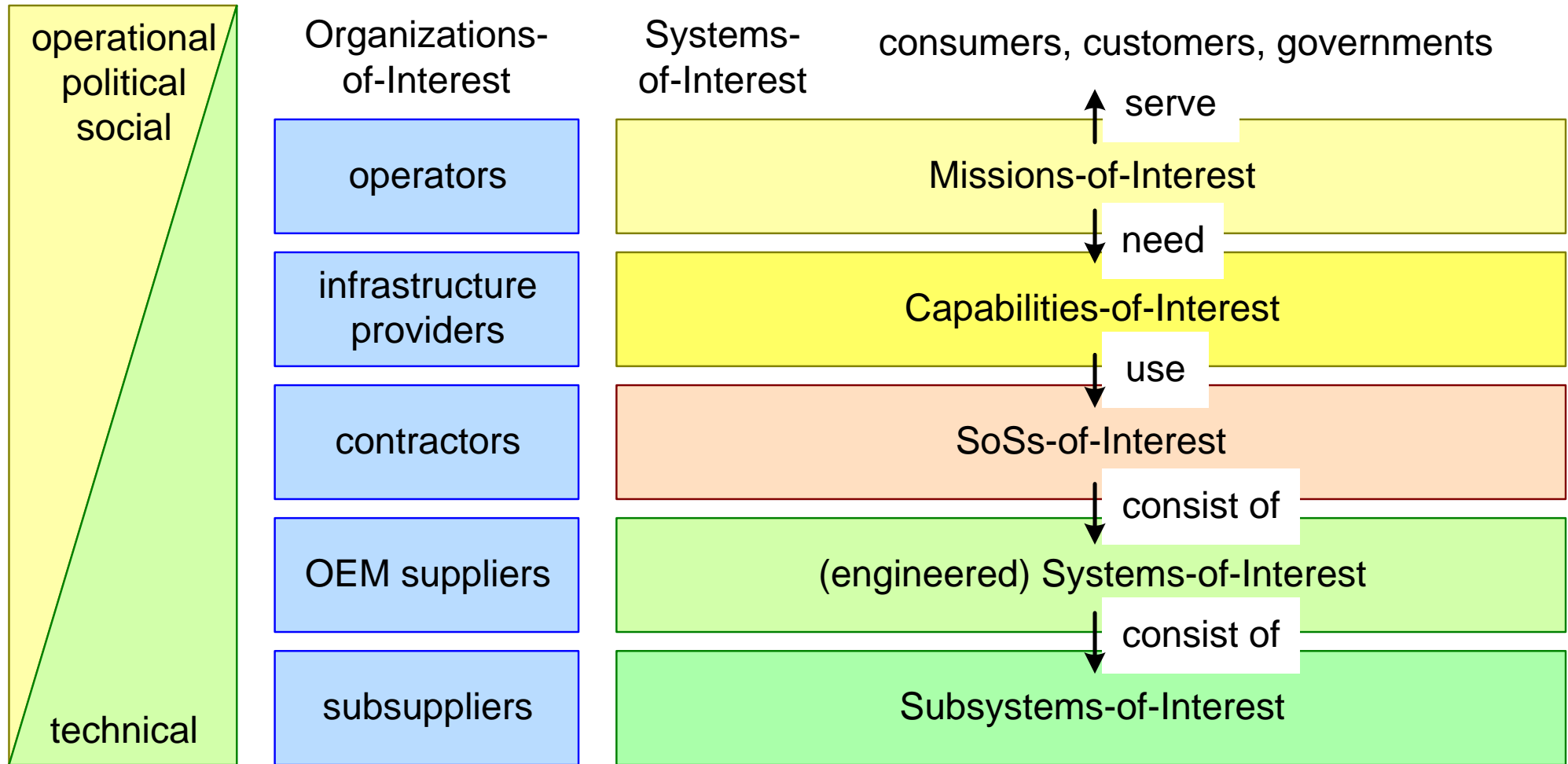
# Characterization of Domain Layers



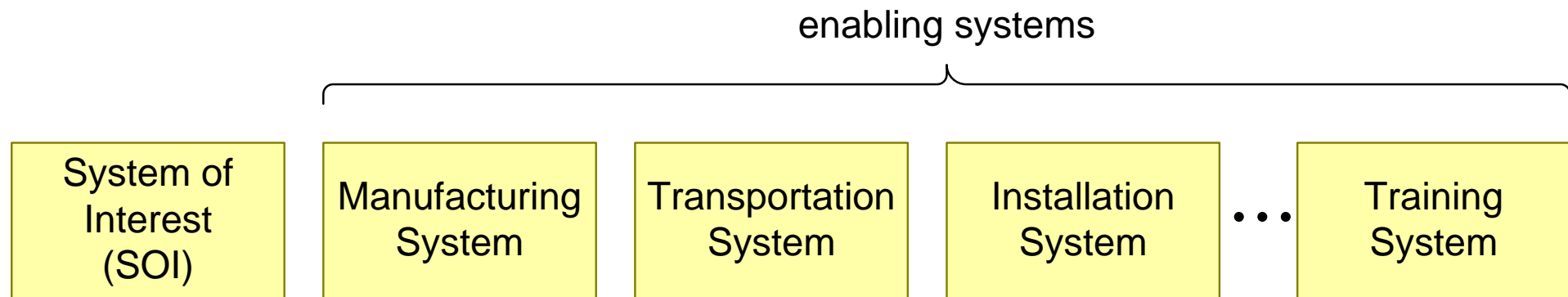
# Positions in the Value Network Differ in Nature



# Perspective Changes from Layer to Layer

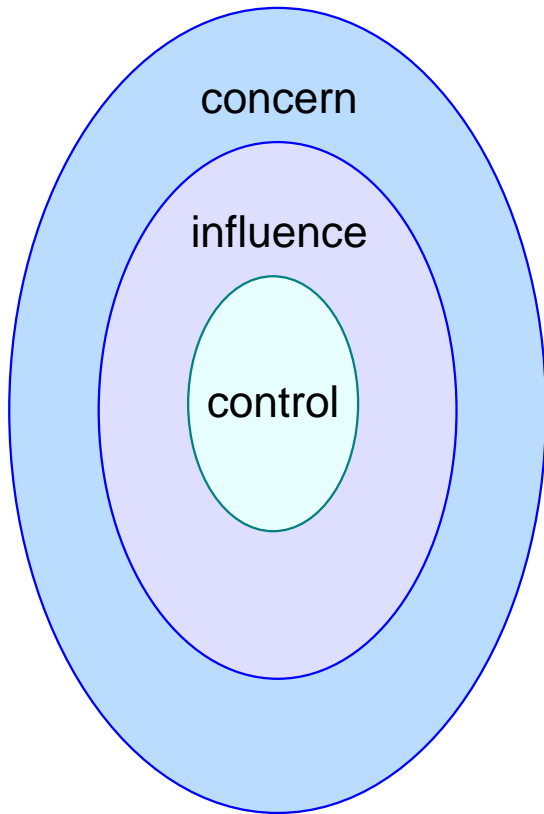


# Development Has to Develop the Sol and the Enabling Systems

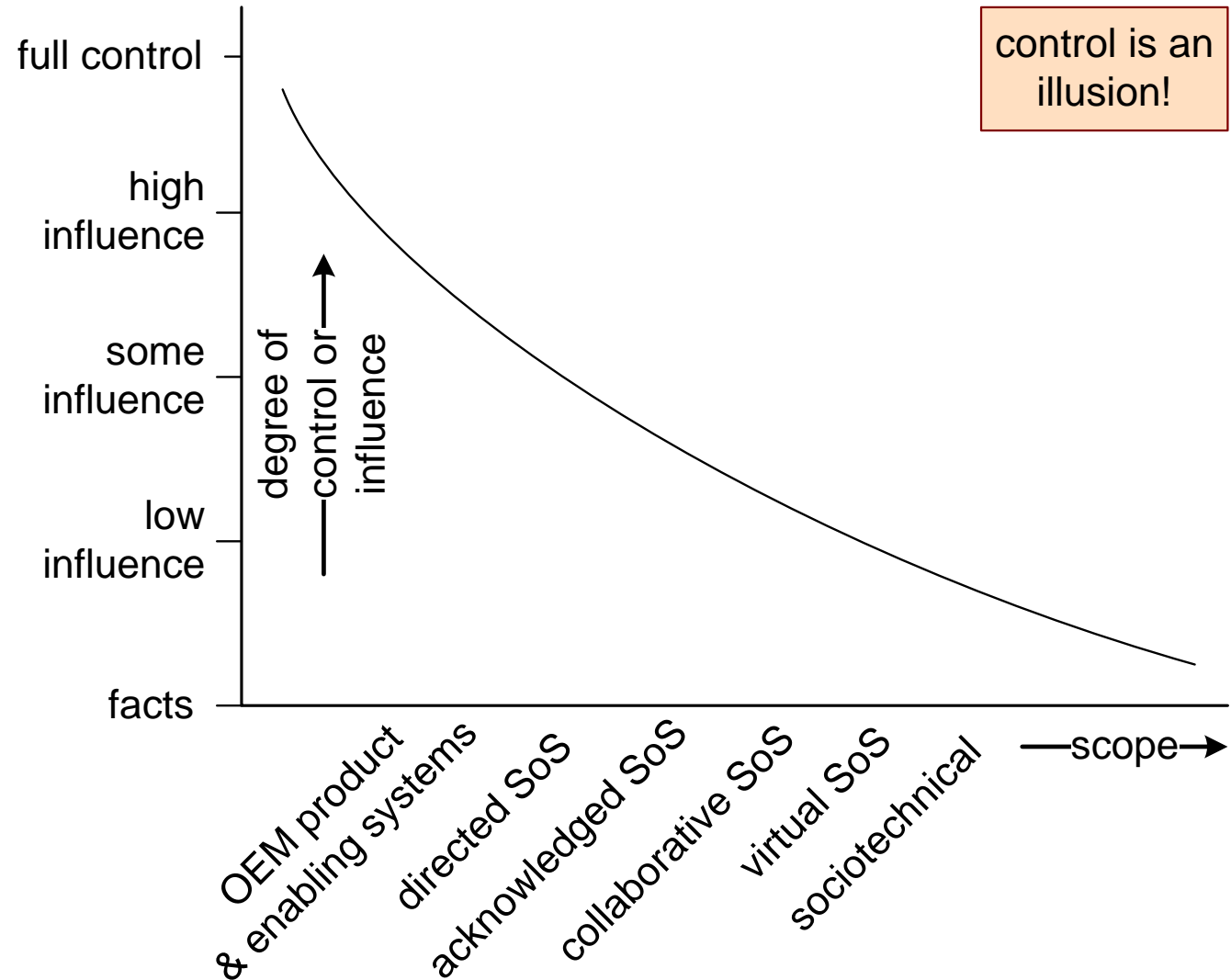


Development and Engineering must develop the System of Interest and all Enabling Systems

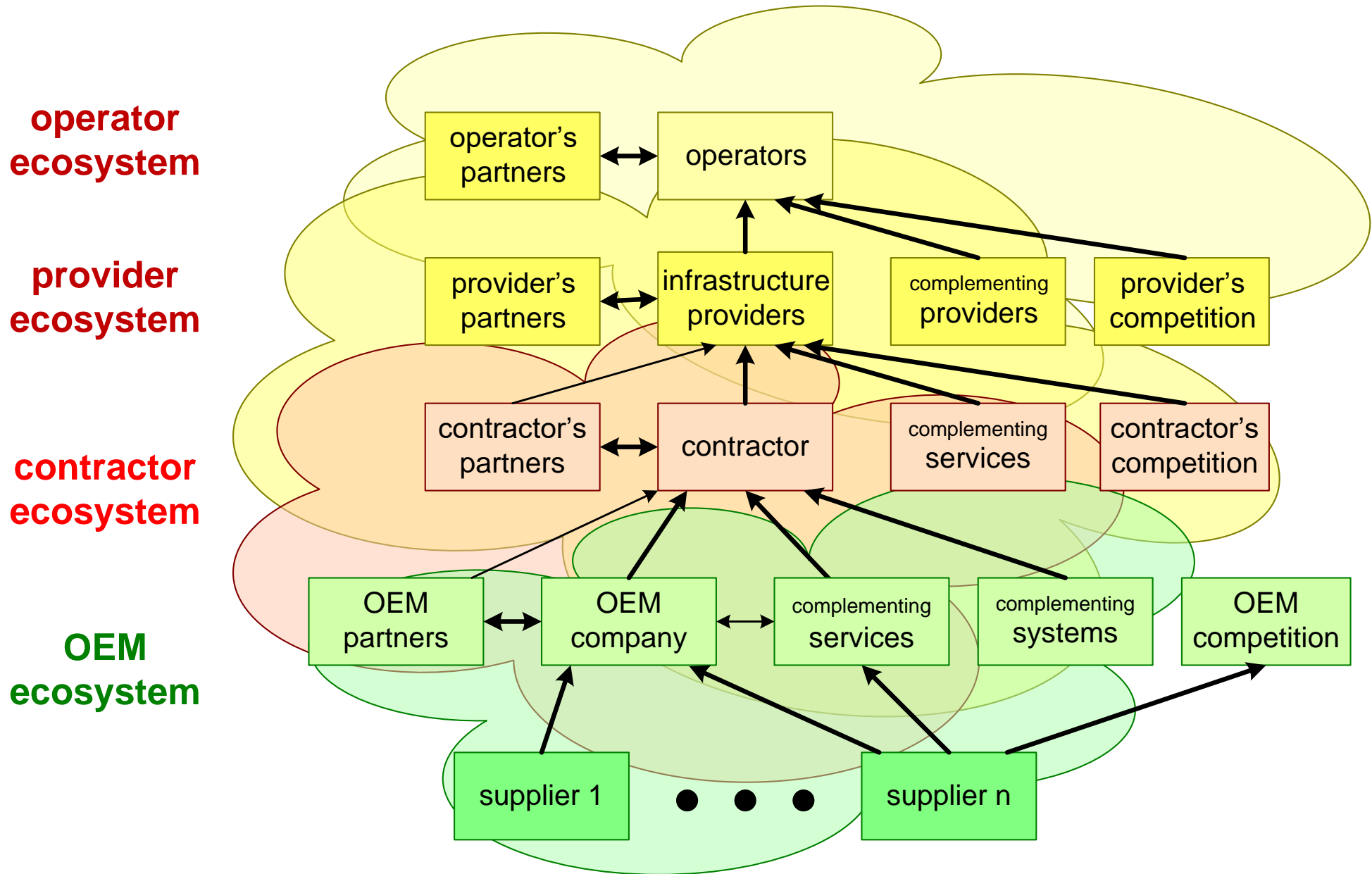
# The Level of Influence Decreases with Scope



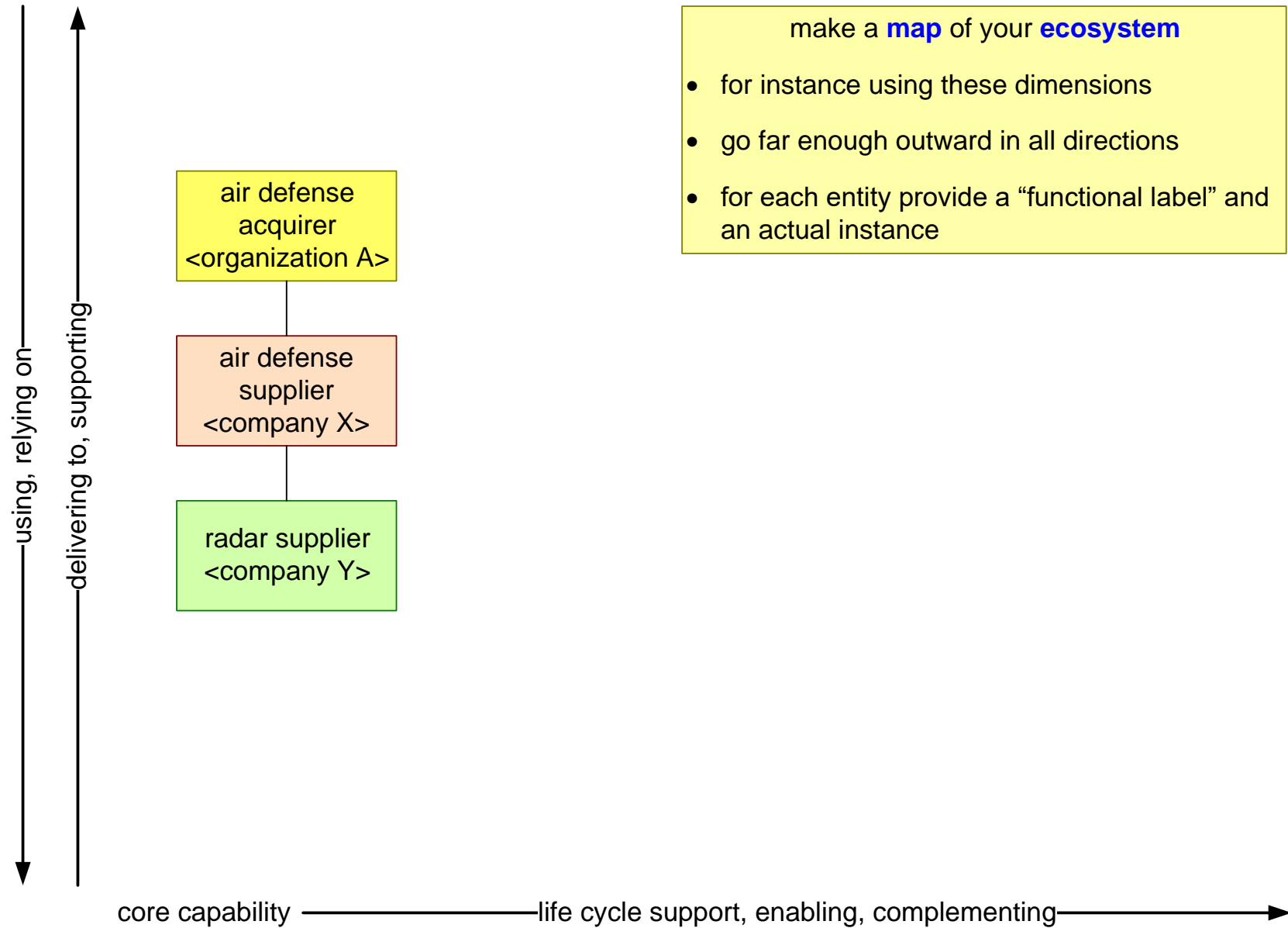
framework after  
"The 7 Habits of Highly Effective People.",  
Stephen Covey



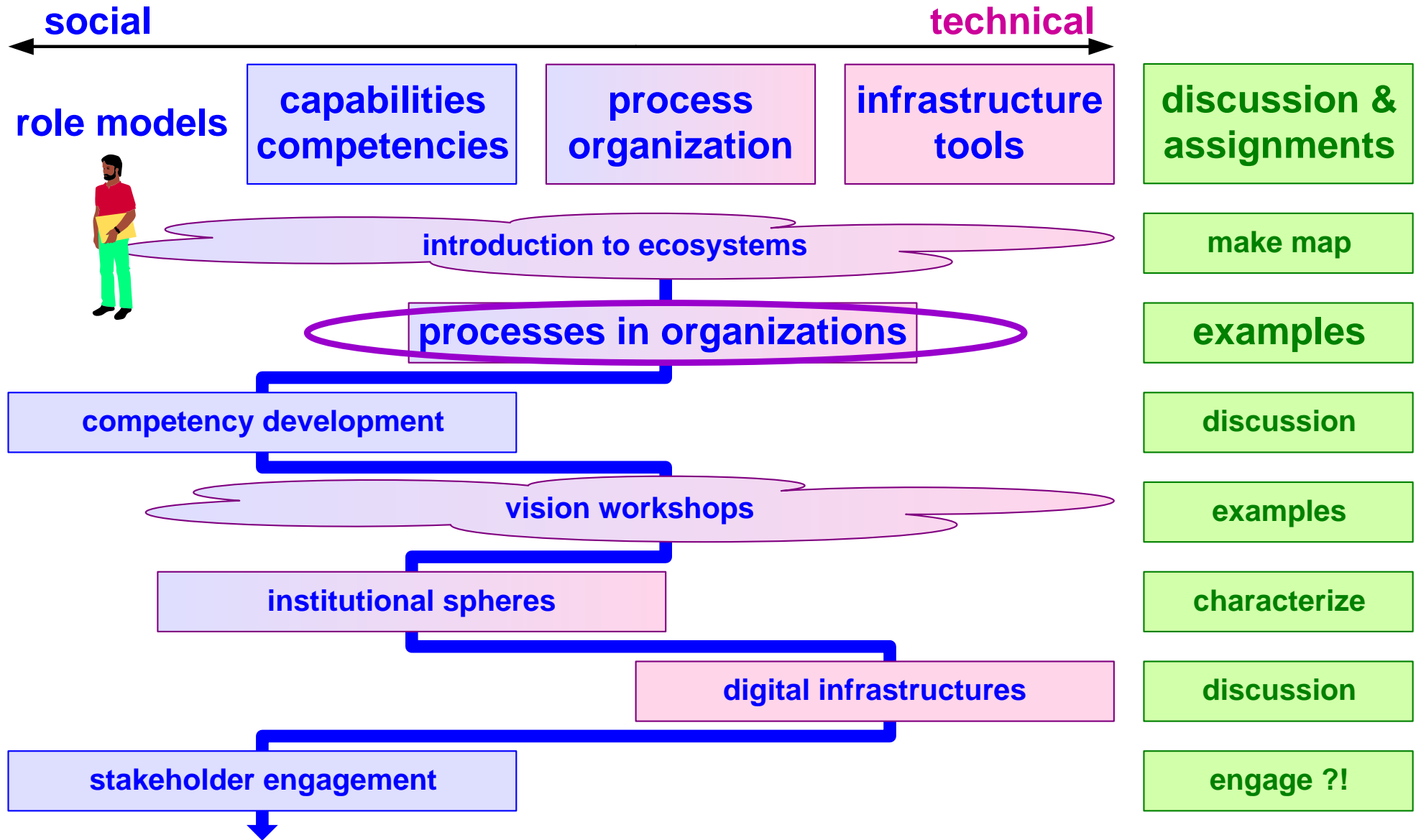
# Each System is Part of its Ecosystem



# Brainstorm



# Processes Differ over Layers



# Nugget: What is a Process?

by *Gerrit Muller* USN-SE

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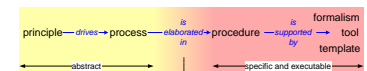
## Abstract

This nugget is explaining the concept of a "process", since this word is heavily overloaded.

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**Purpose** What is to be achieved and why

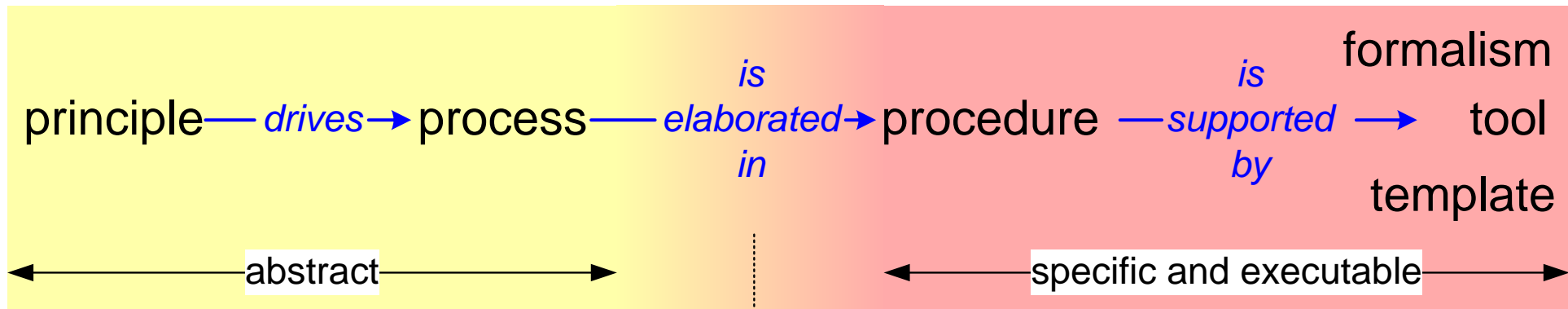
**Structure** How will the goal be achieved

**Rationale** What is the reasoning behind this process

**Roles** What roles are present, what responsibilities are associated, what incentives are present, what are the criteria for these roles

**Ordering** What phasing or sequence is applied

# A process within an abstraction hierarchy



# Nugget Process Decomposition of a Business

by *Gerrit Muller* USN-SE

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## Abstract

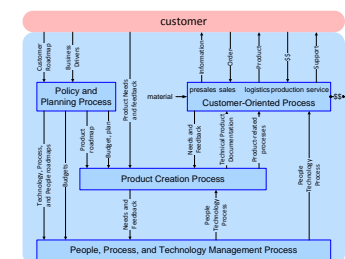
This article positions the system architecture process in a wider business scope. This positioning is intended to help understanding the processes in which the system architect (or team of system architects) is involved.

It focuses on an organization that creates and builds systems consisting of hardware and software. Although other product areas such as solution providers, services, courseware, et cetera also need system architects, the process structure will deviate from the structure as presented here.

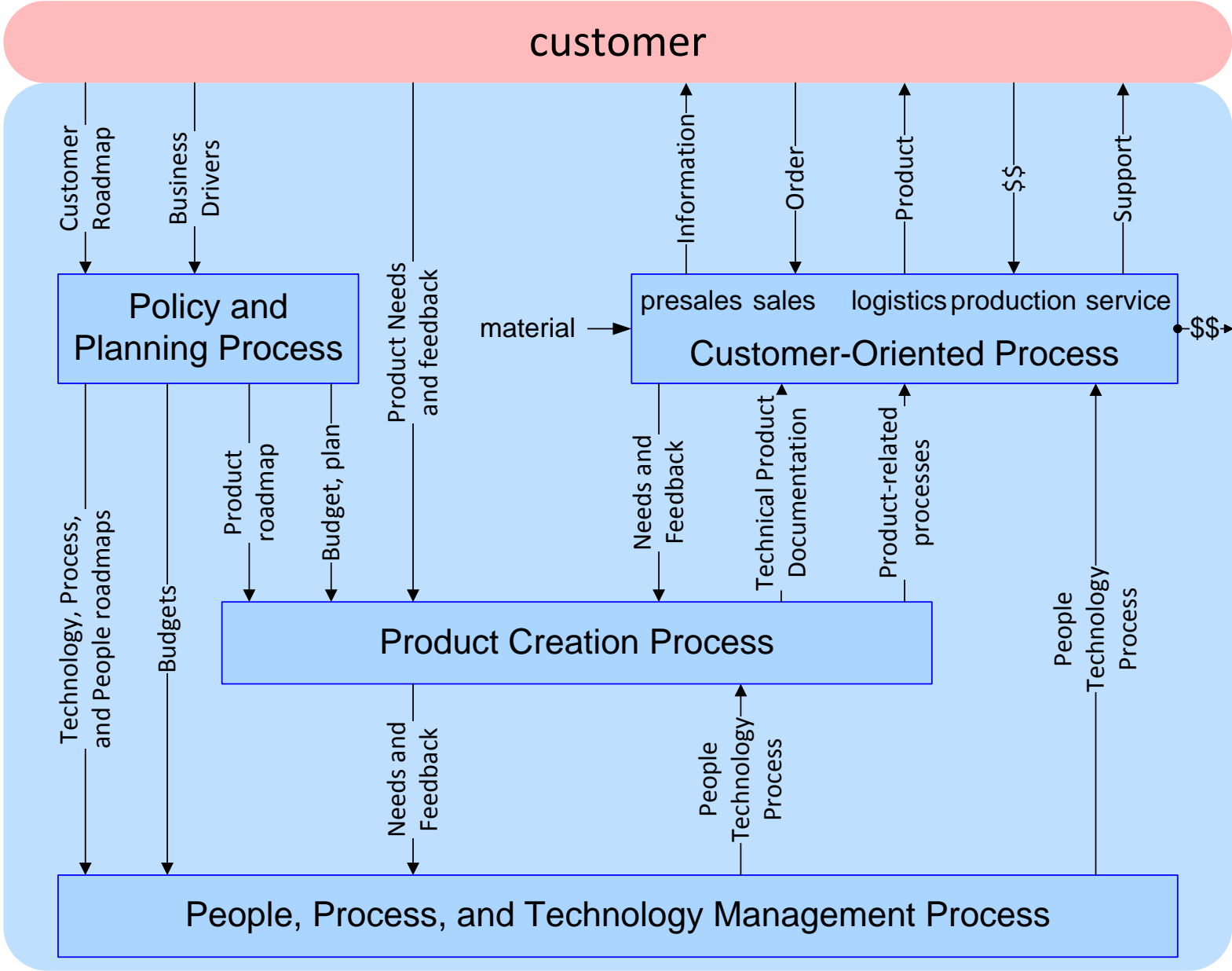
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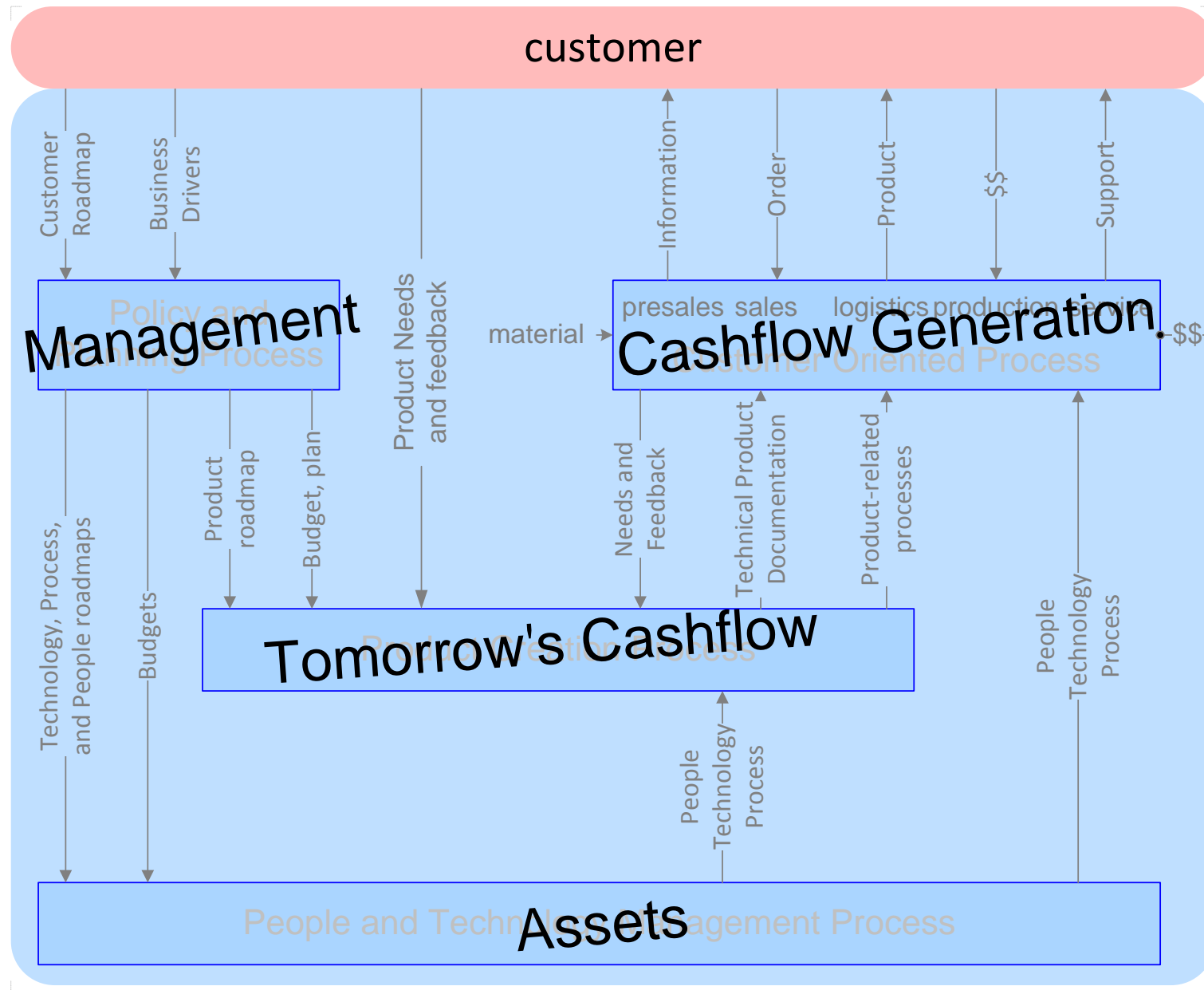
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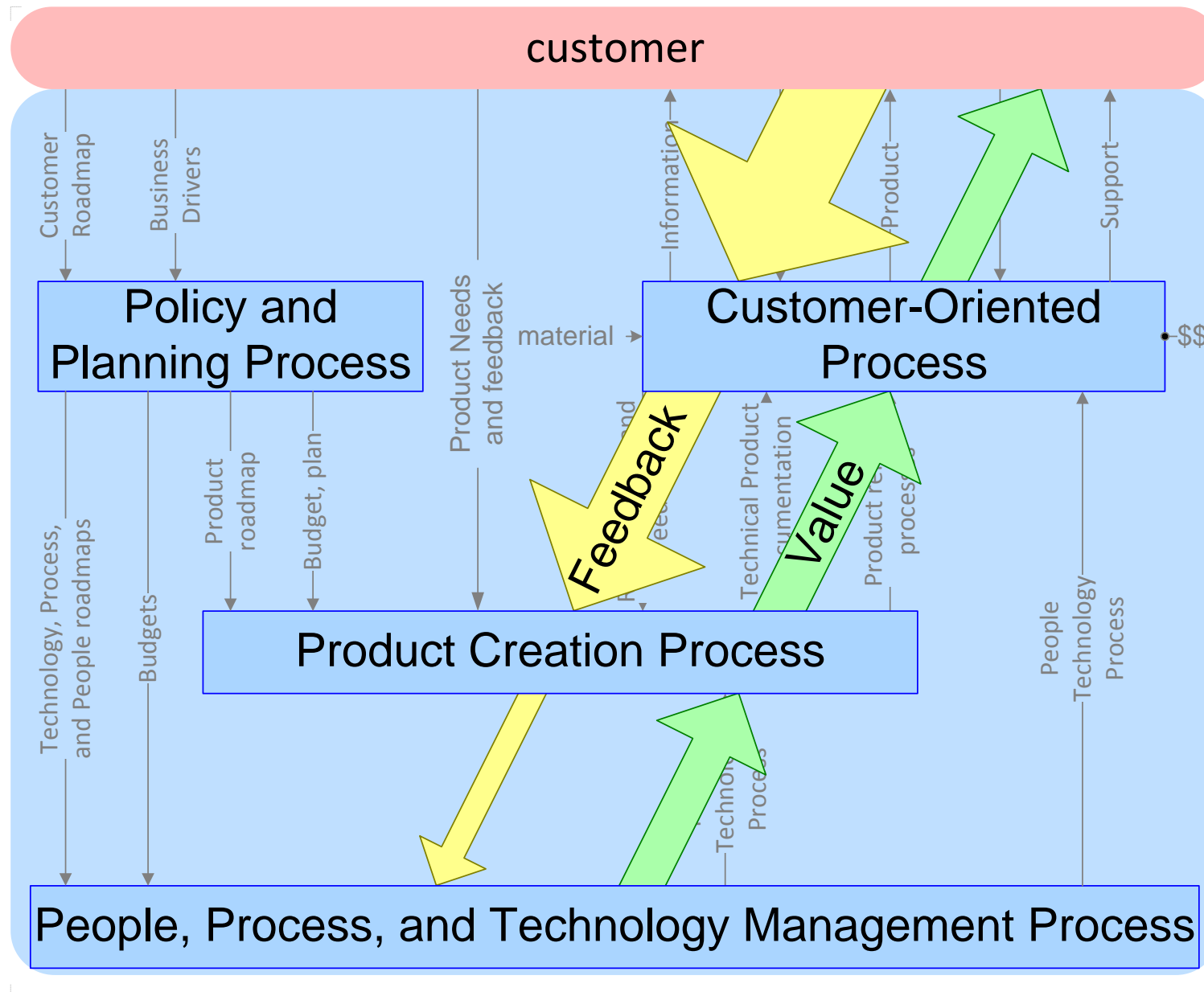
# Simplified Decomposition of the Business



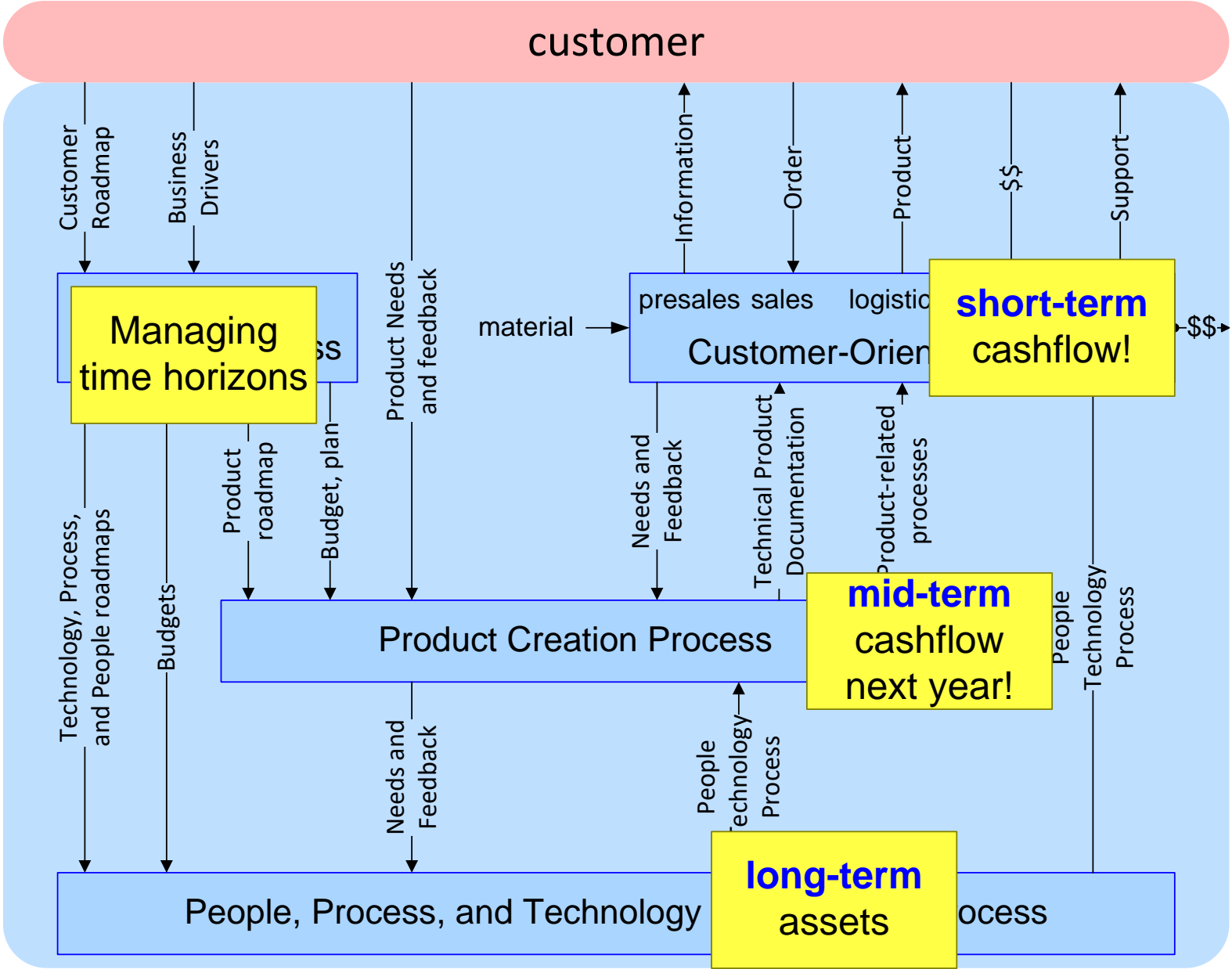
# Financial Characterization of Decomposition



# The Value Chain and the Opposite Feedback Flow



# Tensions between Short and Long Term



# Process Decomposition of an Acquisition Organization

by *Gerrit Muller* USN-SE

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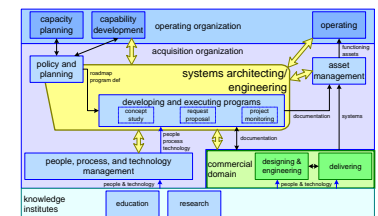
## Abstract

This article positions the system architecture process in an acquisition organization. The positioning helps to understand the processes in which the system architect (or team of system architects) is involved. It focuses on an organization that acquires systems that help to realize capabilities.

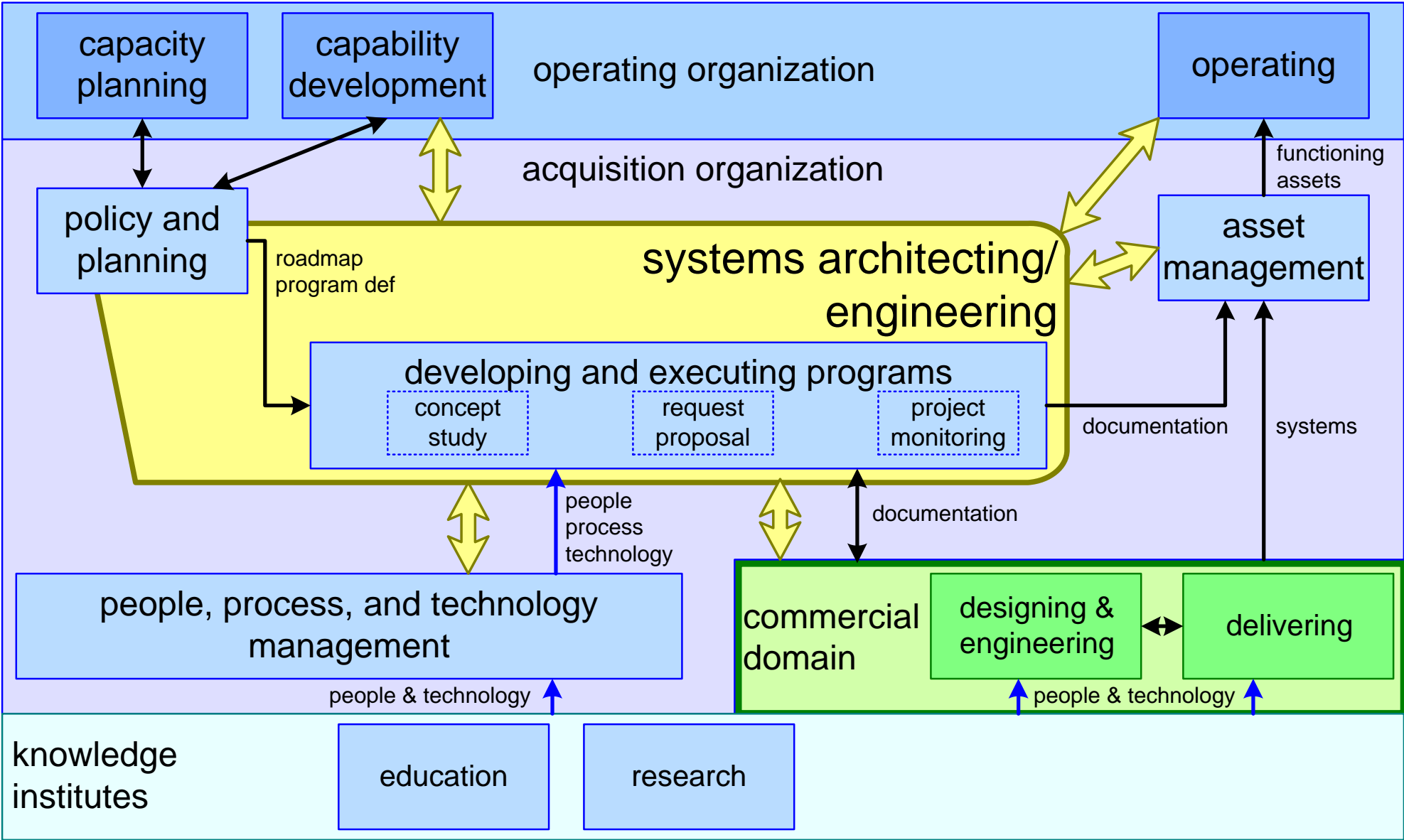
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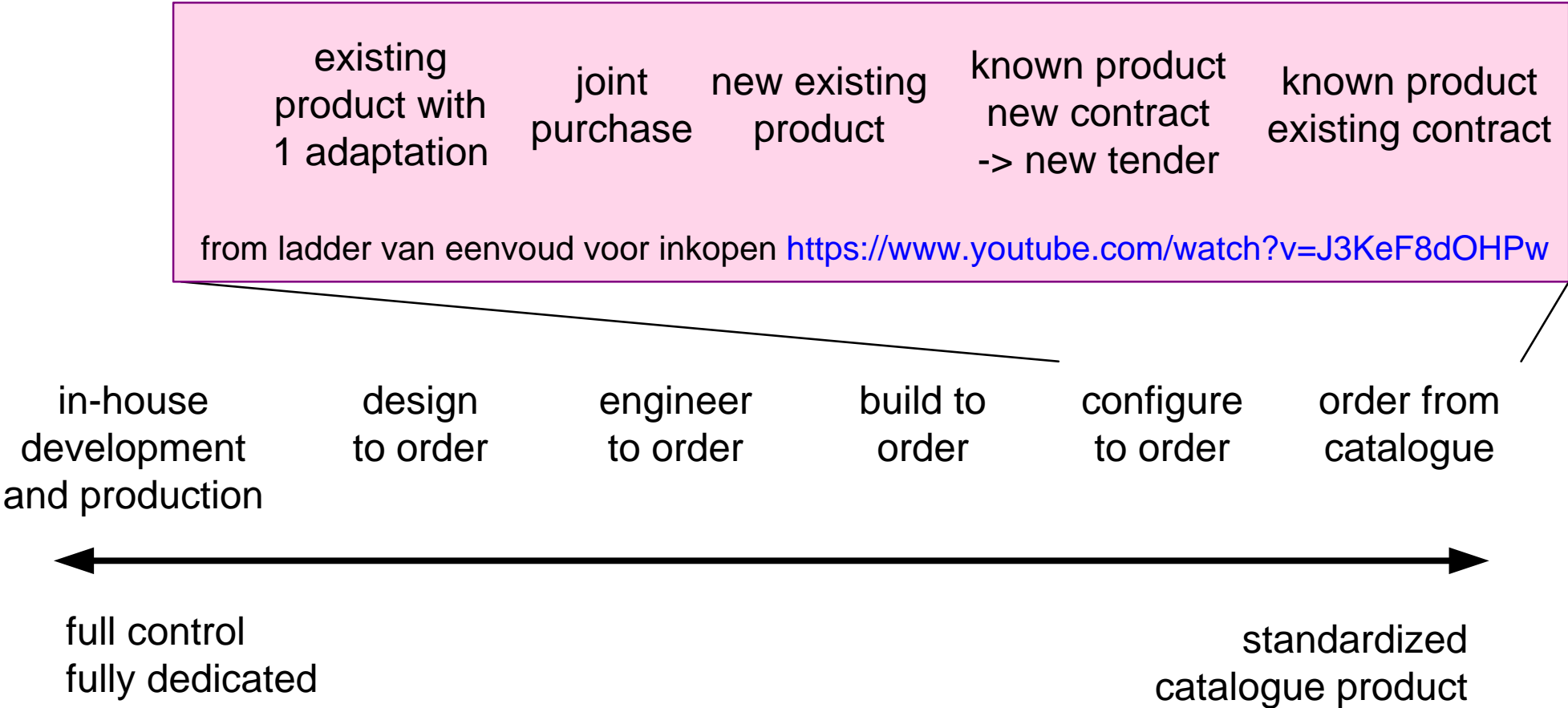
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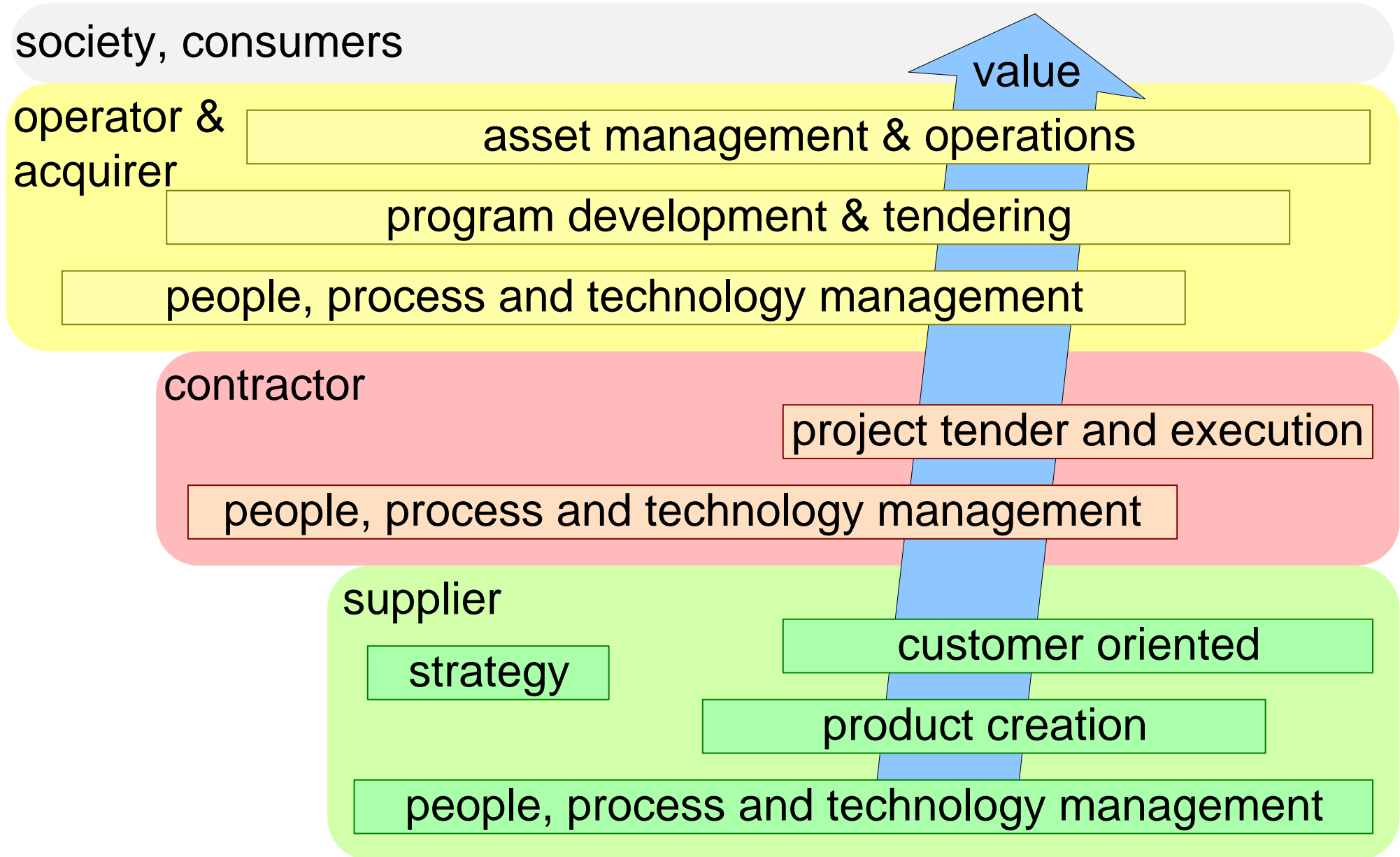
# Simplified Decomposition of an Acquisition Organization



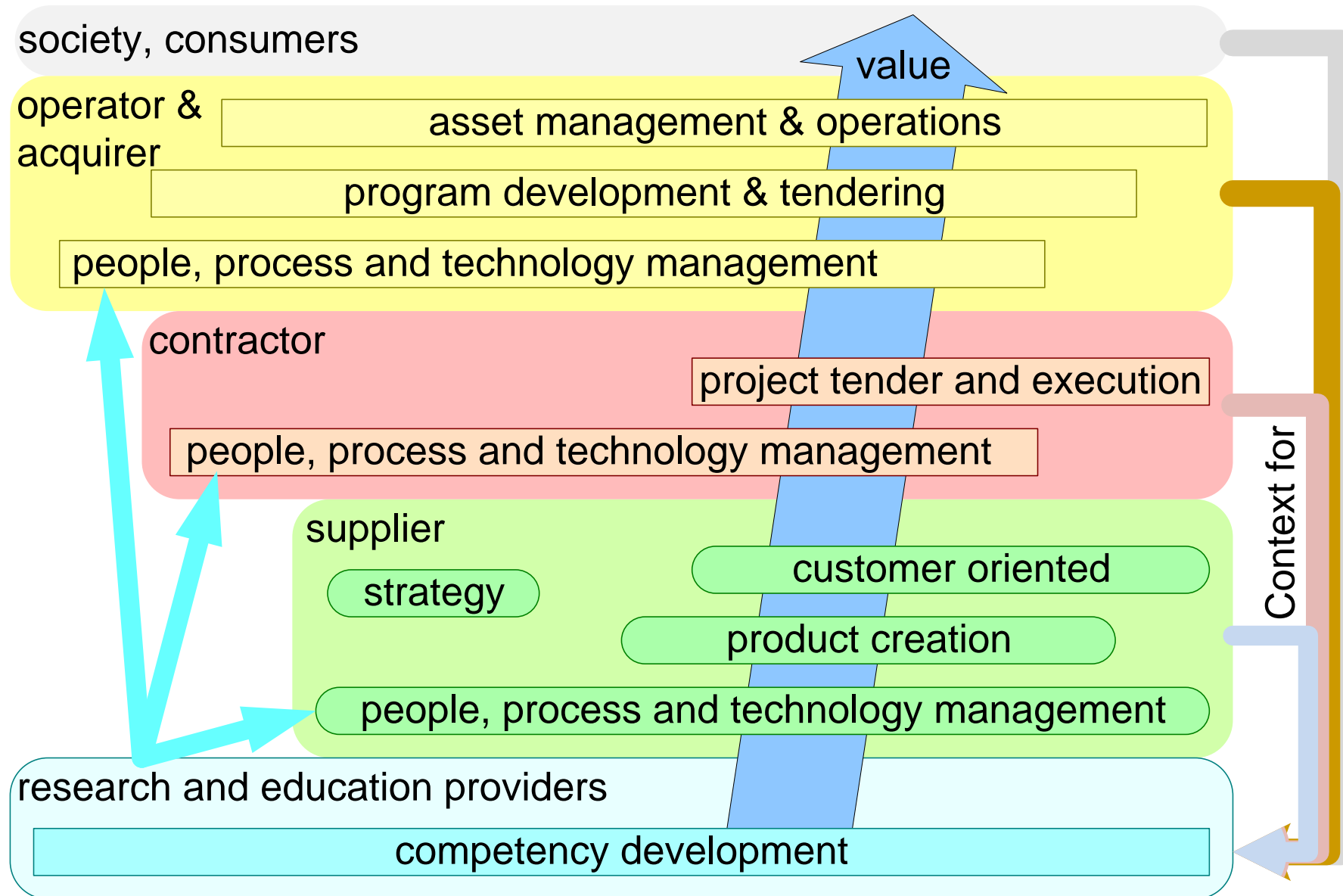
# Buy as Simple as Possible



# The Value Chain across the Layers



# Research and Education as Long-Long-Term Process



# Process Decomposition of a Contractor Organization

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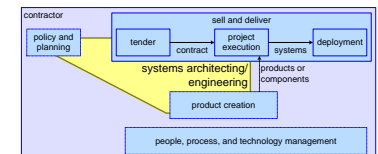
## Abstract

This presentation shows how the process in a contractor organization functions.

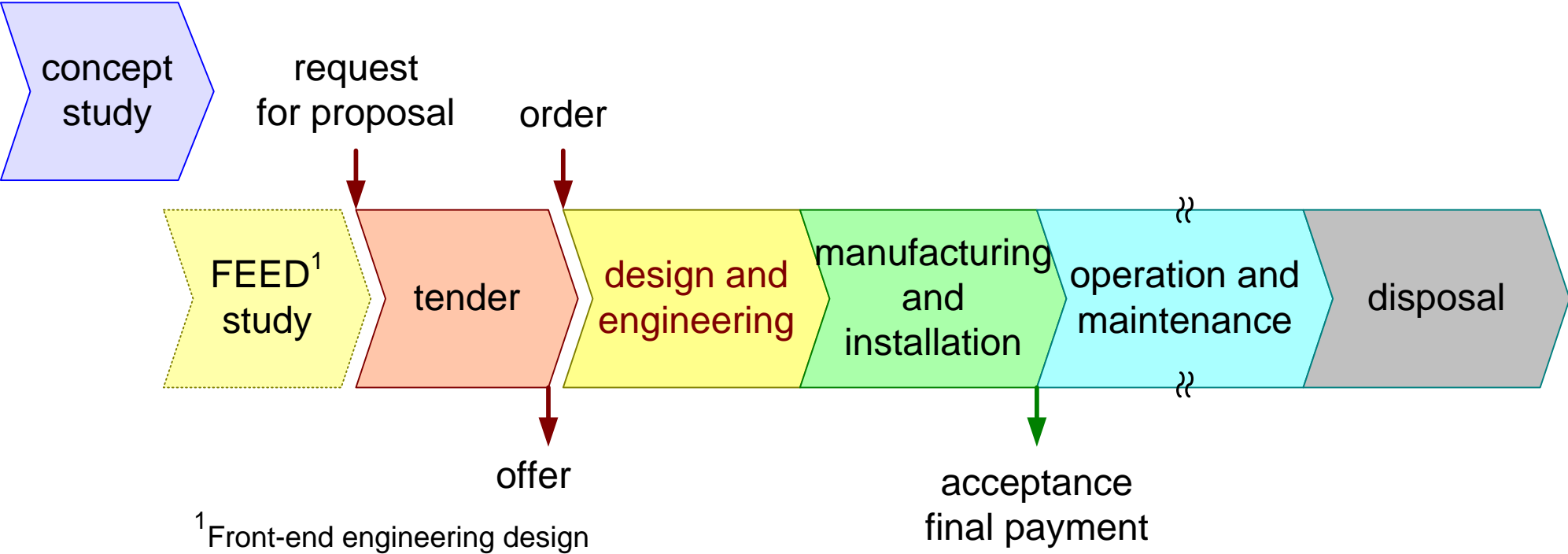
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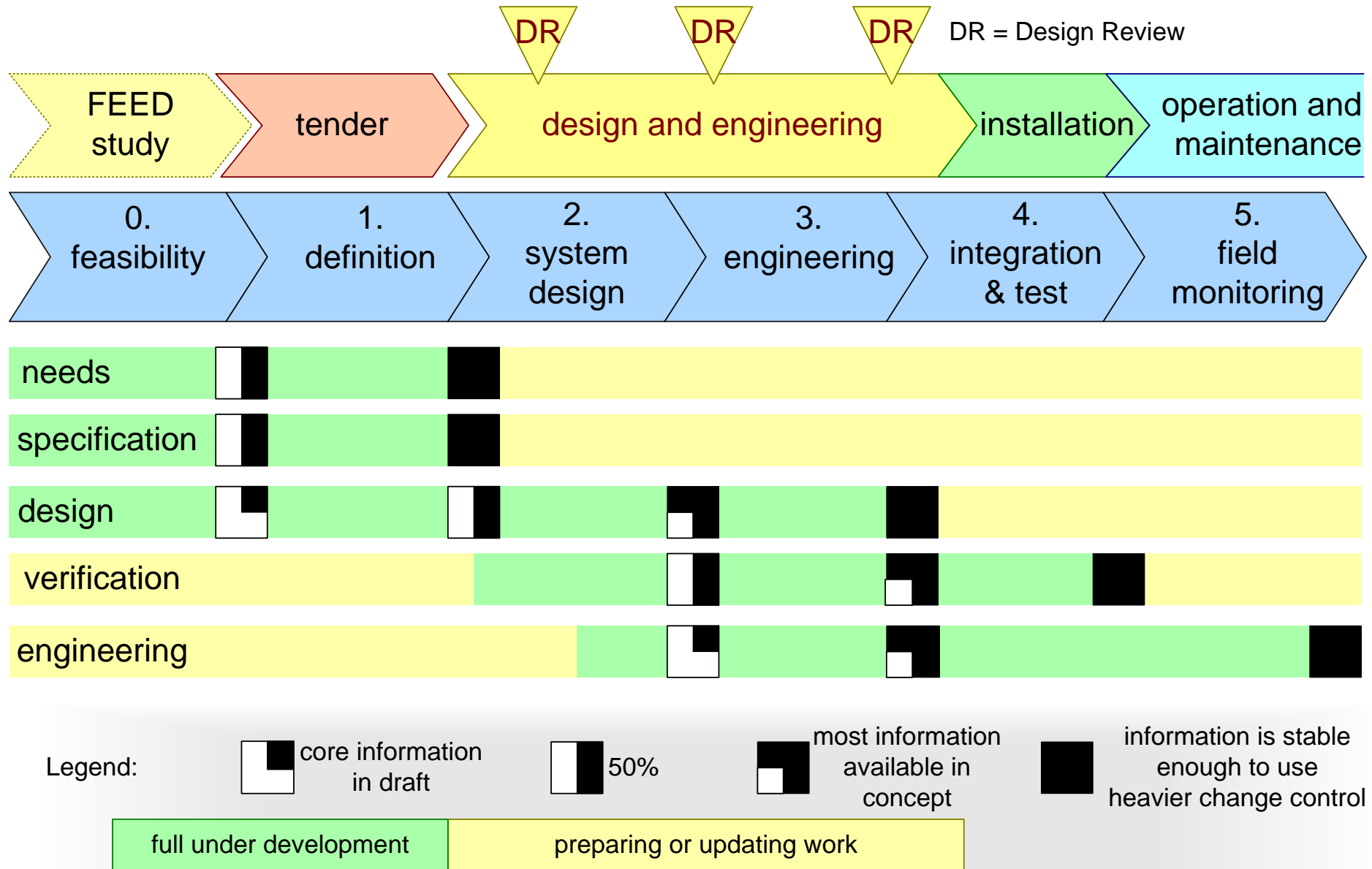
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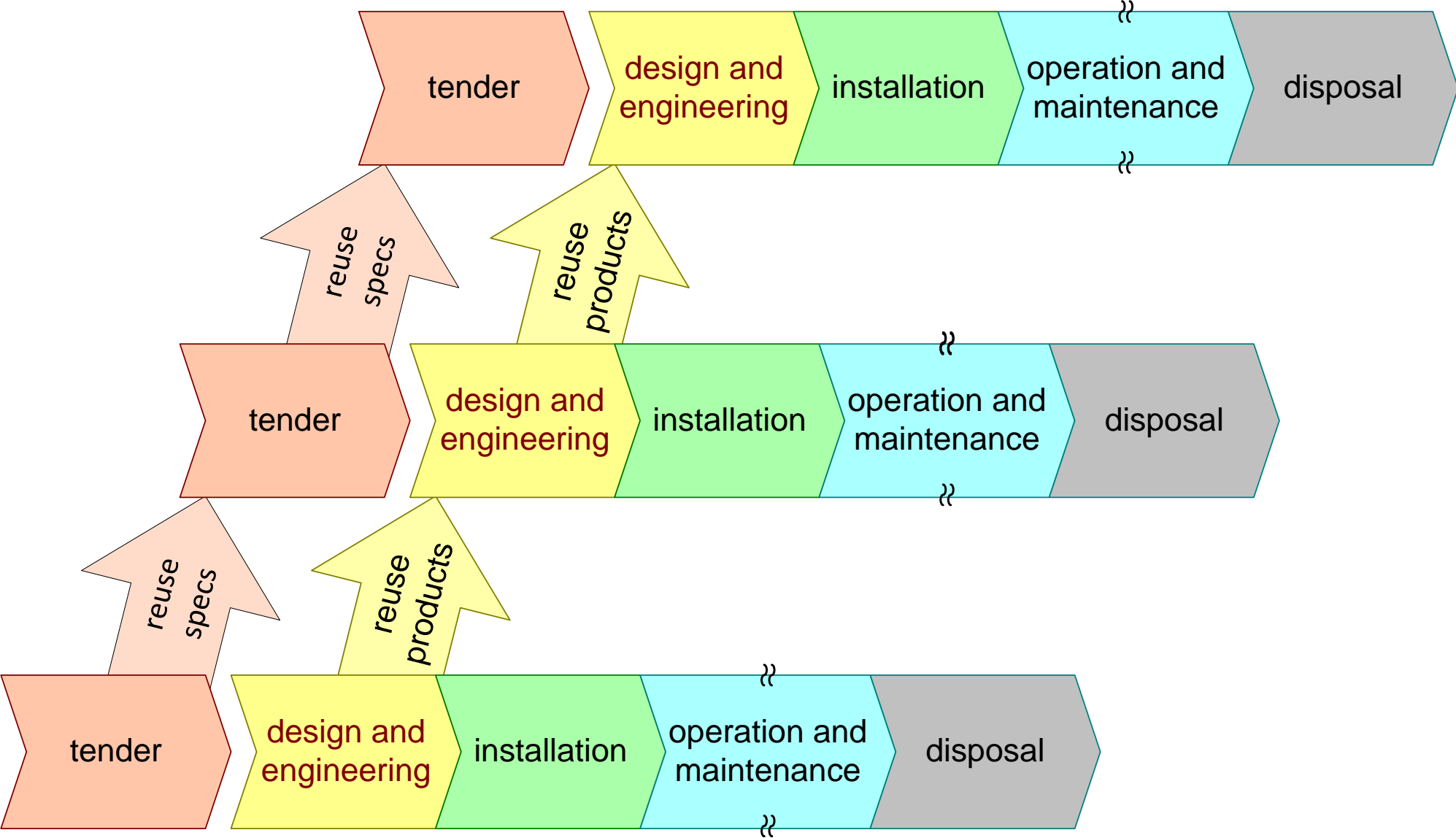
# Project Life Cycle



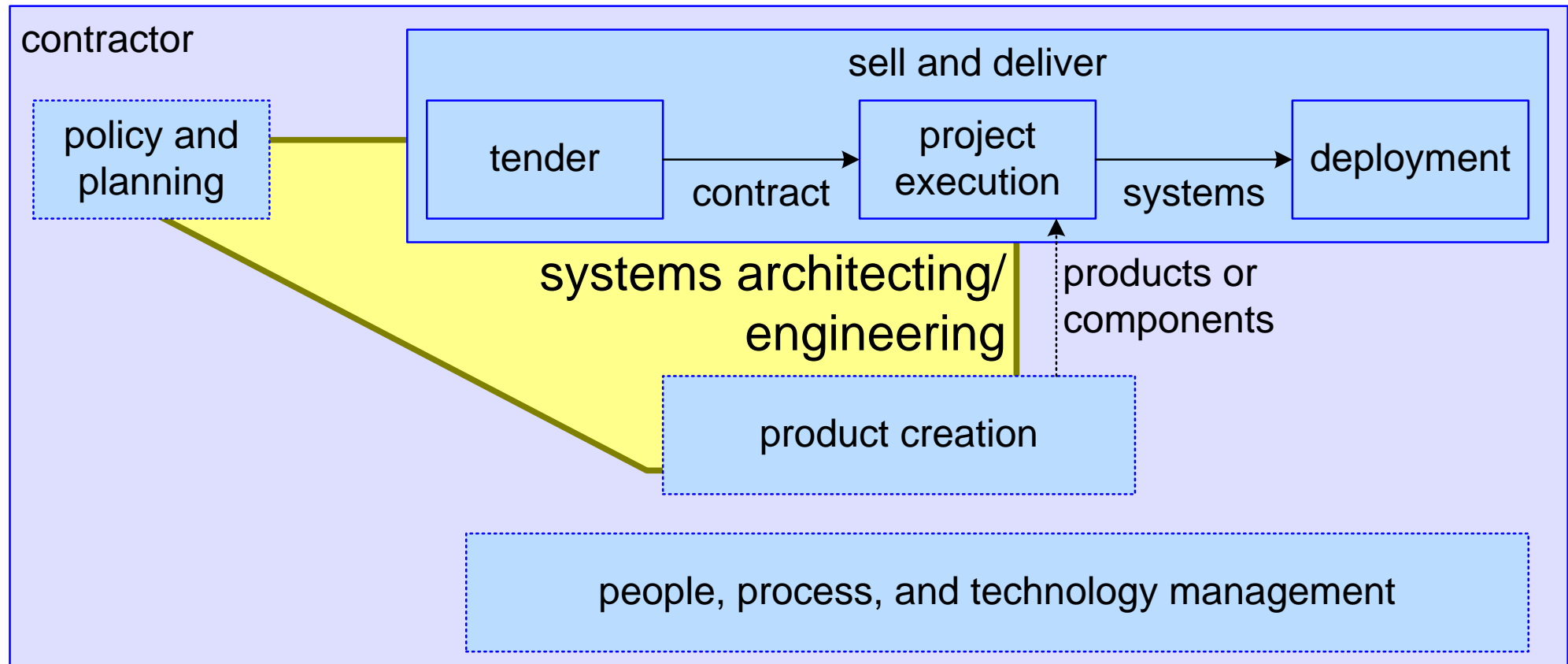
# Phased Project Approach



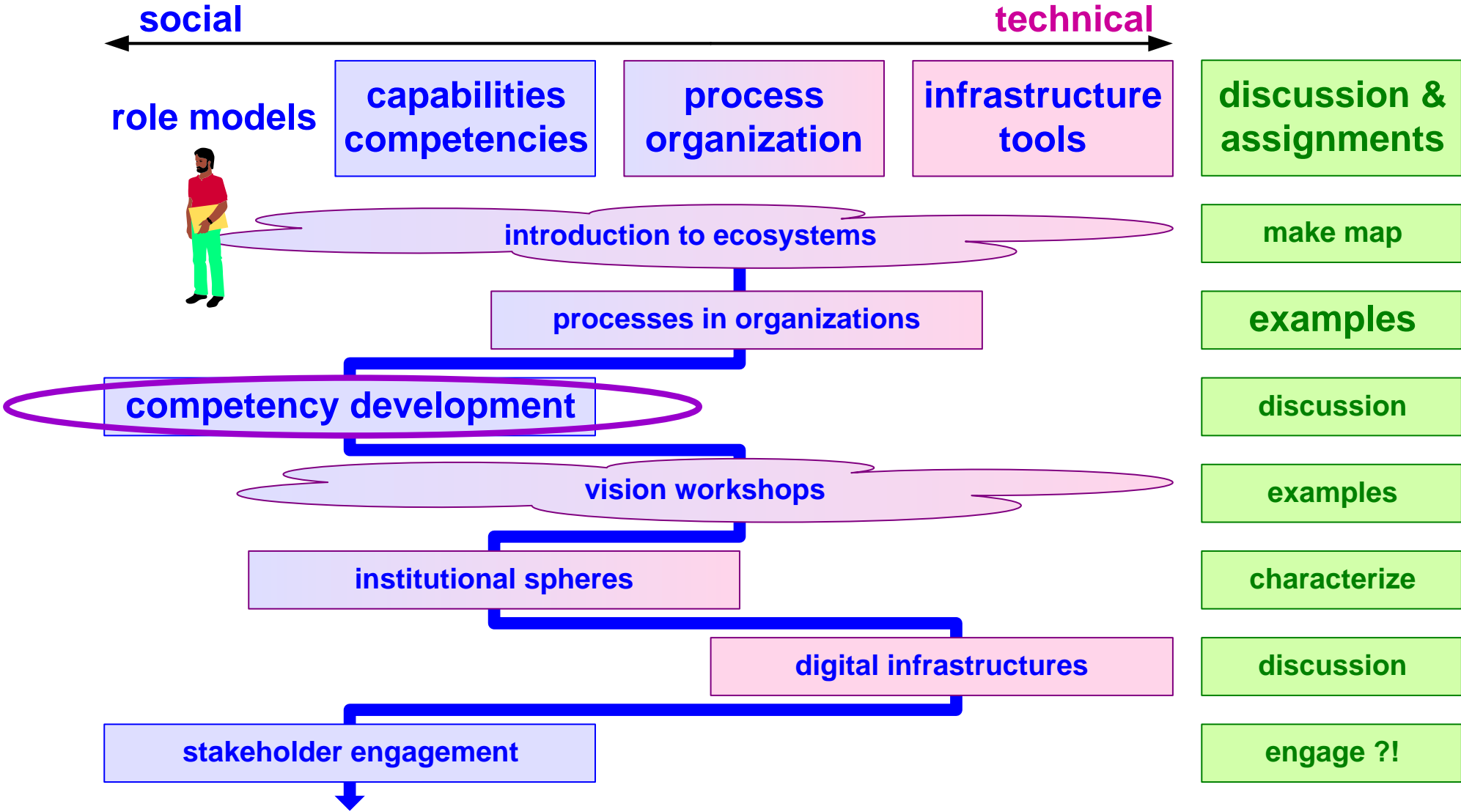
# How Projects Build on previous Projects



# Simplified process diagram for project business



# Competency Development



# Developing Ecosystem Competences

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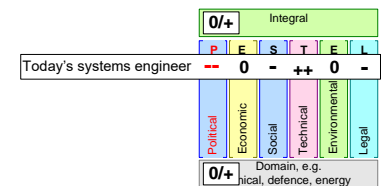
## Abstract

This presentation shows what competencies will help across ecosystem organizations.

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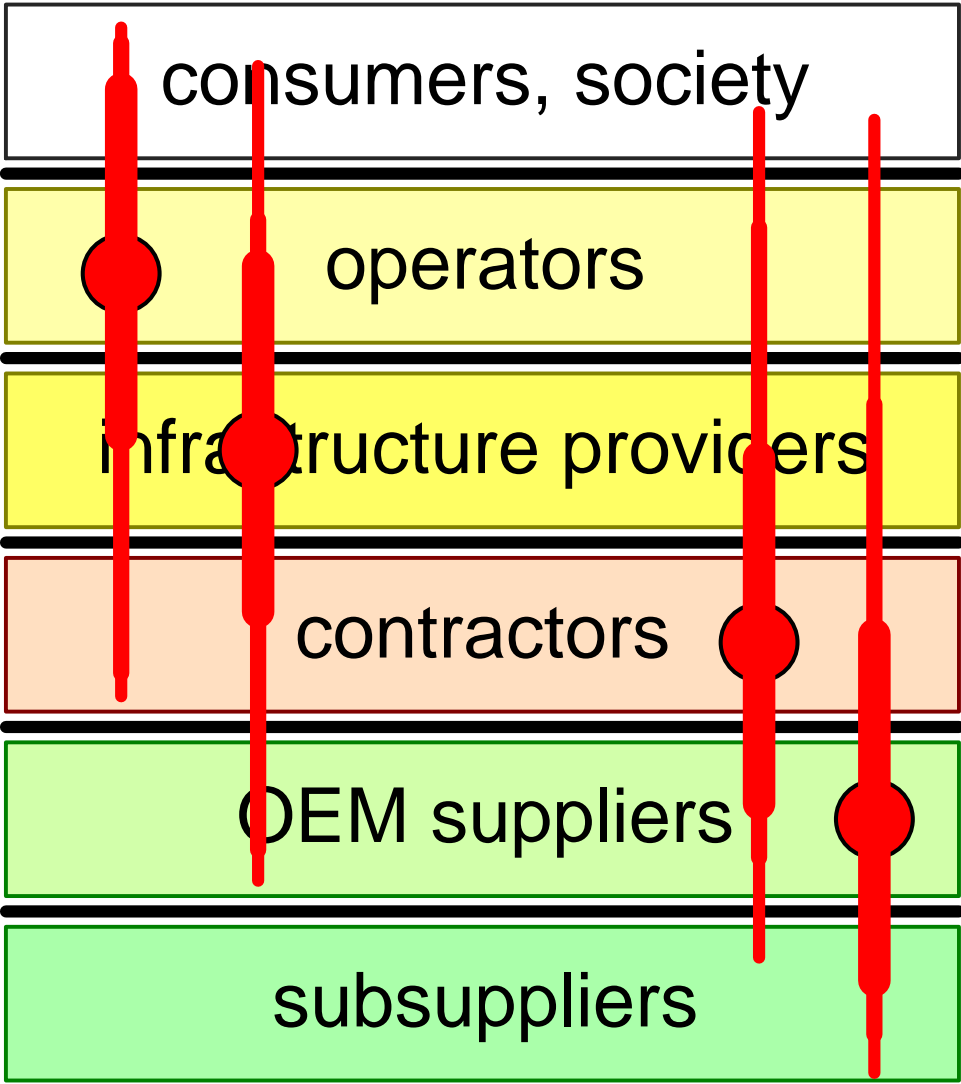
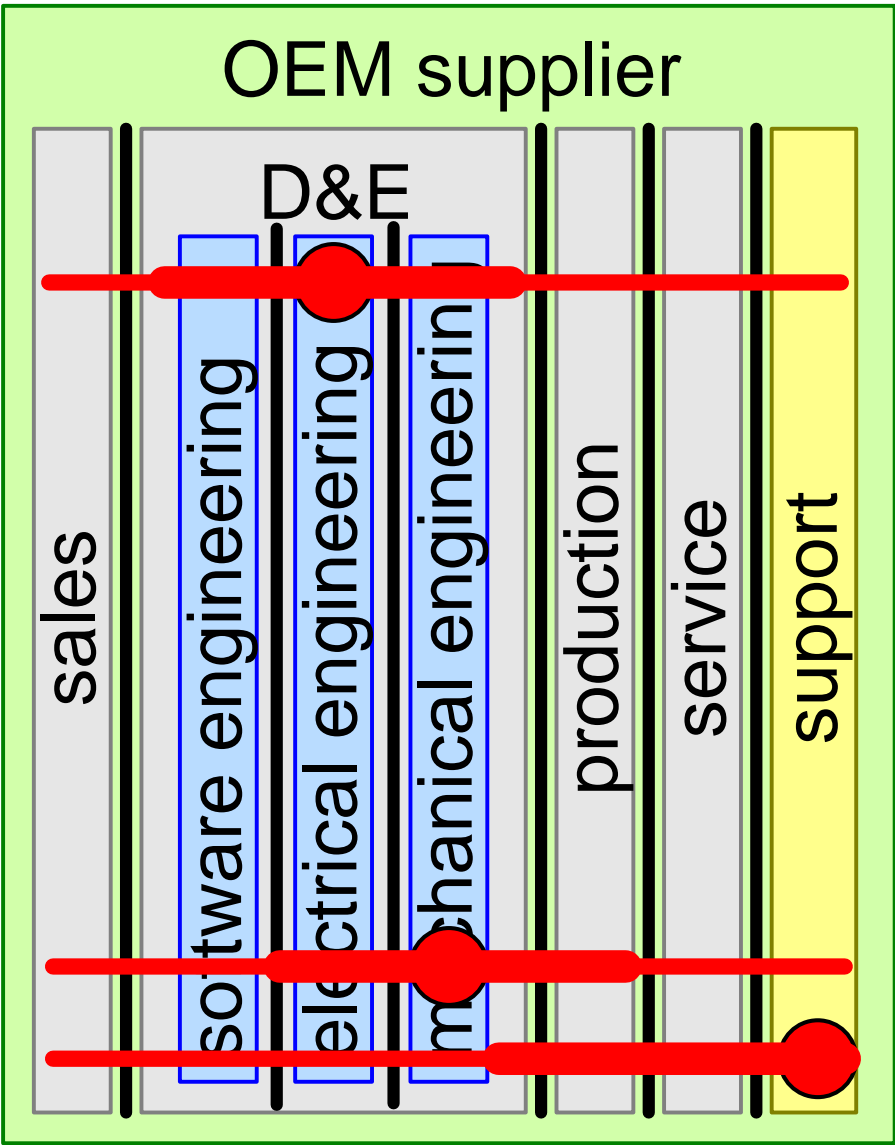
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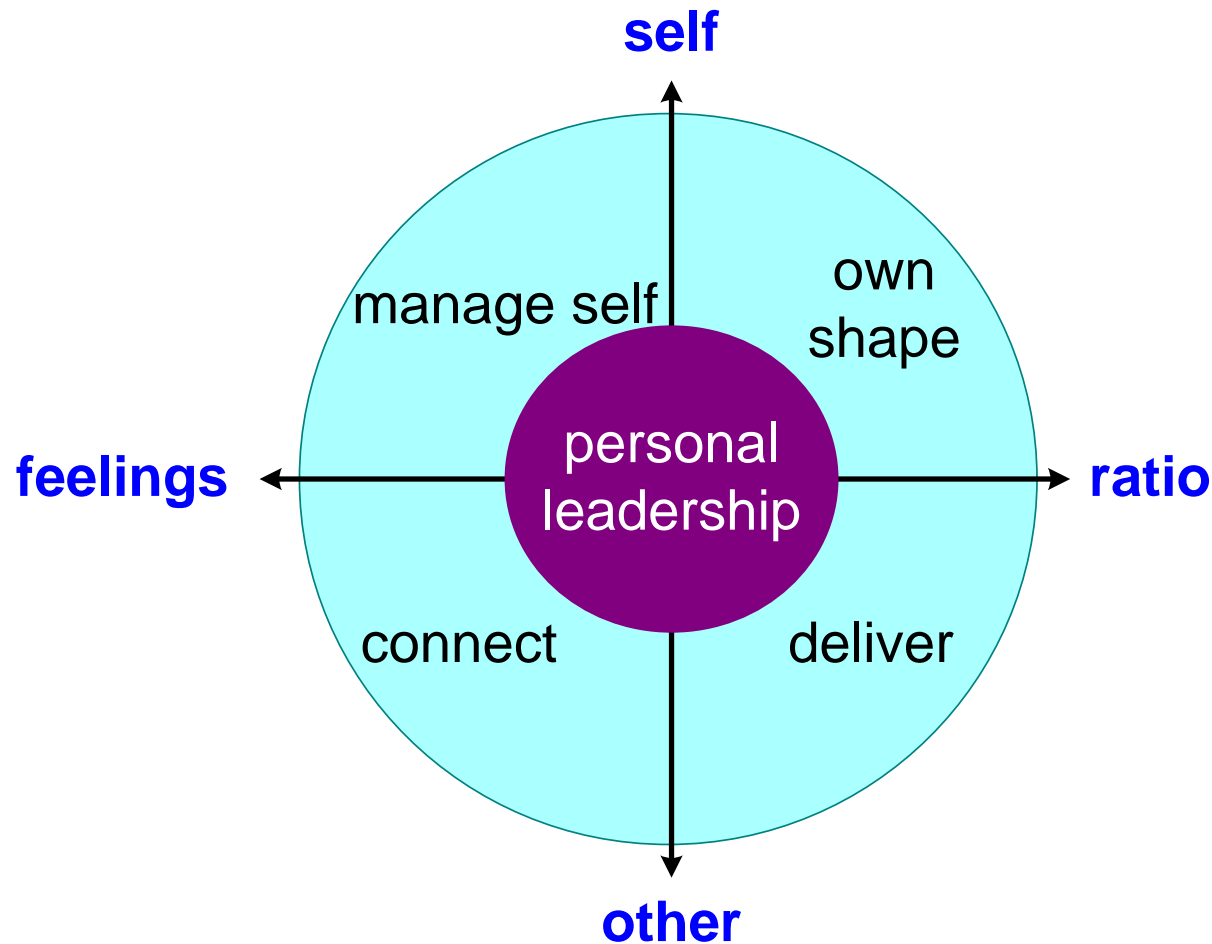
# Orchestrating Content and Stakeholders Across Organizations

- **Orchestrating** is the competence to **proactively nudge** involved **parties** towards a **fitting solution**.
- Orchestrating requires the abilities:
  - to relate with a wide **variety of stakeholders**, to understand their **interests** and **concerns**, to **connect** with them such that they can **influence** them
  - to **understand** the **problem and solution space** sufficiently
  - coping with **ecosystem complexity**, **uncertainties** and **unknowns**, and helping stakeholders to navigate them
- Orchestrating requires the attitudes:
  - to see the **big picture**, while still have an eye for the devilish details
  - to **own**
  - to be **pro-active**
  - to be **genuinely interested** in stakeholders

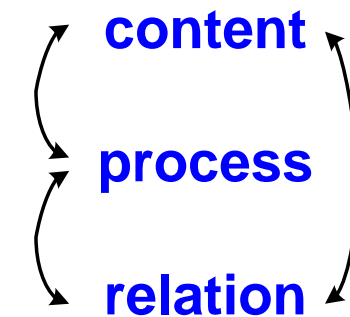
# Most Organizations Need Orchestrators



# Orchestration Builds on Leadership, as We Teach It

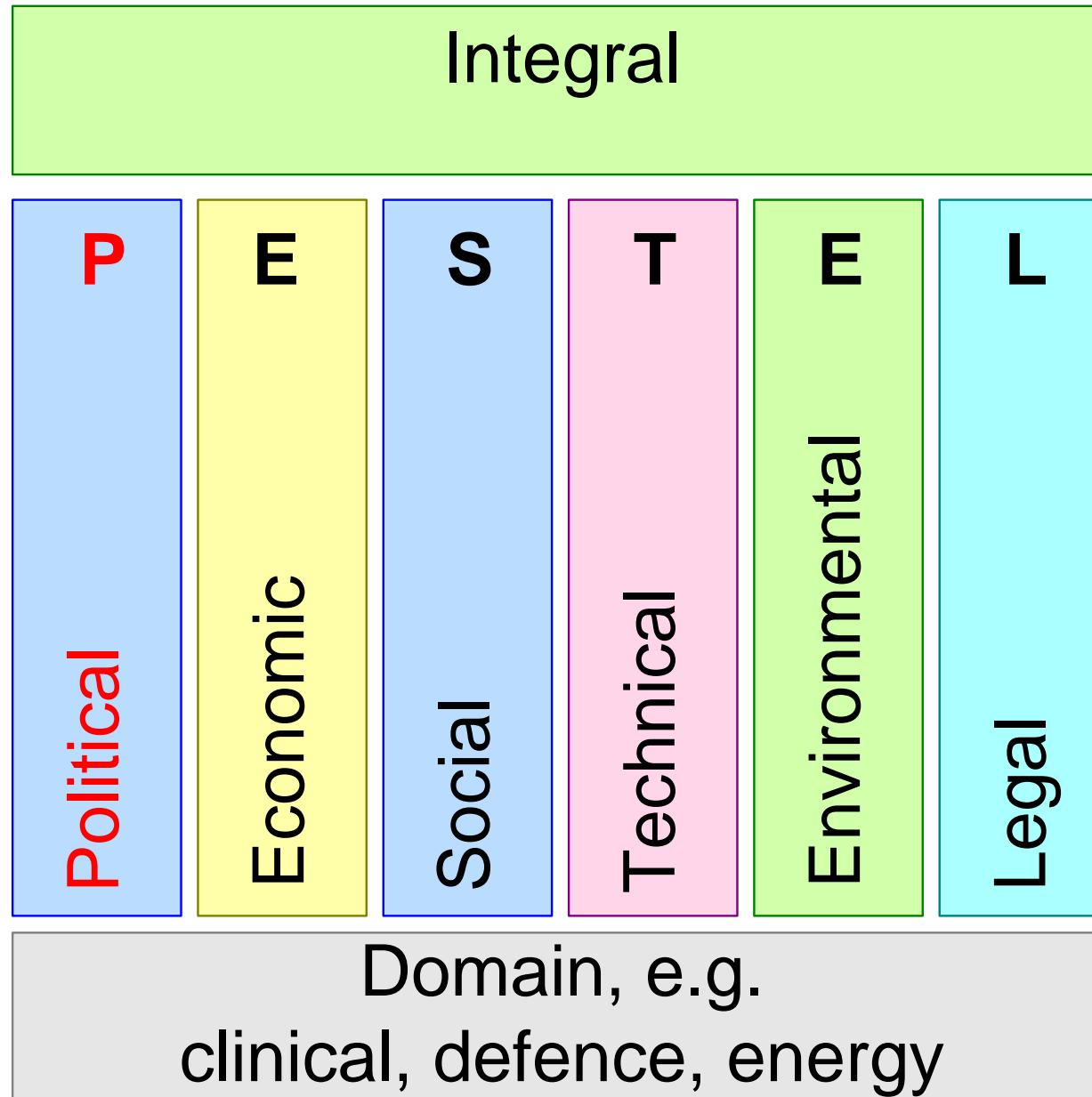


when stuck, change level

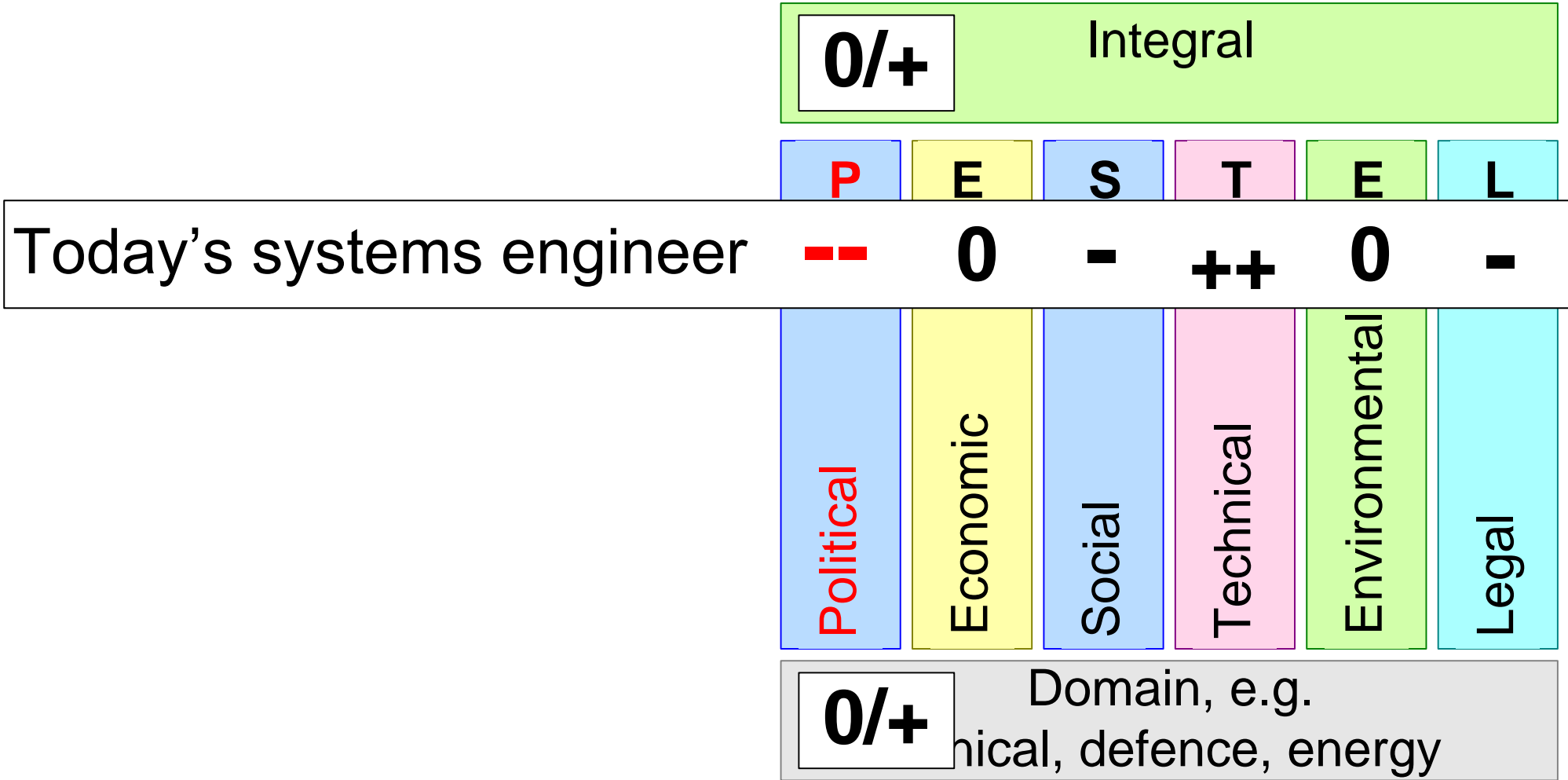


source: the LMS group  
<https://thelmsgroup.nl/en/>

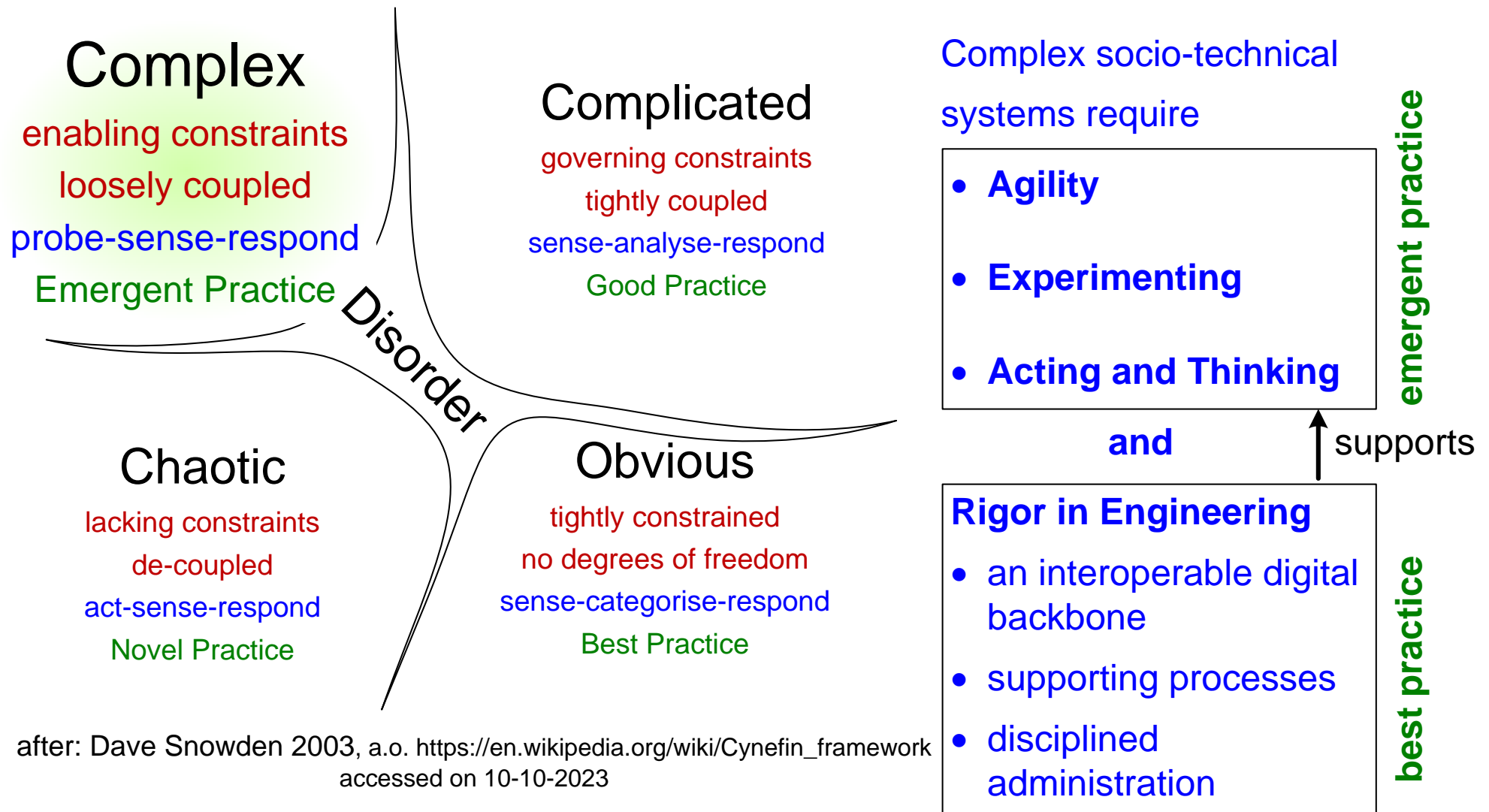
# Capability to Handle a Breadth of Content



# Significant Growth Needed!



# Need: Fast Responding to Disruptive Changes: Agility!



after: Dave Snowden 2003, a.o. [https://en.wikipedia.org/wiki/Cynefin\\_framework](https://en.wikipedia.org/wiki/Cynefin_framework)  
 accessed on 10-10-2023

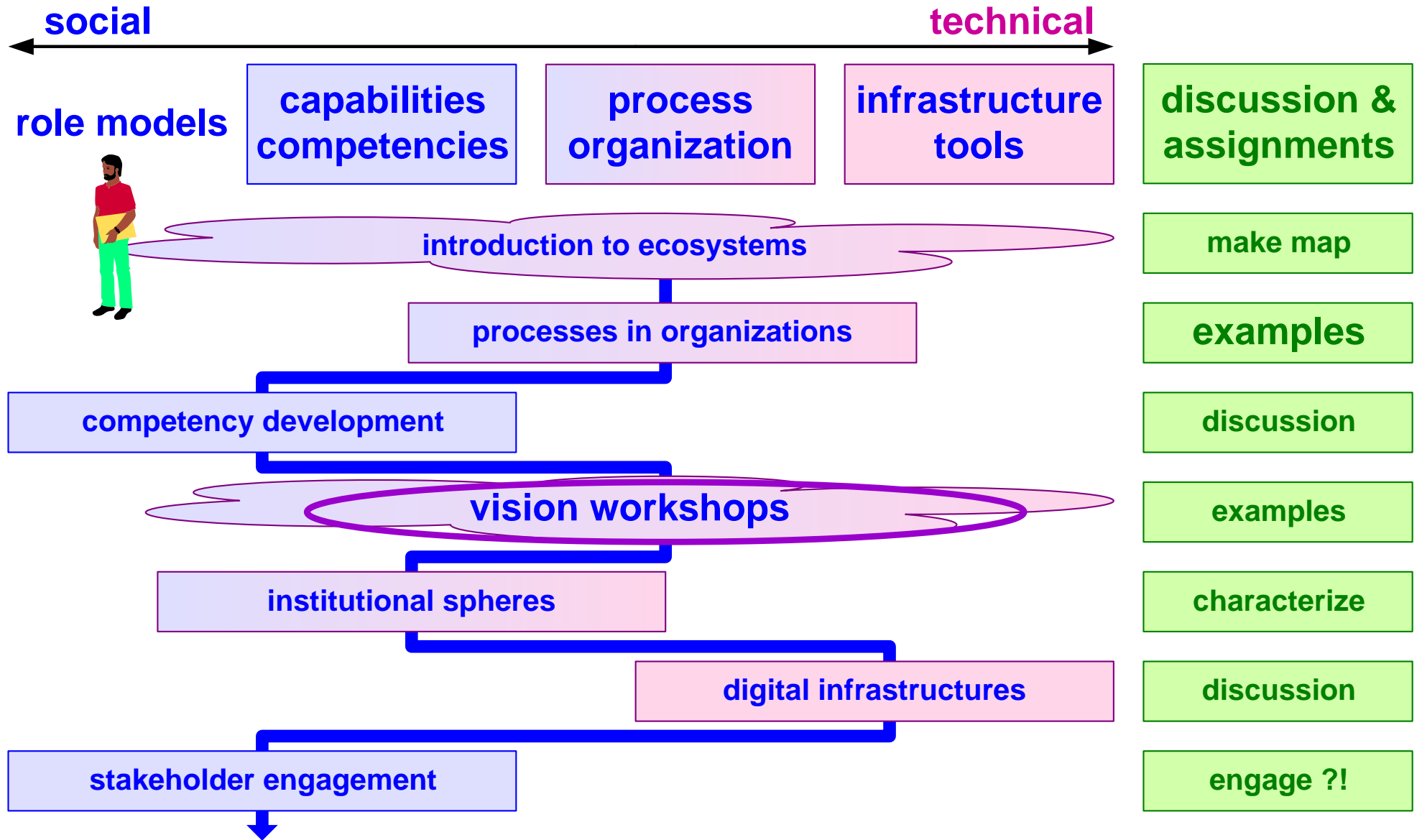
- **orchestration**, which requires **leadership**
- **content** breadth: integral, PESTEL, domain
- **Experiment, Act**, and **Think** to respond fast, **rigor** in engineering management

# Question for Discussion

---

- What competencies do the systems engineers in your organization have?
- Who do you see capable of growing into a full ecosystem orchestrator?
- Where are the challenges to develop orchestrators

# Vision Workshops



# Vision-Workshop How To

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## Abstract

A workshop to determine the vision of an organization requires a shared understanding of the current context and solution, the desired future situation, and a way from current to future situation. This presentation offers a multi-step approach to run such a workshop.

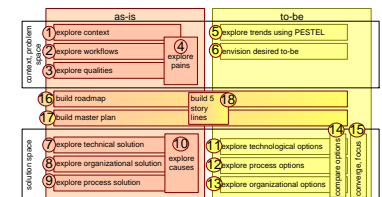
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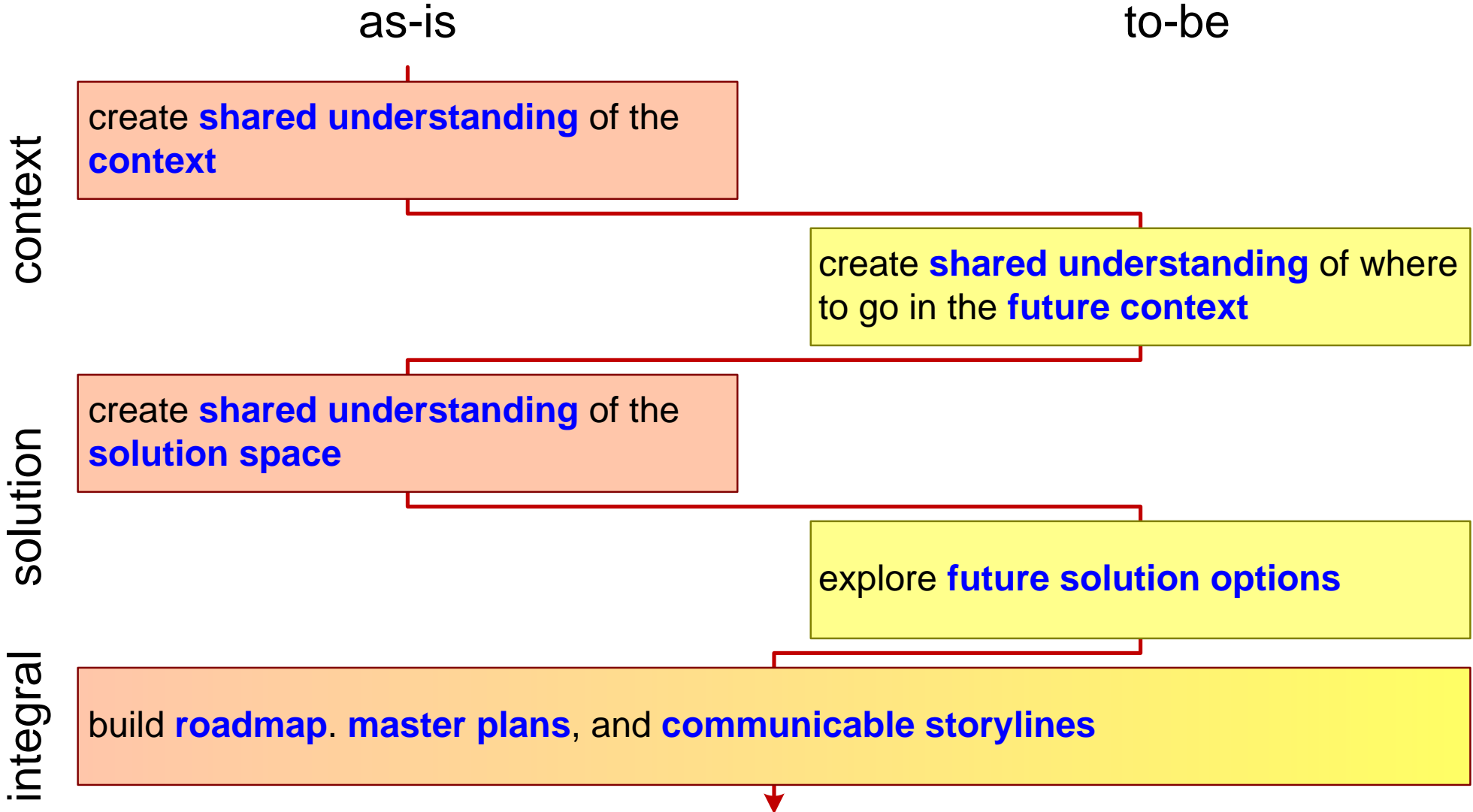
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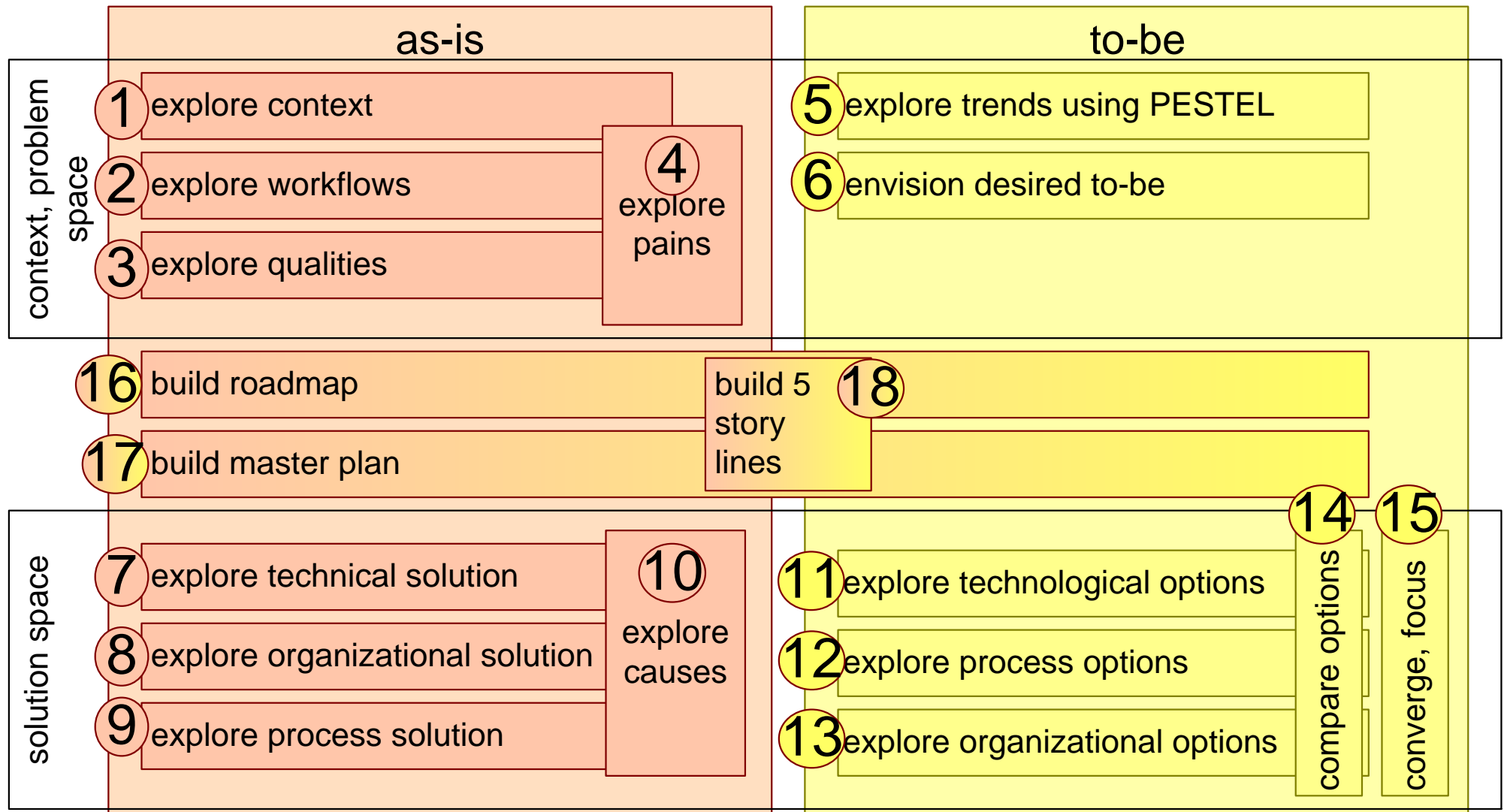
This presentation is the result of reflecting on facilitating workshops to develop a vision in multiple domains, such as (health) care, defense, and research. These organizations are at various levels in the ecosystems of ecosystems, see <https://www.gaudisite.nl/FromSystemToEcosystemSlides.pdf>.

Capturing the de facto methodology that I as facilitator applied, results in this rather structured diagrams. Reality is more chaotic and the application other facilitators should use is more “organic”.

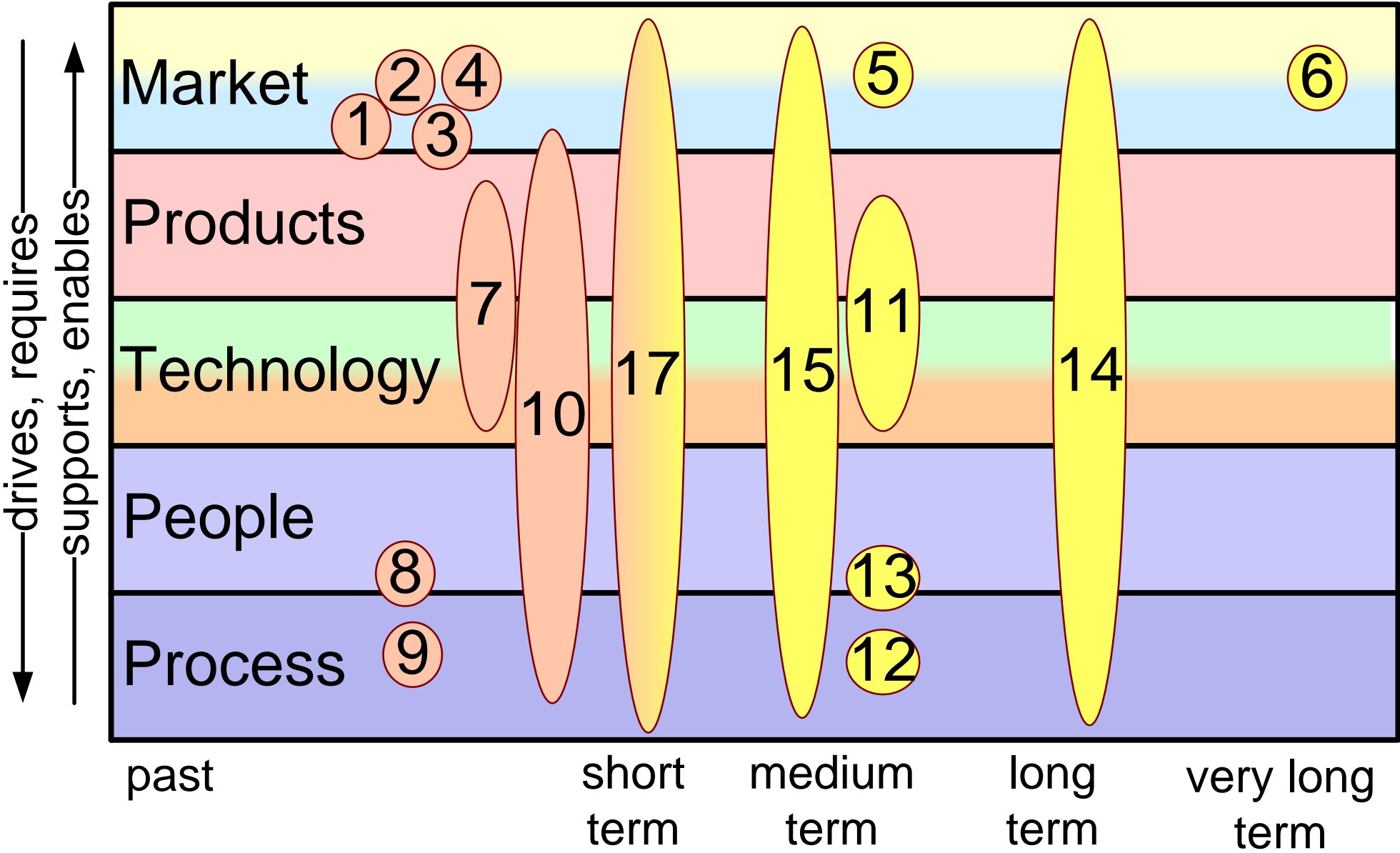
# Main Method Flow



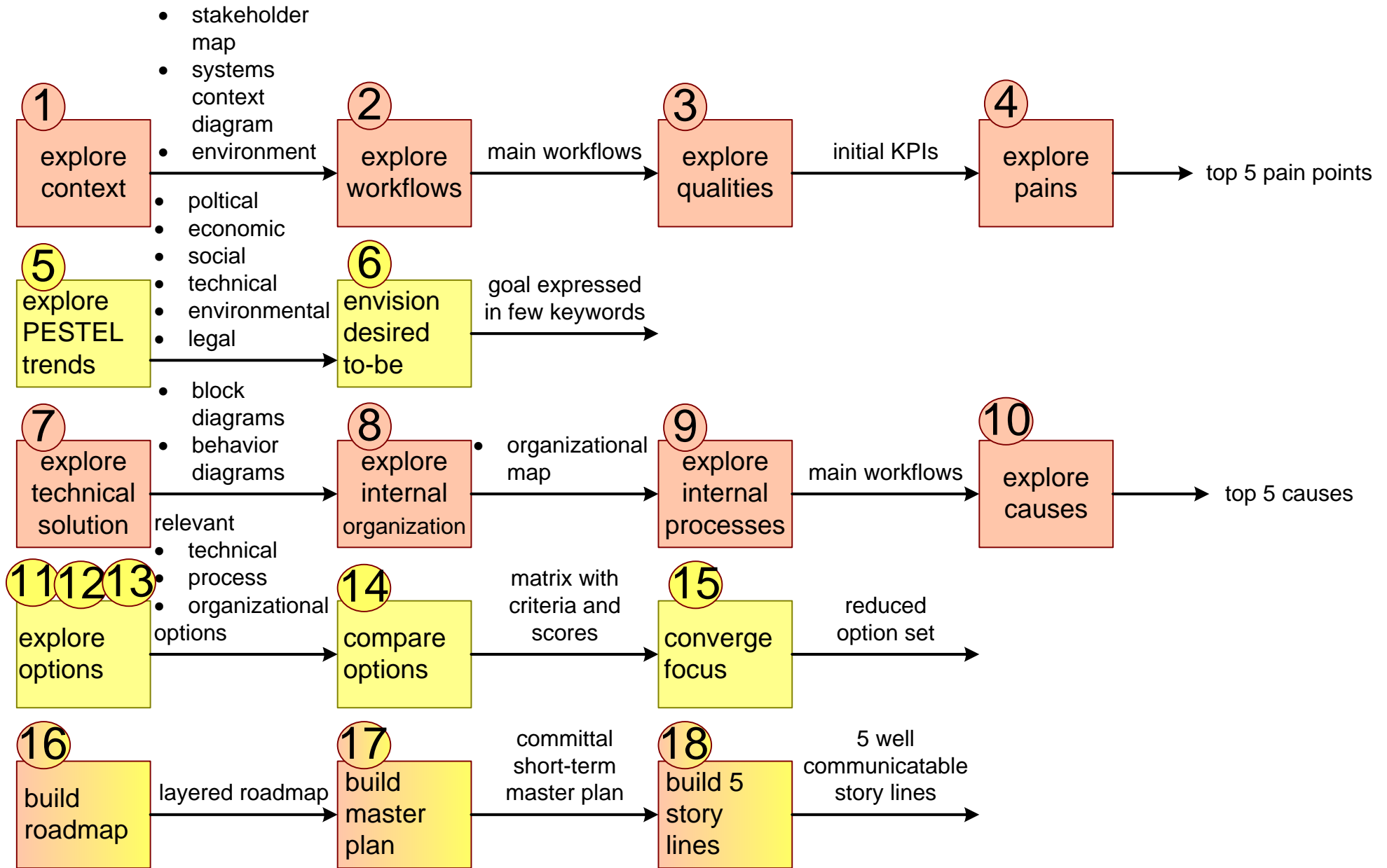
# More Detailed Method for a Vision Workshop



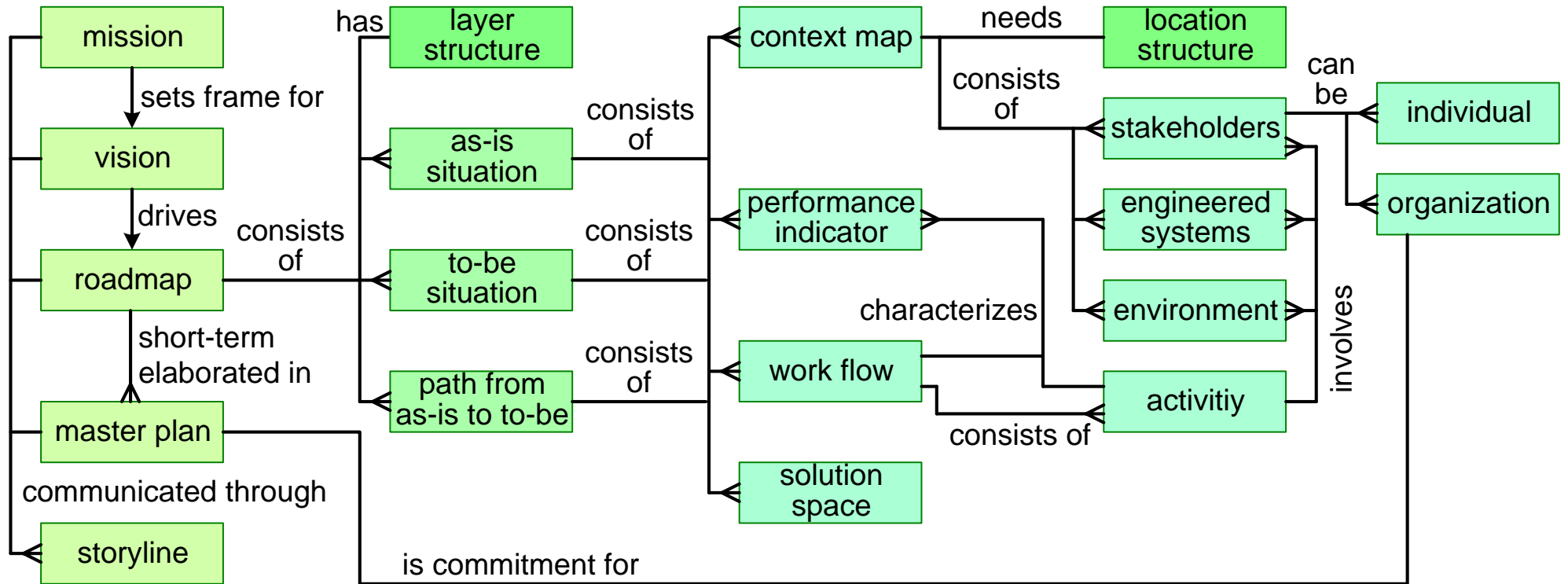
# Steps Mapped on the Roadmap Structure



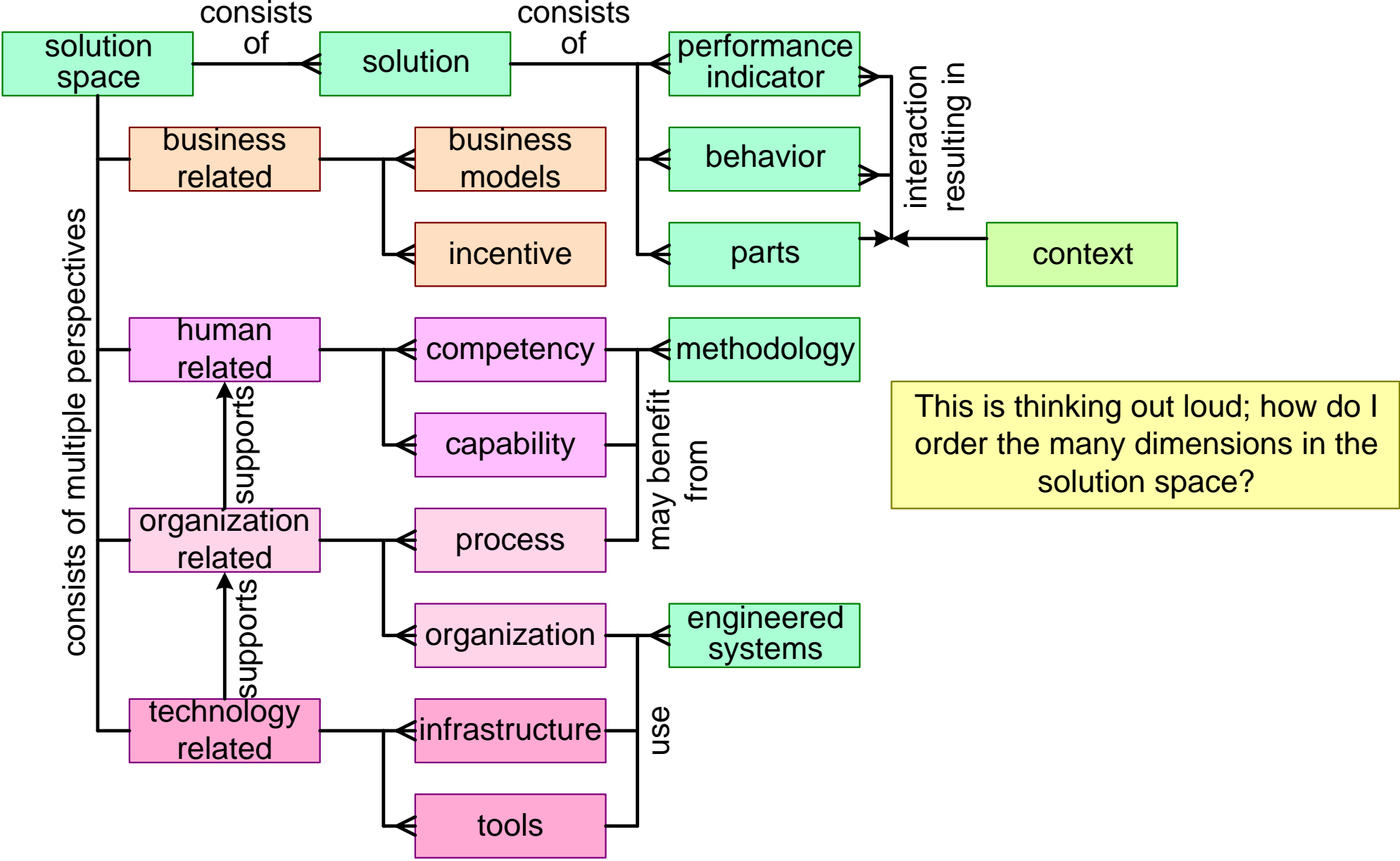
# Workflow for a Vision Workshop



# Entity Relationship Diagram



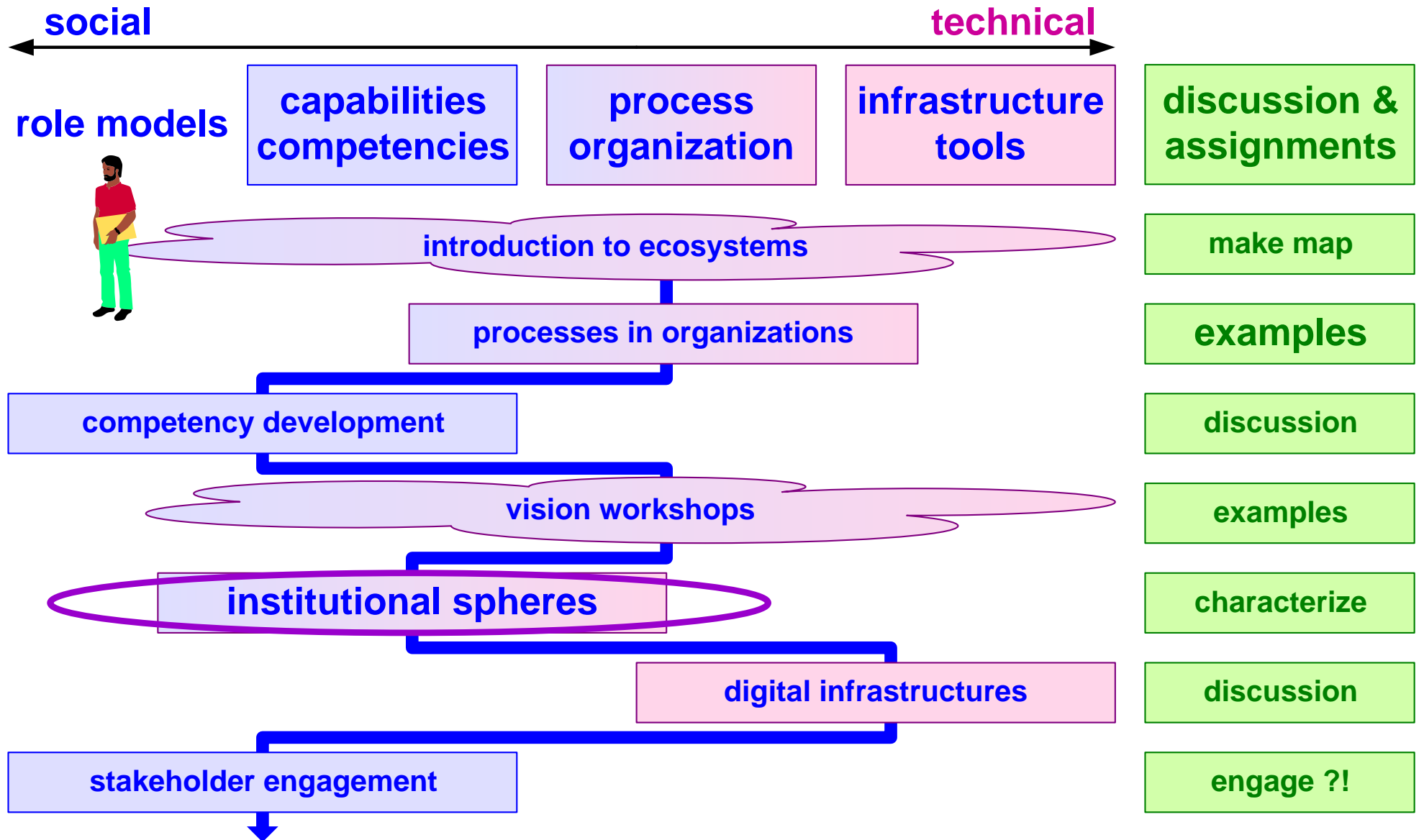
# Solution Space Entity Relationship Diagram



# Recommendations

- Time box from short, 15 minutes, to longer, max 1 week; increment with a factor 2 to 3
- Iterate over many viewpoints, keep iterating
- Keep engaging stakeholders especially the “difficult” stakeholders
- Zoom-in and Zoom-out over many orders of magnitude, macro to nano. zoom step between 10 and 100
- Explore ideas concrete and specific use examples
- Conceptualize and Generalize with care ensure that insights are meaningful
- Connect the dots insights come from understanding relations
- Fill big gaps not connected dots and big jumps are suspect
- Visualize in many variations, be creative, use feedback
- Separate Goals, Means, and Rationale many stakeholders confuse goals and means, help them to disentangle
- Bring focus through judging, while staying open-minded this is a balancing act
- avoid meta discussions postpone until you understand the problem sufficiently

# Institutional Spheres



# Institutional Spheres, Governmental, Commercial, and Academic

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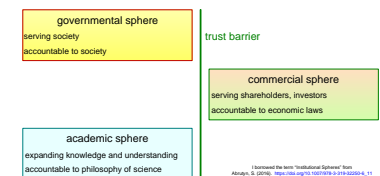
## Abstract

The organizations in the ecosystem come from different institutional spheres. The sphere they reside in determines the way they perceive the world, their drivers, and thereby their behavior.

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# Institutional Spheres have Different Drivers

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## governmental sphere

serving society

accountable to society

trust barrier

## commercial sphere

serving shareholders, investors

accountable to economic laws

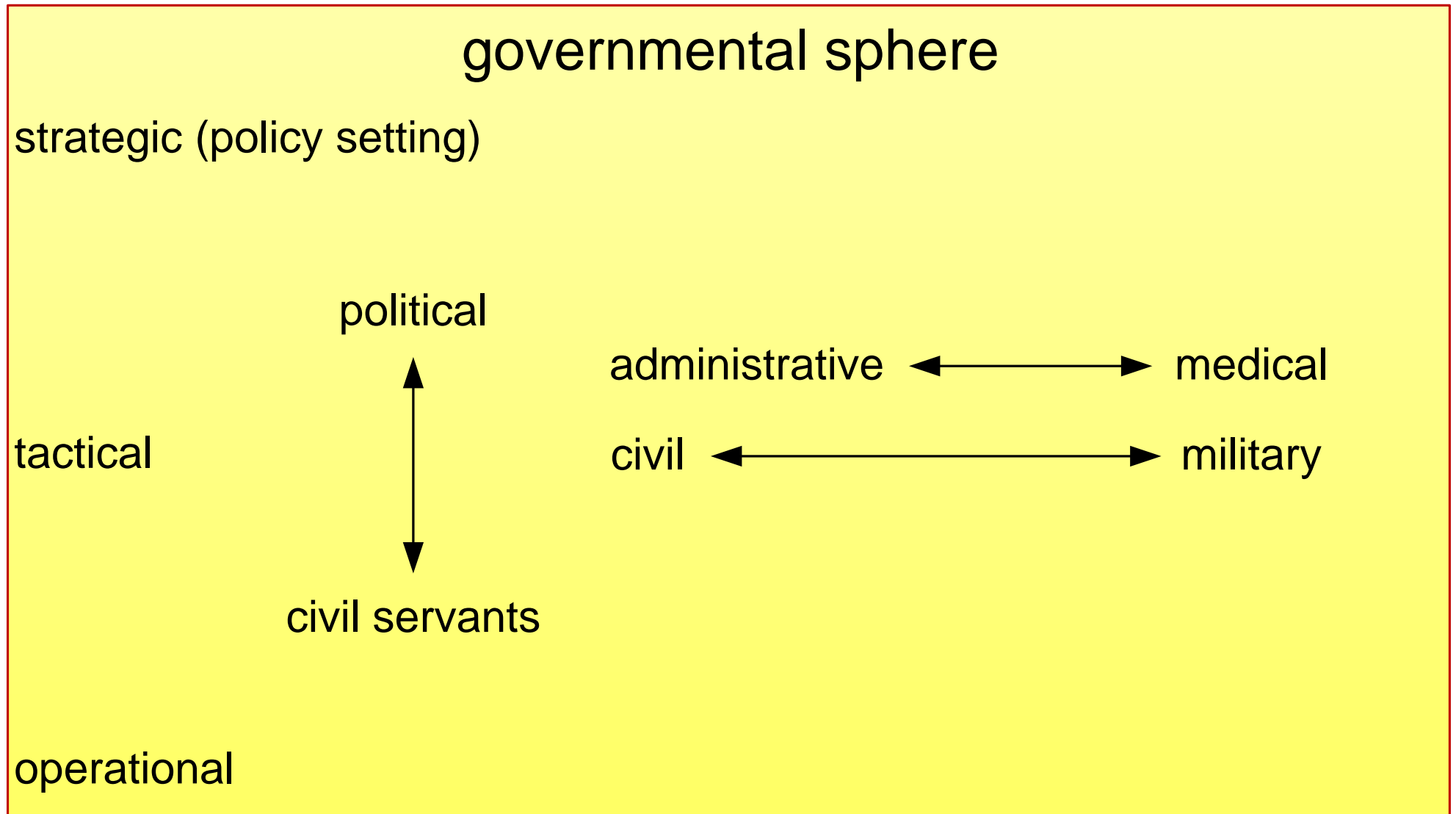
## academic sphere

expanding knowledge and understanding

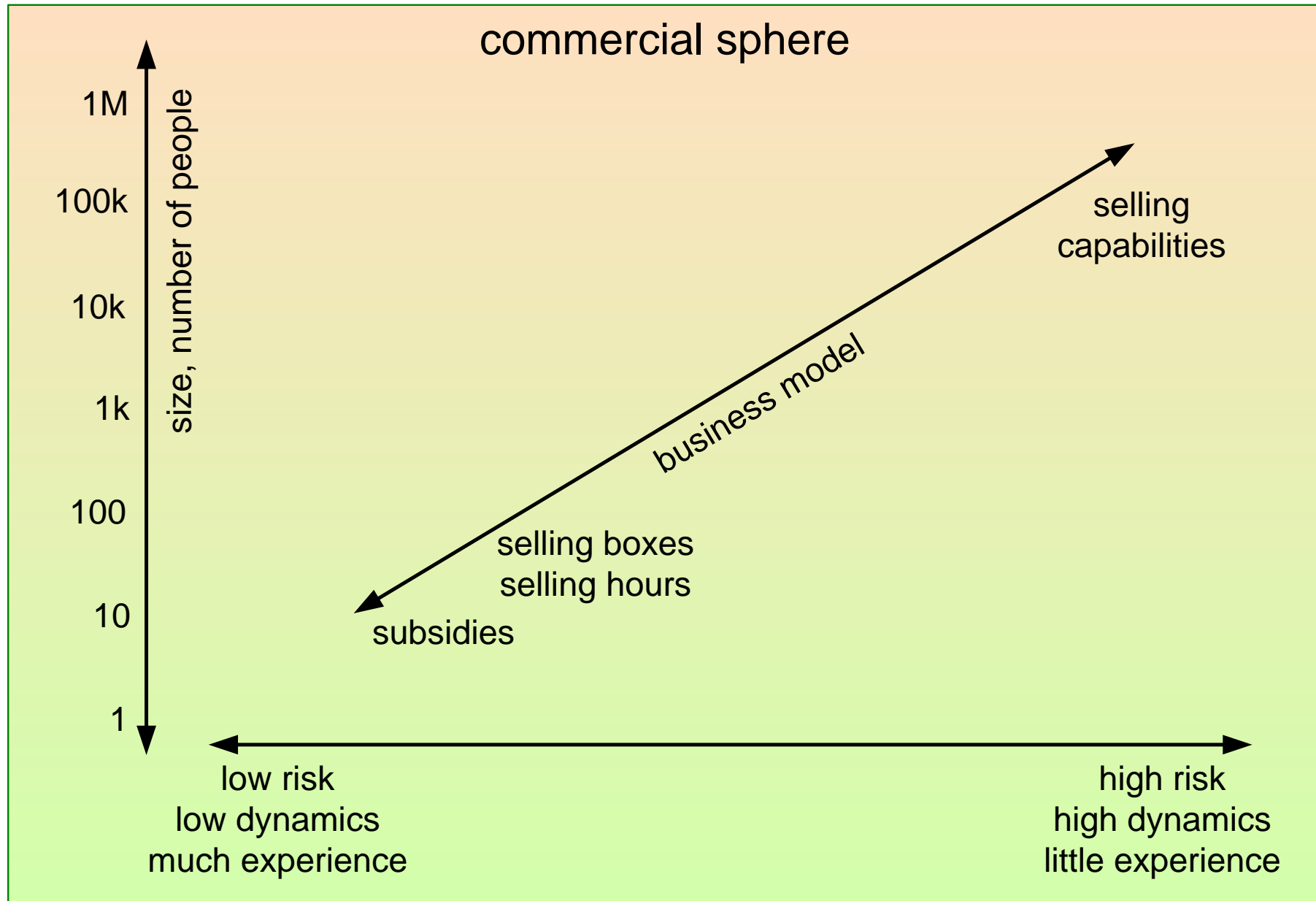
accountable to philosophy of science

I borrowed the term “Institutional Spheres” from  
Abrutyn, S. (2016). [https://doi.org/10.1007/978-3-319-32250-6\\_11](https://doi.org/10.1007/978-3-319-32250-6_11)

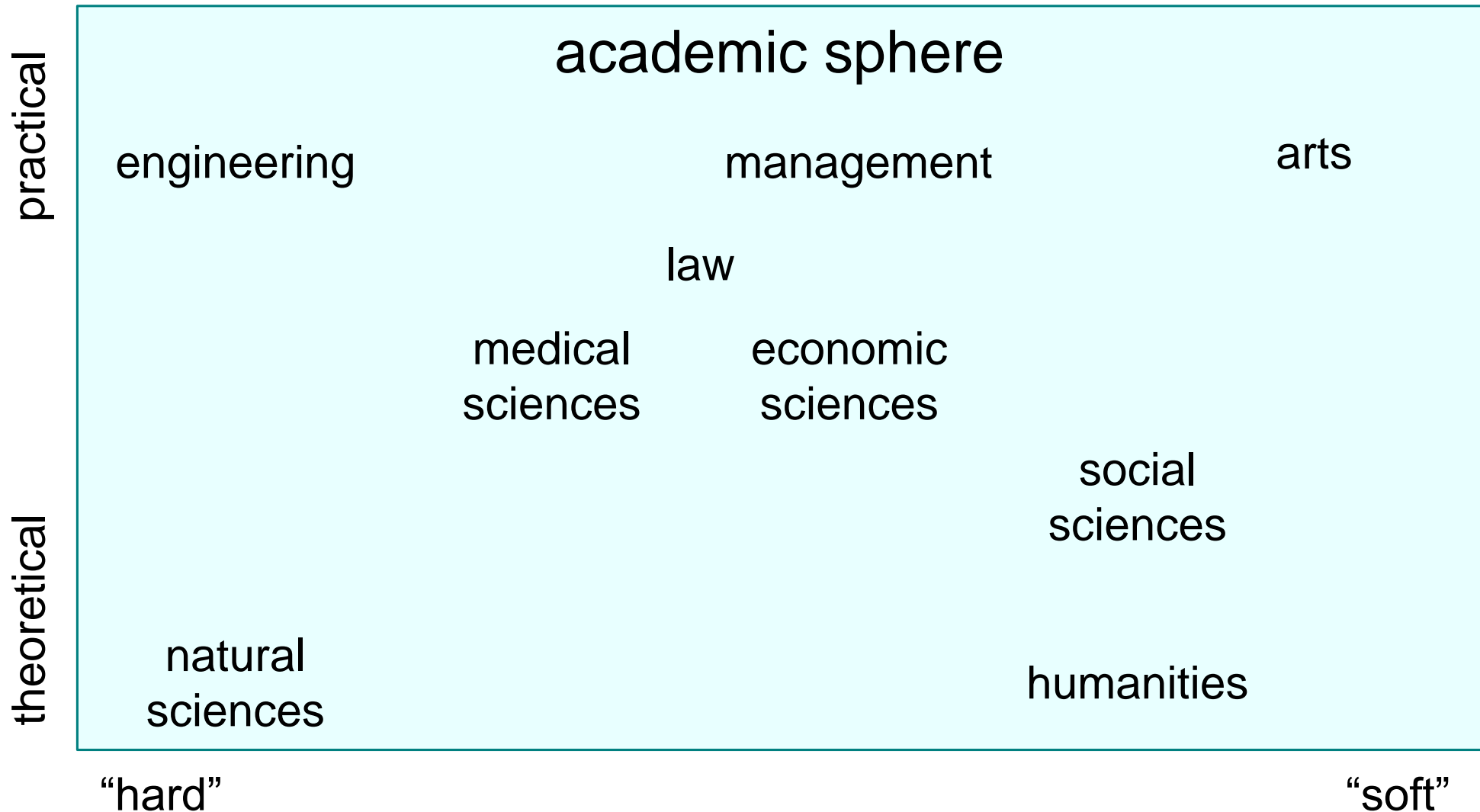
# Governmental Sphere Has Diverse Sub-Spheres



# Dimensions in the Commercial Sphere



# Academic Sphere has Multiple Dimensions

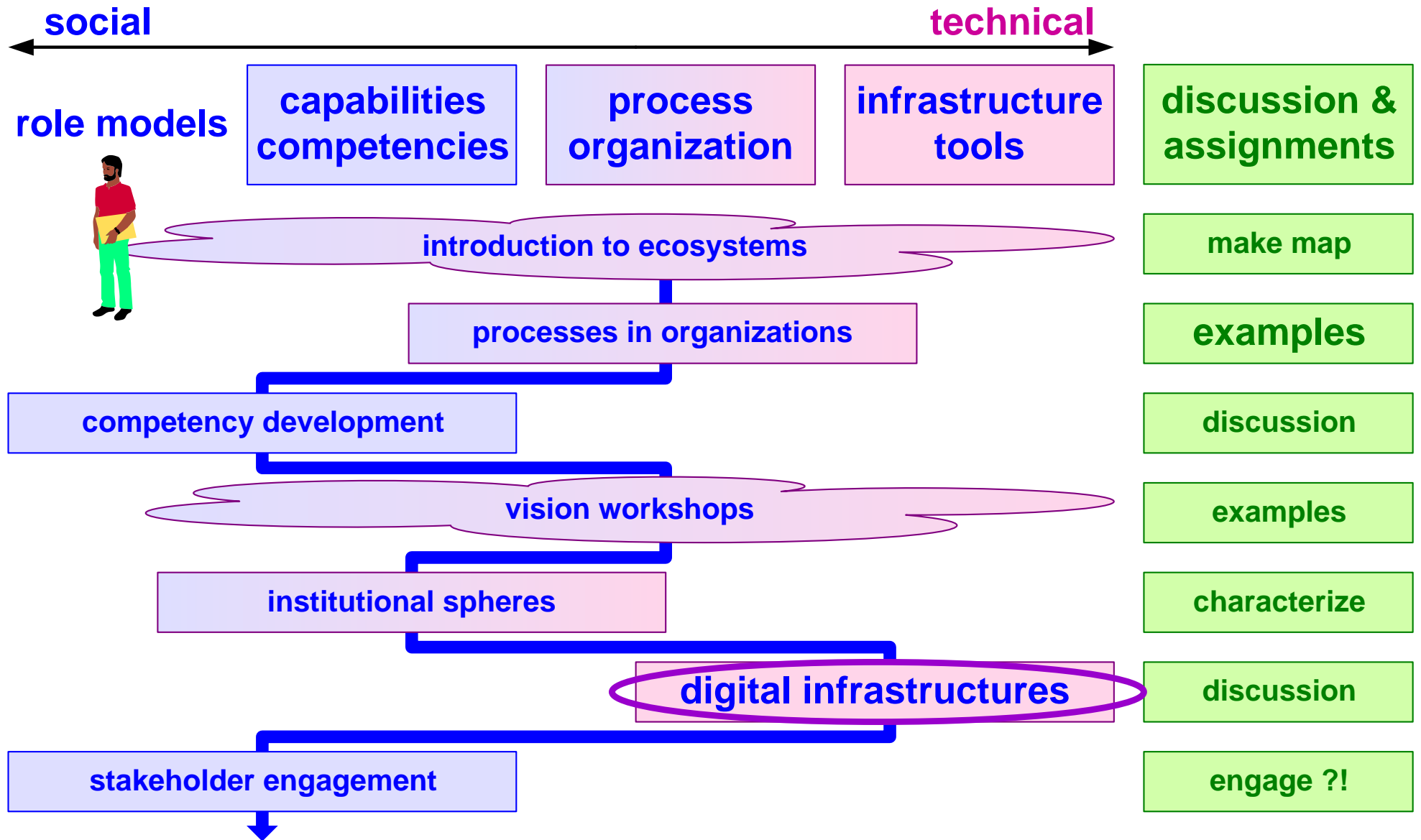


# Exercise Institutional Spheres

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- Characterize your own organization
- What are the main similarities and differences with organizations a layer up or down?
- What are the most significant characteristics that require attention?

# Digital Infrastructures



# Ecosystem Digital Infrastructure

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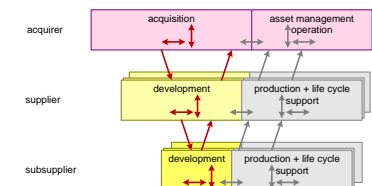
## Abstract

Organizations in an ecosystem need a digital infrastructure that facilitates digital information exchange across organizational borders.

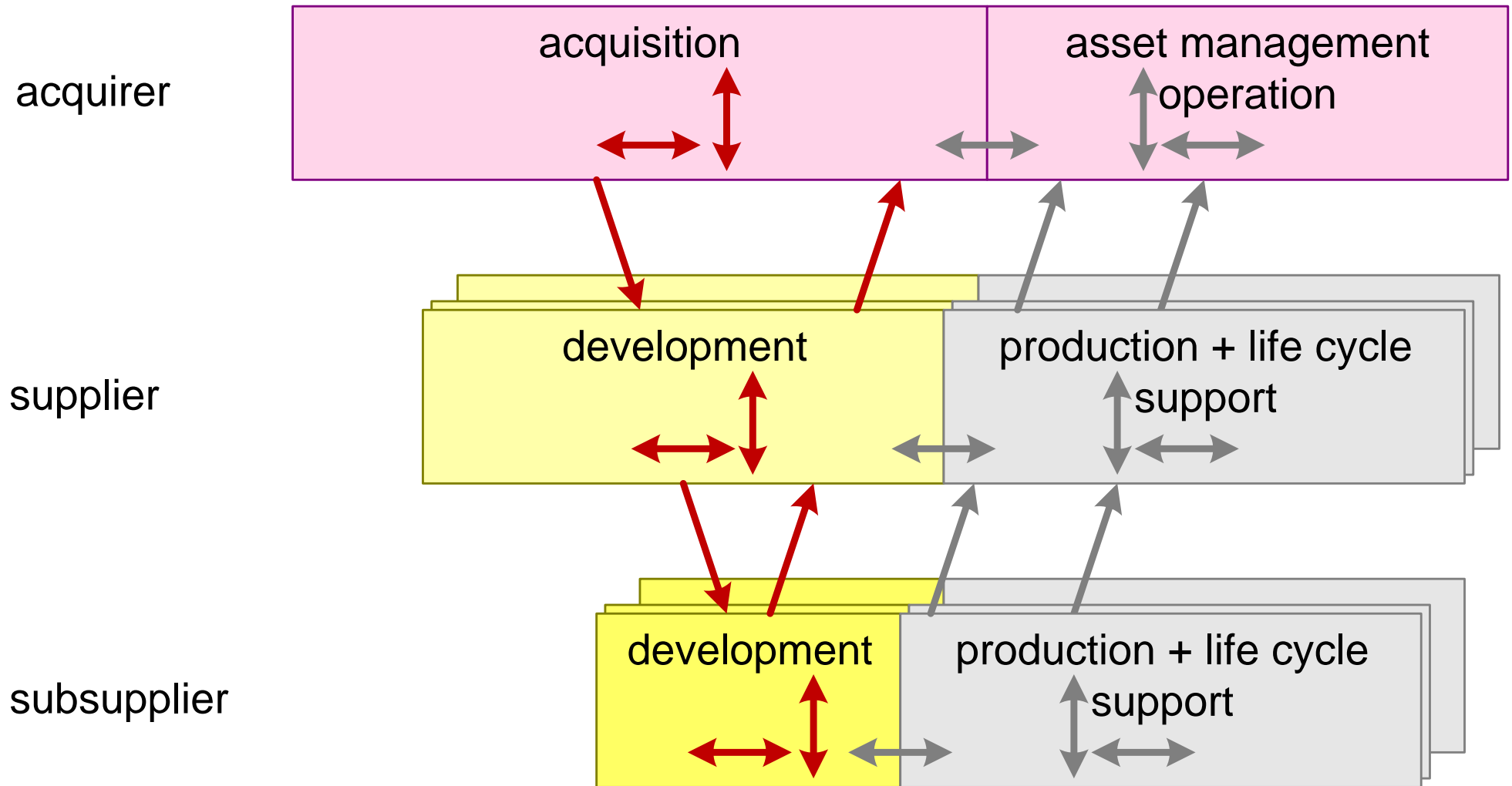
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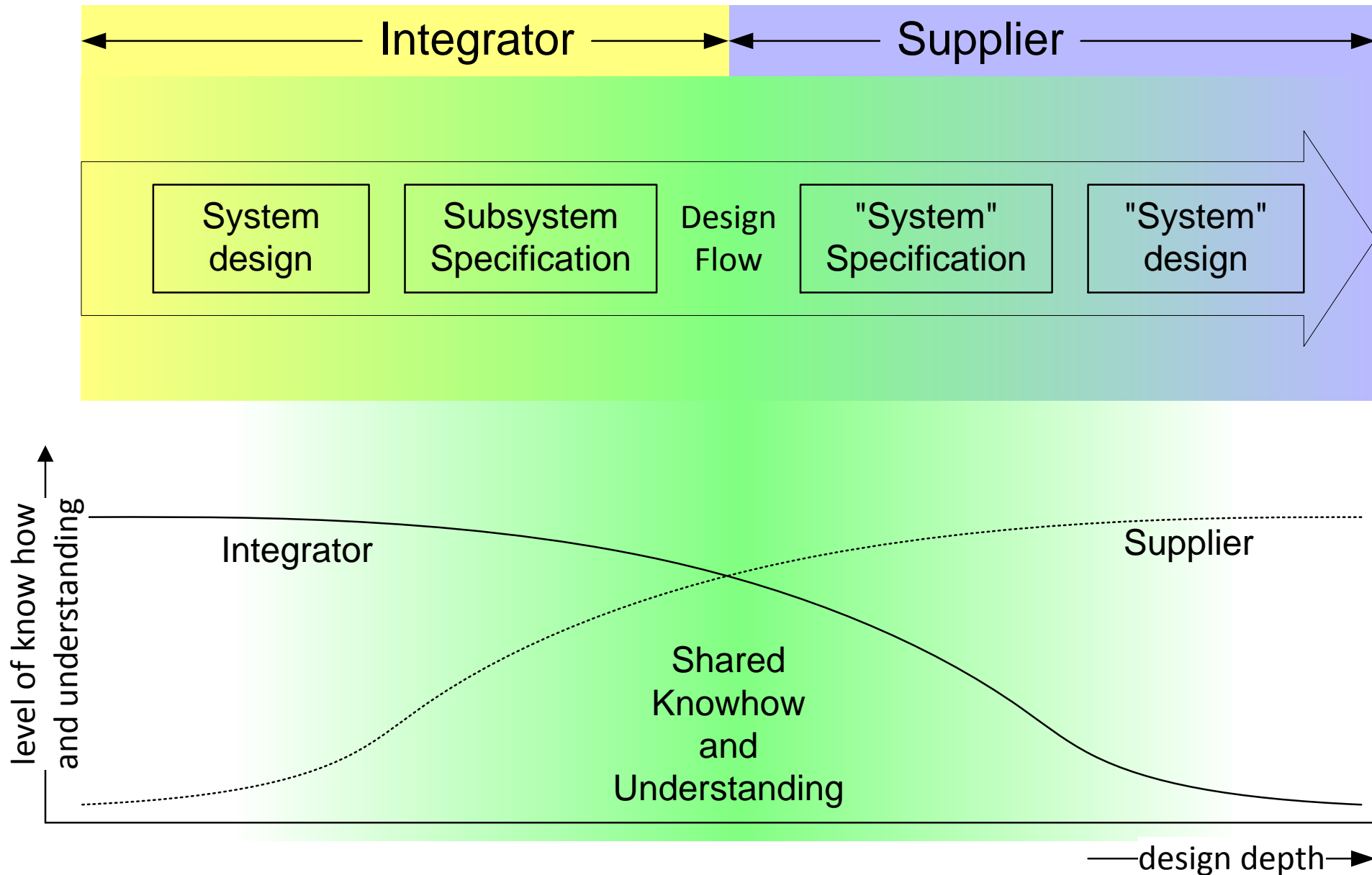
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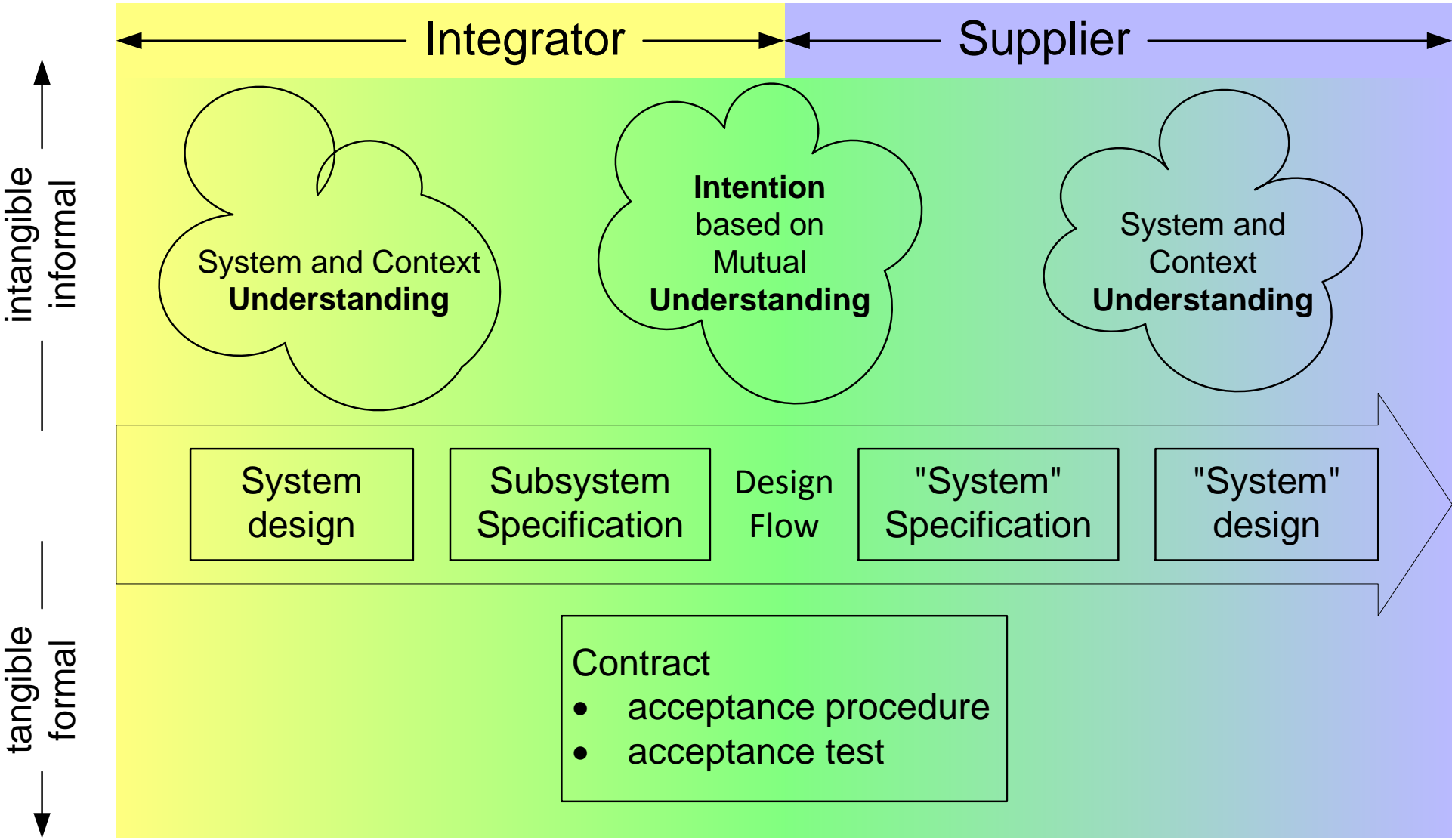
# Information Flows between Organizations



# Theory: Subcontractors require SMART relation

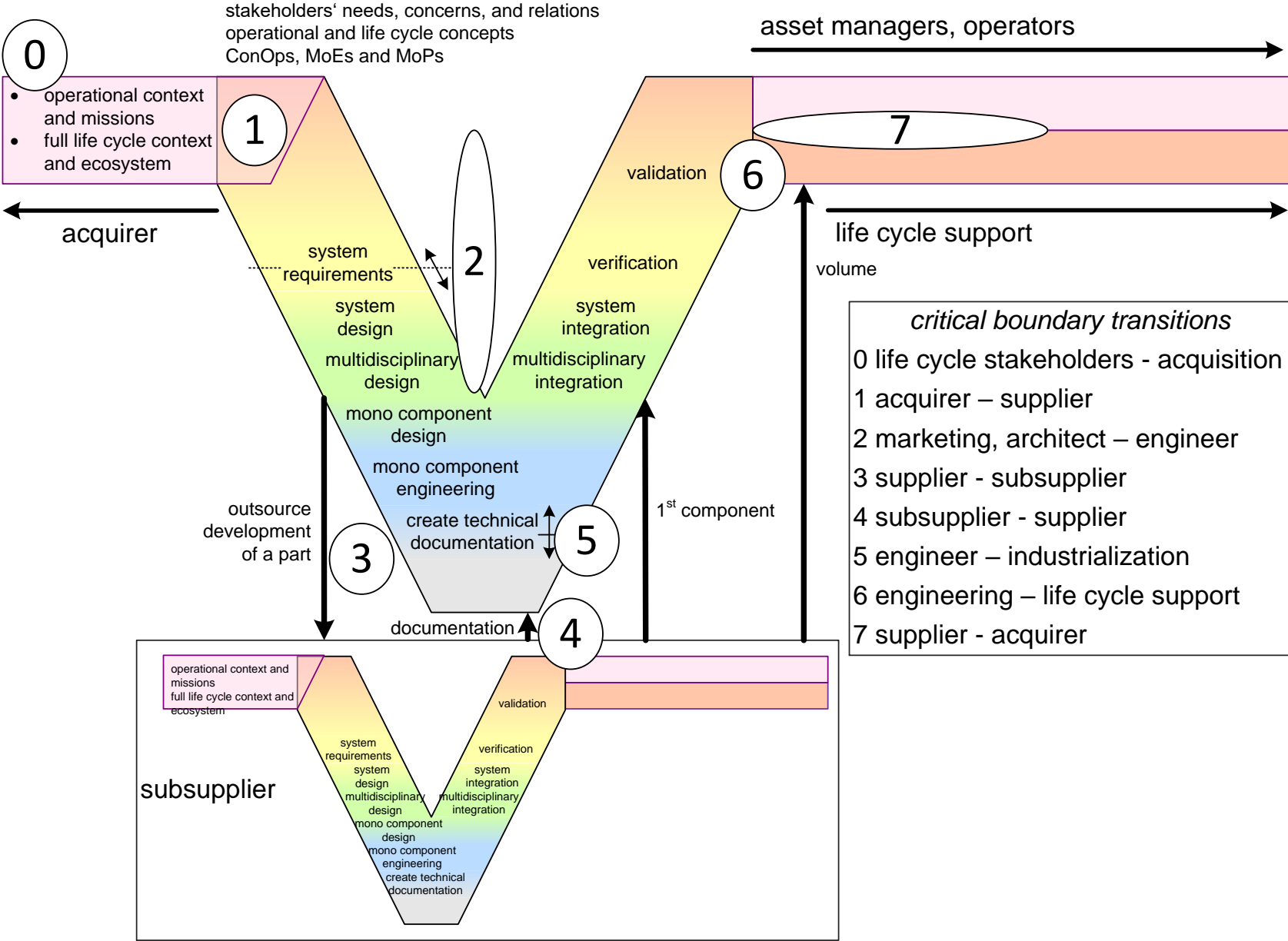


# Critical Success Factor: Mutual understanding

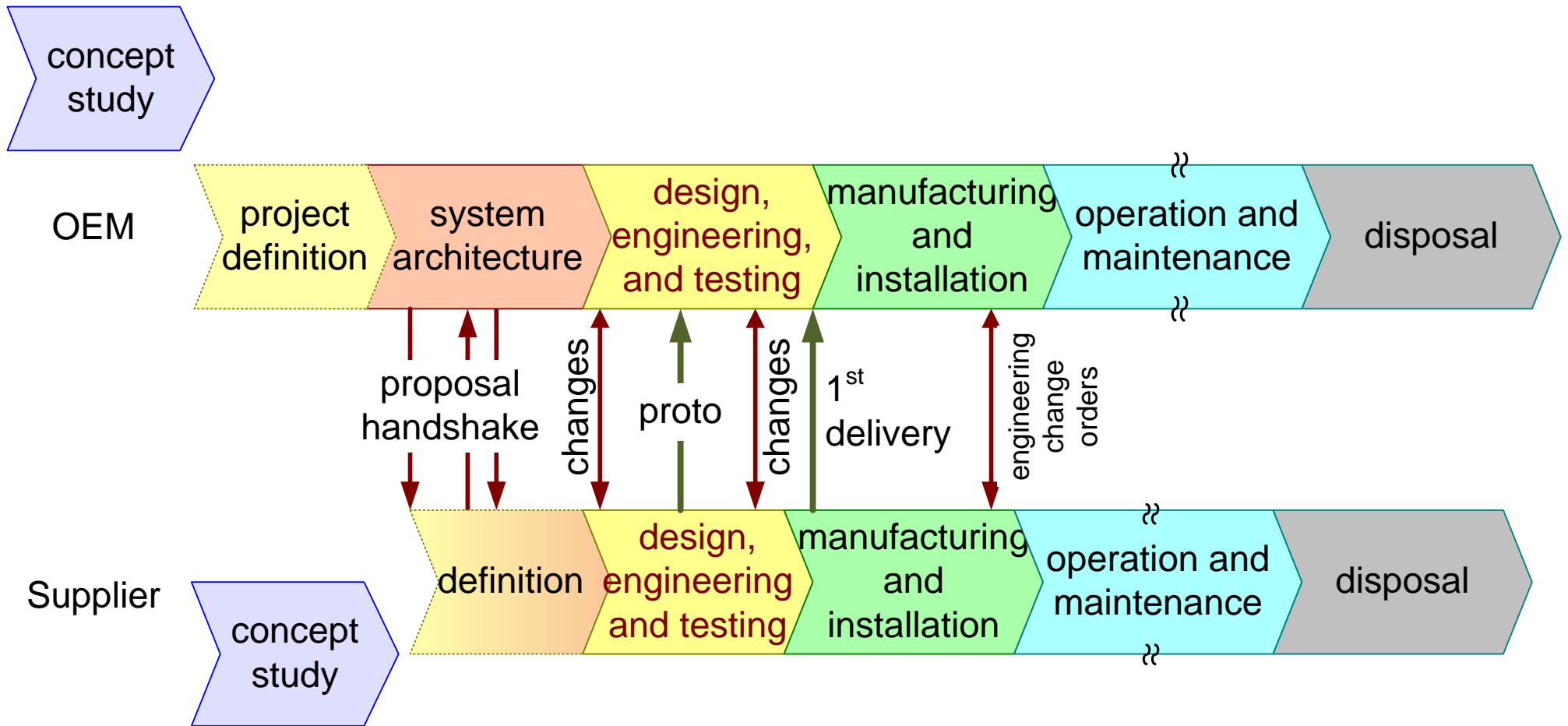


Subsystem in Integrator perspective = "System" in Supplier perspective

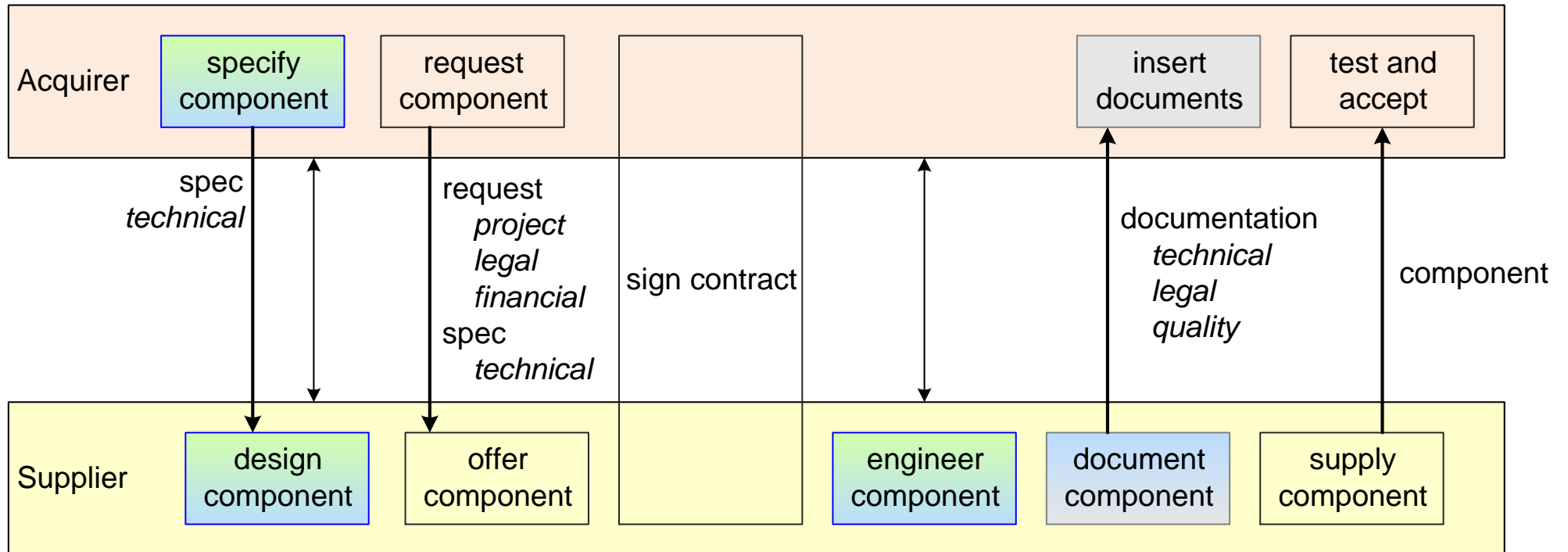
# Critical Boundary Transitions in the V-model



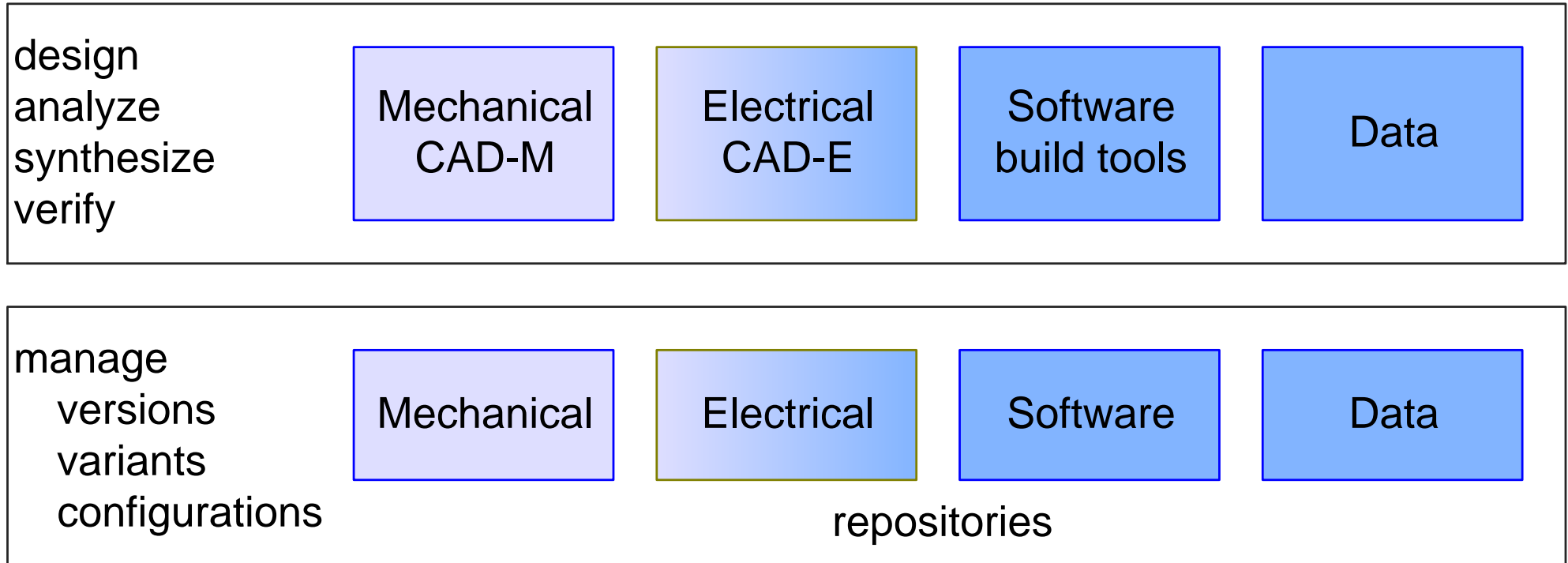
# Project Life Cycles Acquirer and Supplier



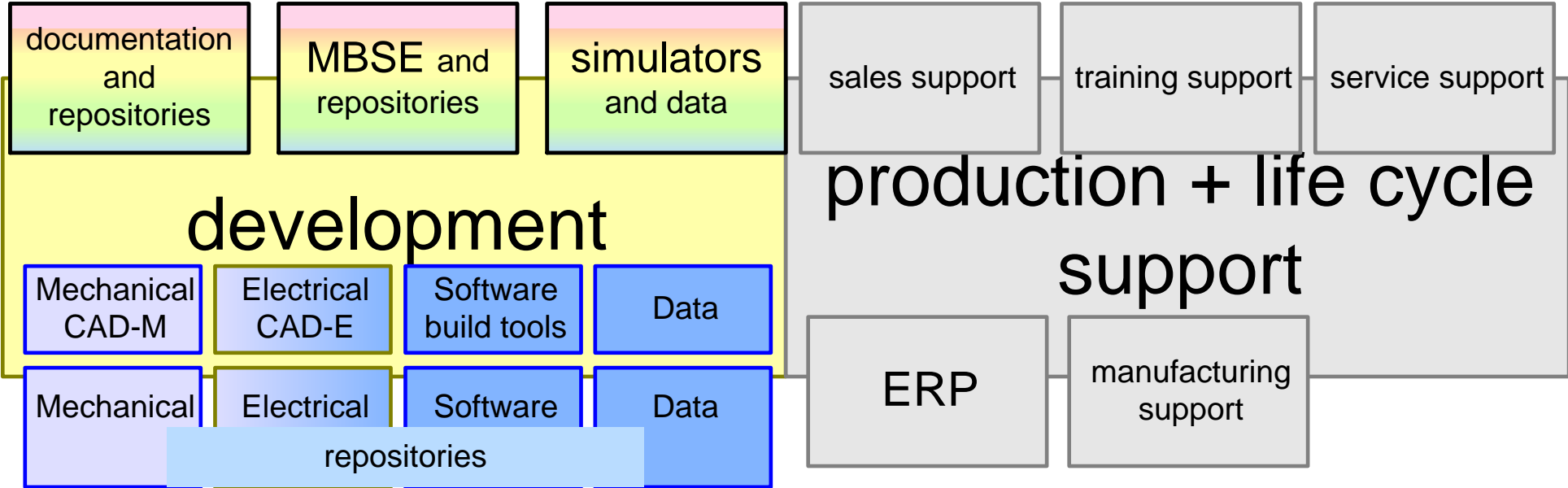
# Interaction Acquirer and Supplier when Outsourcing Design



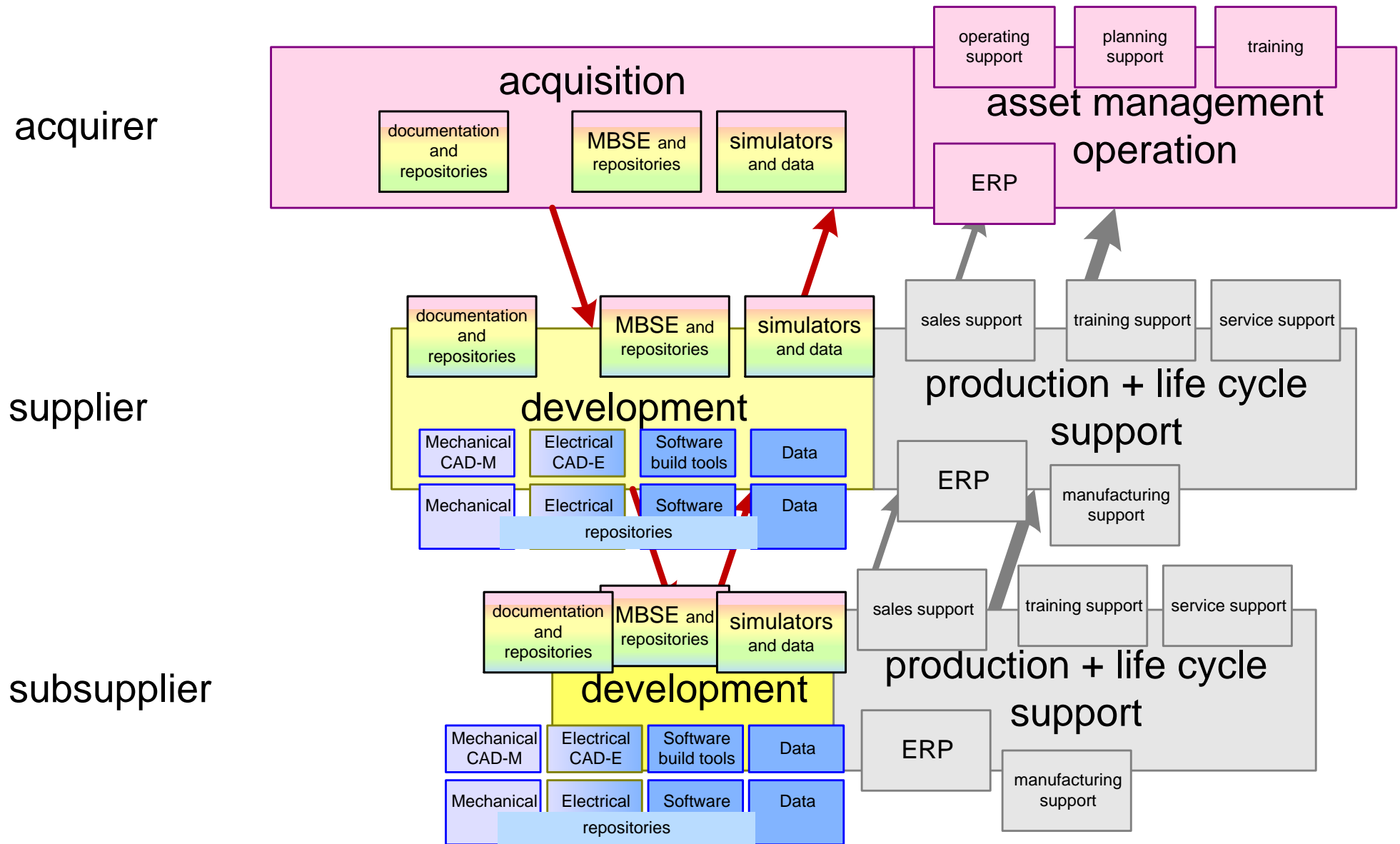
# The Digital Mono-Engineering Environments



# IT-Tools a Supplier is Using



# IT-Tools across Layers when Outsourcing Design

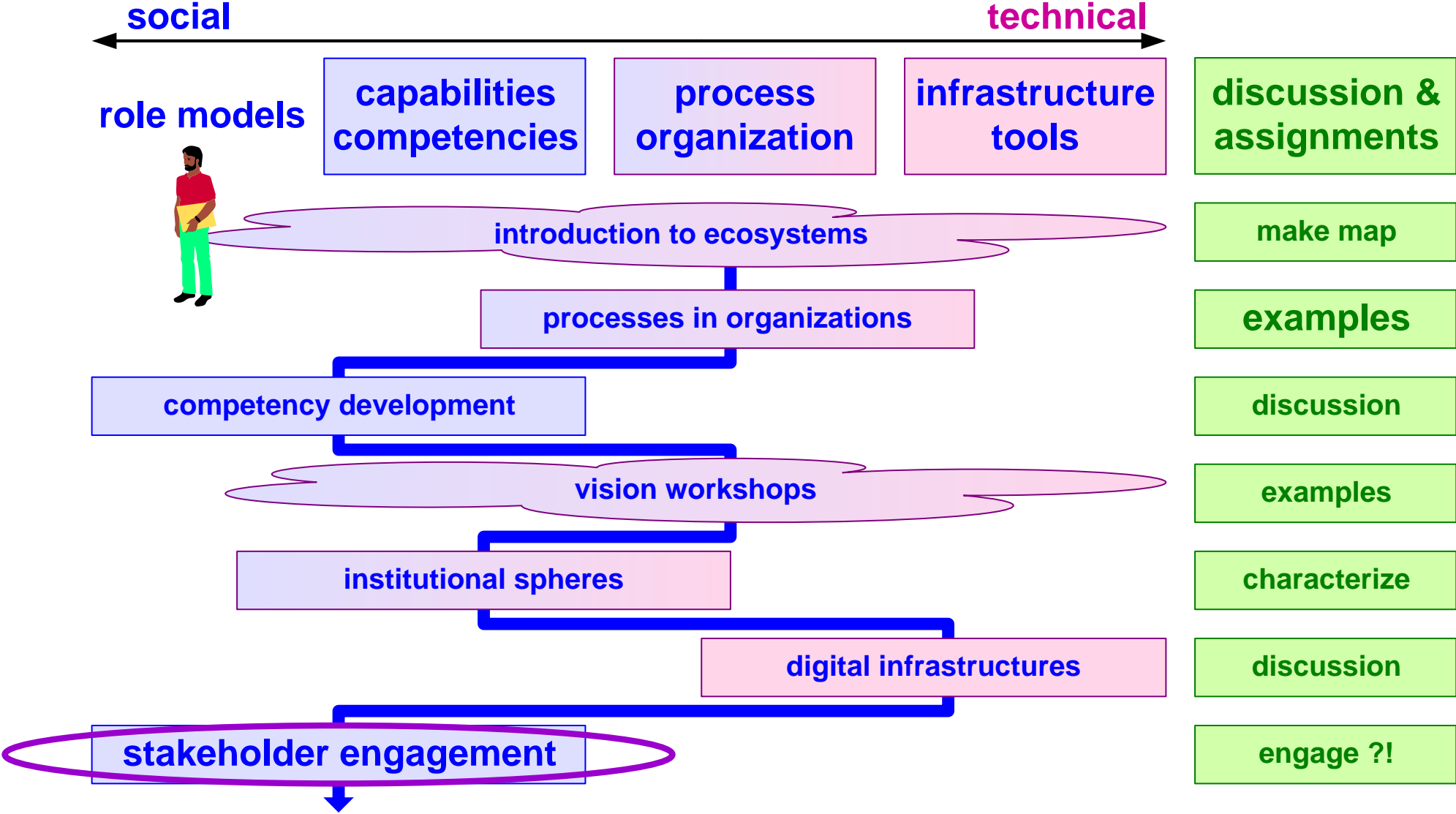


# Processes Differ over Layers

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- Quantify the IT landscape in your organization, e.g. #IT systems, application, information domains..
- How well do the applications interoperate? How much human interactions do workflows need?
- How well does the IT landscape interoperate with the IT landscape of other organizations?

# Stakeholder Engagement



# Stakeholders, from Abstract to Individual Humans

by *Gerrit Muller* USN-SE

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## Abstract

Systems engineering uses the term stakeholders very often. This presentation explores the concept of stakeholders. We look at abstractions that we make as well as the relation to real human beings, from flesh and blood, with their emotions, beliefs, and behavior.

## Distribution

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status: draft  
version: 0.2

Defining **personas** is way to make roles less abstract  
Defining a set of **archetypes** may help in reasoning about variations  
Sketching **caricatures** brings the insights more alive

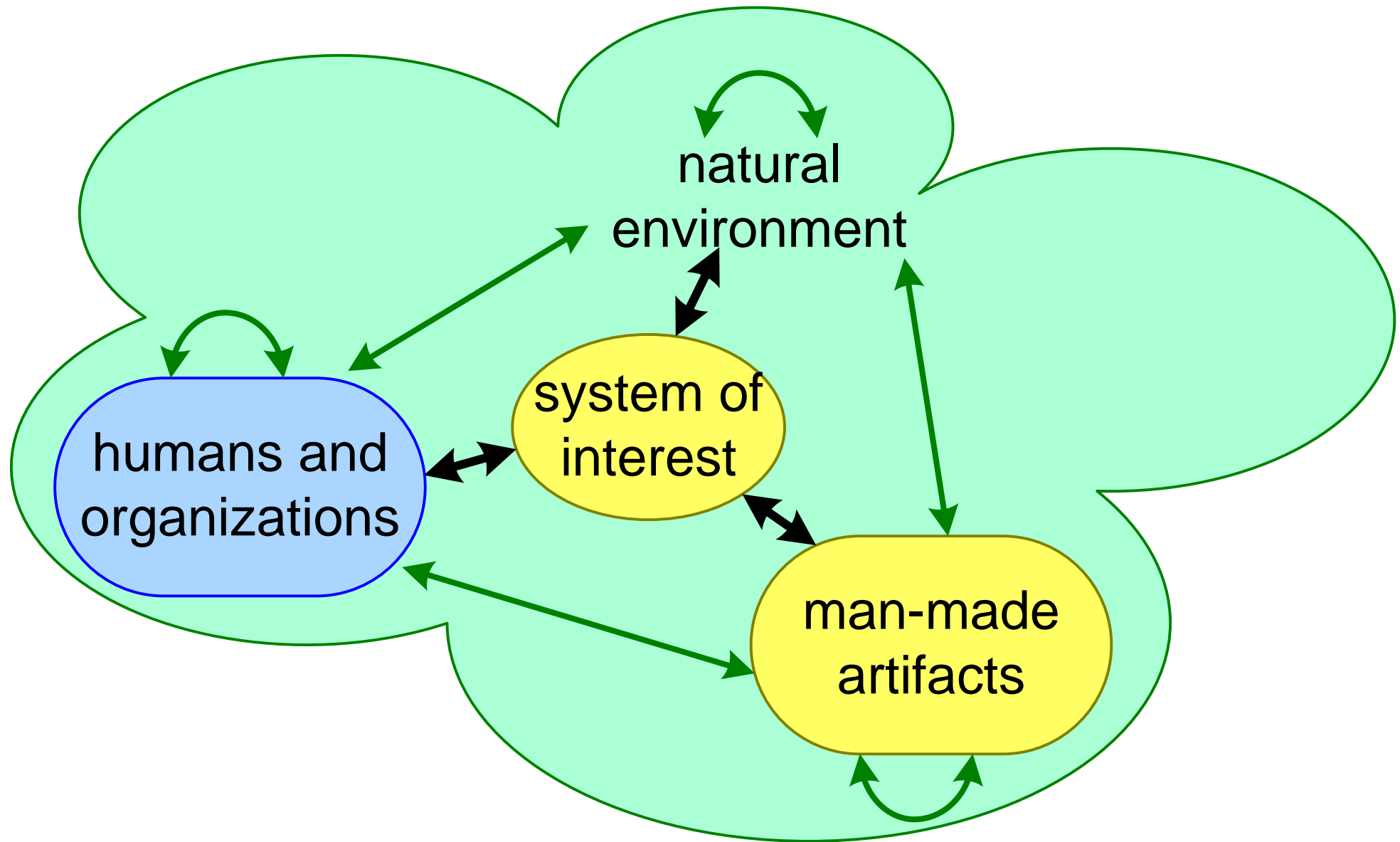
client	team worker	implementer
creative	cooperative, avoids friction	disciplined, conservative, dile
resource investigator	shaper	complex finisher
enthusiastic contributor	driver, dynamic	conscientious, painstaking
coordinator	monitor evaluator	specialist
mature, chairman	subot, analytical	single-minded, rare skills

**Bebber's archetypes**

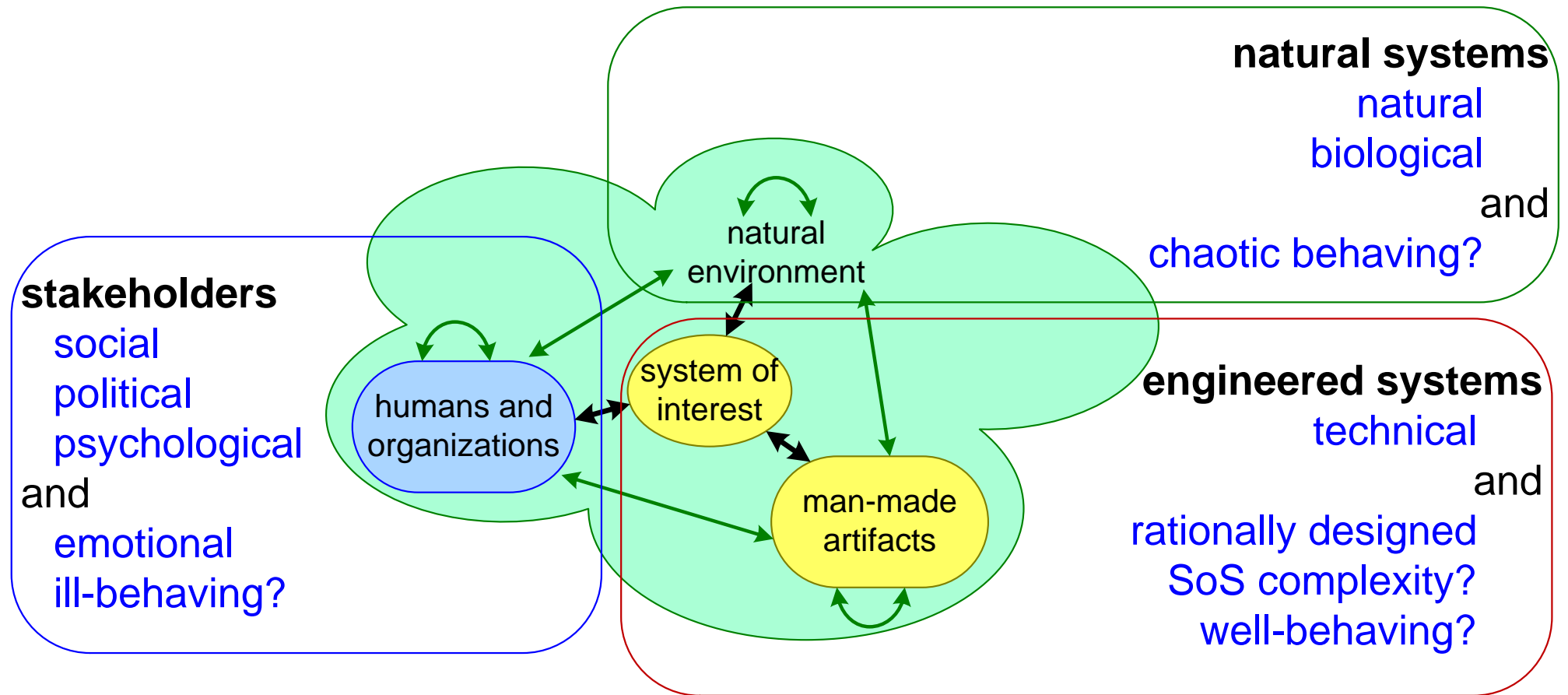


Caricature of a sergeant major  
courtesy Bas van Zundert

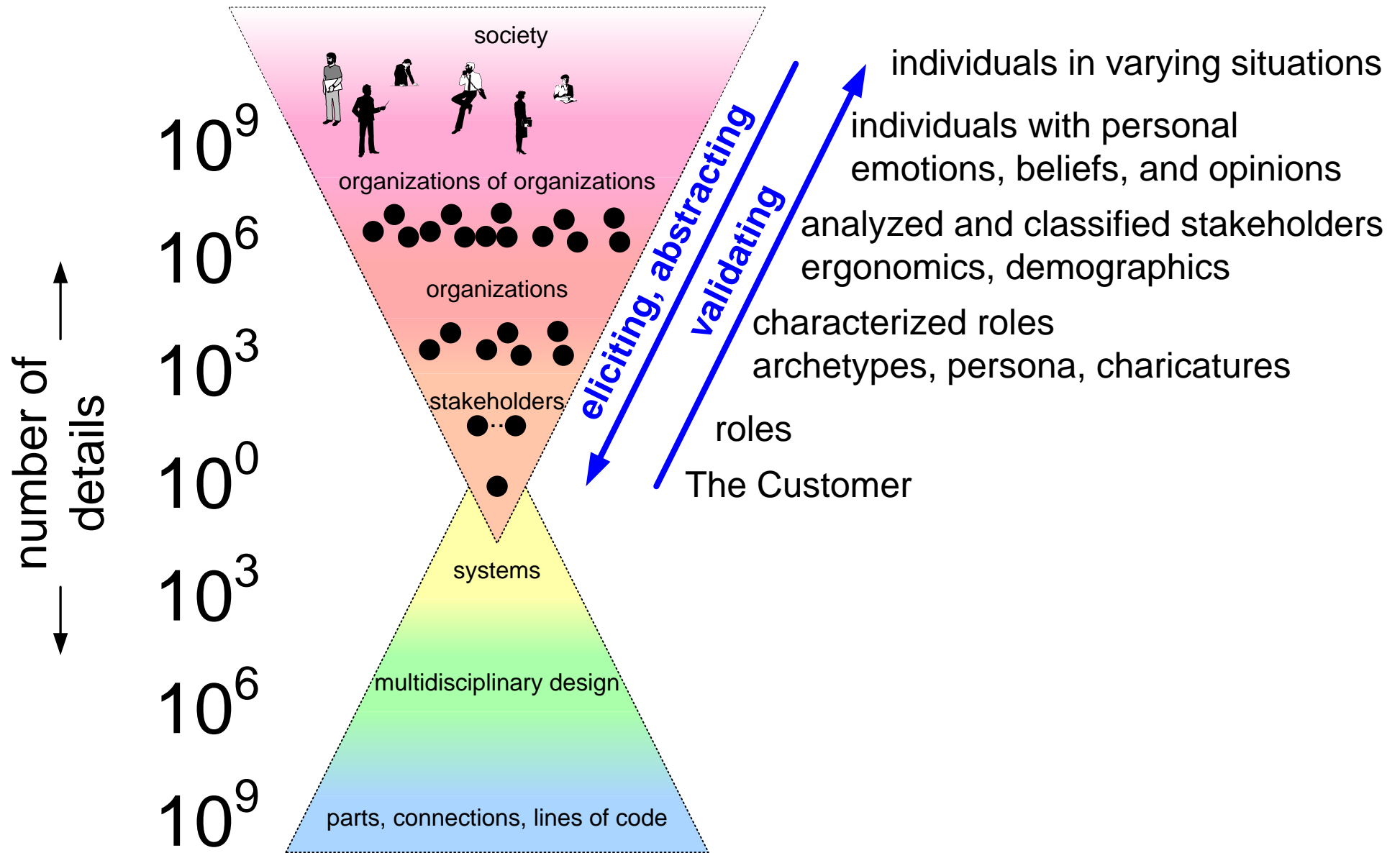
# The Context of a System-of-Interest



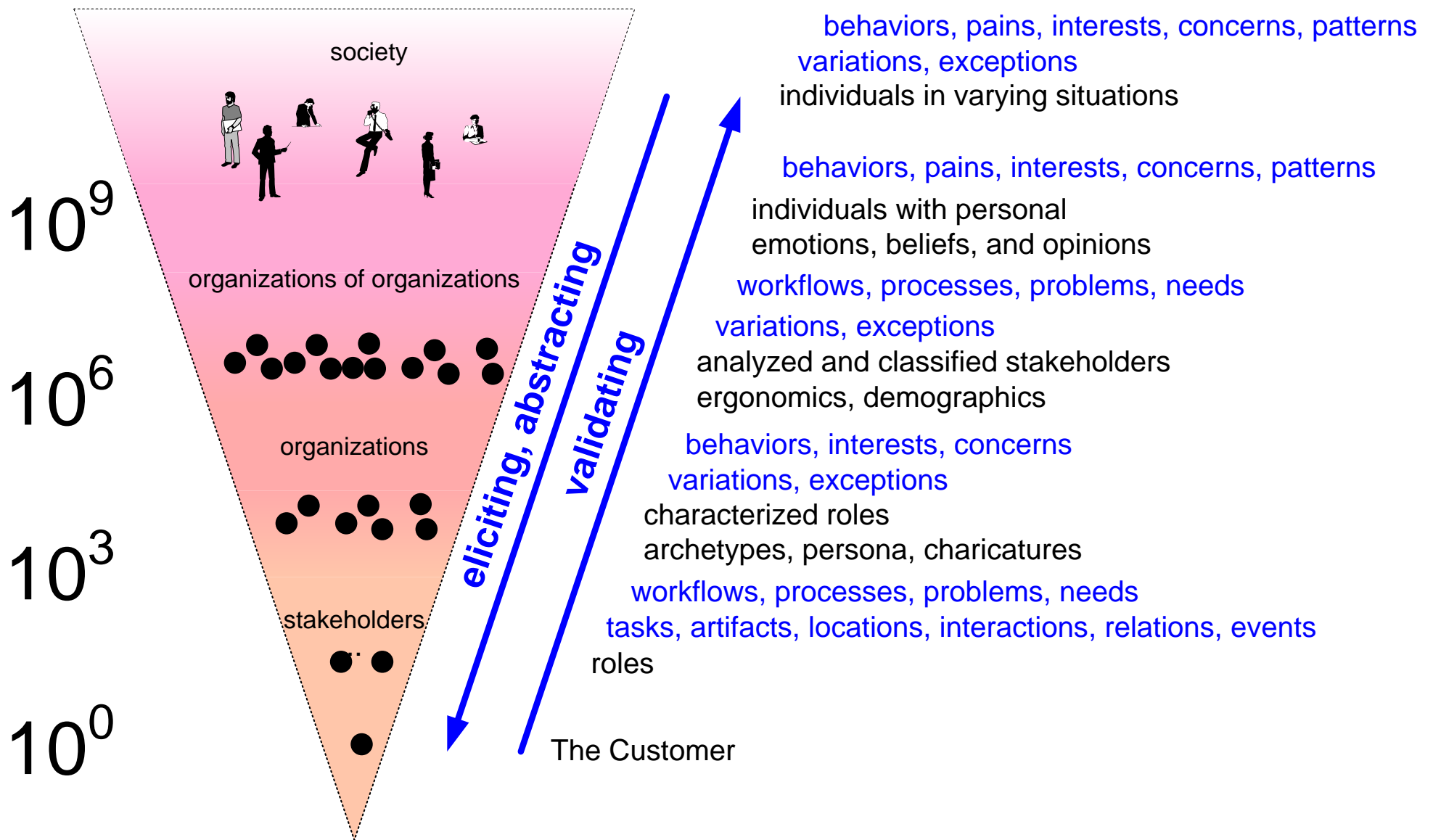
# Stakeholders: Psychological and Socio-Political



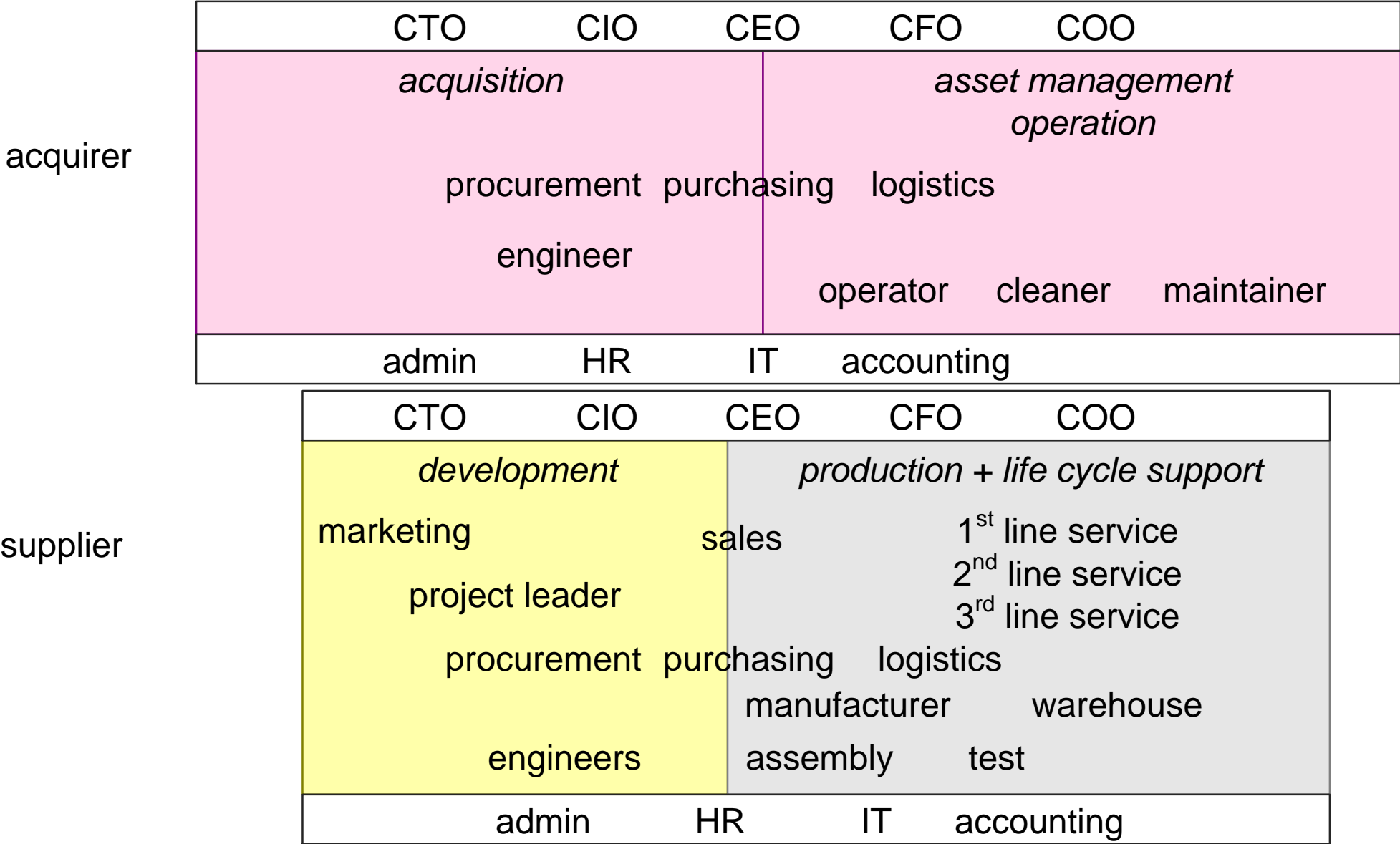
# Abstraction from Humans to Roles



# Elaborating What to Observe



# Generic Roles Business-to-Business



# Making Roles More Specific

Defining **personas** is way to make roles less abstract

Defining a set of **archetypes** may help in reasoning about variations

Sketching **caricatures** brings the insights more alive

*plant*  
creative

*team worker*  
cooperative,  
averts friction

*implementer*  
disciplined, conservative,  
doer

*resource investigator*  
enthusiastic  
communicator

*shaper*  
driver, dynamic

*completer finisher*  
conscientious, painstaking

*coordinator*  
mature, chairman

*monitor evaluator*  
sober, analytical

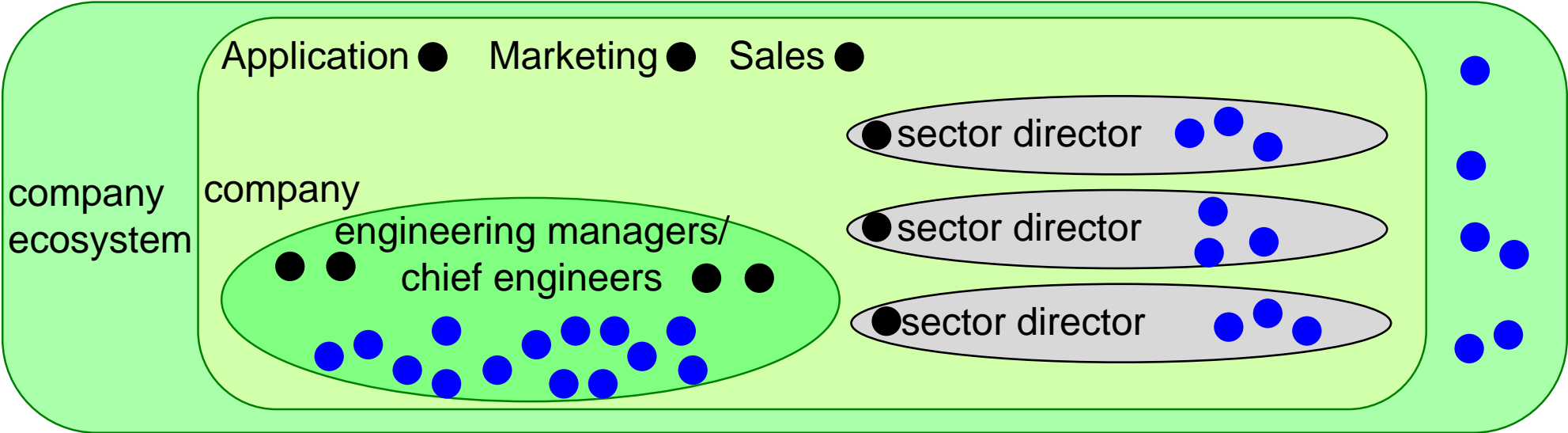
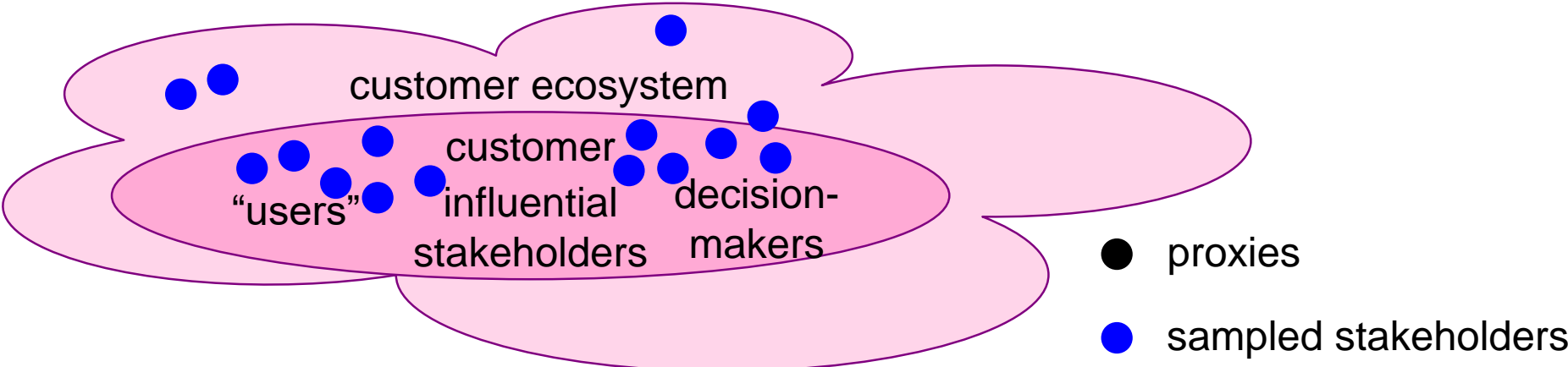
*specialist*  
single-minded, rare skills

Belbin's archetypes



**Caricature** of a sergeant major  
courtesy Bas van Zunderd

# Multiple People Engage Stakeholders



# Multiple People Engage Stakeholders 2

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- Sales: customer stakeholders with decision power or big influence
- Marketing: customer stakeholders and the wider customer ecosystem
- Application: customer stakeholders that actively work with the system
- Sector directors: (manufacturing, customer support, etc.) life cycle stakeholders and the wider life cycle ecosystem
- Systems engineers: sampling enough relevant stakeholders to work with their problem and topic of interest

**How can systems engineers know what is enough sampling and what stakeholders are relevant?**

# Increasing Competences to Achieve a Trustful Network

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**engaging** more effectively with stakeholders and **building** a **network** and **trust**

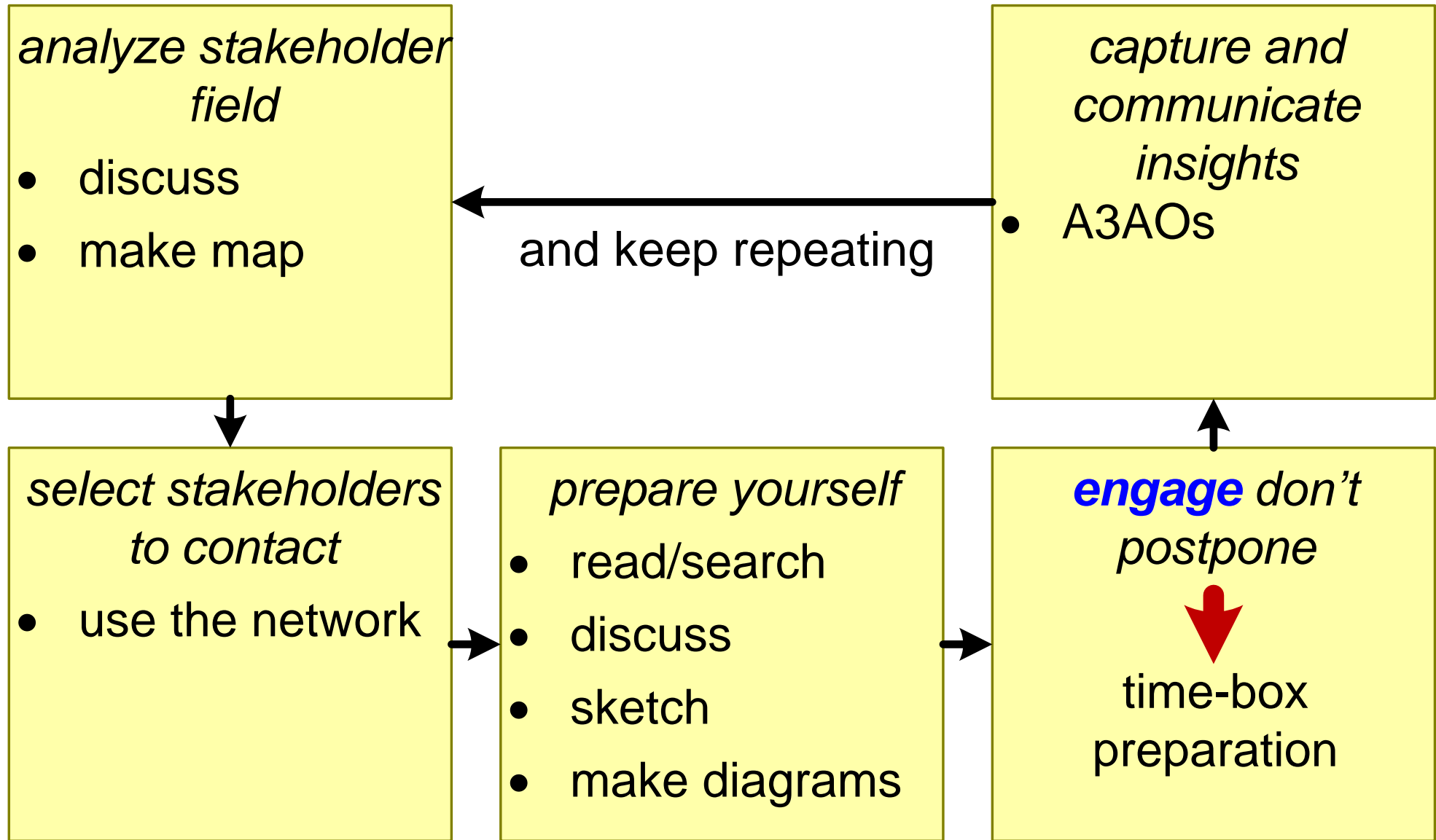
**empathizing** with stakeholders

**understanding** stakeholder **pains, concerns, interests,** and **needs**

**understanding what** they **do, how** they **do** it, **what** they **use,** **whom** they **communicate** with

**listening** and **observing** stakeholders in their **environment**

# Approach to Engaging Stakeholders



# Do You Have Energy for Final Engagement?

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- What are your main take-aways?
- Any Questions?
- What were the benefits of this tutorial
- What were the concerns related to the tutorial?