

Tutorial How to Orchestrate in Ecosystems?

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

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`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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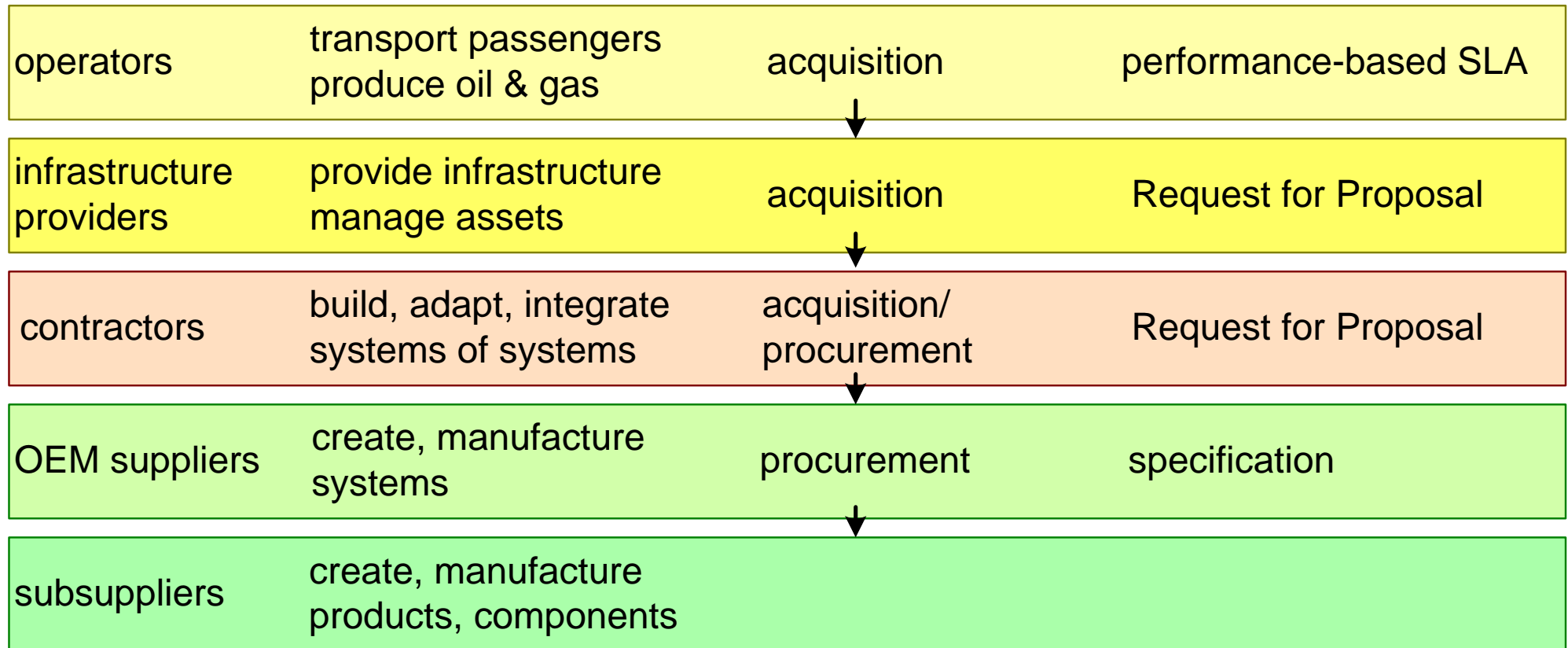
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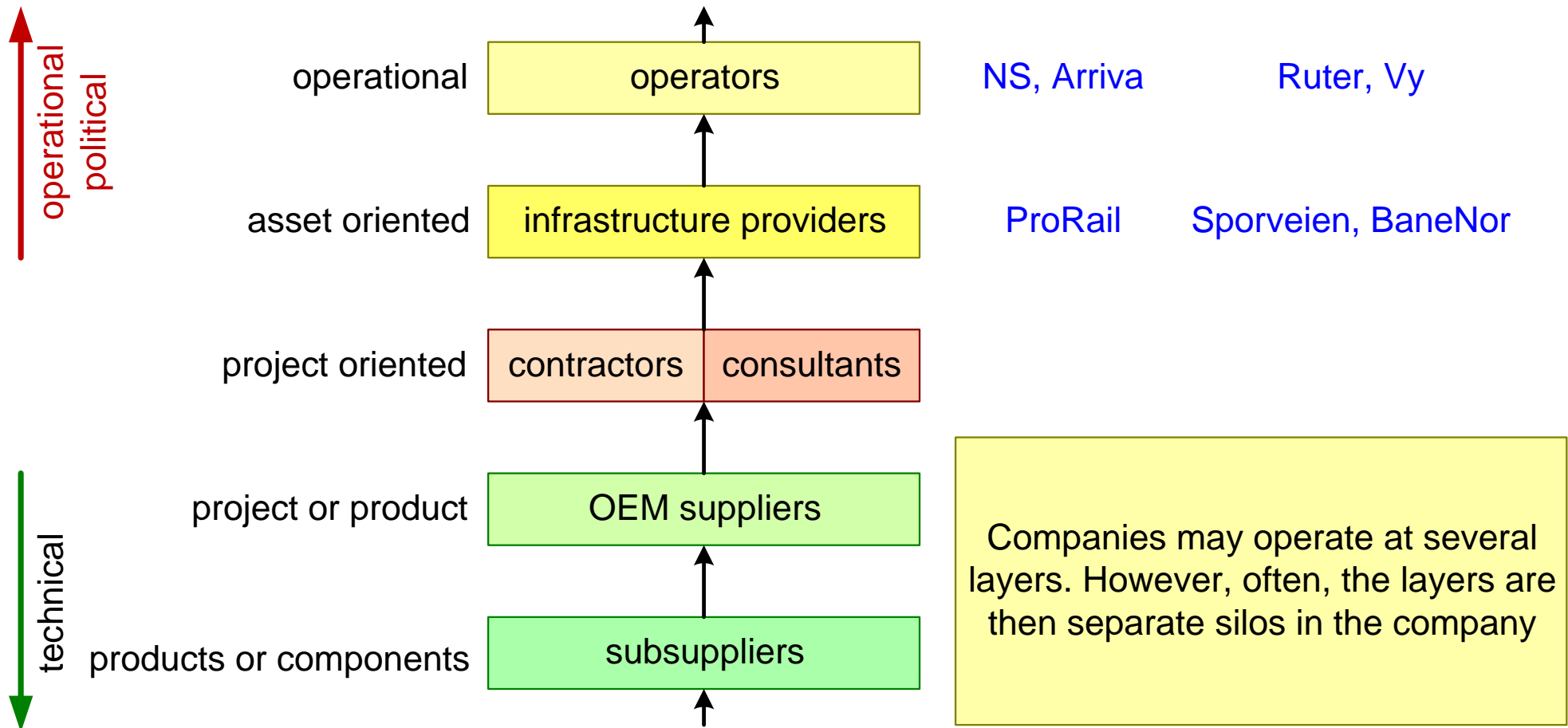
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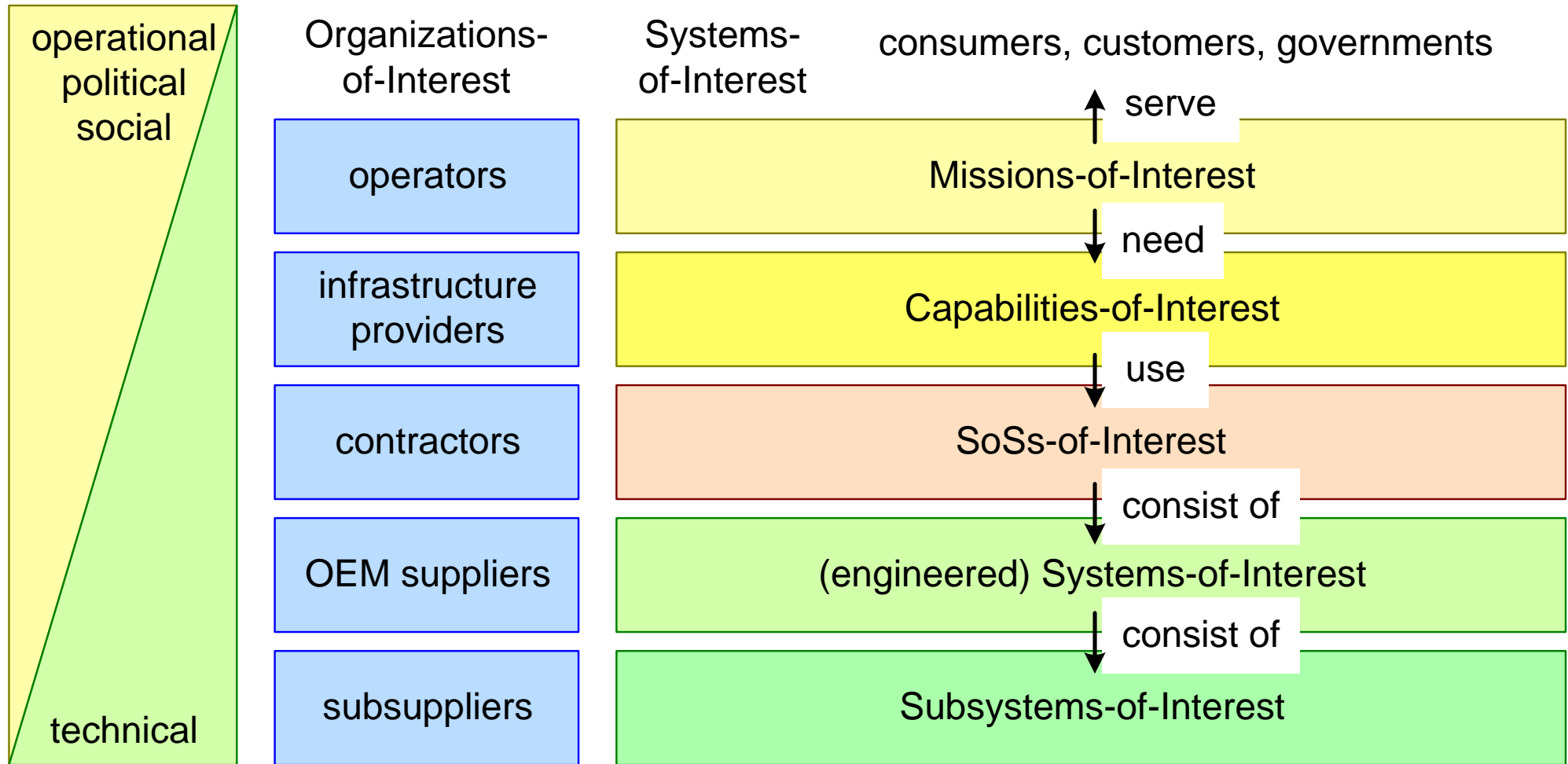
Characterization of Domain Layers



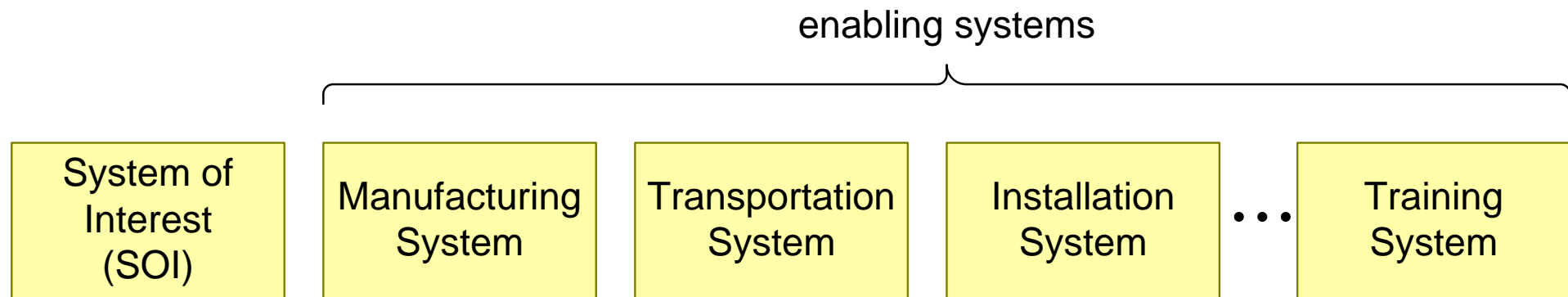
Positions in the Value Network Differ in Nature



Perspective Changes from Layer to Layer

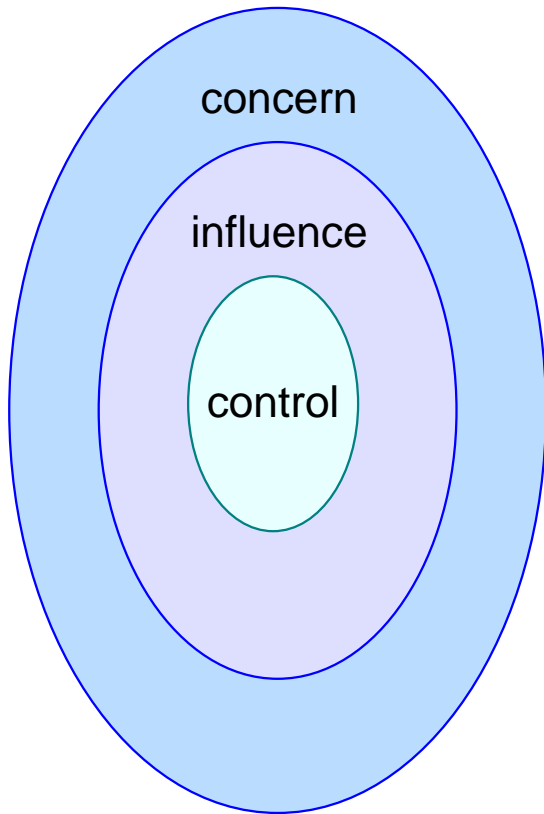


Development Has to Develop the Sol and the Enabling Systems

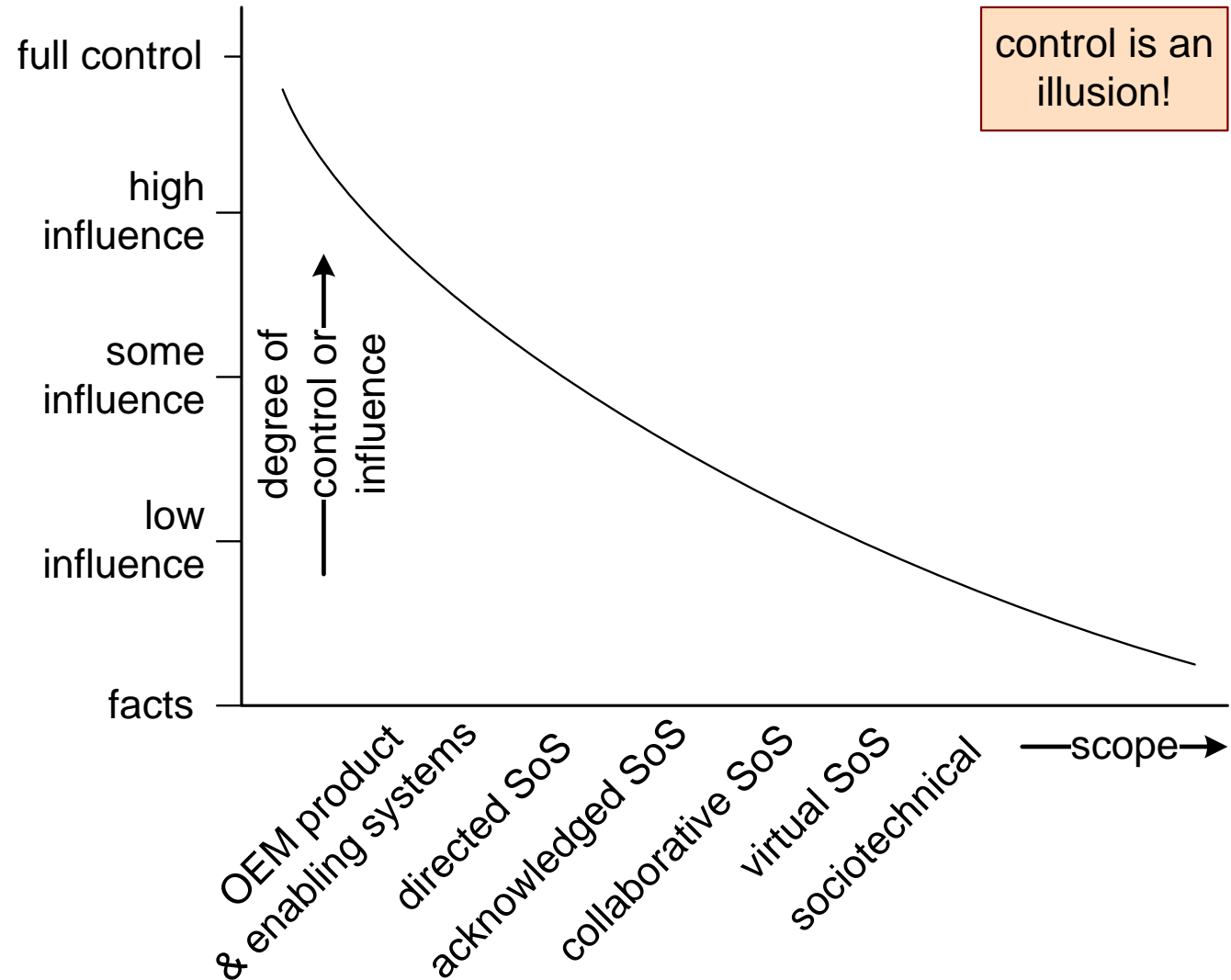


Development and Engineering must develop the System of Interest and all Enabling Systems

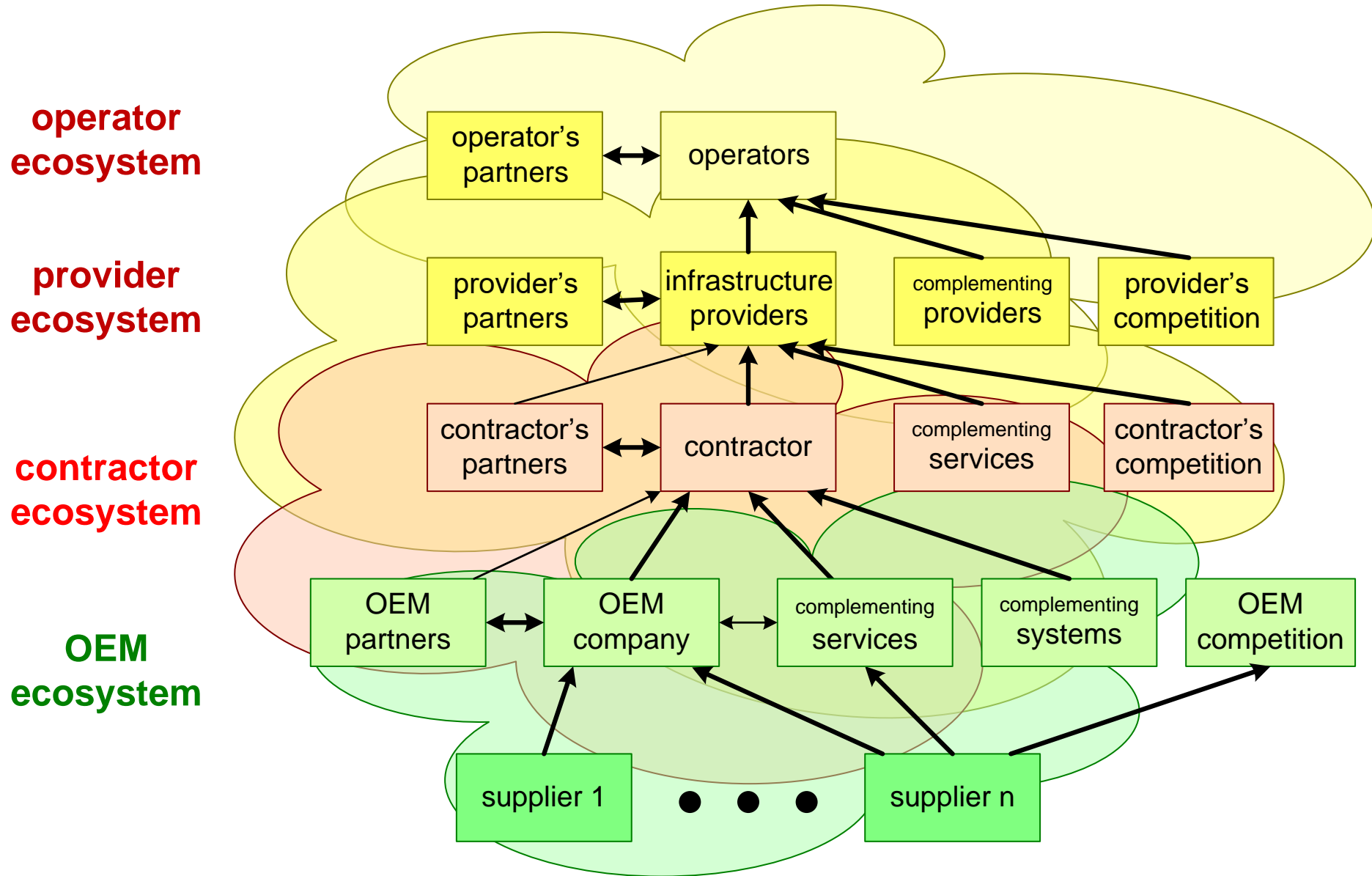
The Level of Influence Decreases with Scope



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



Each System is Part of its Ecosystem



Nugget: What is a Process?

by *Gerrit Muller* USN-SE

e-mail: `gaudisite@gmail.com`

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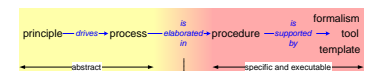
Abstract

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

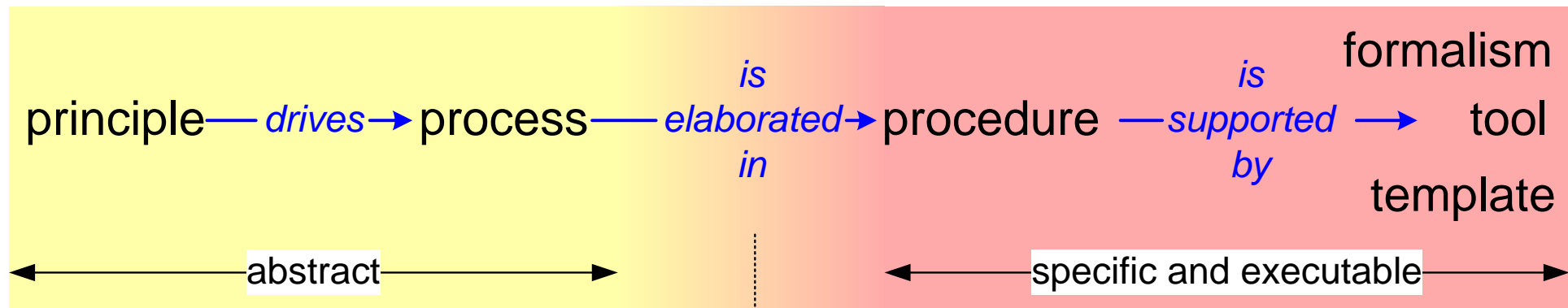
Structure How will the goal be achieved

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



Process Decomposition of a Business

by *Gerrit Muller* USN-SE

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Abstract

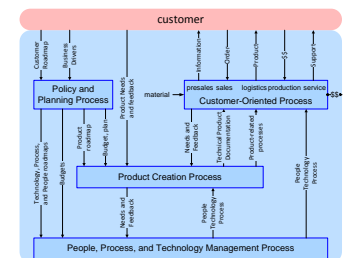
This article positions the system architecture process in a wider business scope. This positioning is intended to help understanding the processes in which the system architect (or team of system architects) is involved.

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.

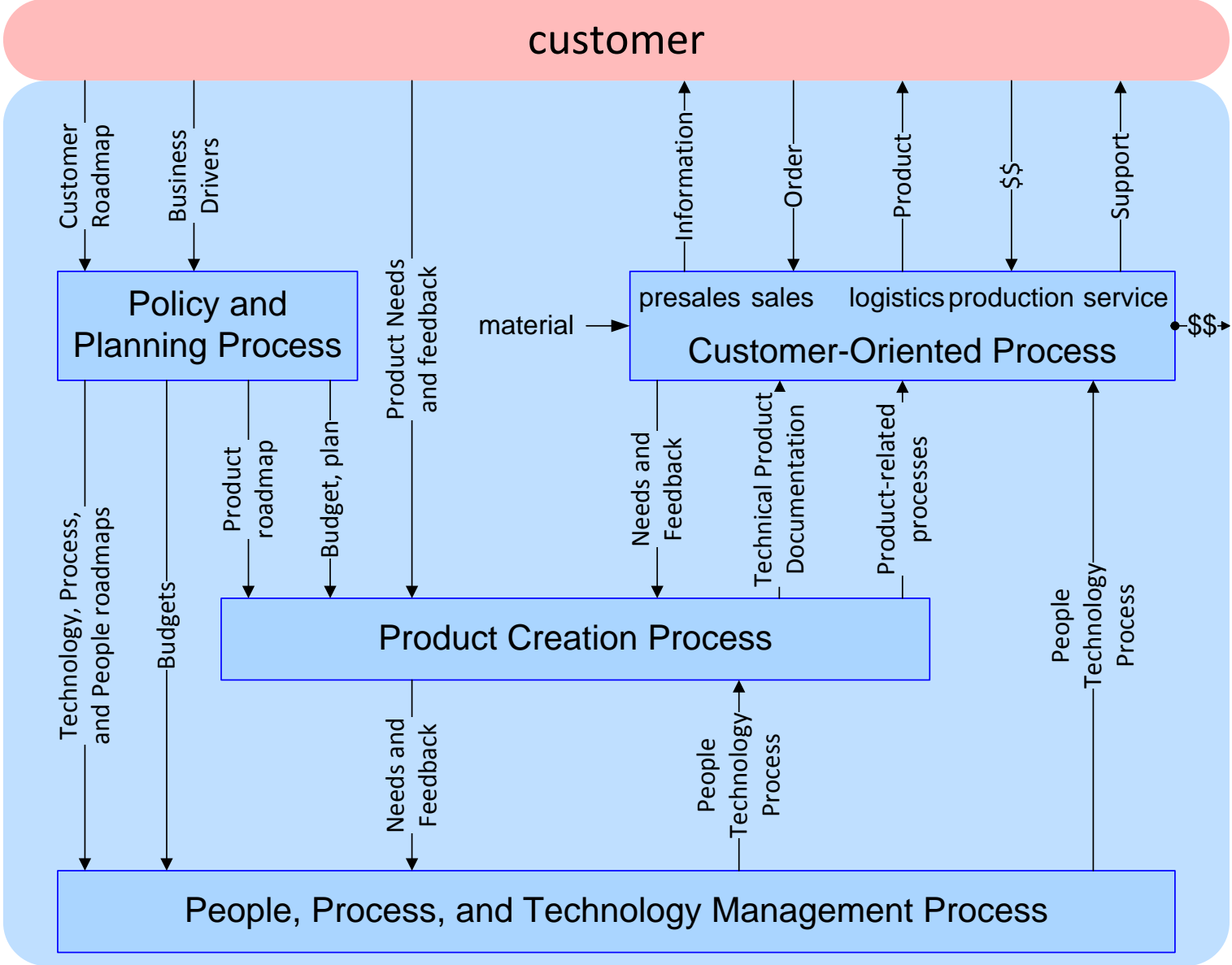
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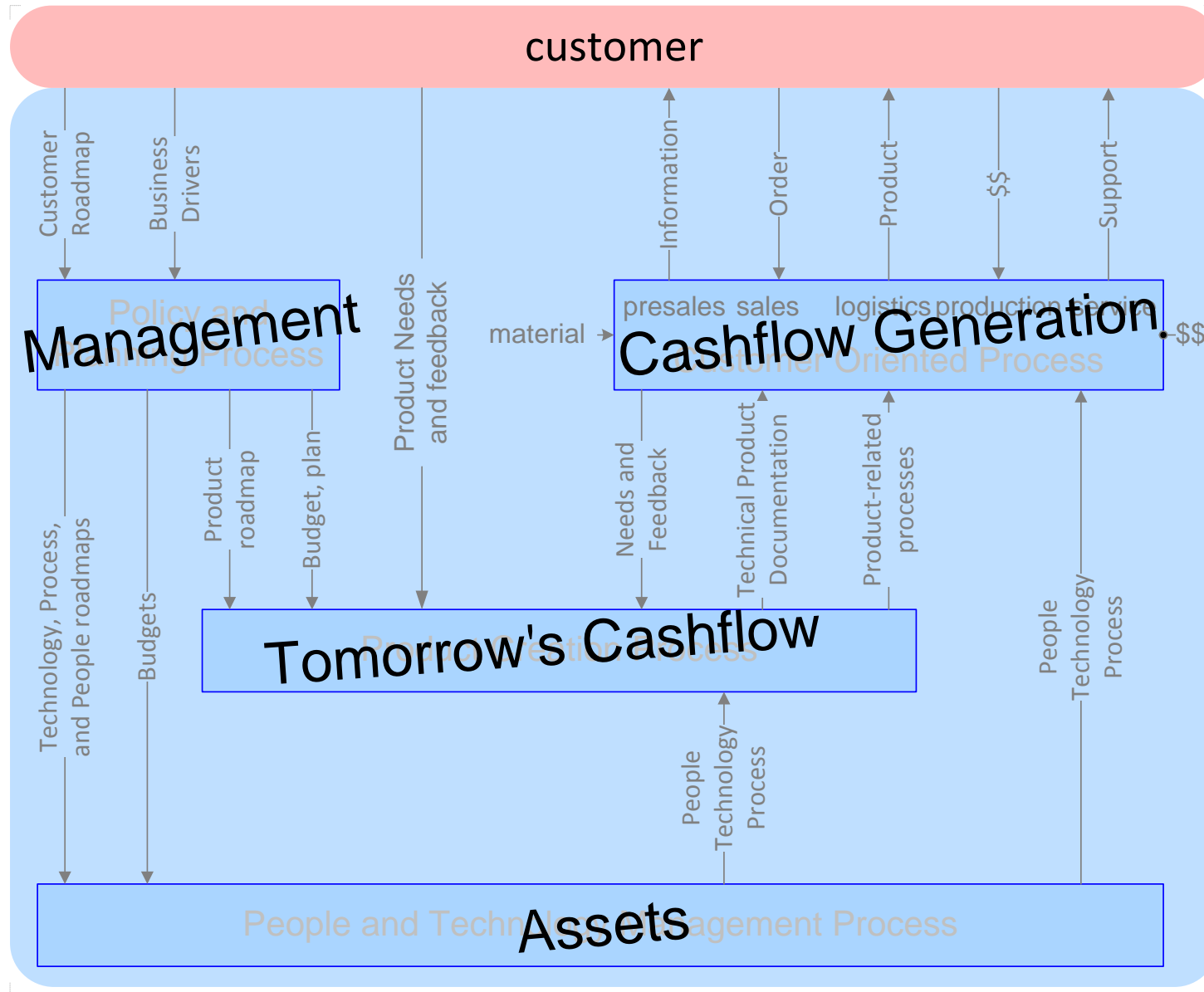
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Simplified Decomposition of the Business



Financial Characterization of Decomposition



Multiple Instances per Process

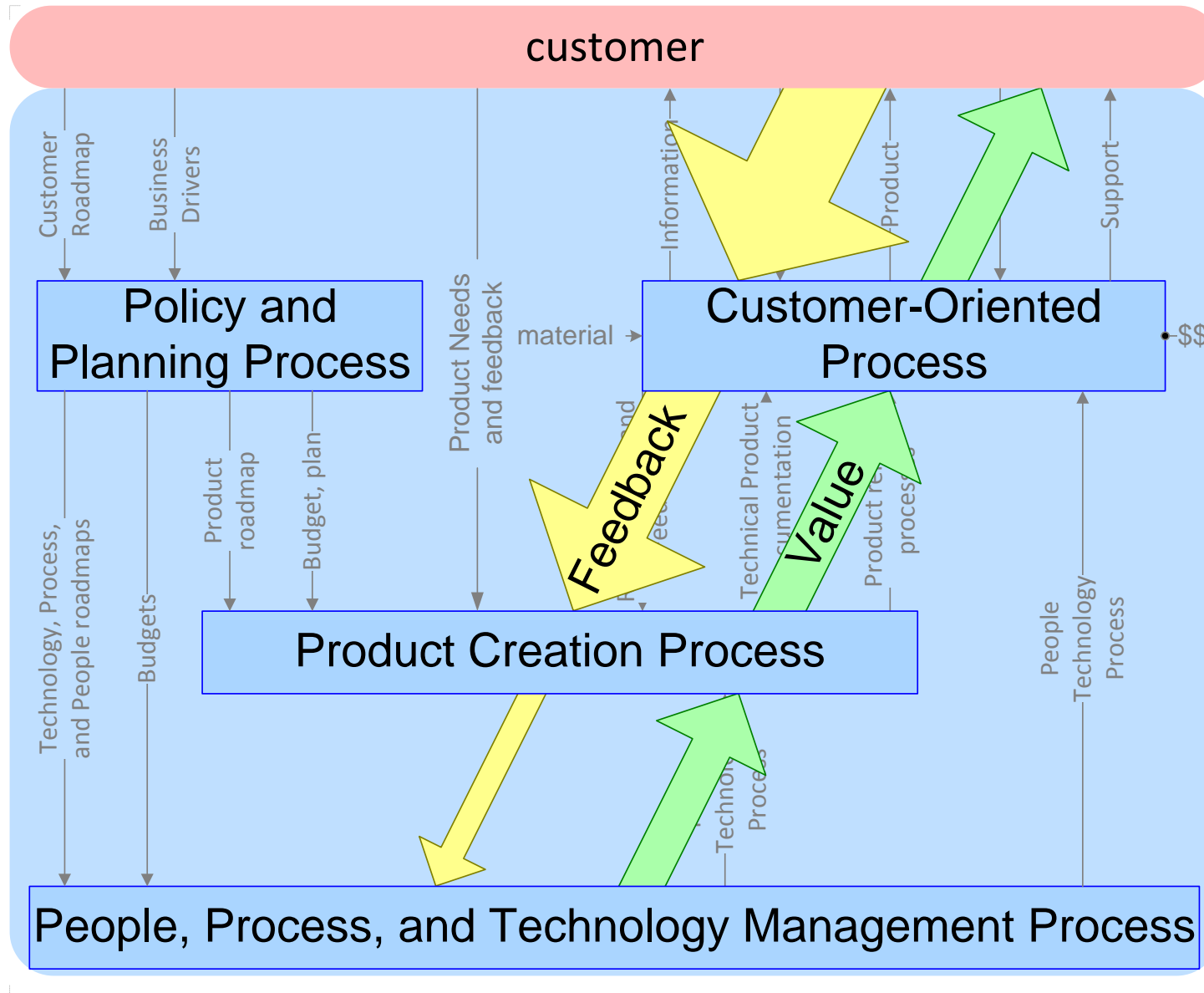
Customer Oriented Process: Depends on geography, customer base, and supply chain.

Product Creation Process: One per entity to be developed, where such an entity can be a product family, a product, or a subsystem.

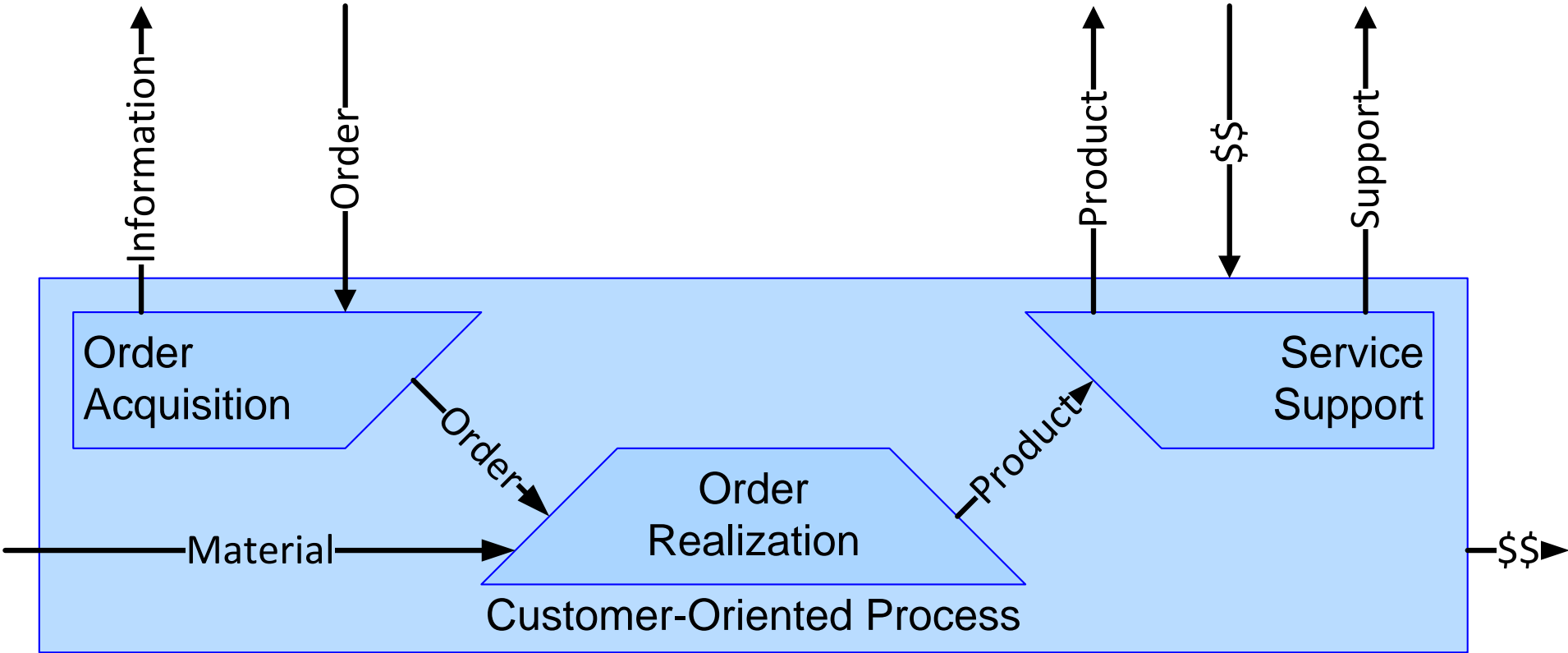
People and Technology Management Process: One per “competence”, where a competence is a cohesive set of technologies and methods.

Policy and Planning Process: One per business. This is the pro-active integrating process.

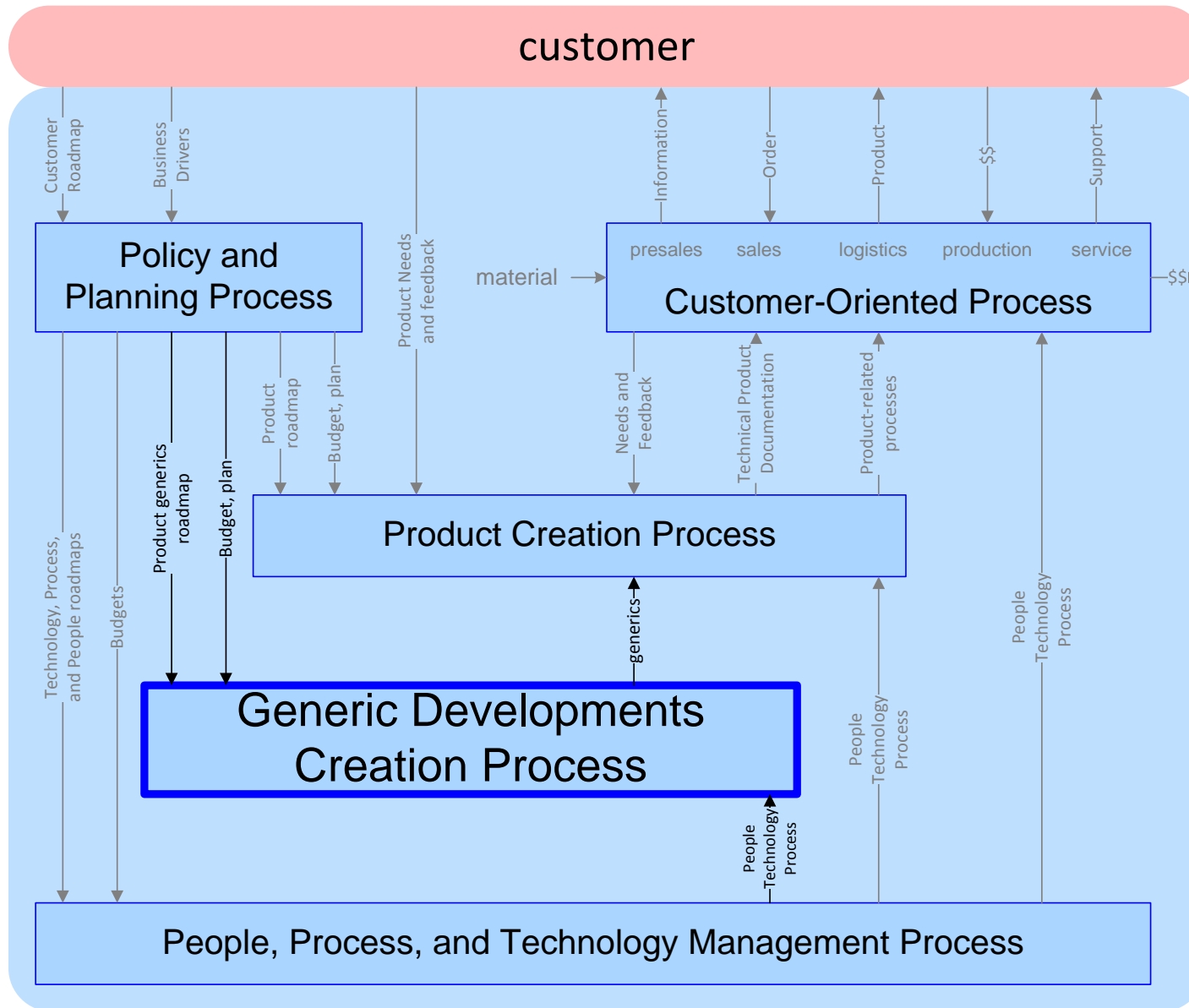
The Value Chain and the Opposite Feedback Flow



Decomposition of the Customer Oriented Process



Extended with Generic Developments



Process Decomposition of an Acquisition Organization

by *Gerrit Muller* USN-SE

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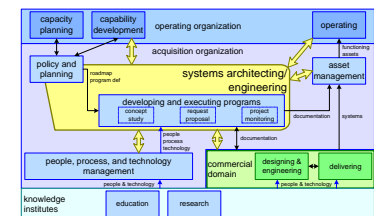
Abstract

This article positions the system architecture process in an acquisition organization. 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 acquires systems that help to realize capabilities.

Distribution

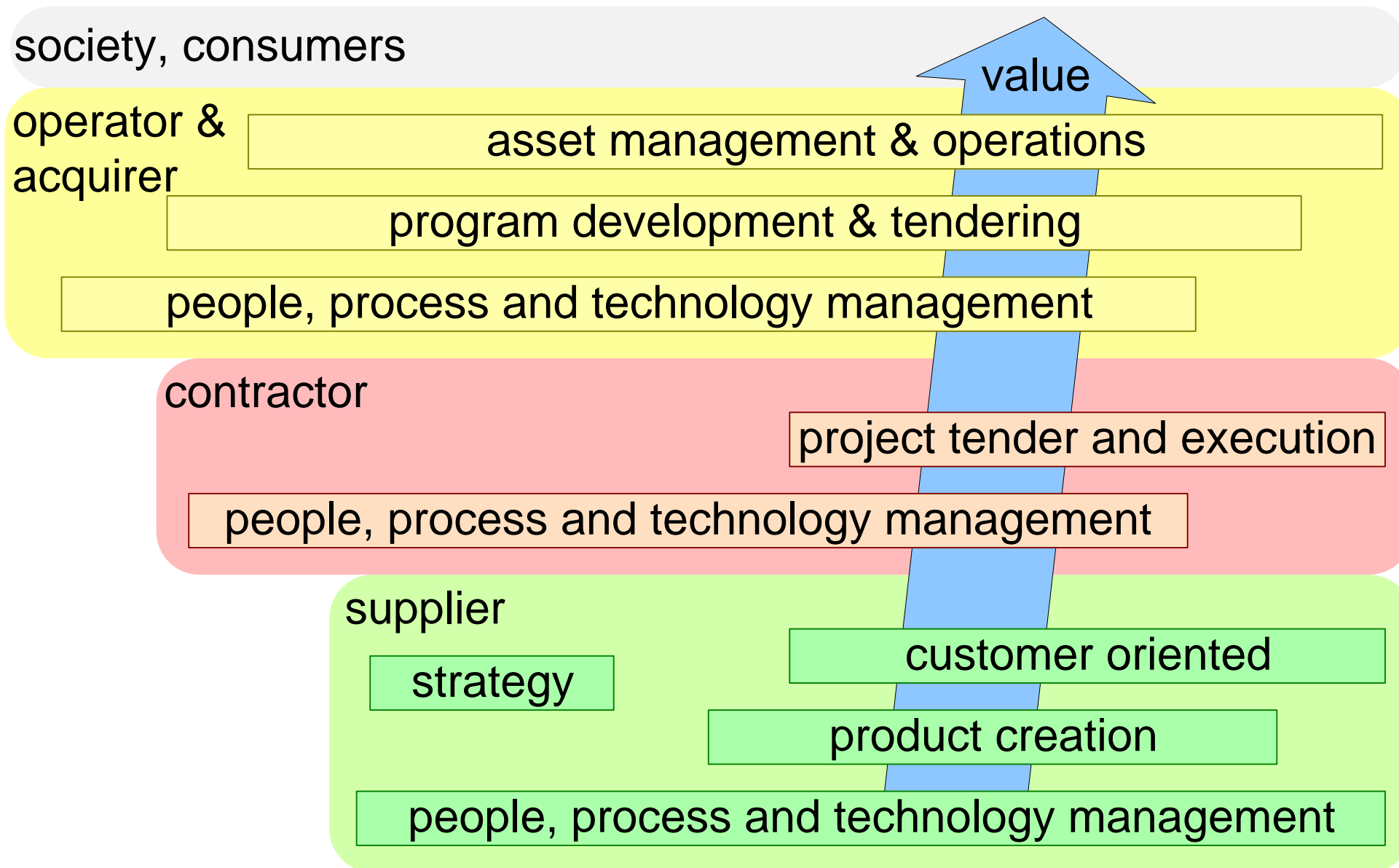
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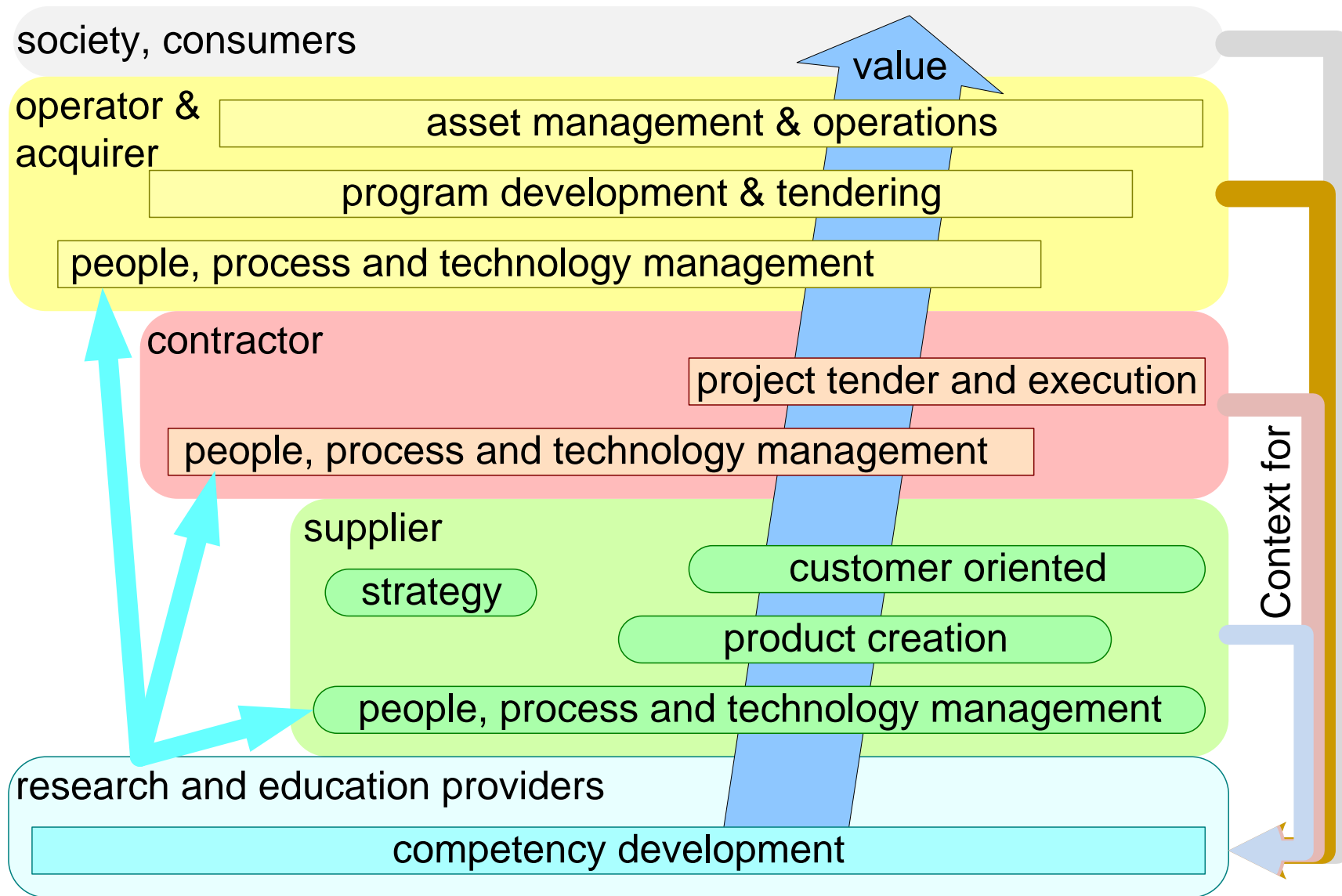


Simplified Decomposition of an Acquisition Organization

The Value Chain across the Layers



Research and Education as Long-Long-Term Process



Process Decomposition of a Contractor Organization

by *Gerrit Muller* USN-SE

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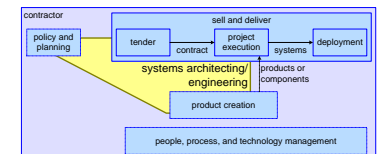
Abstract

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

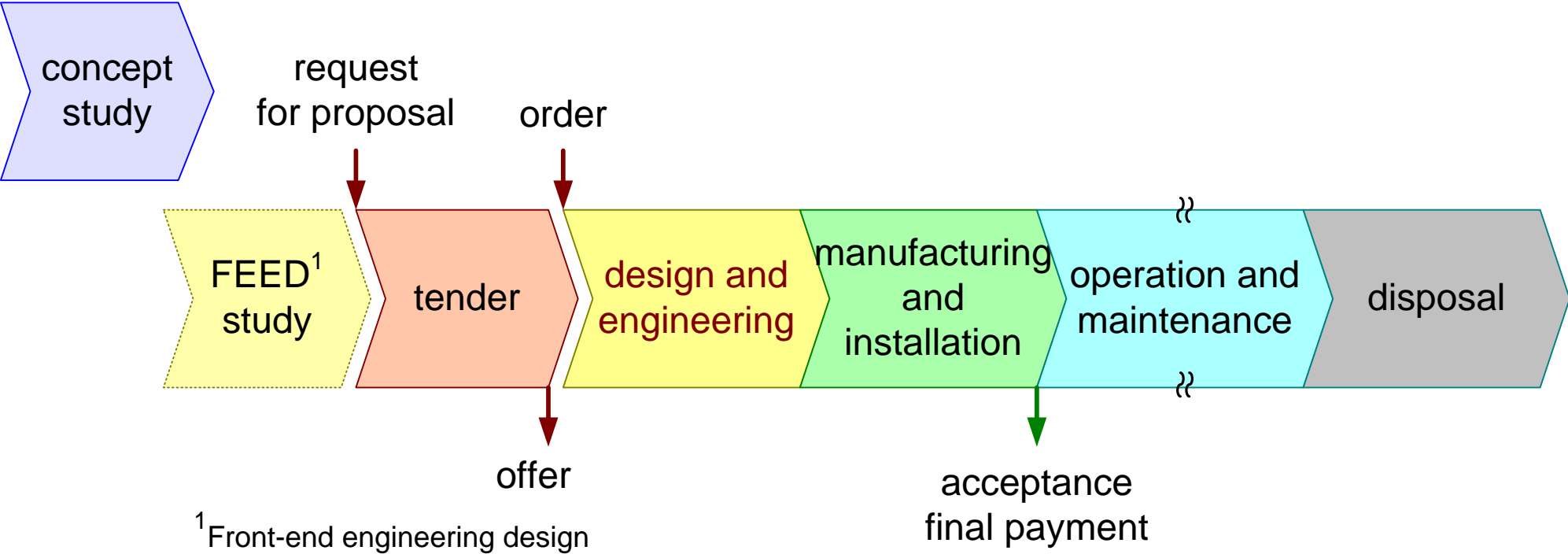
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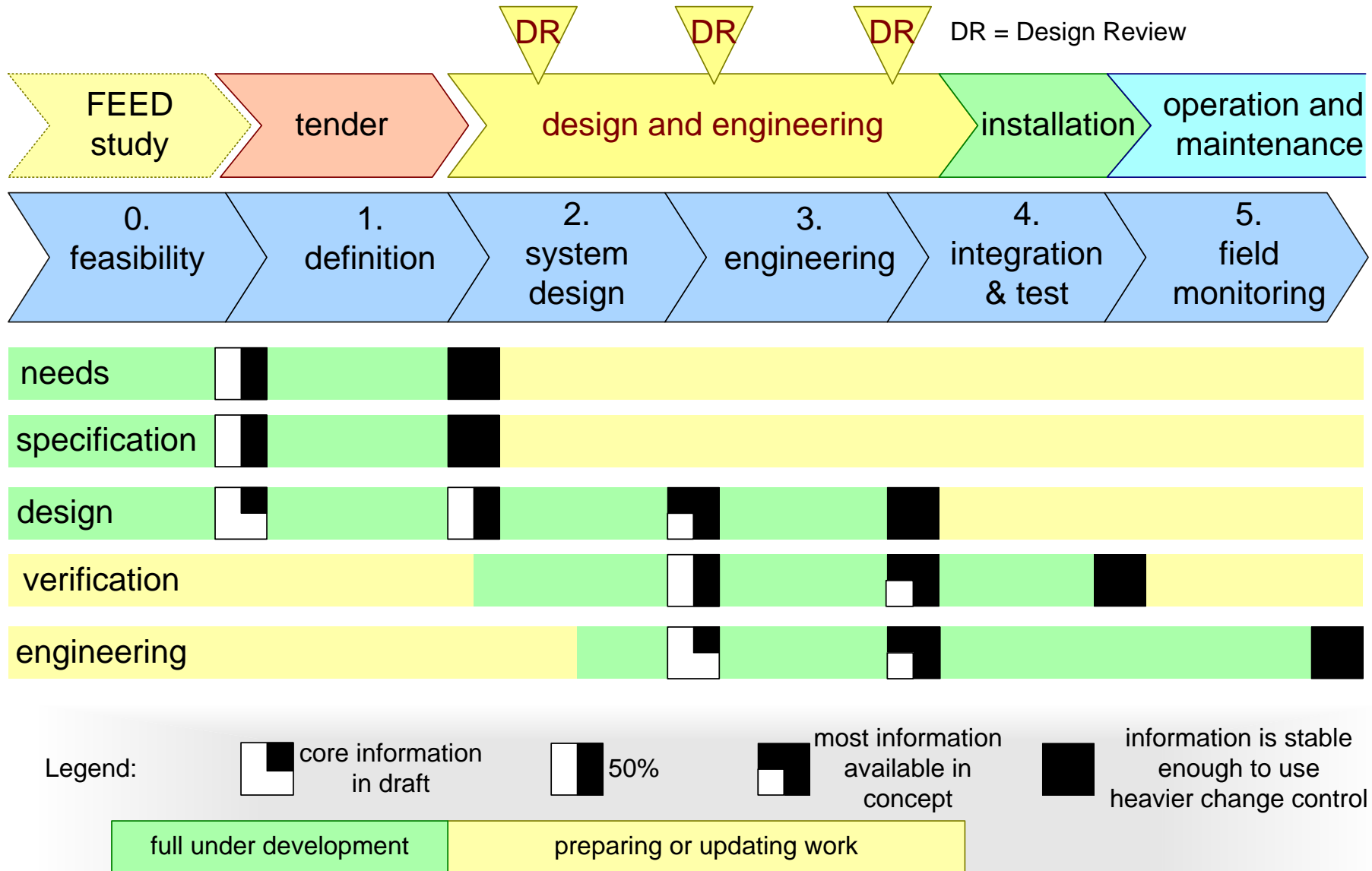
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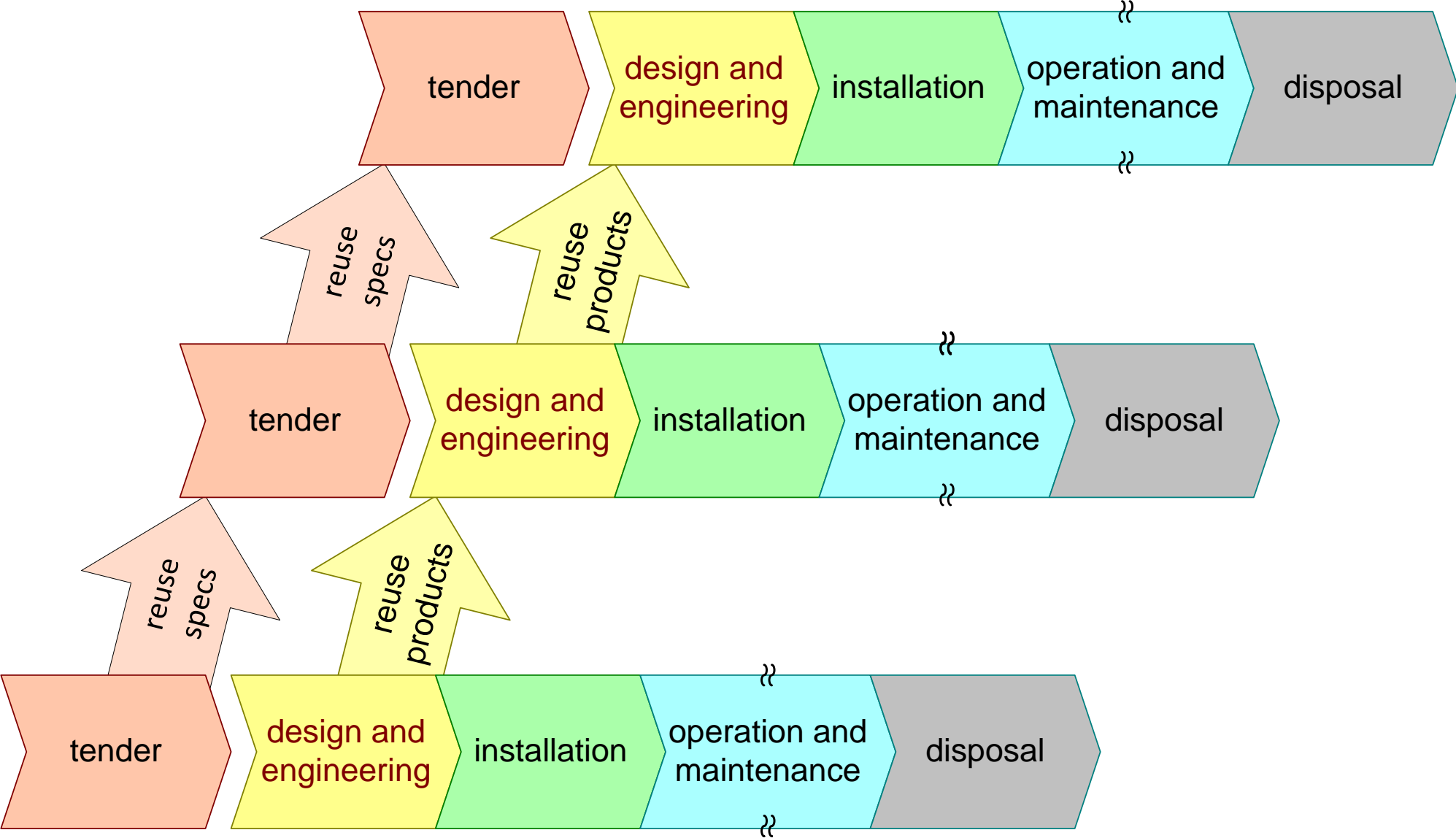
Project Life Cycle



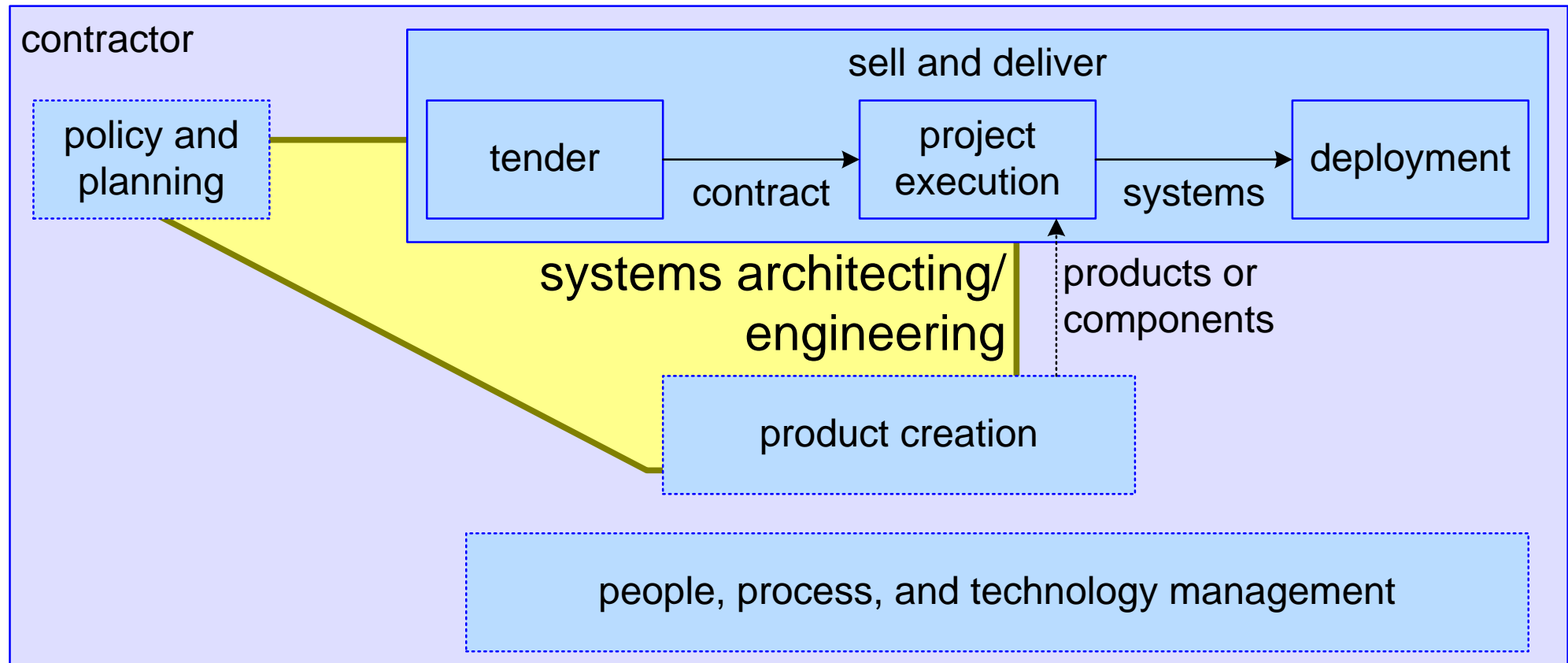
Phased Project Approach



How Projects Build on previous Projects



Simplified process diagram for project business



Developing Ecosystem Competences

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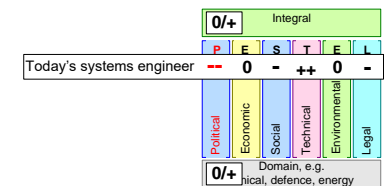
Abstract

This presentation shows what competencies will help across ecosystem organizations.

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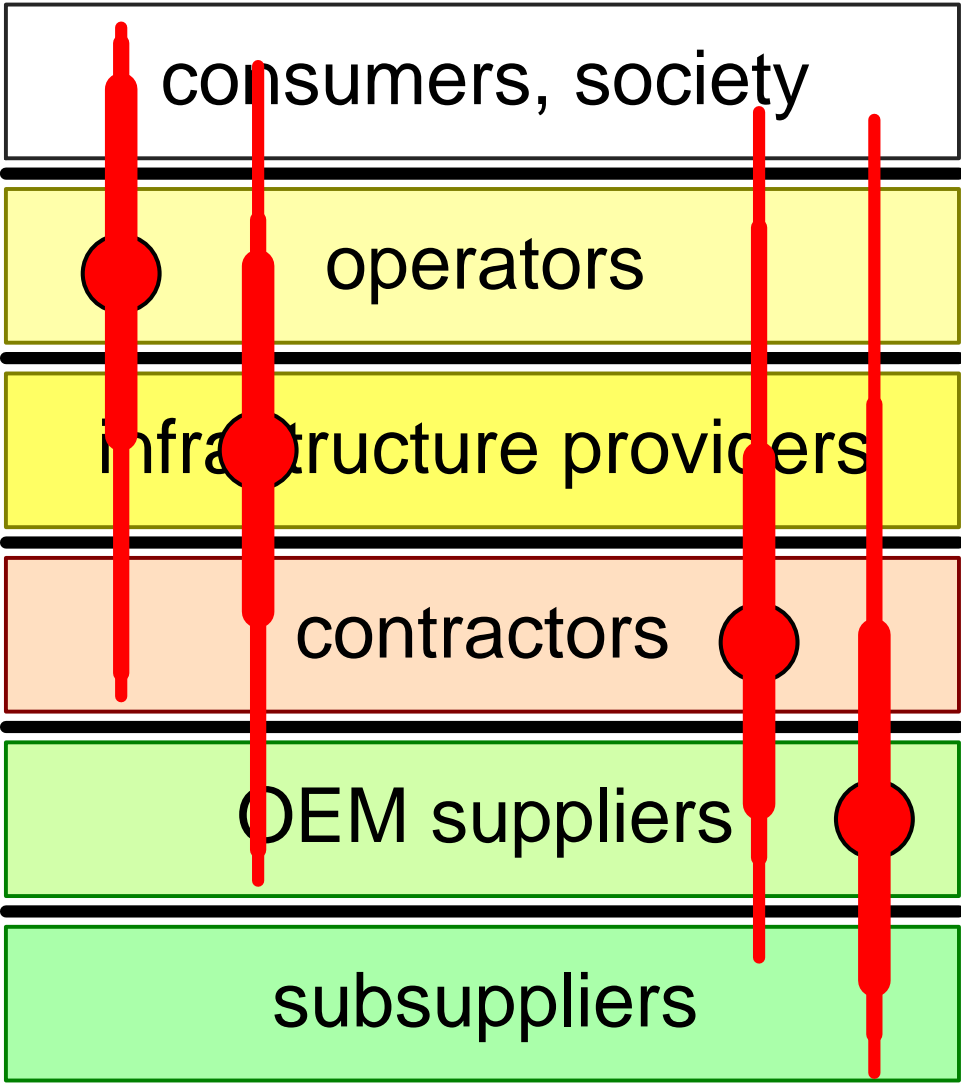
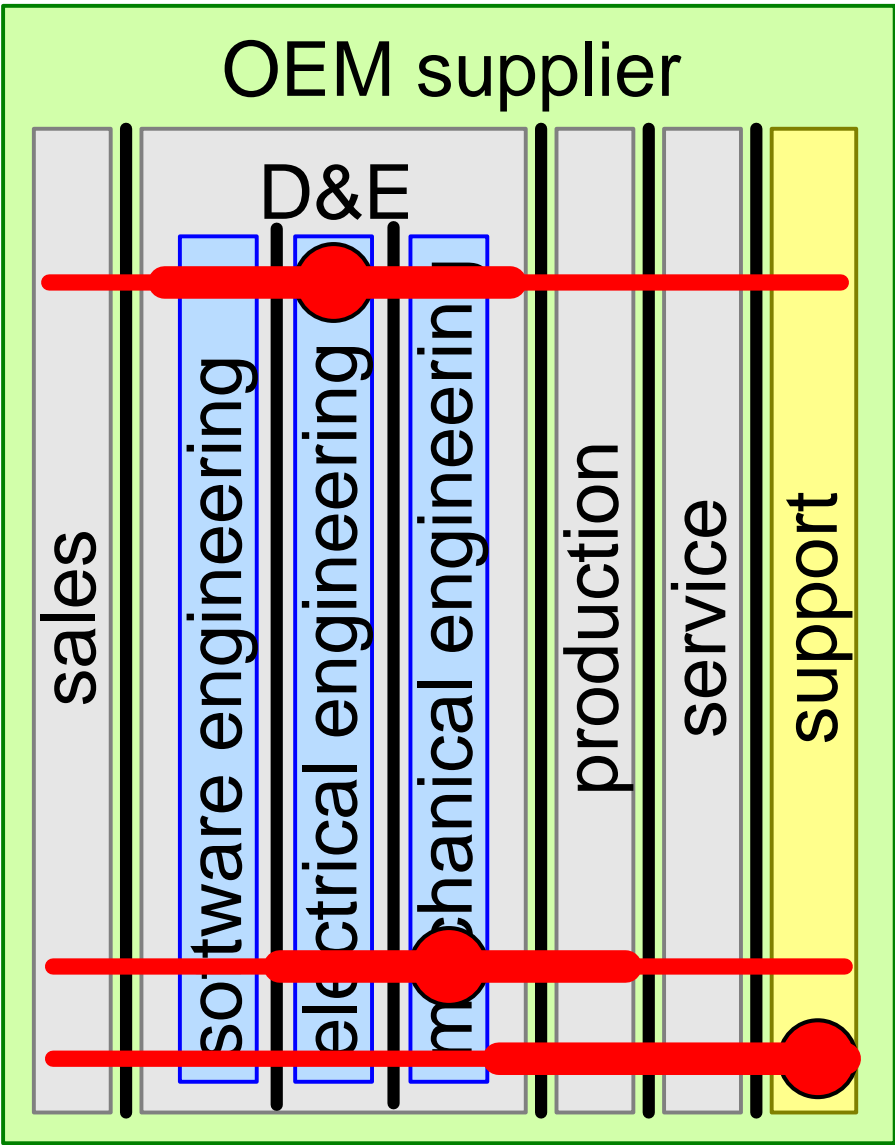
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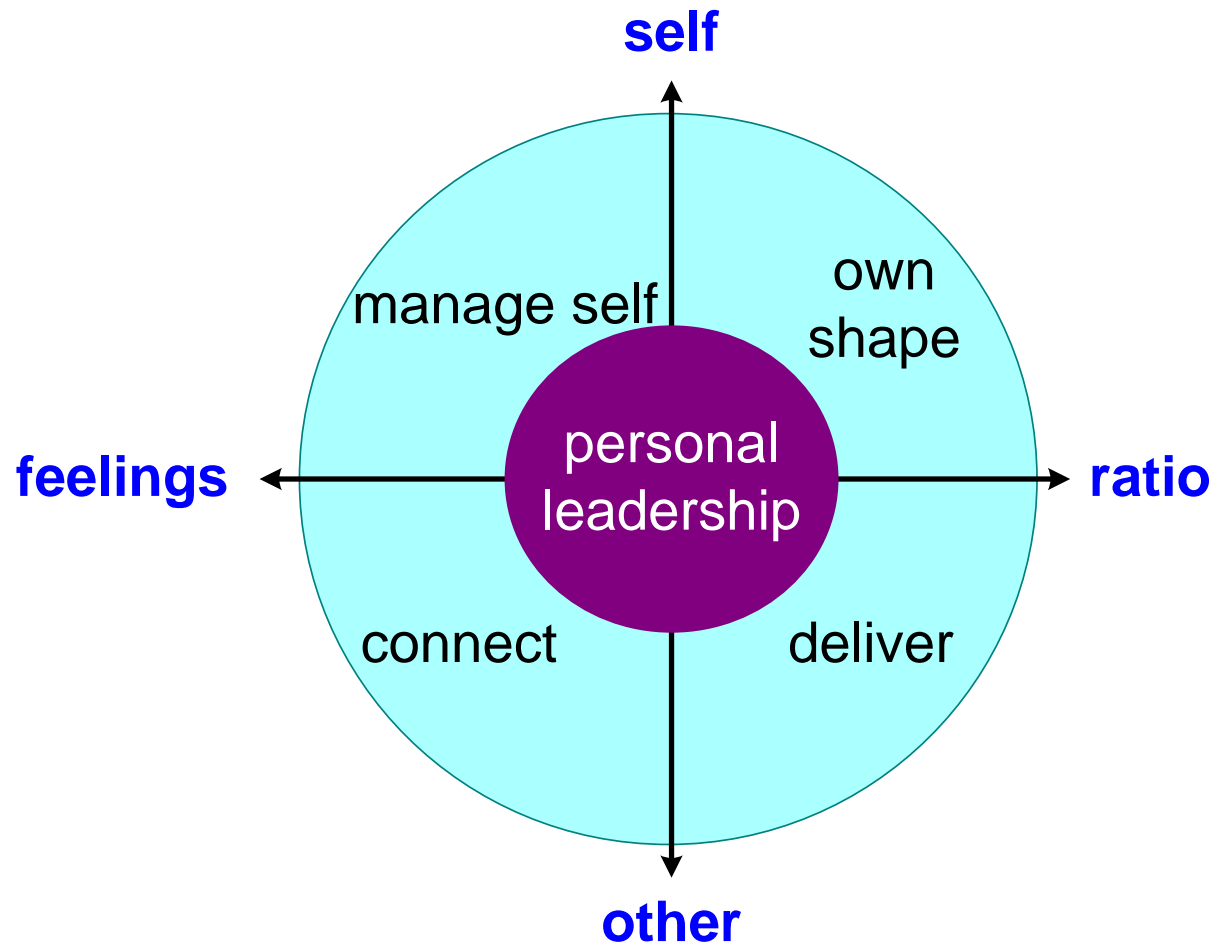
Orchestrating Content and Stakeholders Across Organizations

- **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

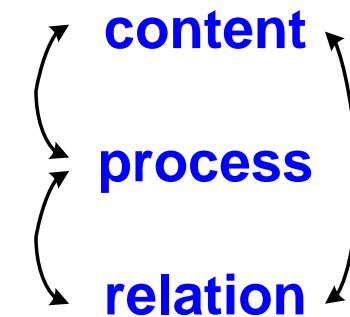
Most Organizations Need Orchestrators



Orchestration Builds on Leadership, as We Teach It

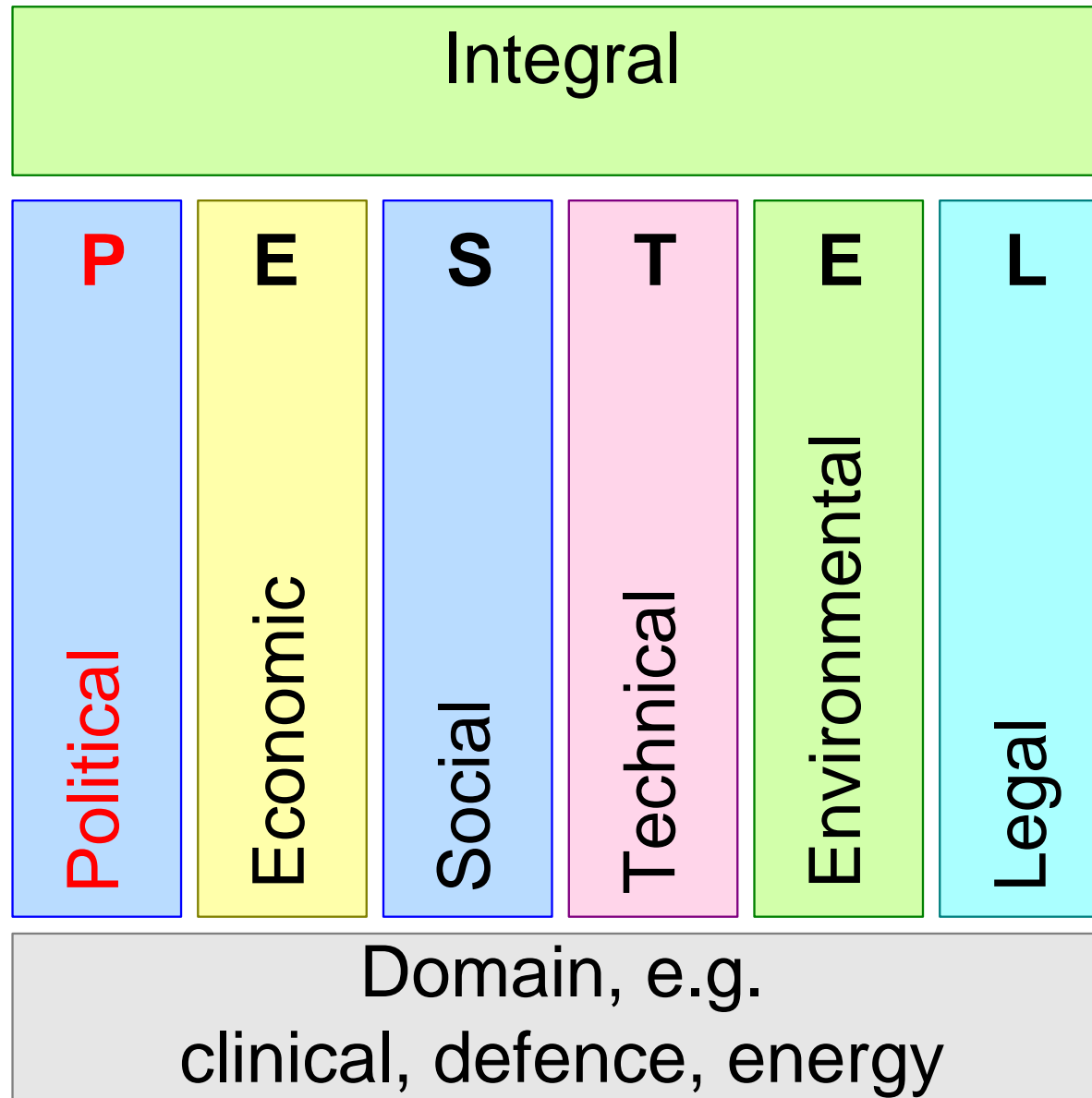


when stuck, change level

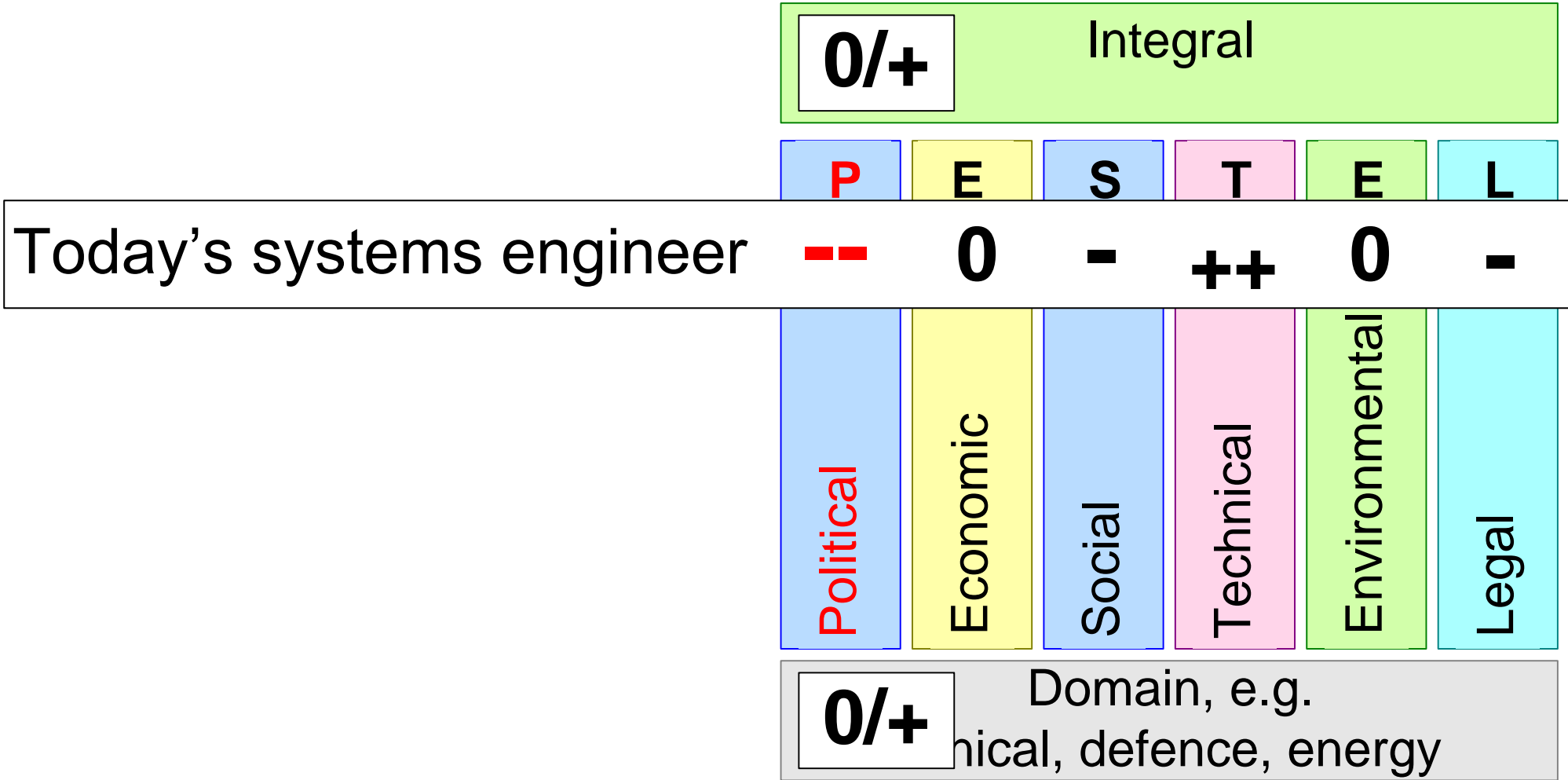


source: the LMS group
<https://thelmsgroup.nl/en/>

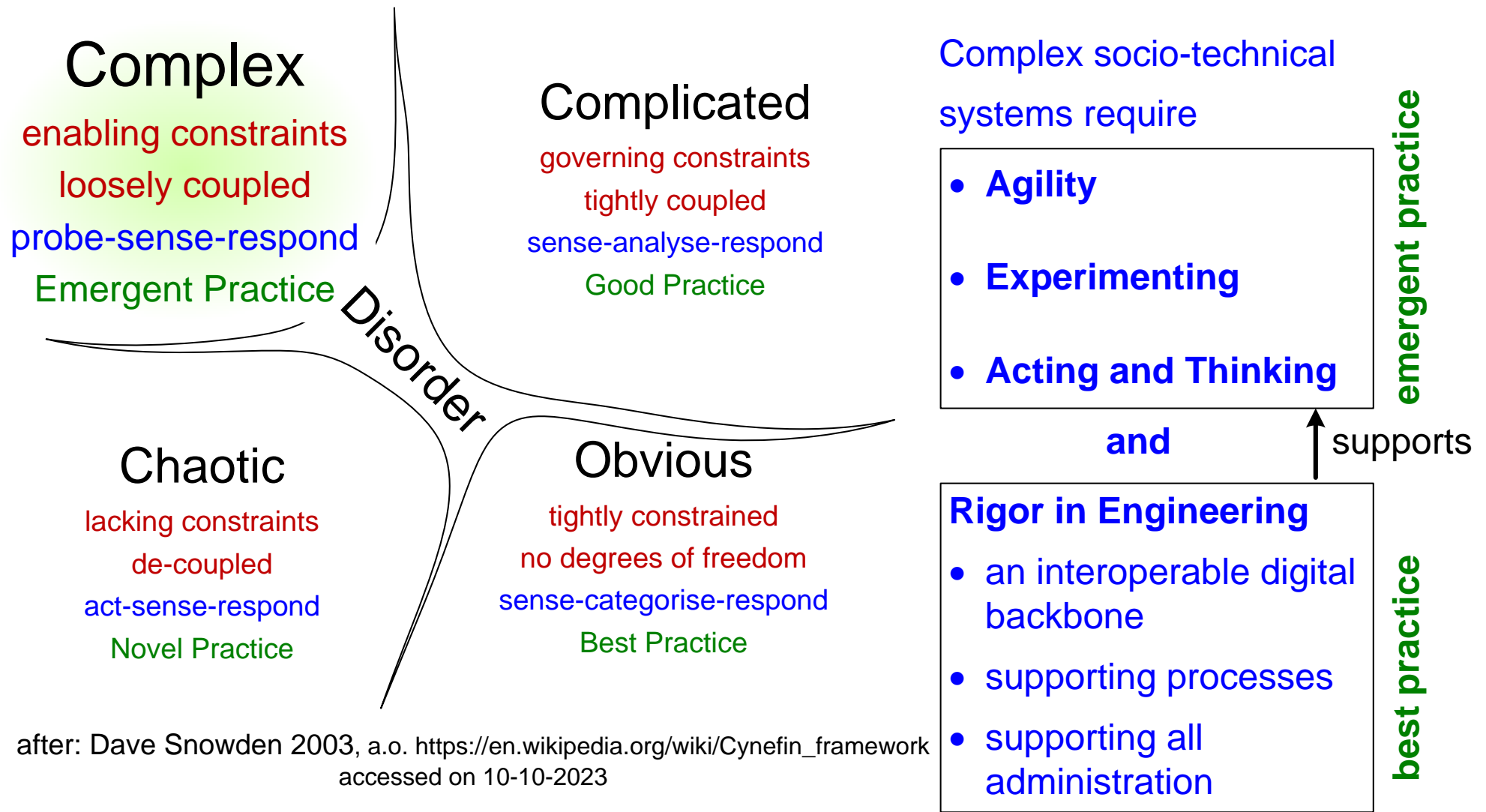
Capability to Handle a Breadth of Content



Significant Growth Needed!



Need: Fast Responding to Disruptive Changes: Agility!



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

Vision-Workshop How To

by *Gerrit Muller* USN-SE

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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.

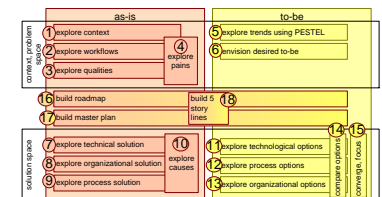
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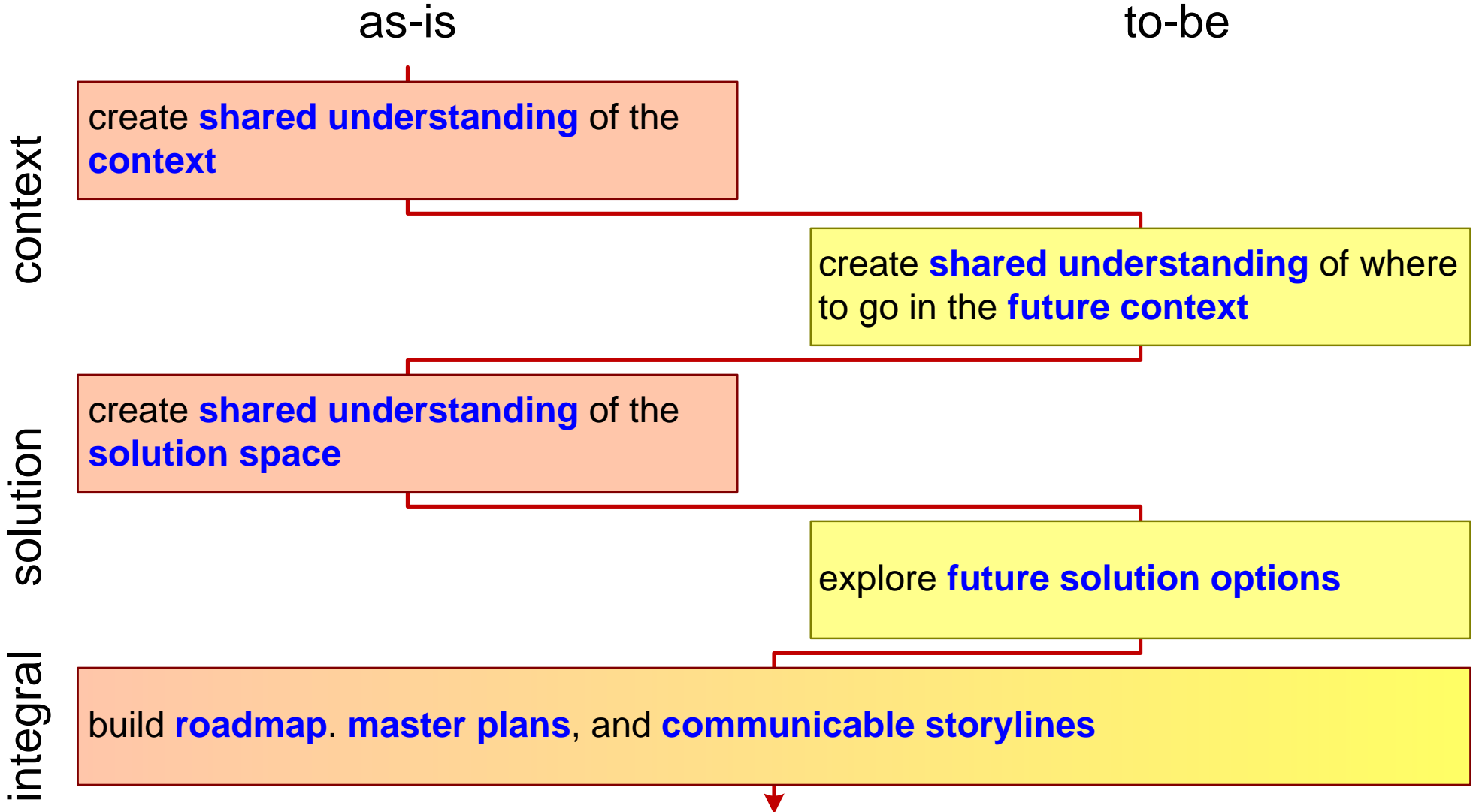
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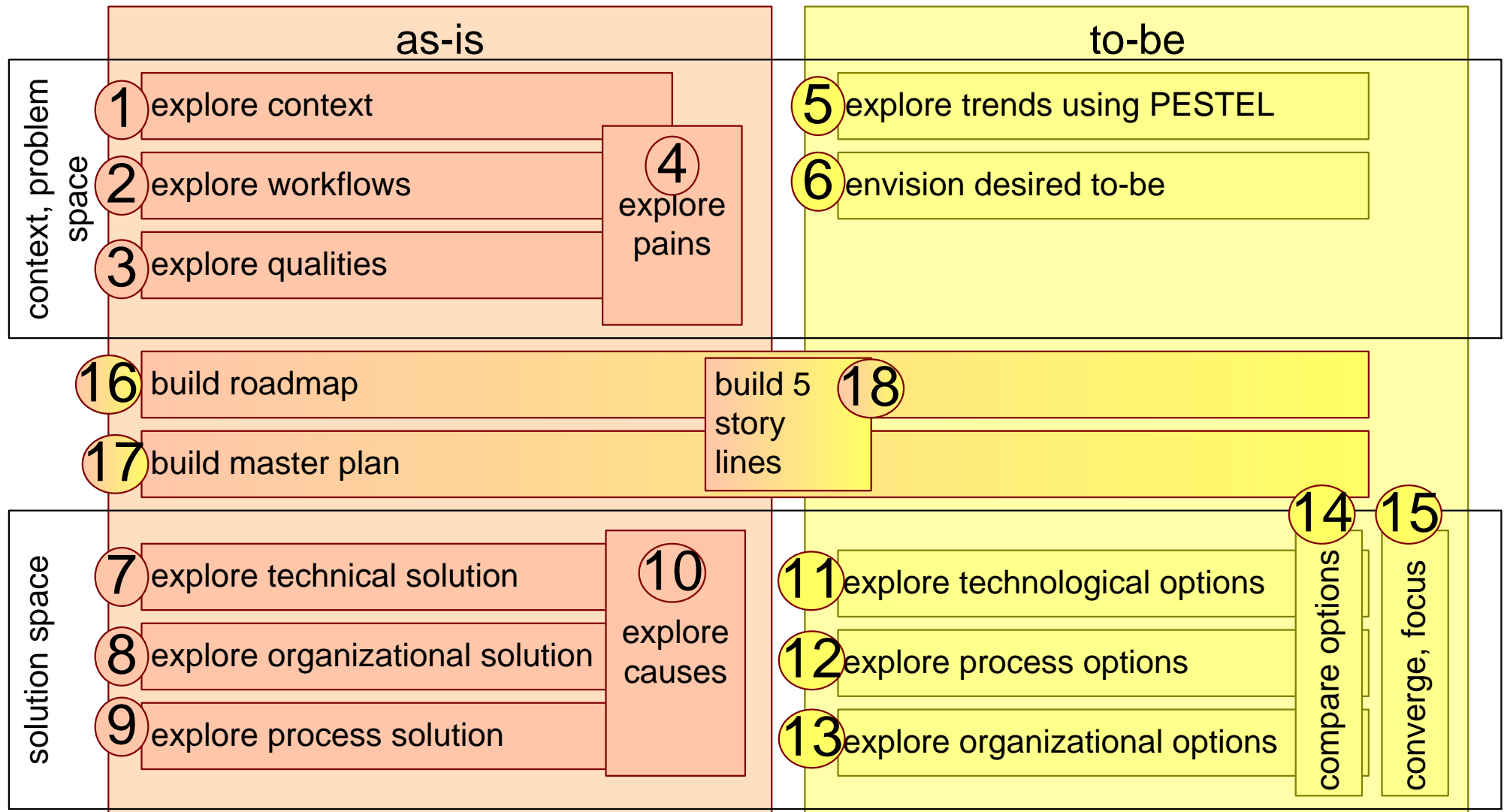
This presentation is the result of reflecting on facilitating workshops to develop a vision in multiple domains, such as (health) care, defense, and research. These organizations are at various levels in the ecosystems of ecosystems, see <https://www.gaudisite.nl/FromSystemToEcosystemSlides.pdf>.

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”.

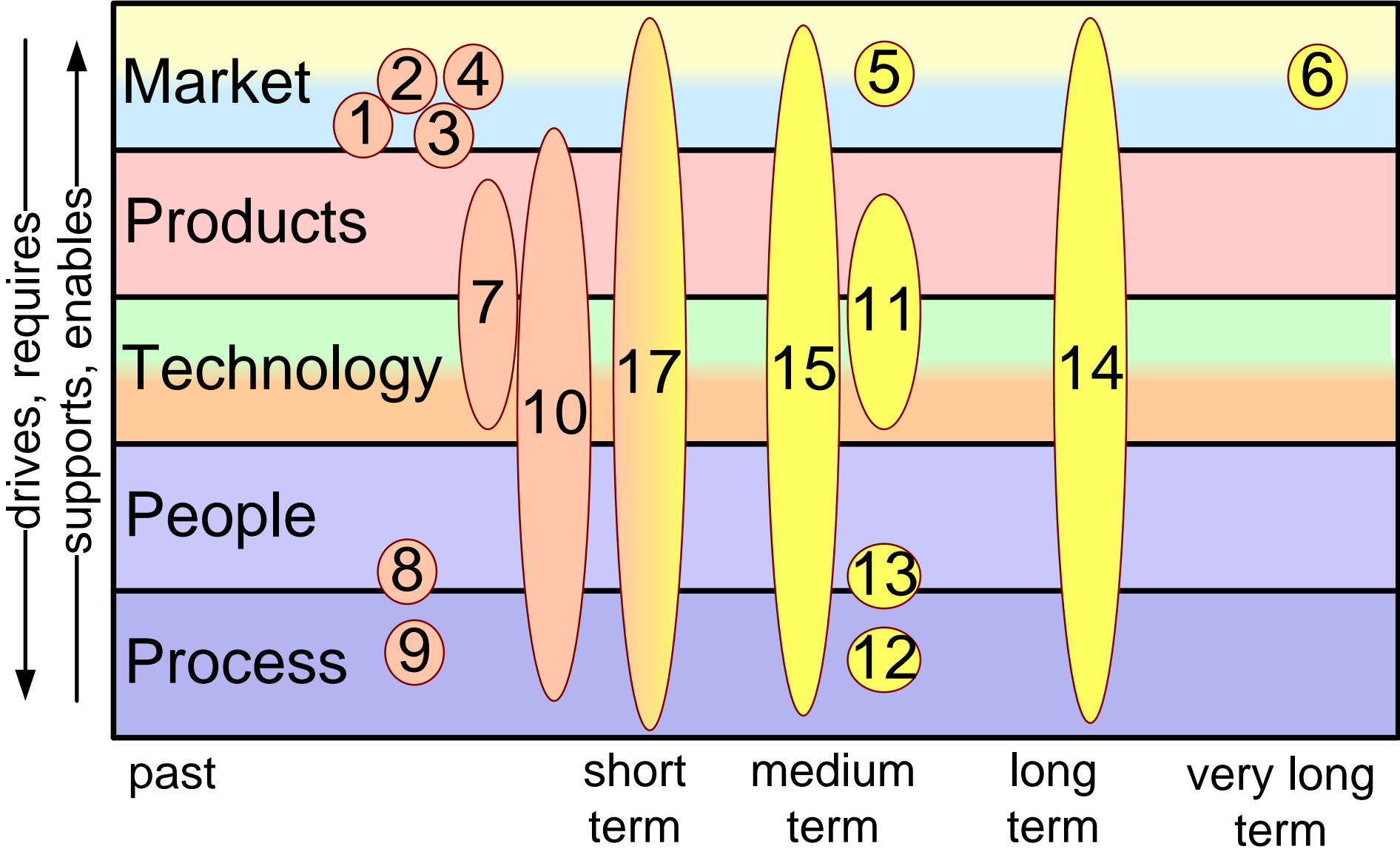
Main Method Flow



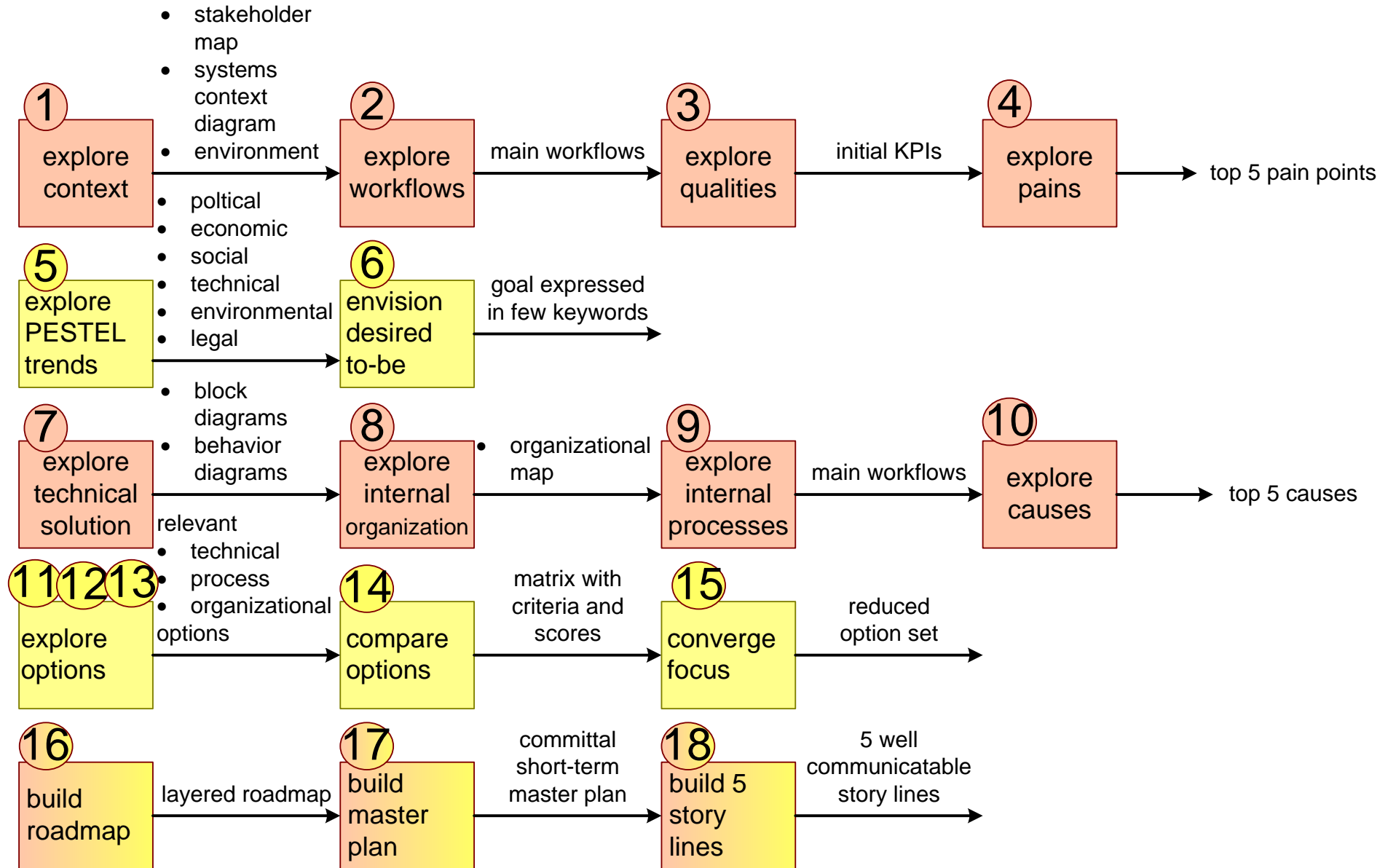
More Detailed Method for a Vision Workshop



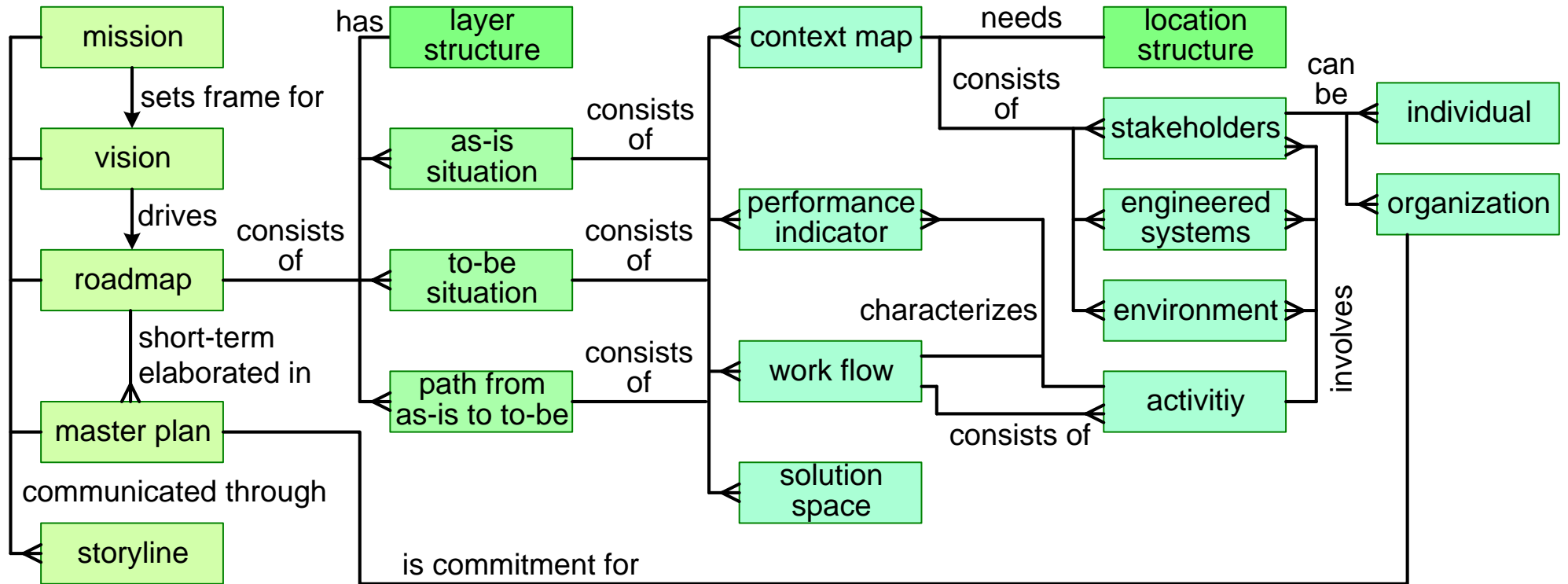
Steps Mapped on the Roadmap Structure



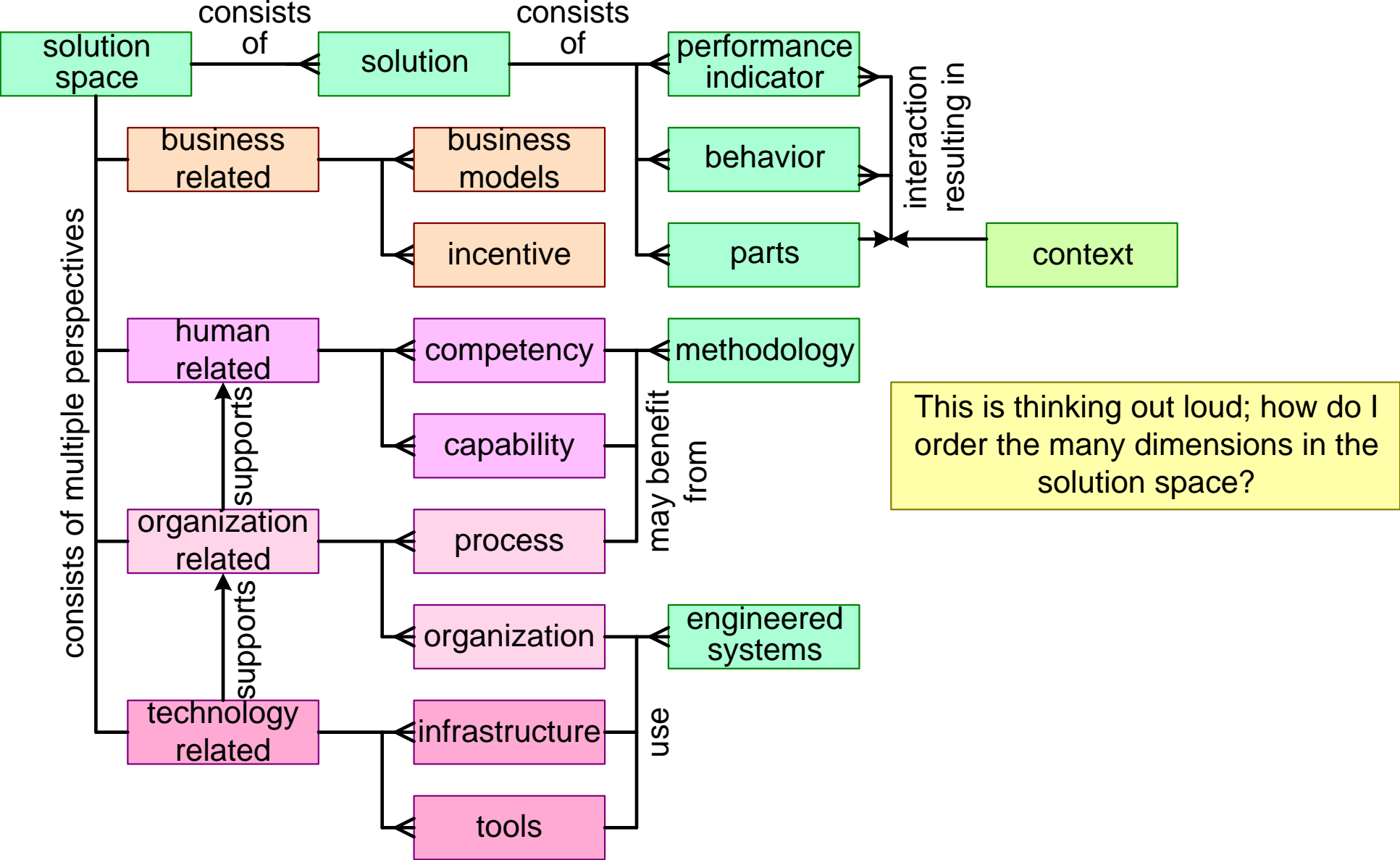
Workflow for a Vision Workshop



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

Ecosystem Digital Infrastructure

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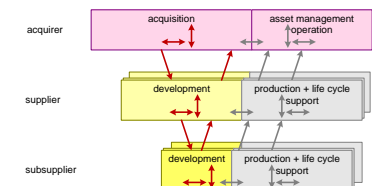
Abstract

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

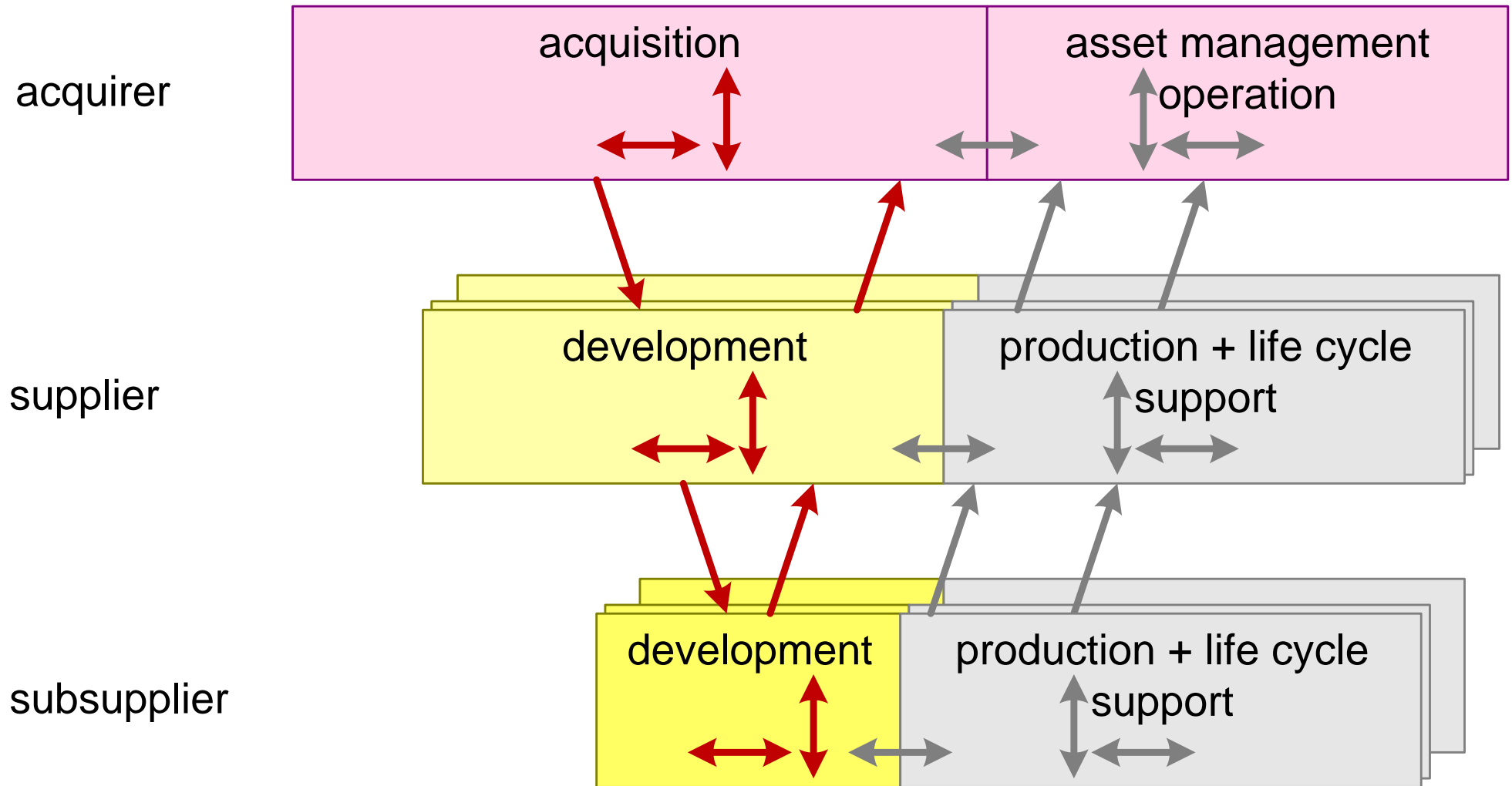
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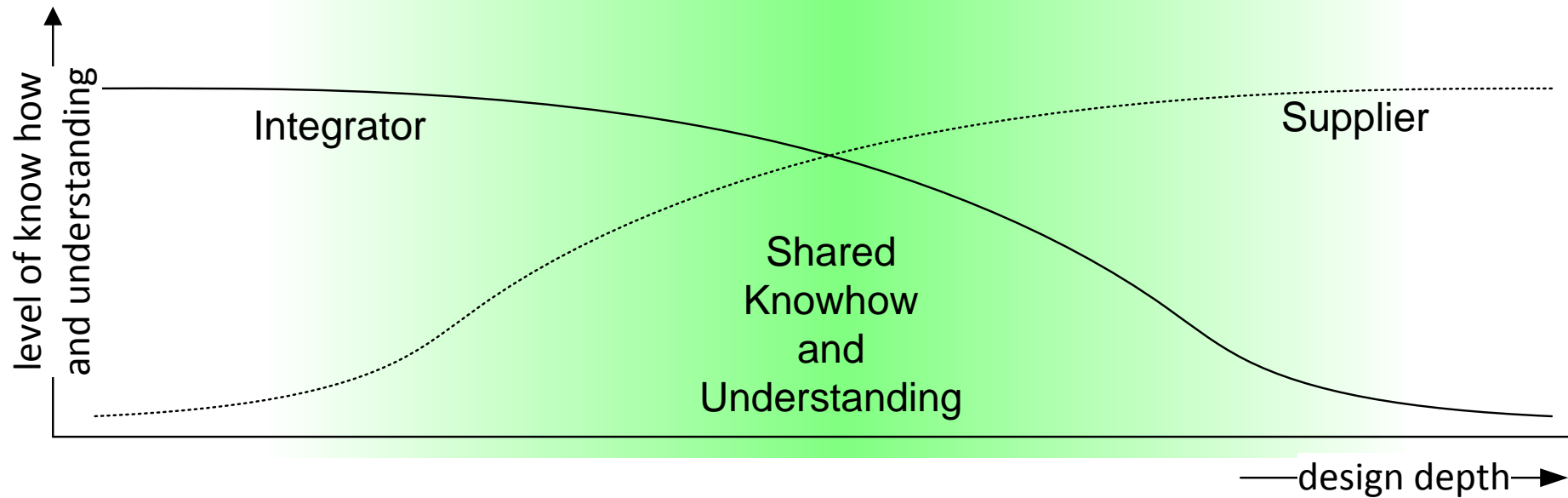
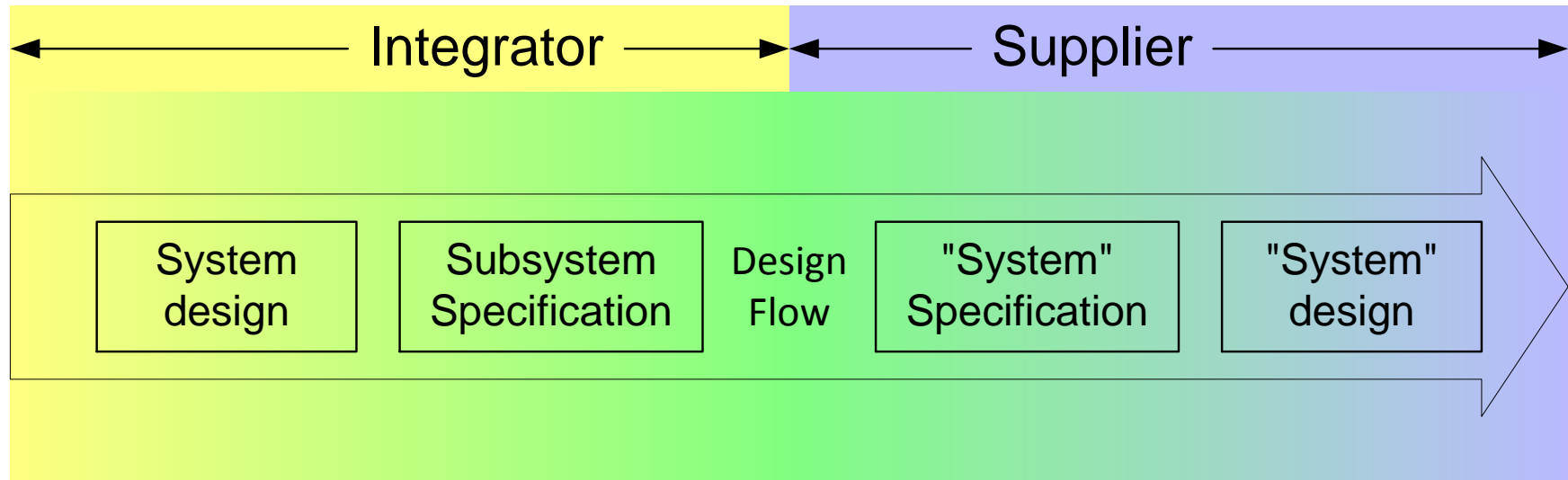
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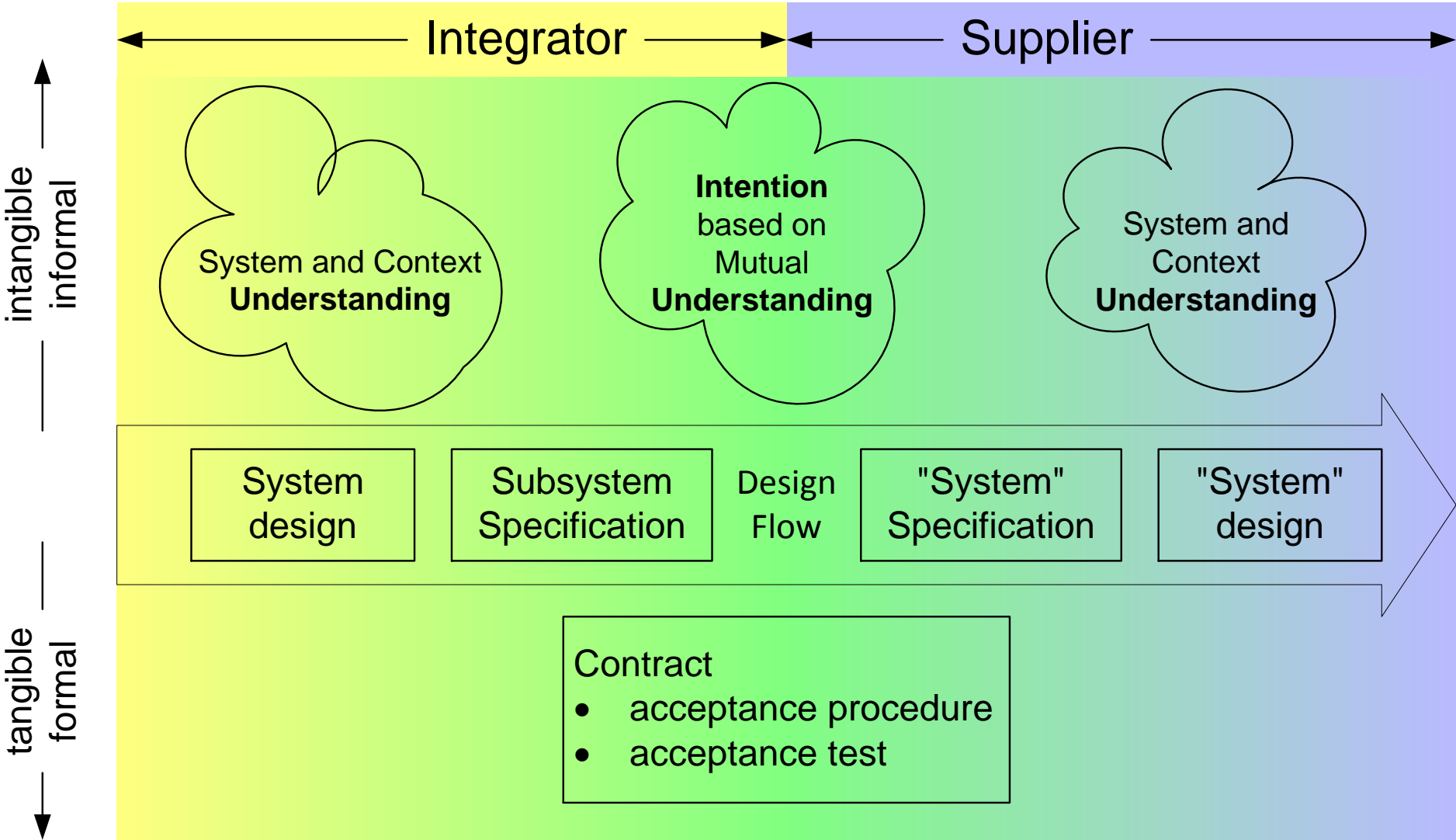
Information Flows between Organizations



Theory: Subcontractors require SMART relation

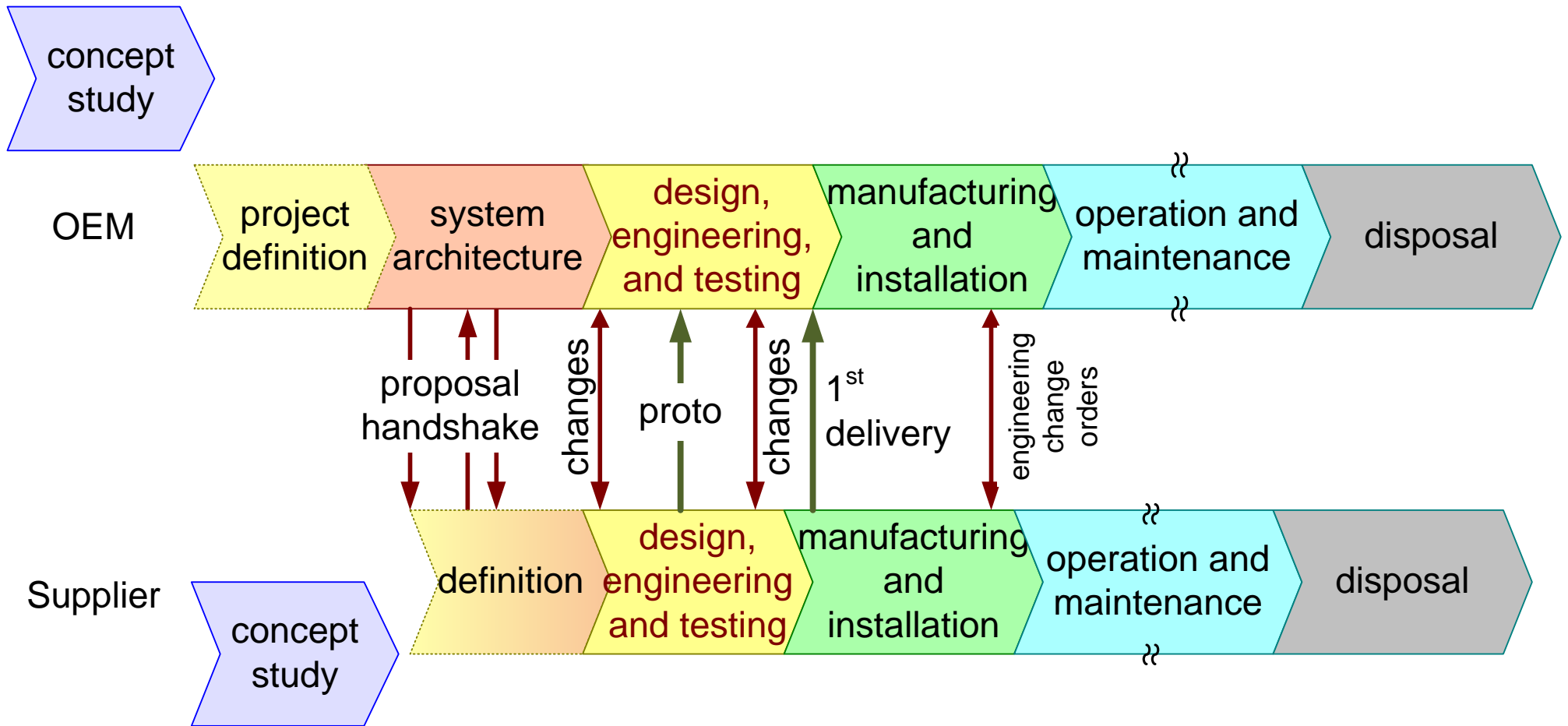


Critical Success Factor: Mutual understanding

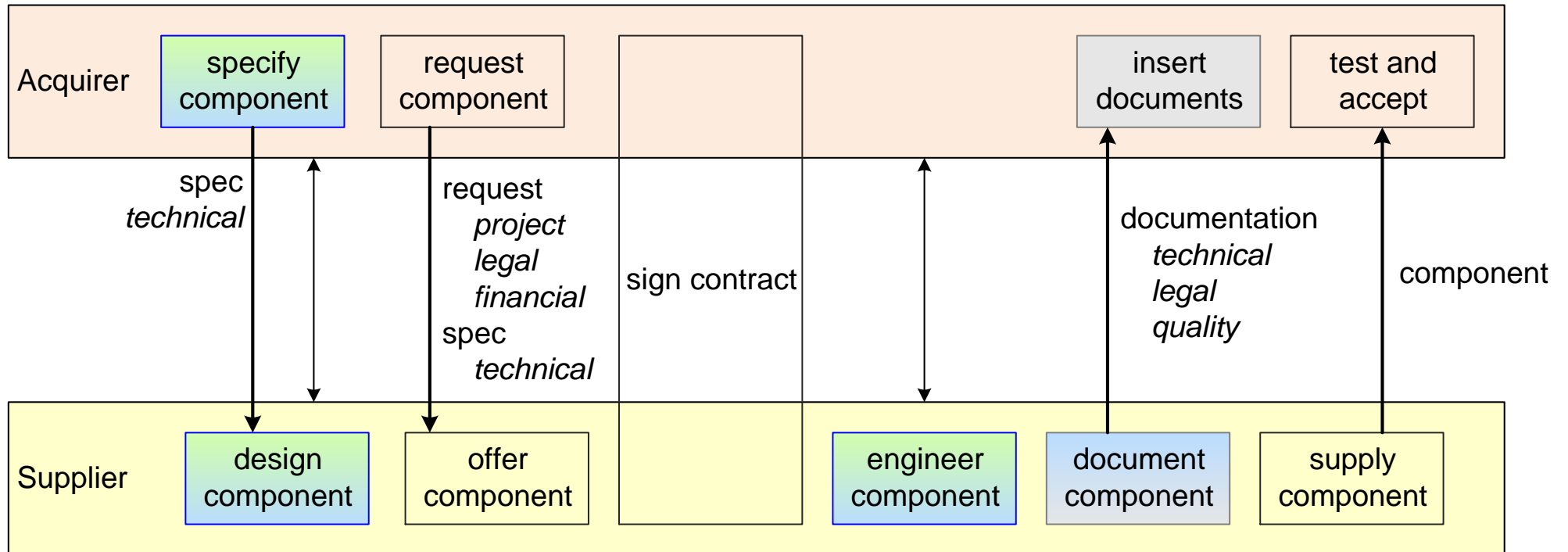


Subsystem in Integrator perspective = "System" in Supplier perspective

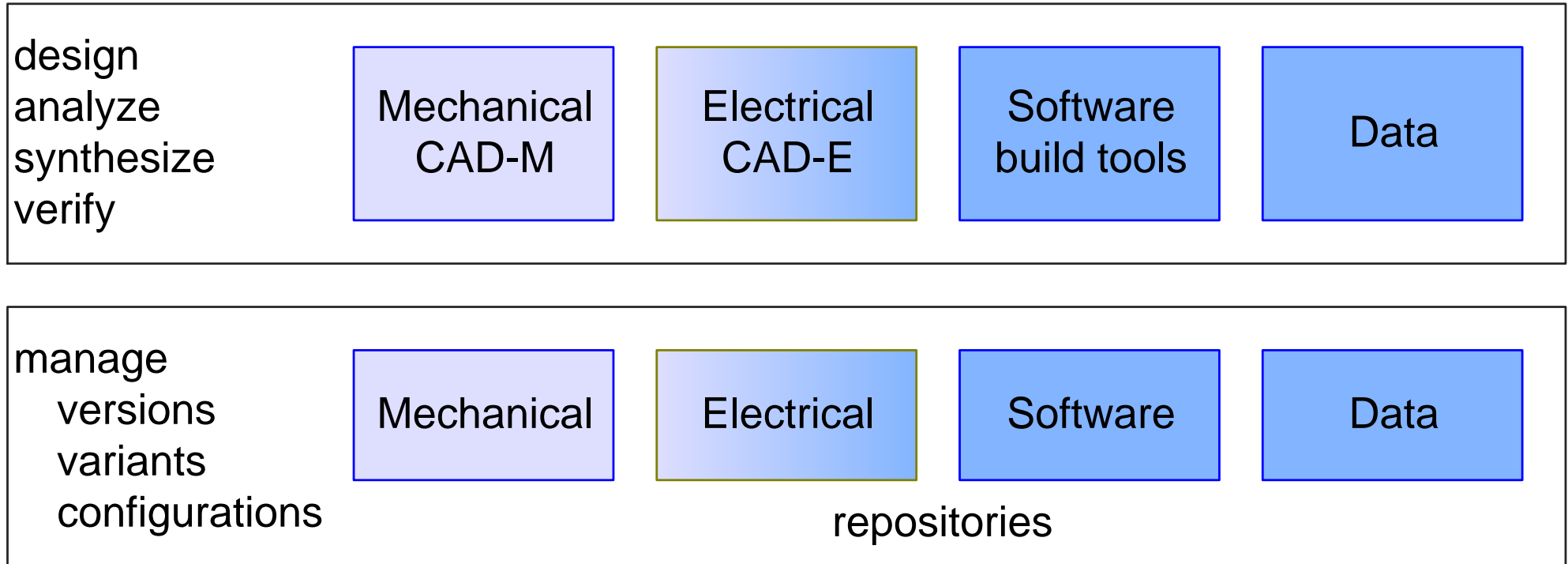
Project Life Cycles Acquirer and Supplier



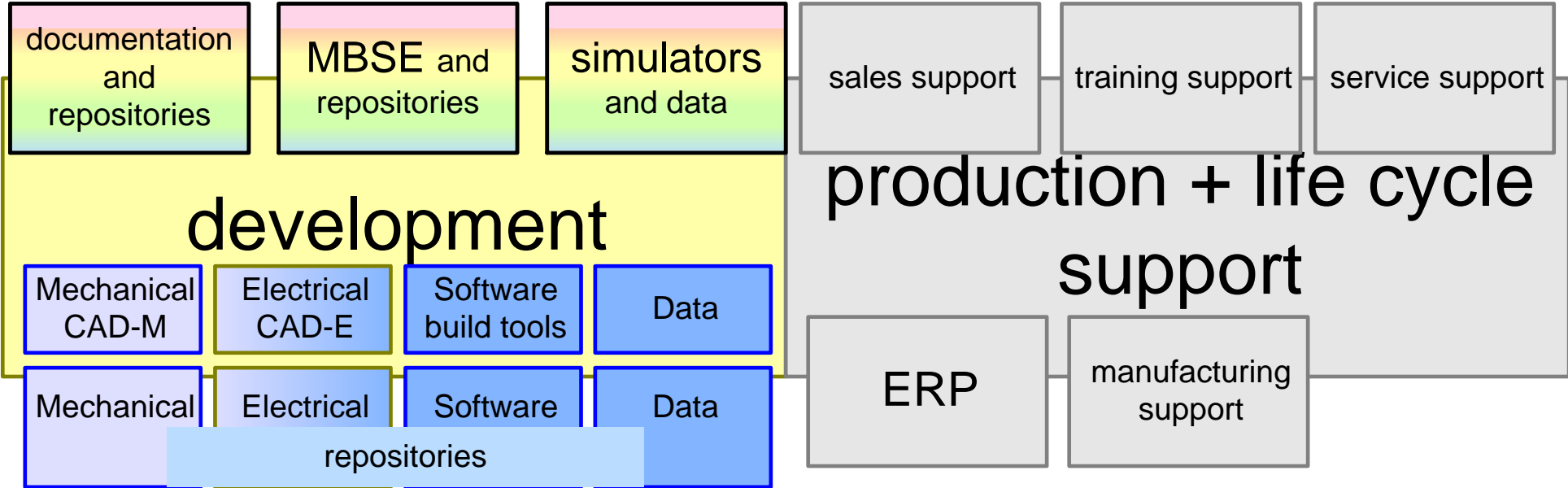
Interaction Acquirer and Supplier when Outsourcing Design



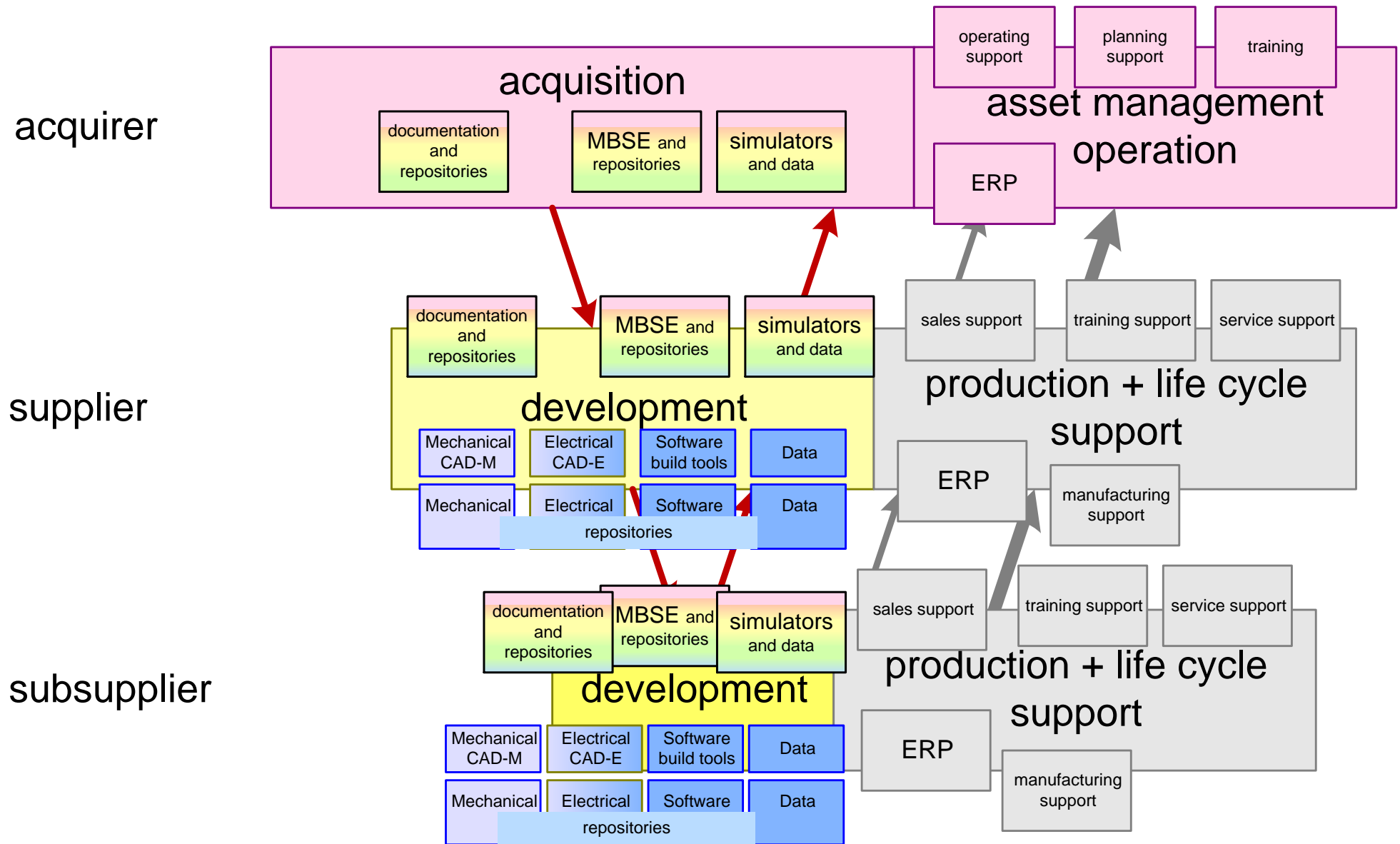
The Digital Mono-Engineering Environments



IT-Tools a Supplier is Using



IT-Tools across Layers when Outsourcing Design



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.

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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

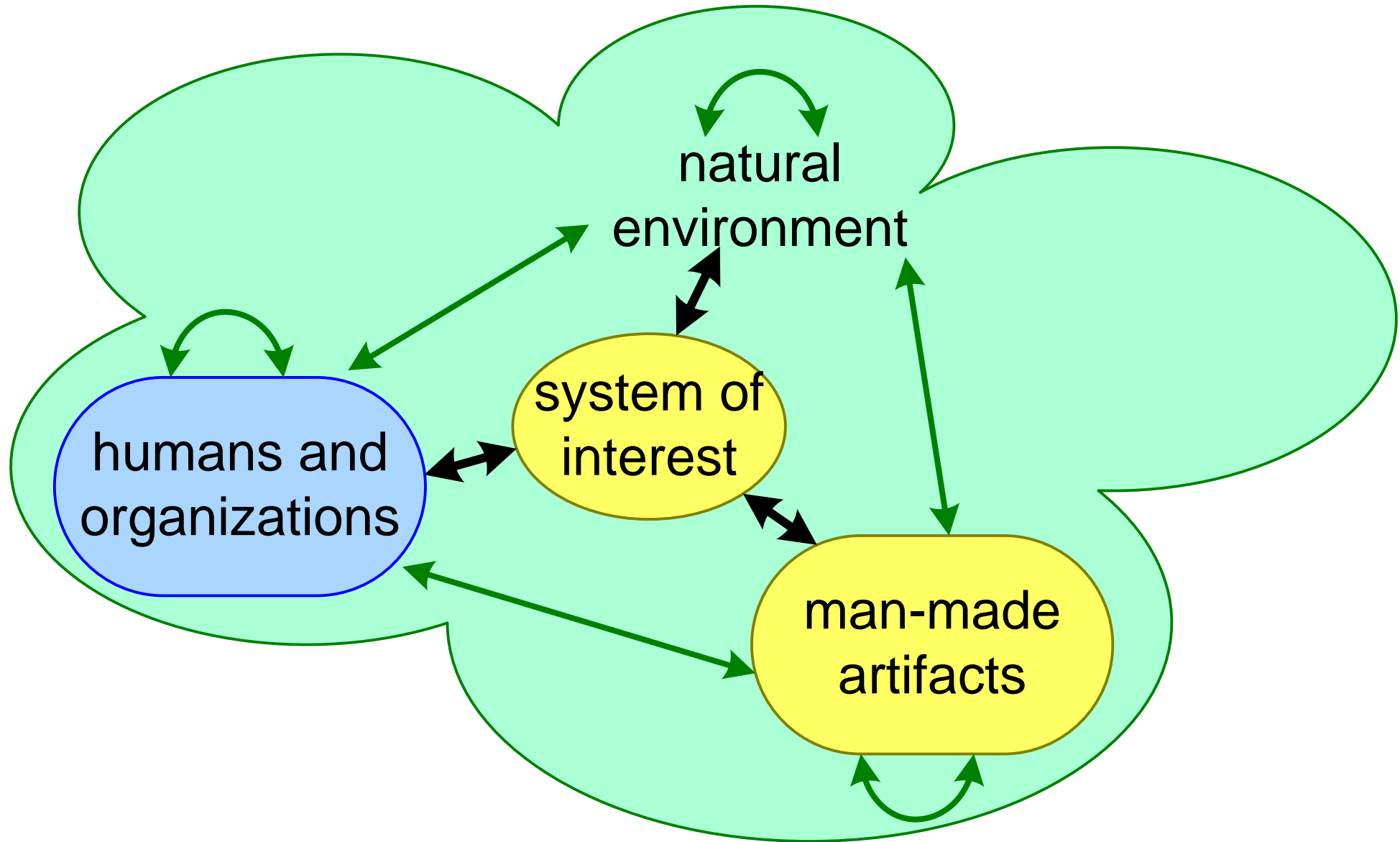
| | | |
|-----------------------------|---------------------------------|------------------------------------|
| client | team worker | implementer |
| creative | cooperative, avoids friction | disciplined, conservative, dile |
| resource investigator | shaper | complex finisher |
| enthusiastic contributor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

[Bebber's archetypes](#)

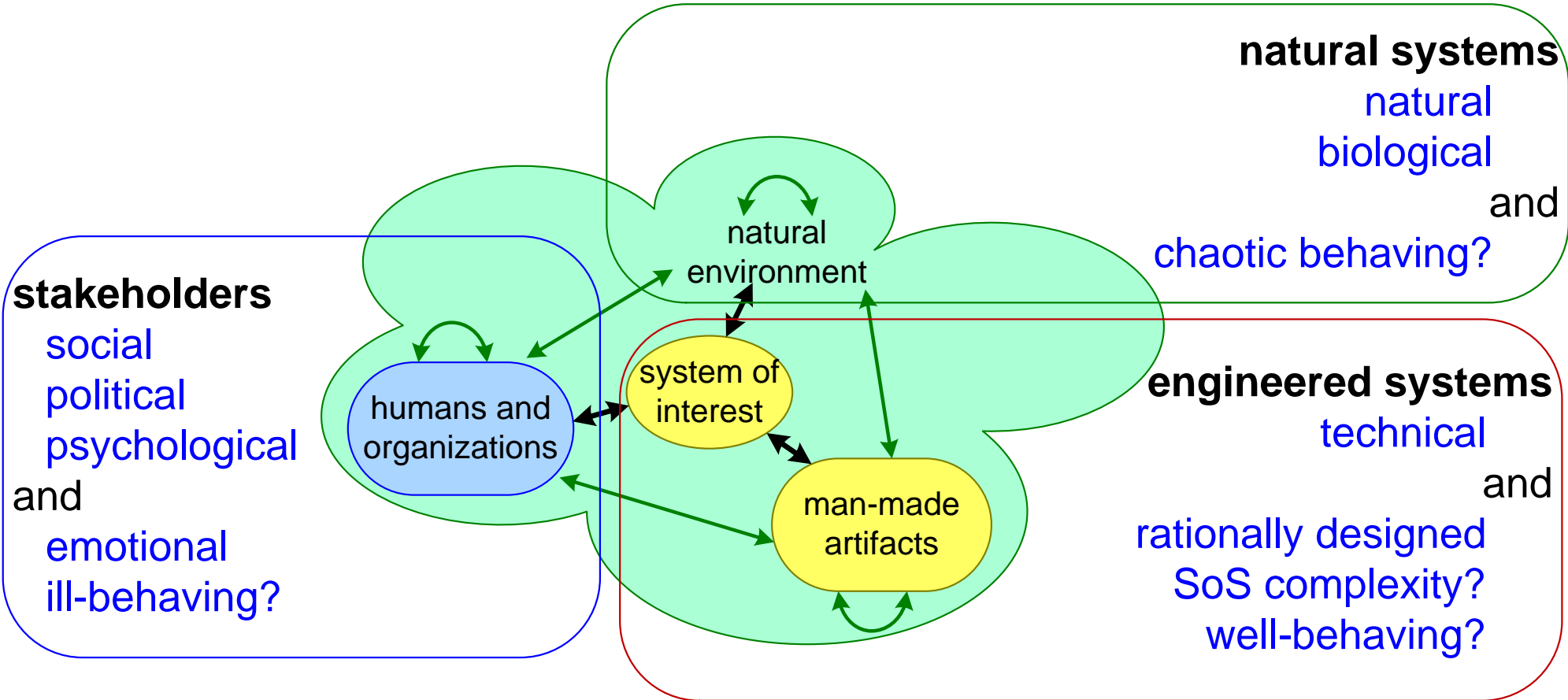


Caricature of a sergeant major
courtesy Bas van Zunderd

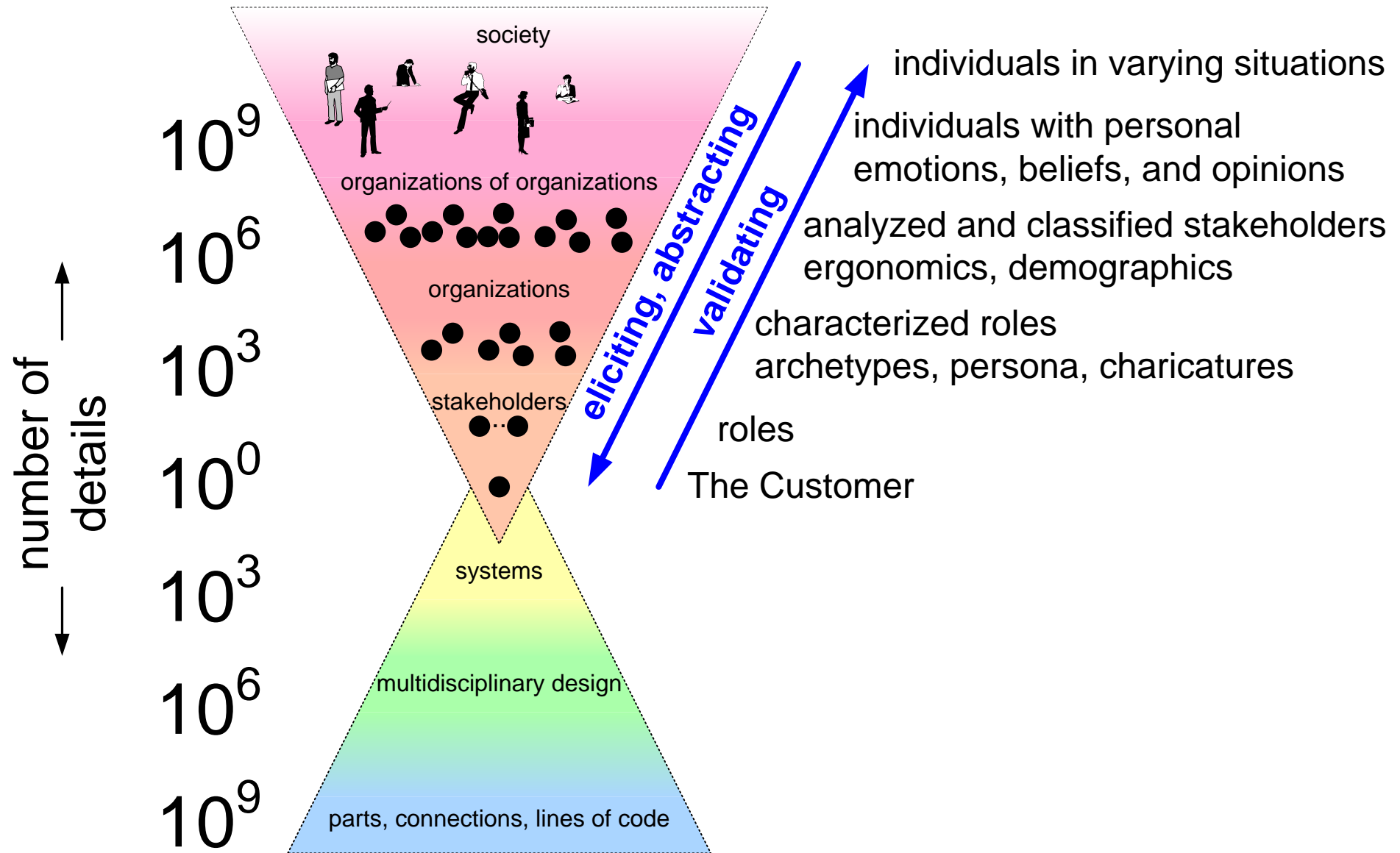
The Context of a System-of-Interest



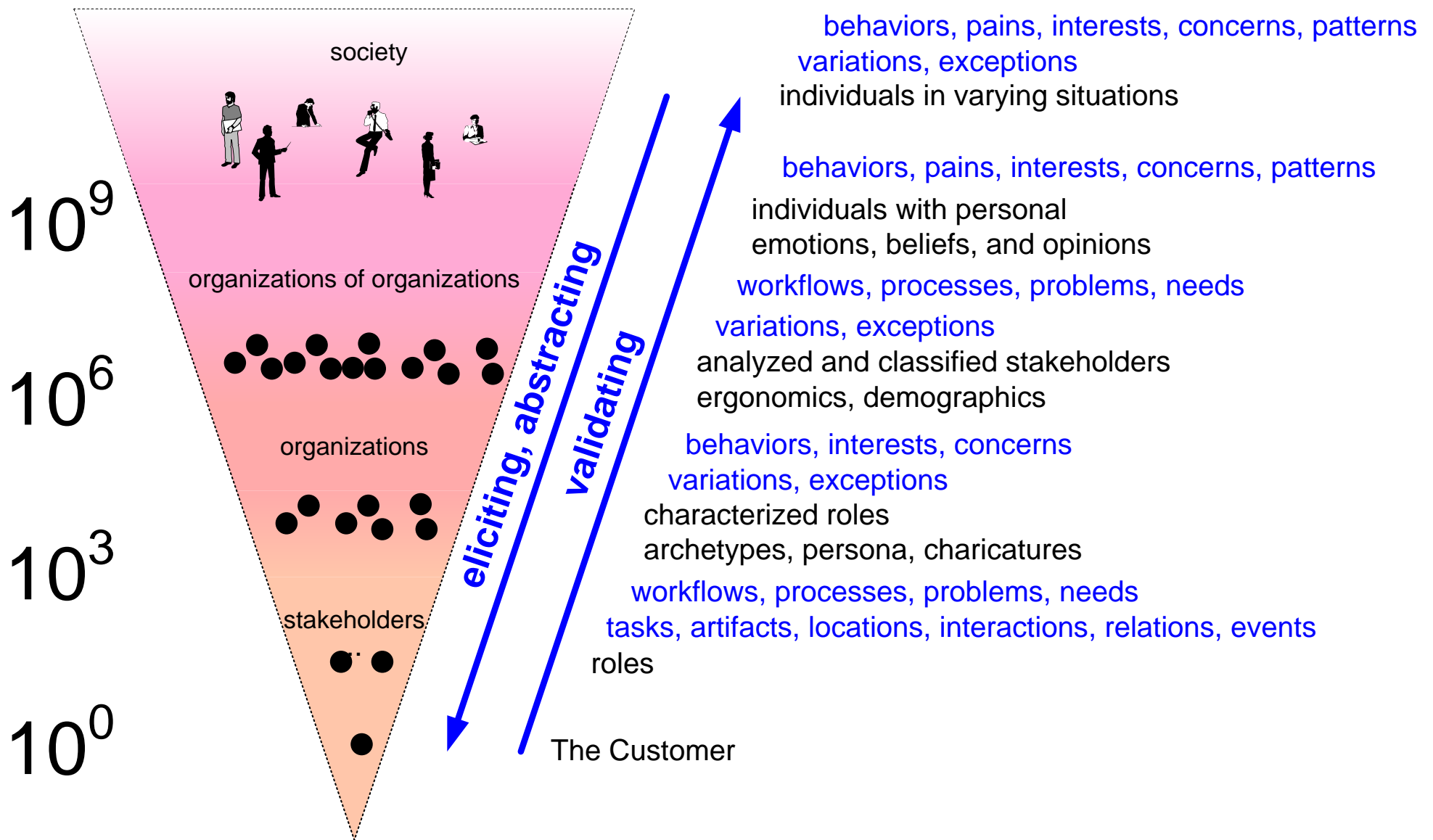
Stakeholders: Psychological and Socio-Political



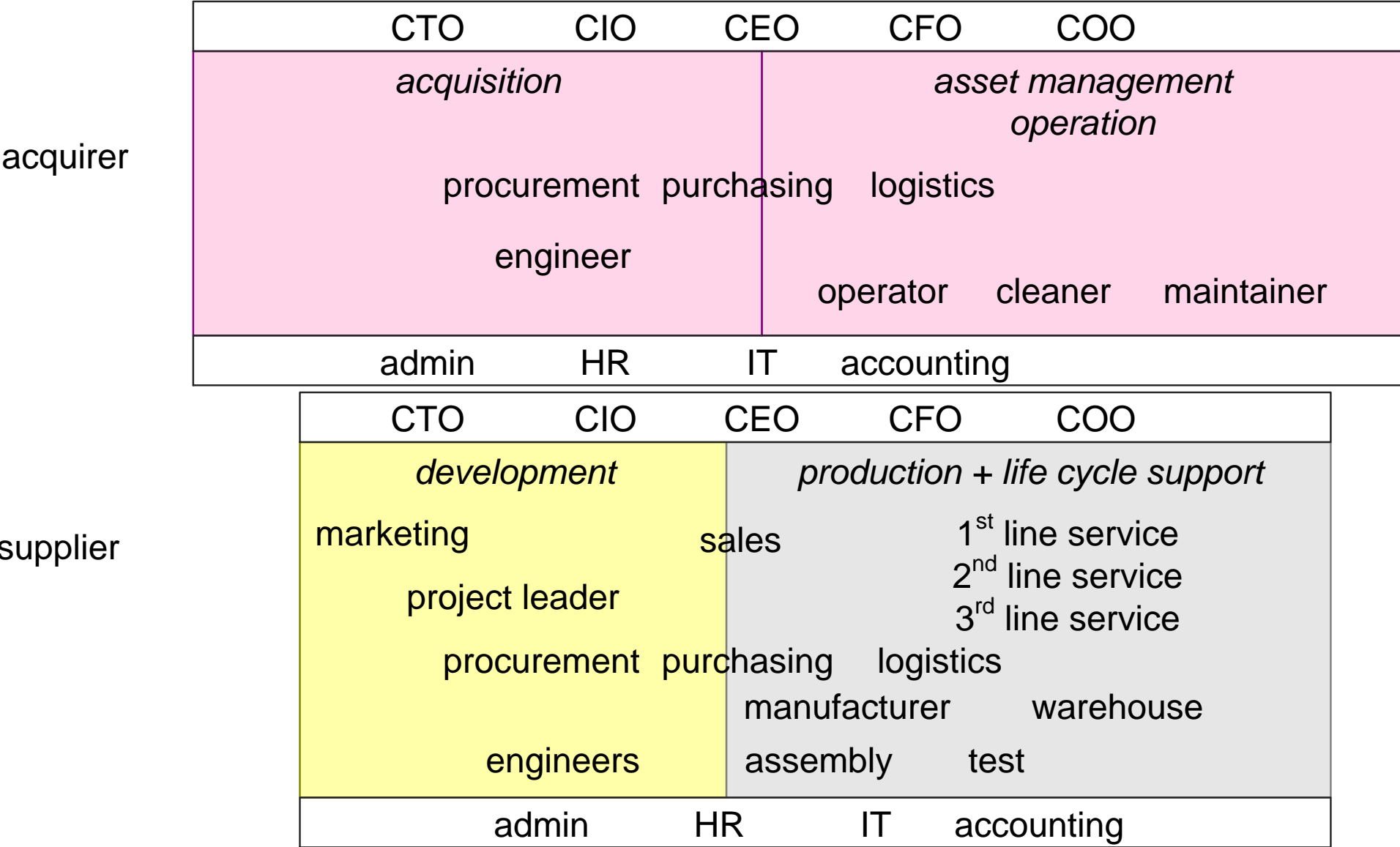
Abstraction from Humans to Roles



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

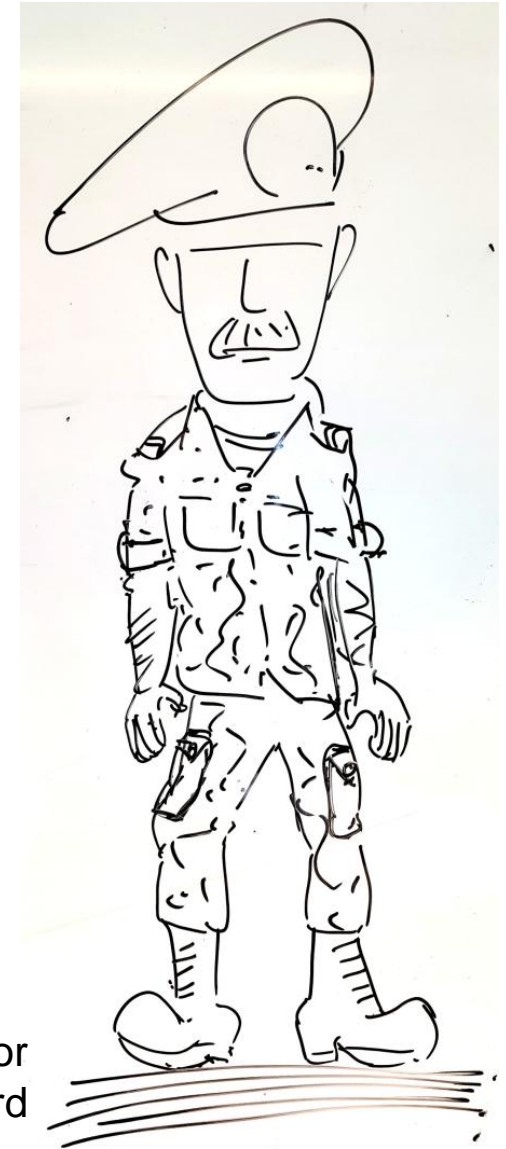
completer finisher
conscientious, painstaking

coordinator
mature, chairman

monitor evaluator
sober, analytical

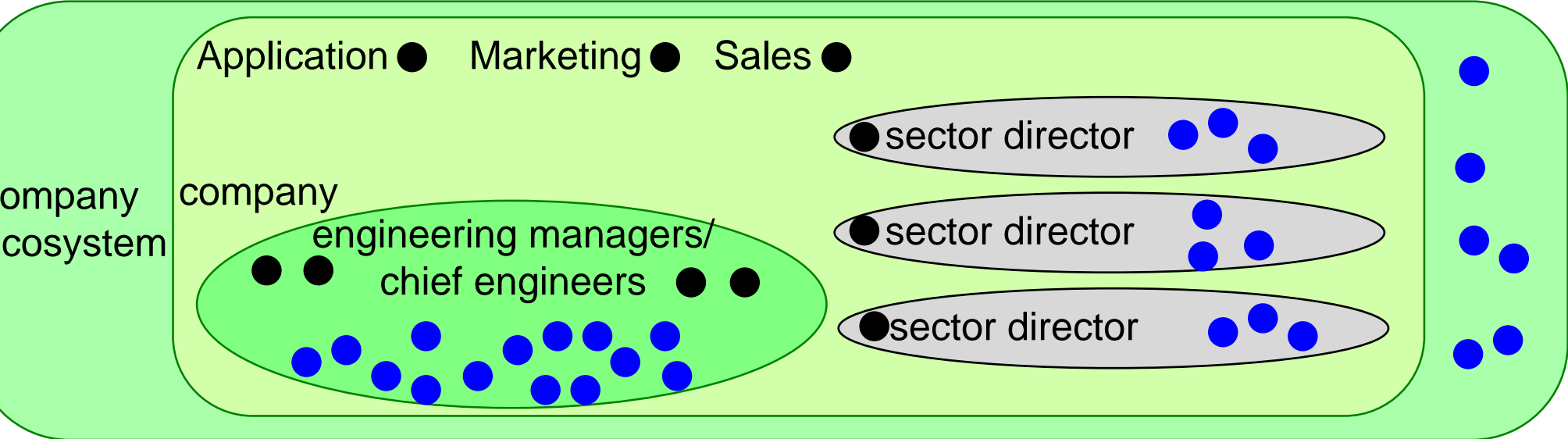
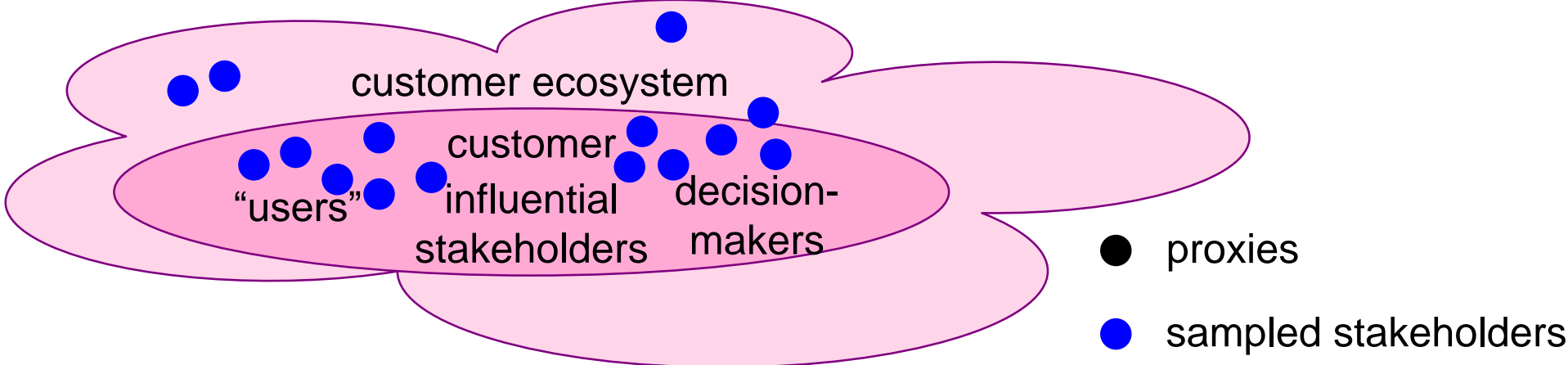
specialist
single-minded, rare skills

Belbin's archetypes



Caricature of a sergeant major
courtesy Bas van Zunderd

Multiple People Engage Stakeholders



Multiple People Engage Stakeholders 2

- 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

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

