

Decomposing the Architect; What are Critical Success Factors?

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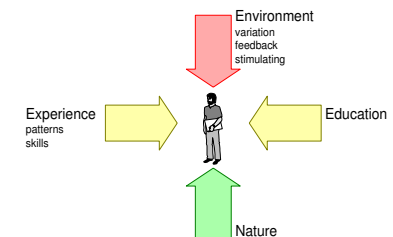
Abstract

System architects are scarce. If we want to search or educate potential system architects, then it is useful to know factors that determine the success of system architects. In this presentation we look at 4 areas: nature, education, environment and experience. We will make these areas more specific by quantification and illustration.

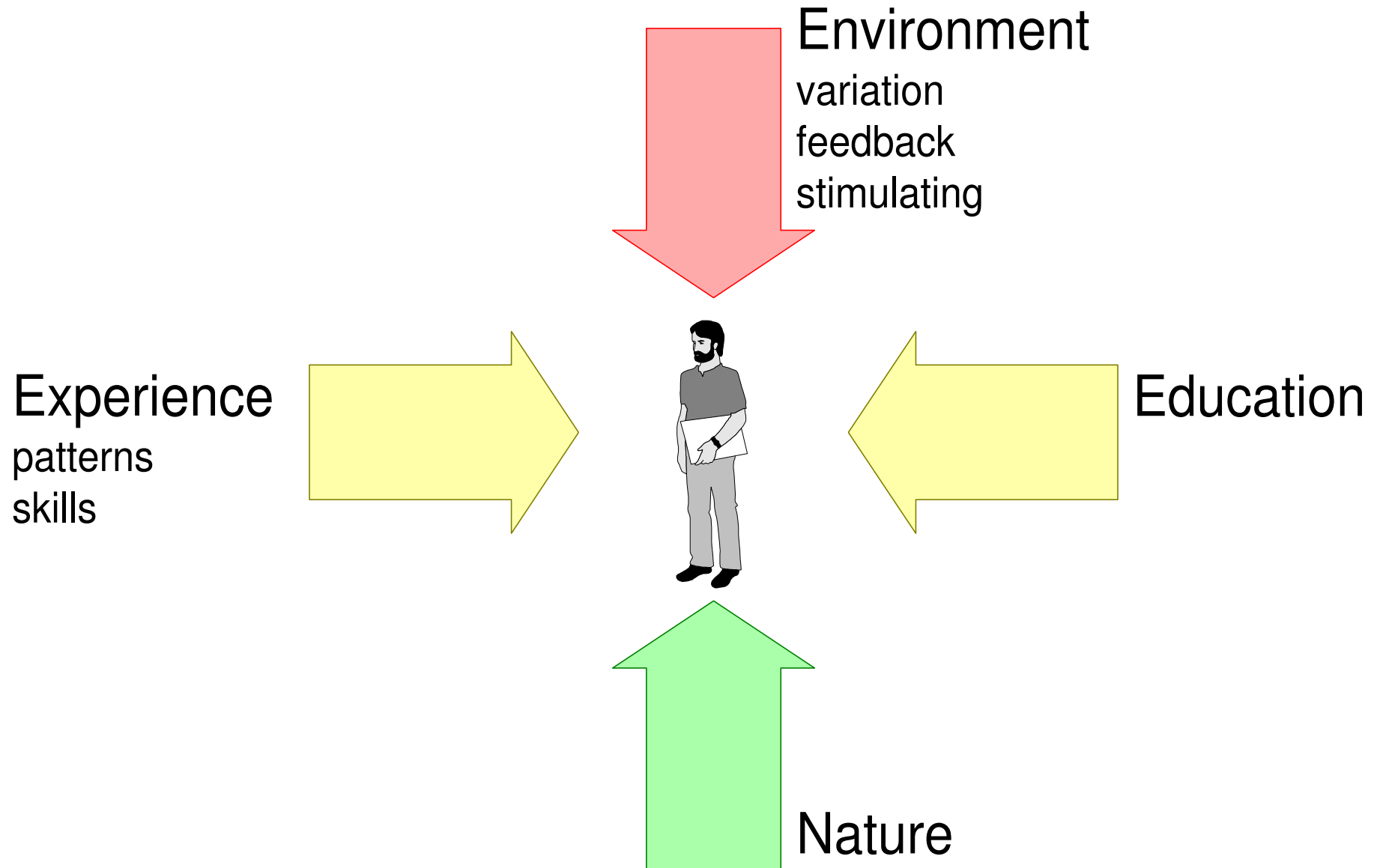
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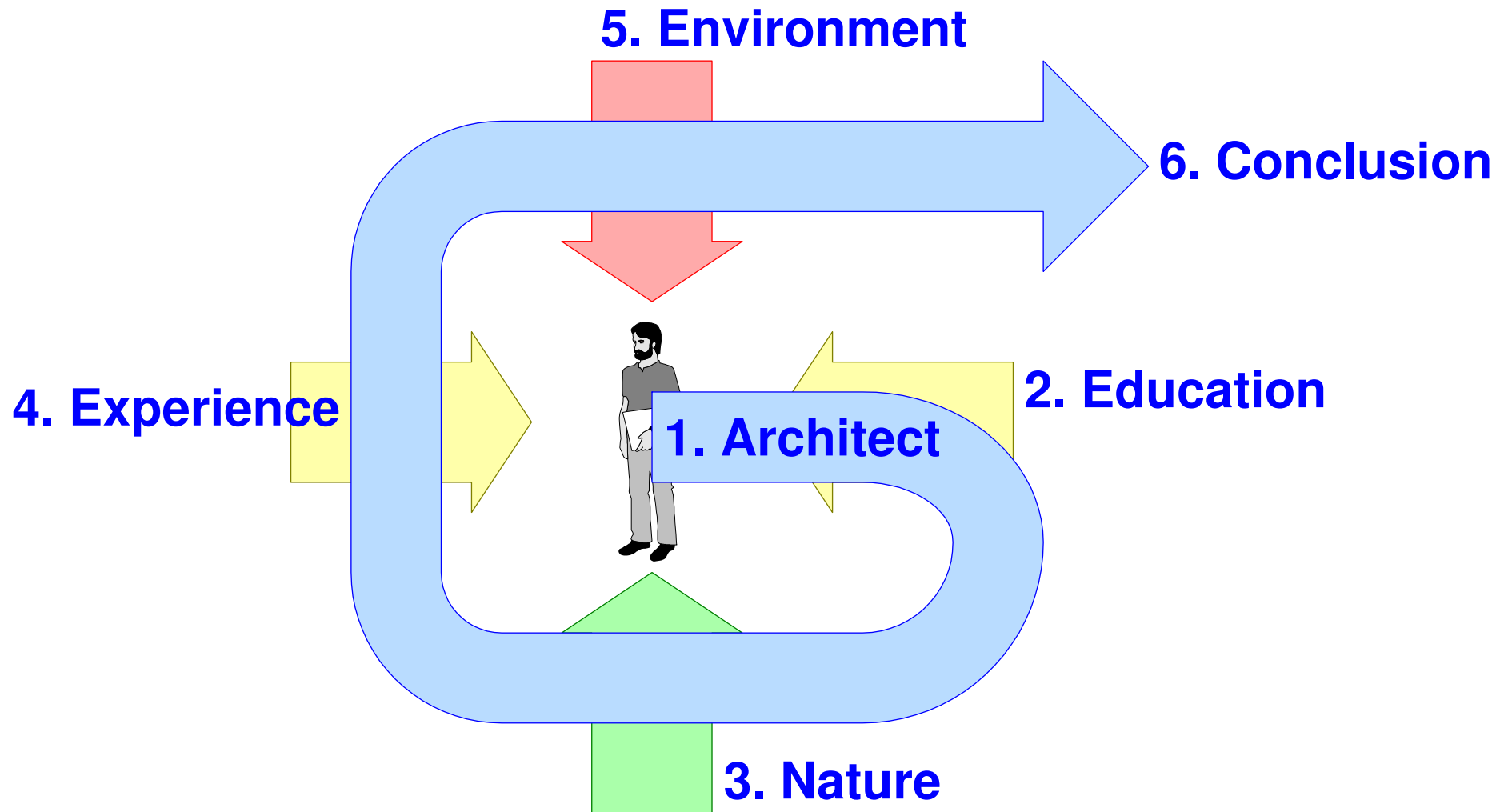
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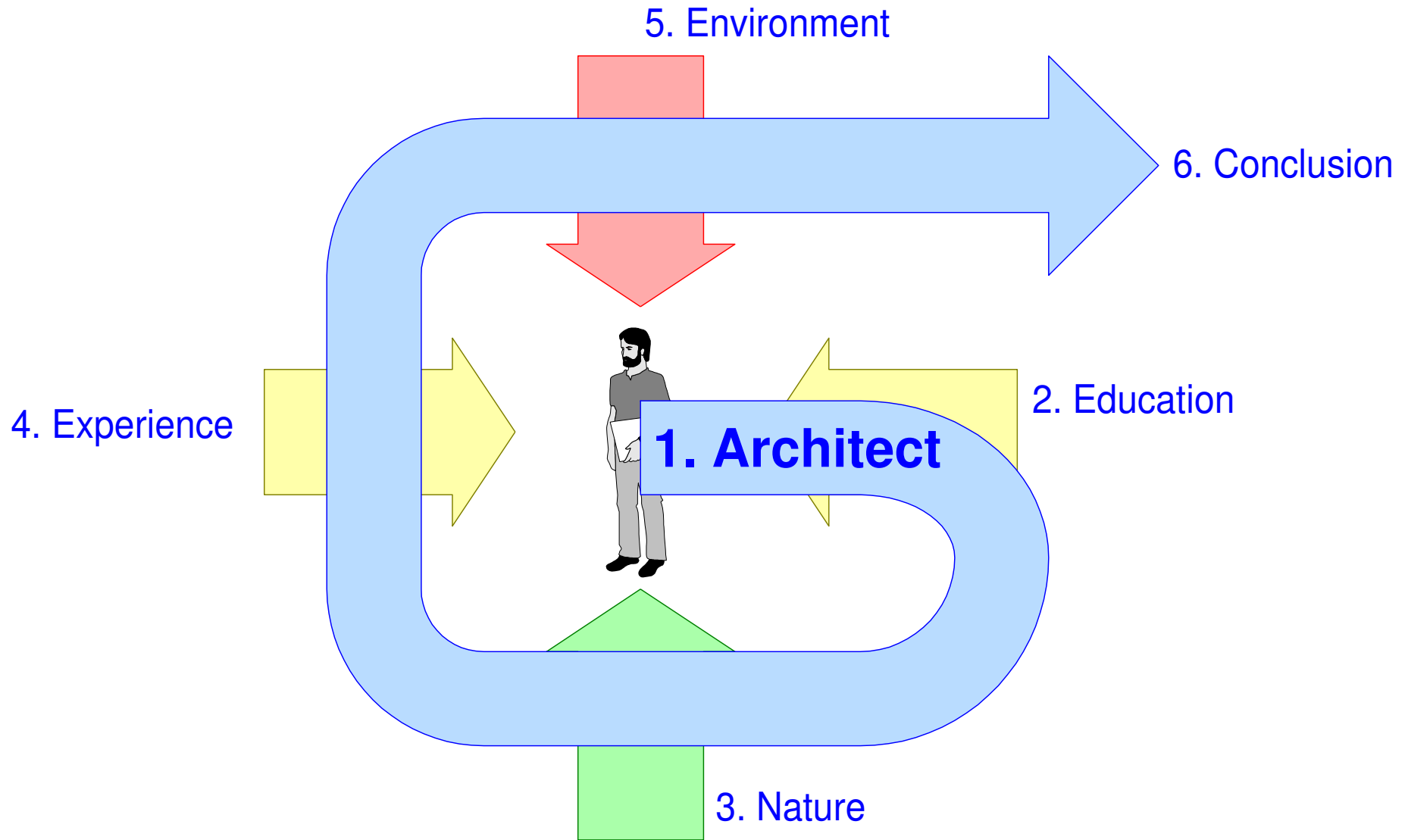


Decomposing Contributing Factors

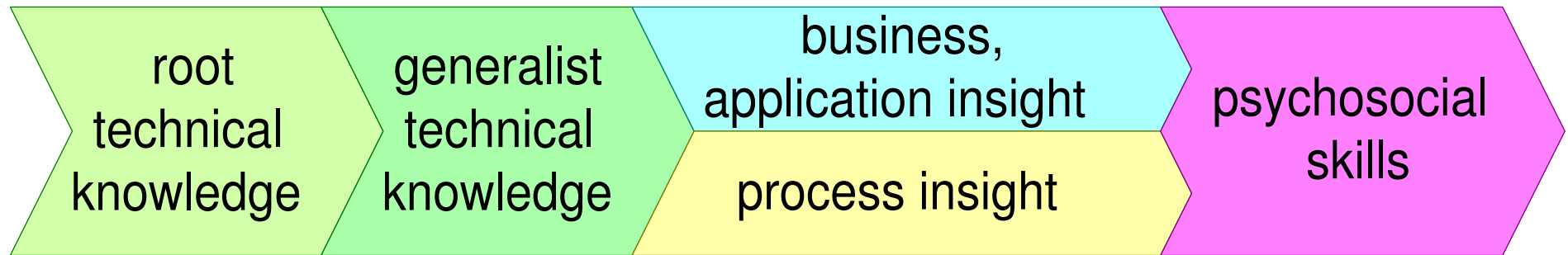


Structure of this Presentation

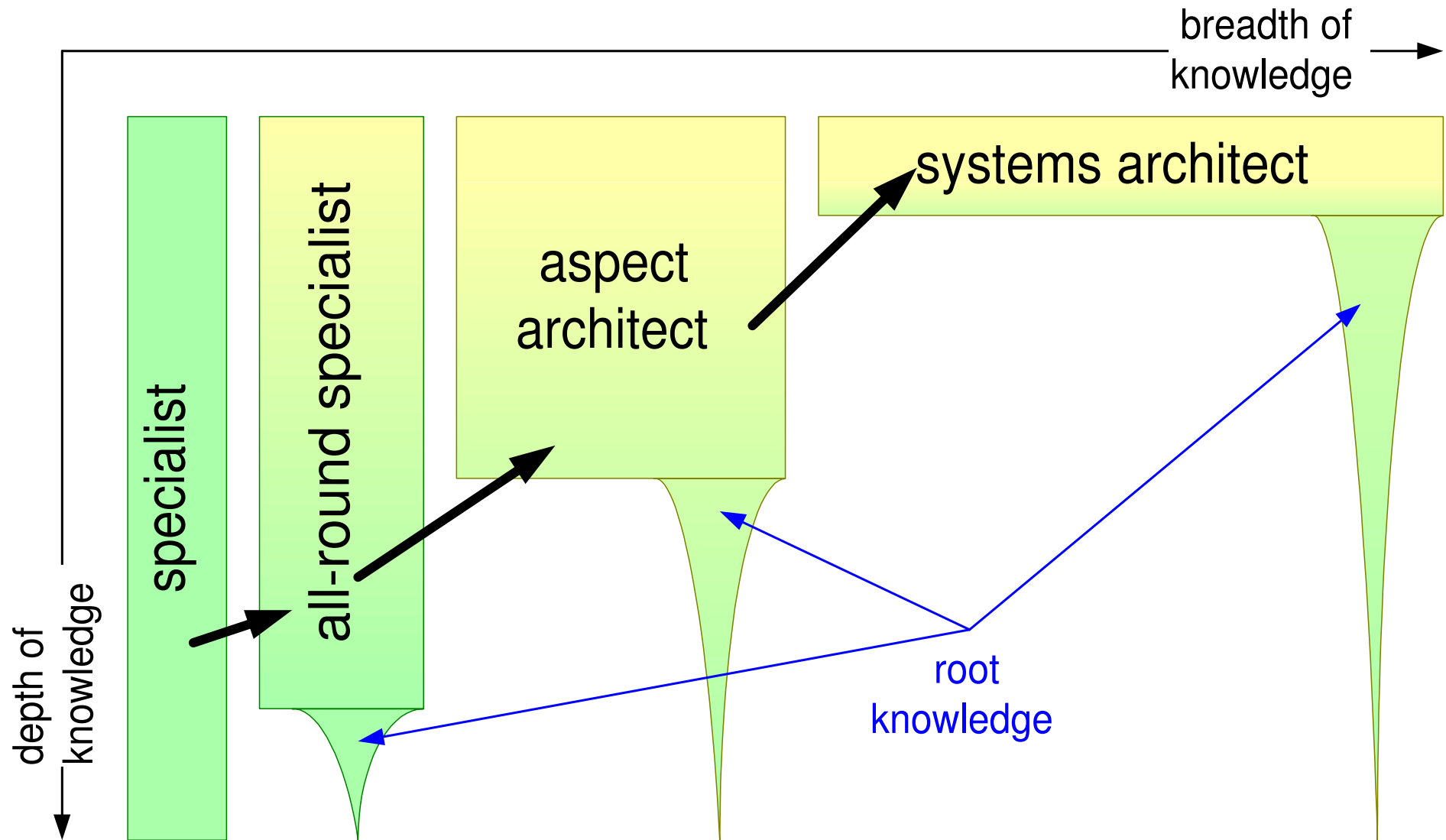




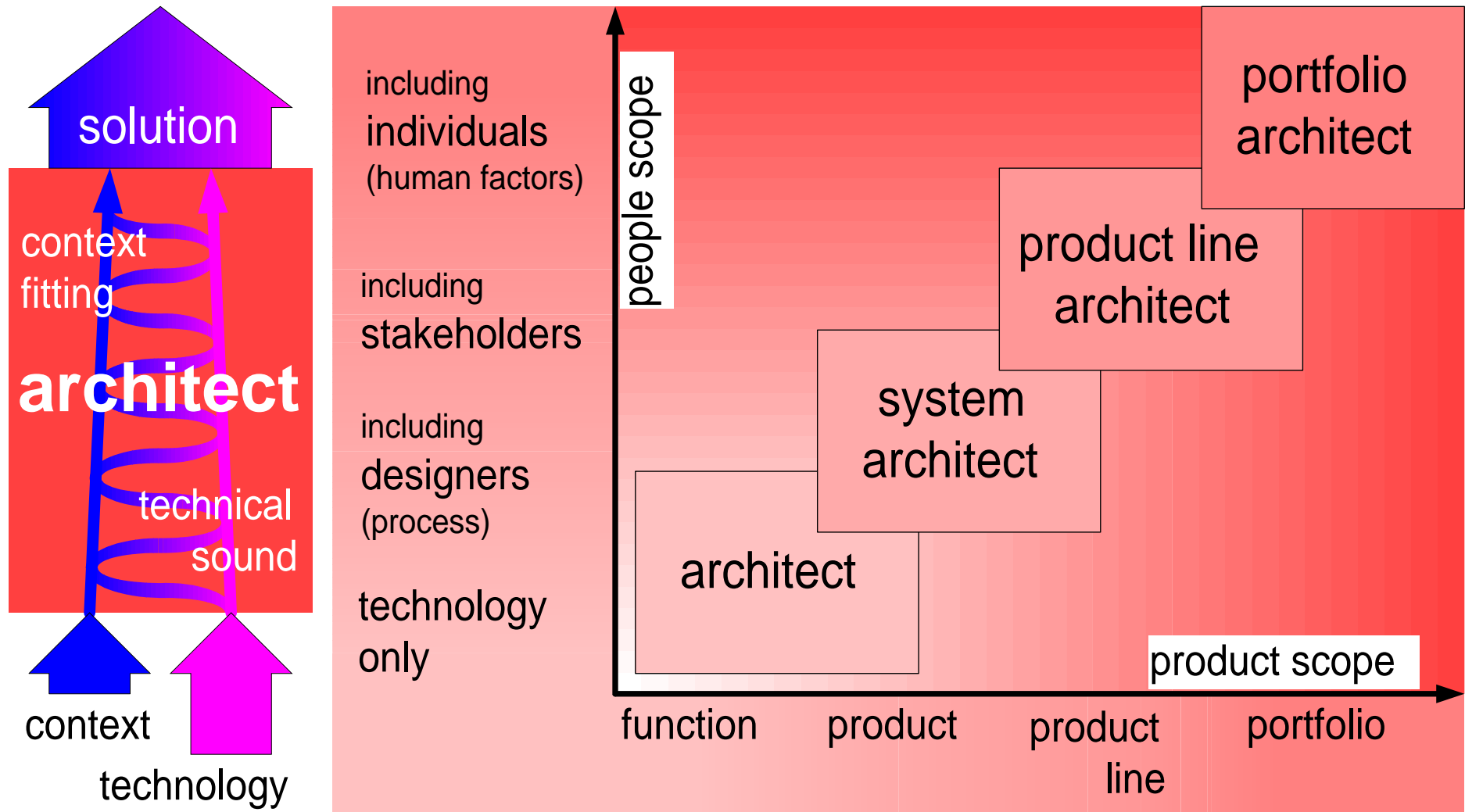
Observed Typical Growth of System Architects

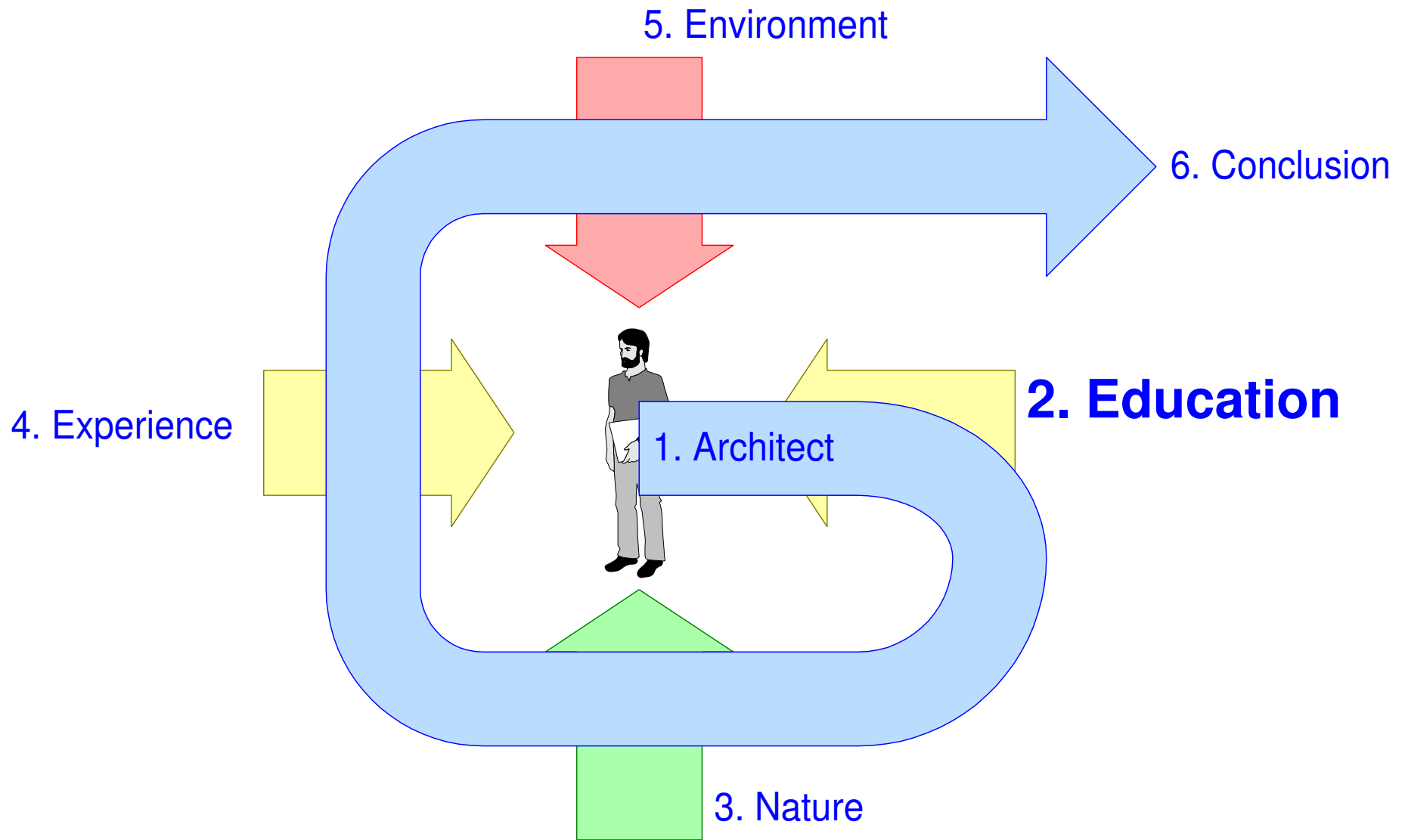


From Specialist to Generalist

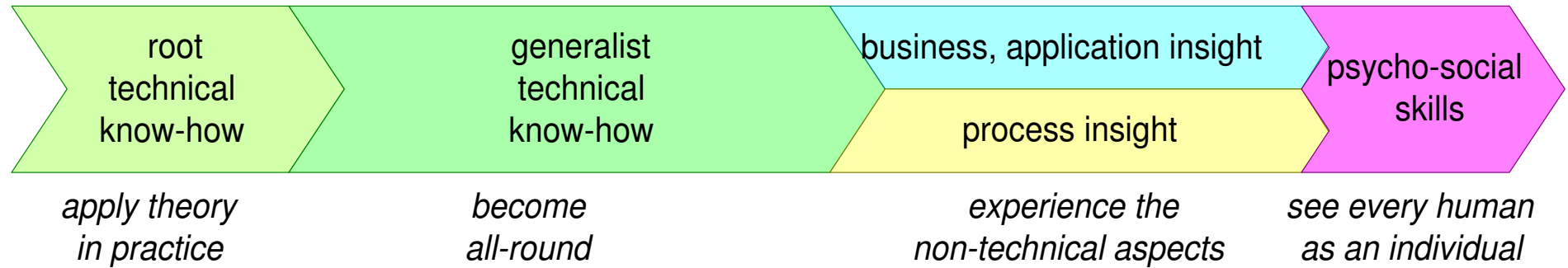


Different Architecting Scopes

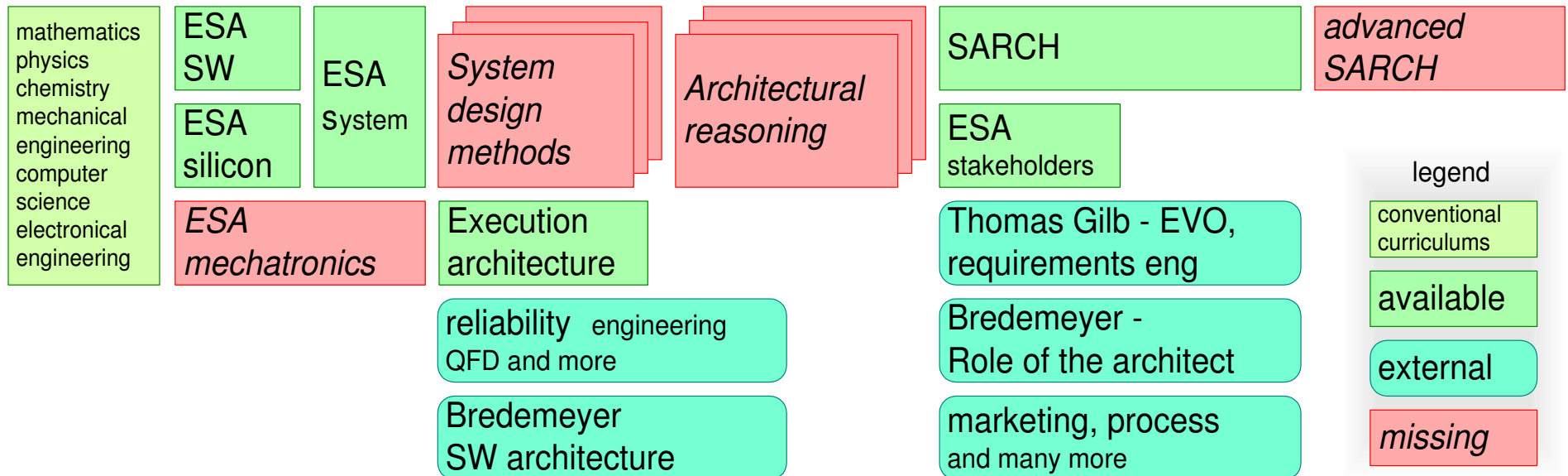




Proposed Curriculum for System Architects



architecture school



Overview of CAFCR framework

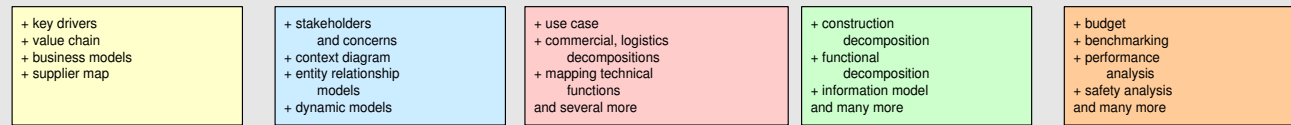
method outline

method visualization

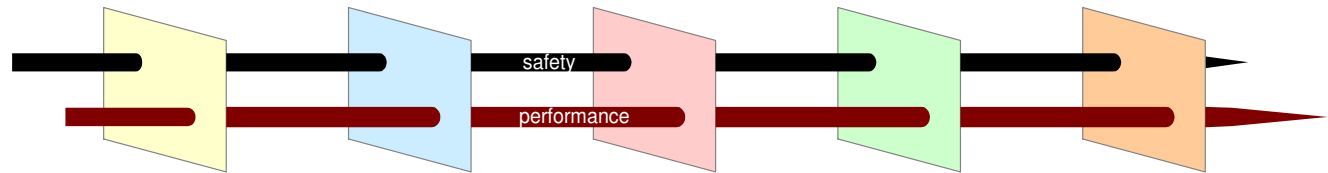
framework



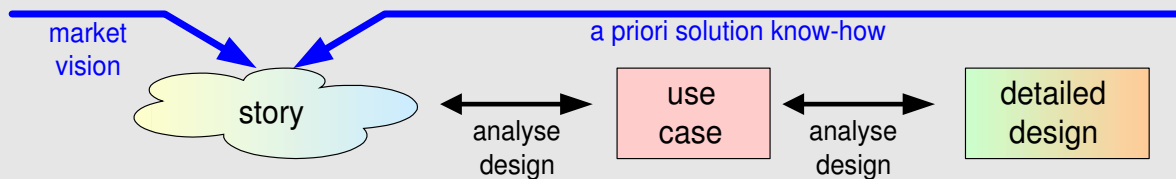
submethods



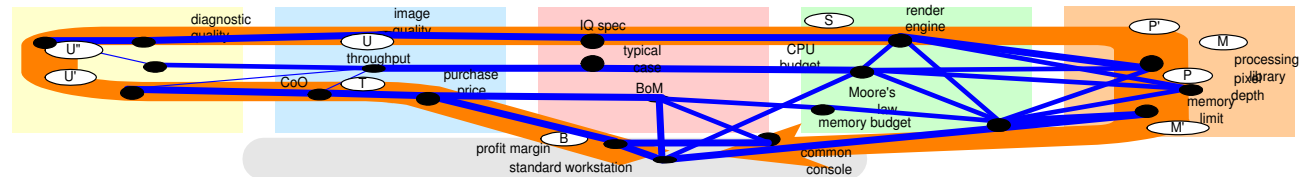
integration via qualities



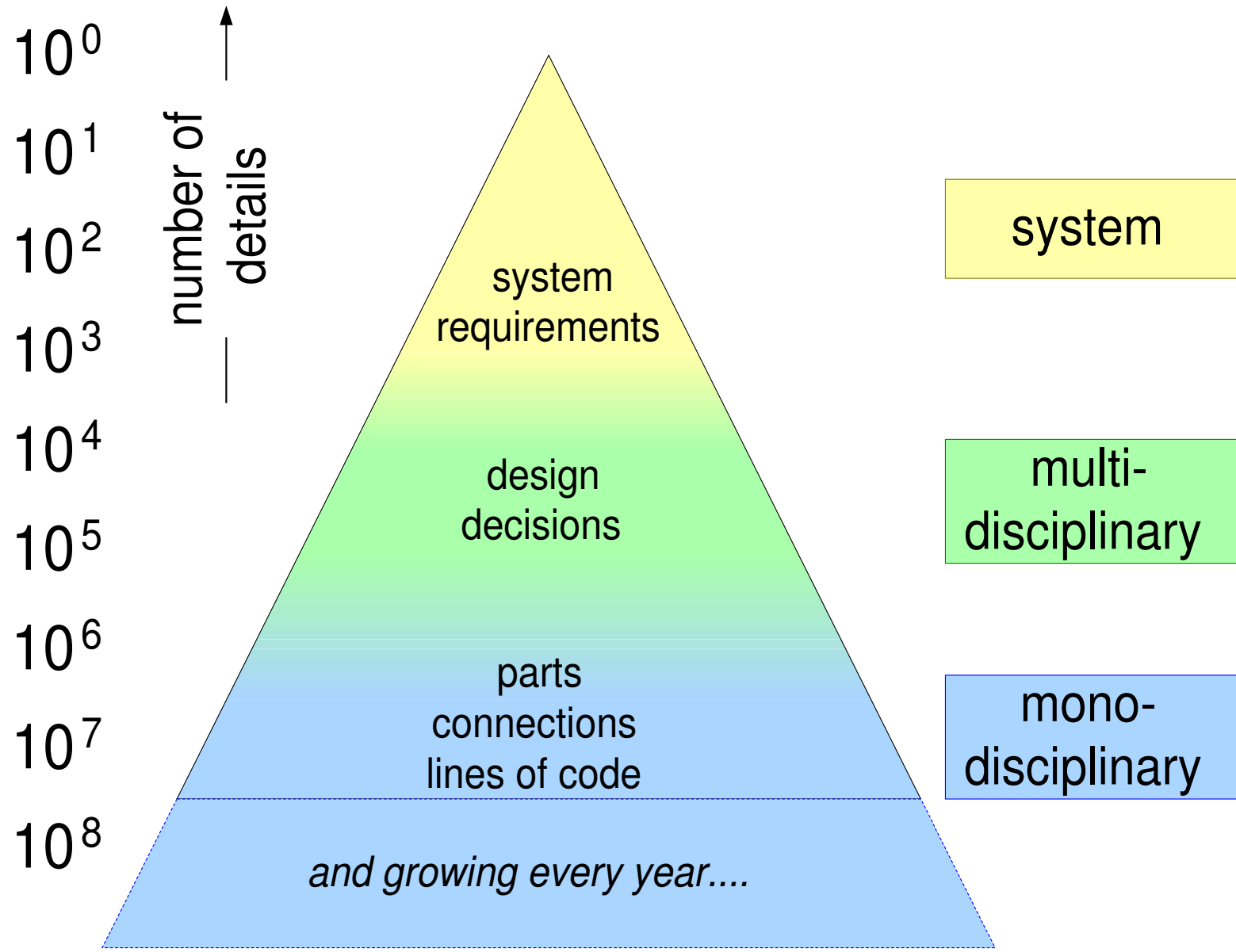
explore specific details



reasoning

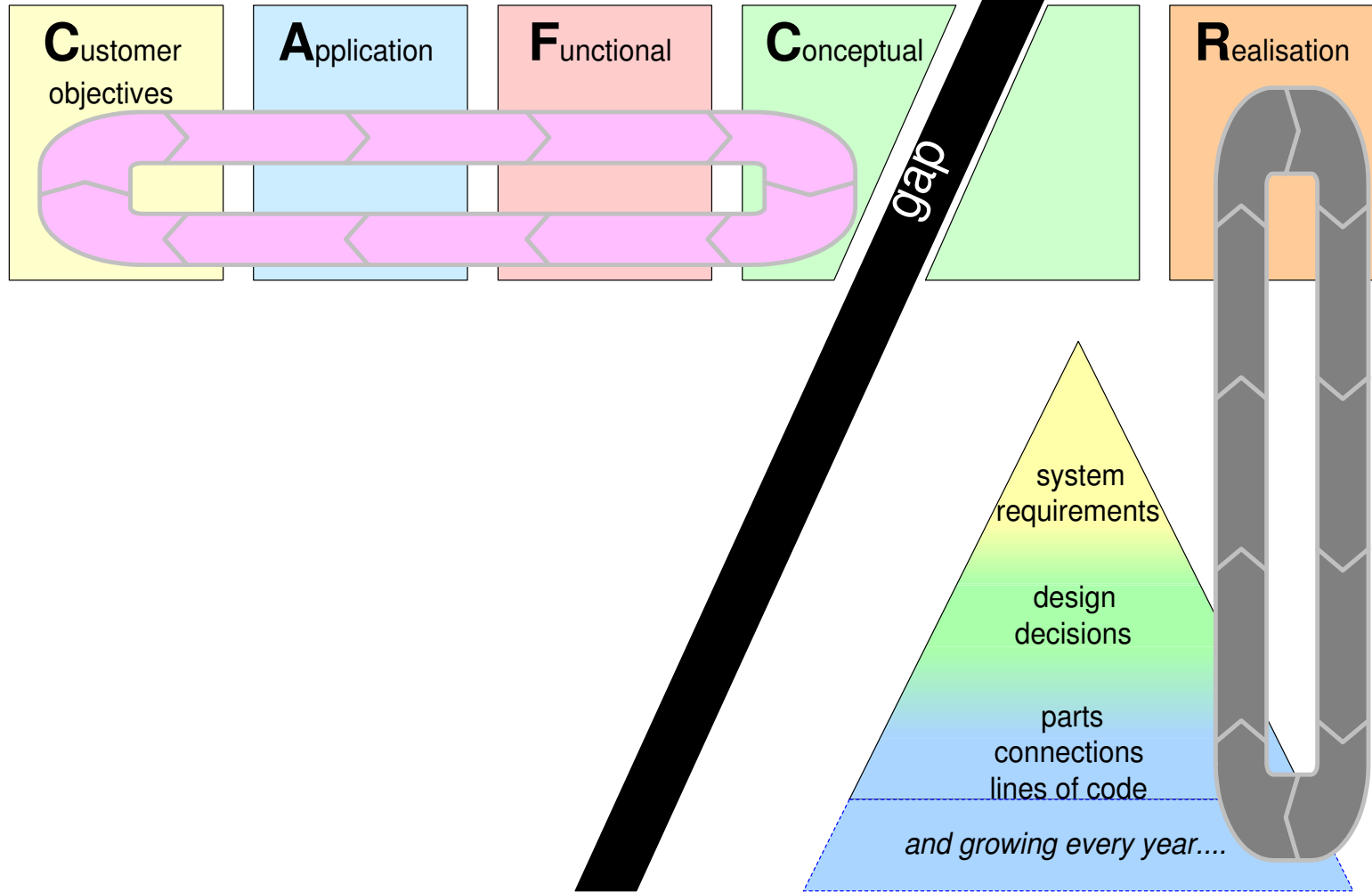


Connecting System Design to Detailed Design



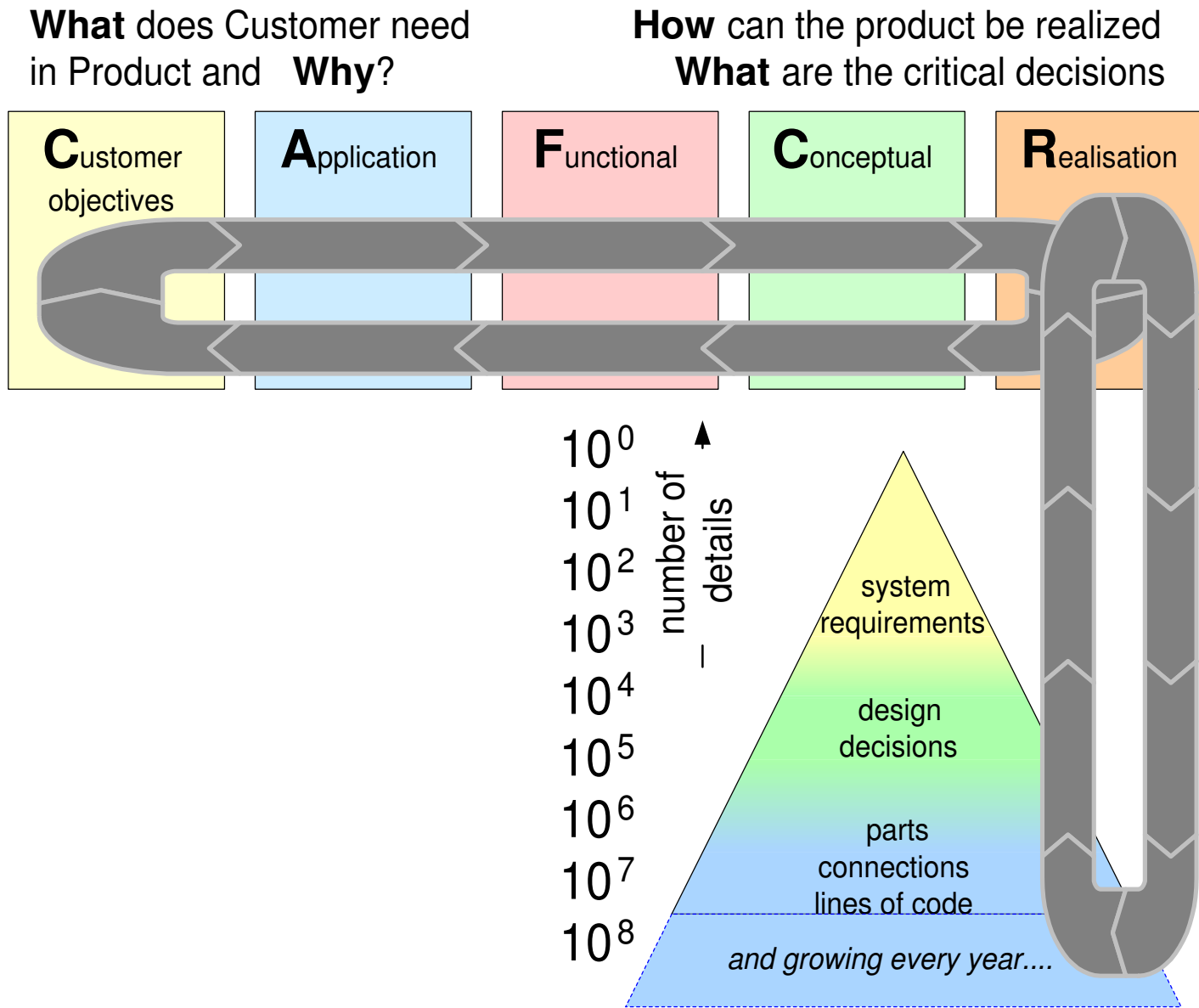
Organizational Problem: Disconnect

What does Customer need
in Product and **Why?**

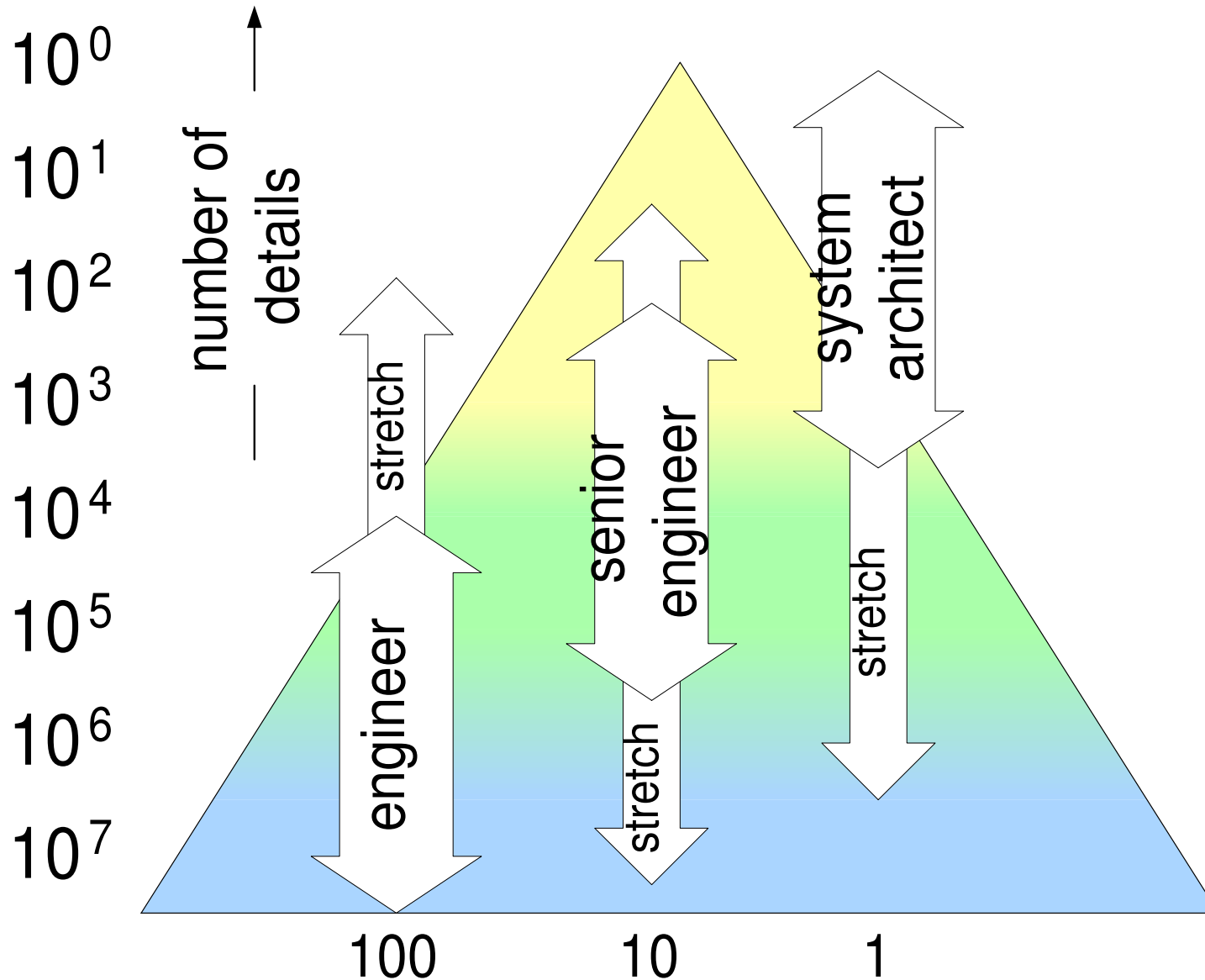


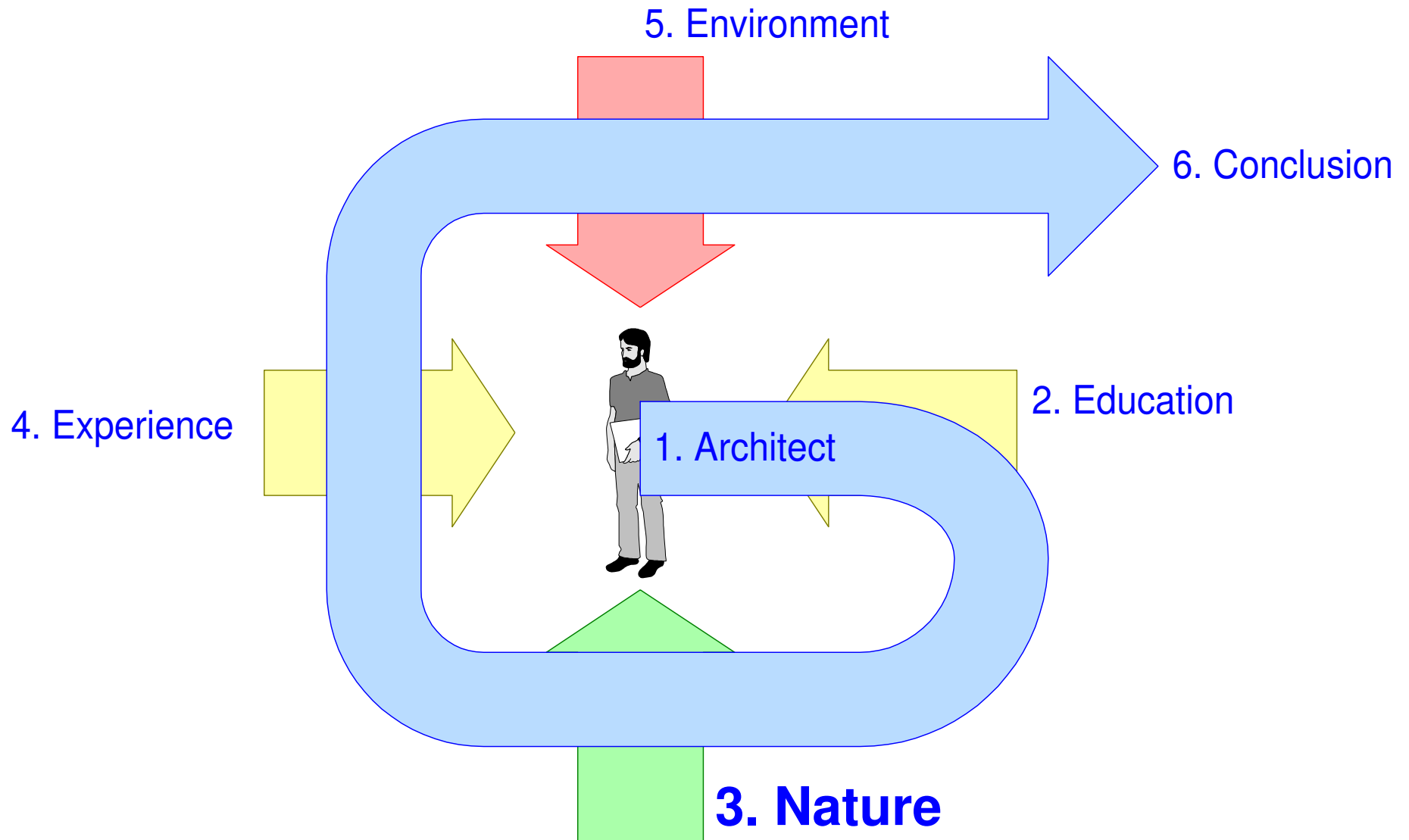
How can the product be realized
What are the critical decisions

Architect: Connecting Problem and Technical Solution

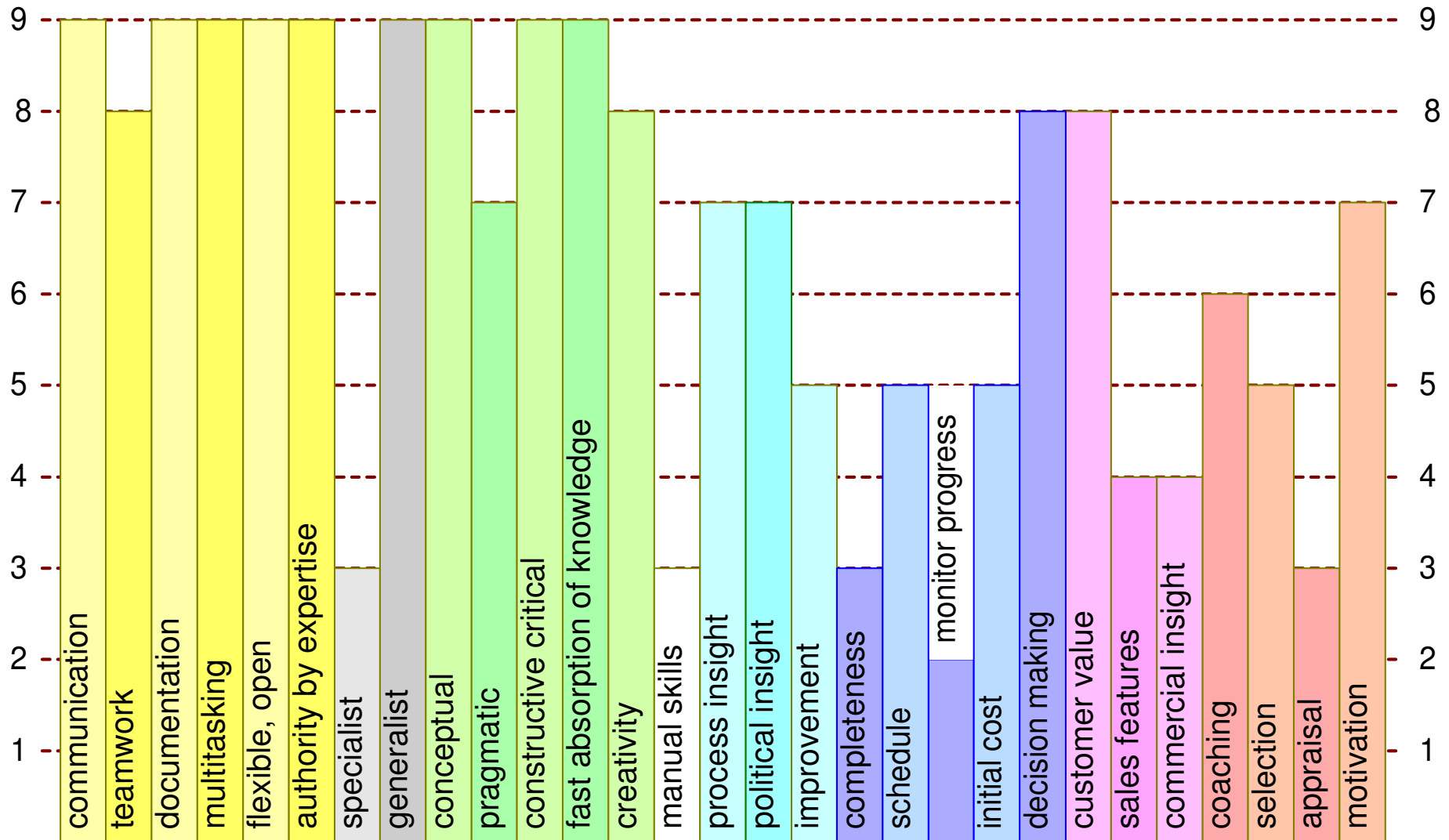


Major Bottleneck: Mental Dynamic Range

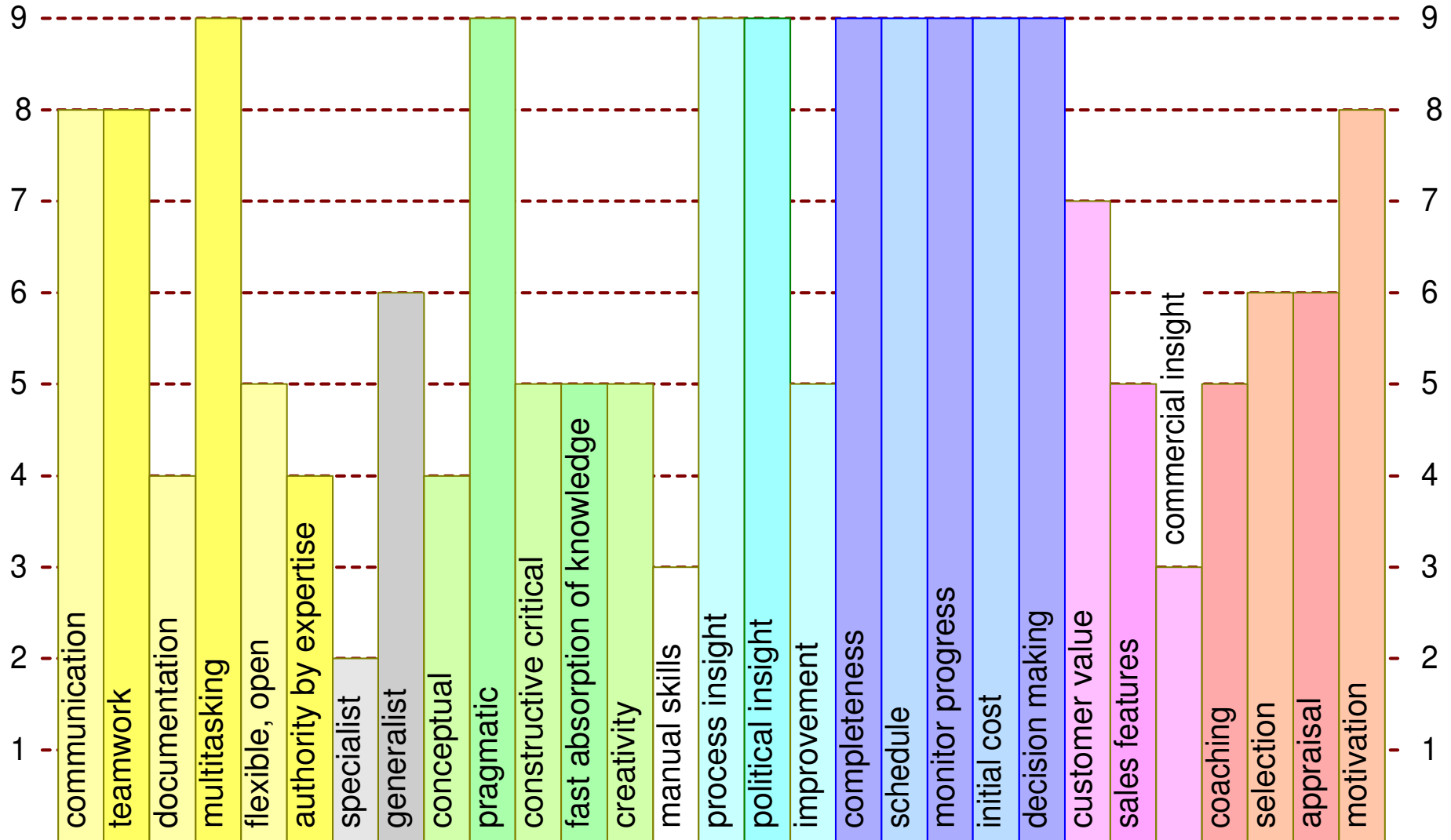




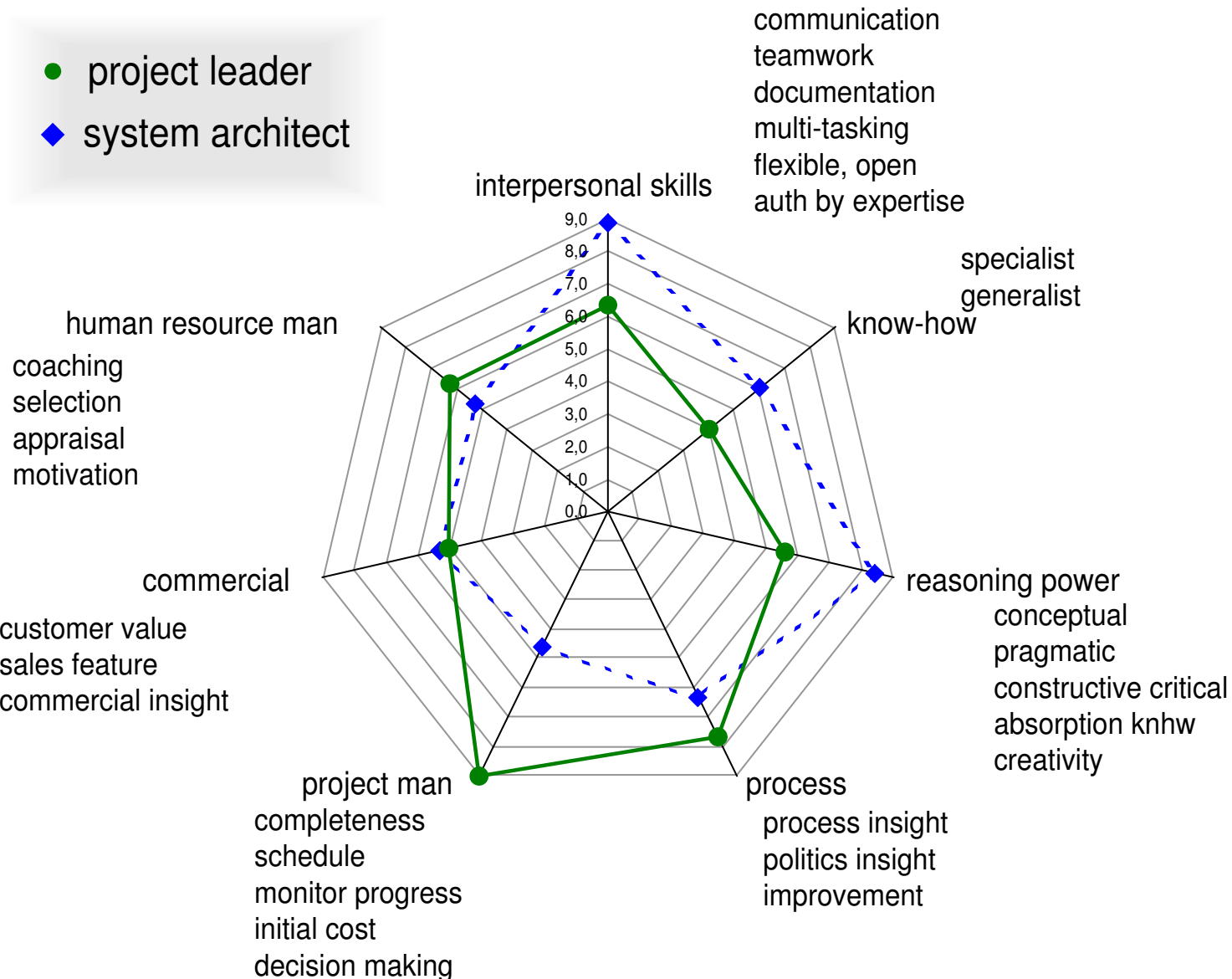
Profile of an "Ideal" System Architect



For Comparison: Profile of a Project Leader

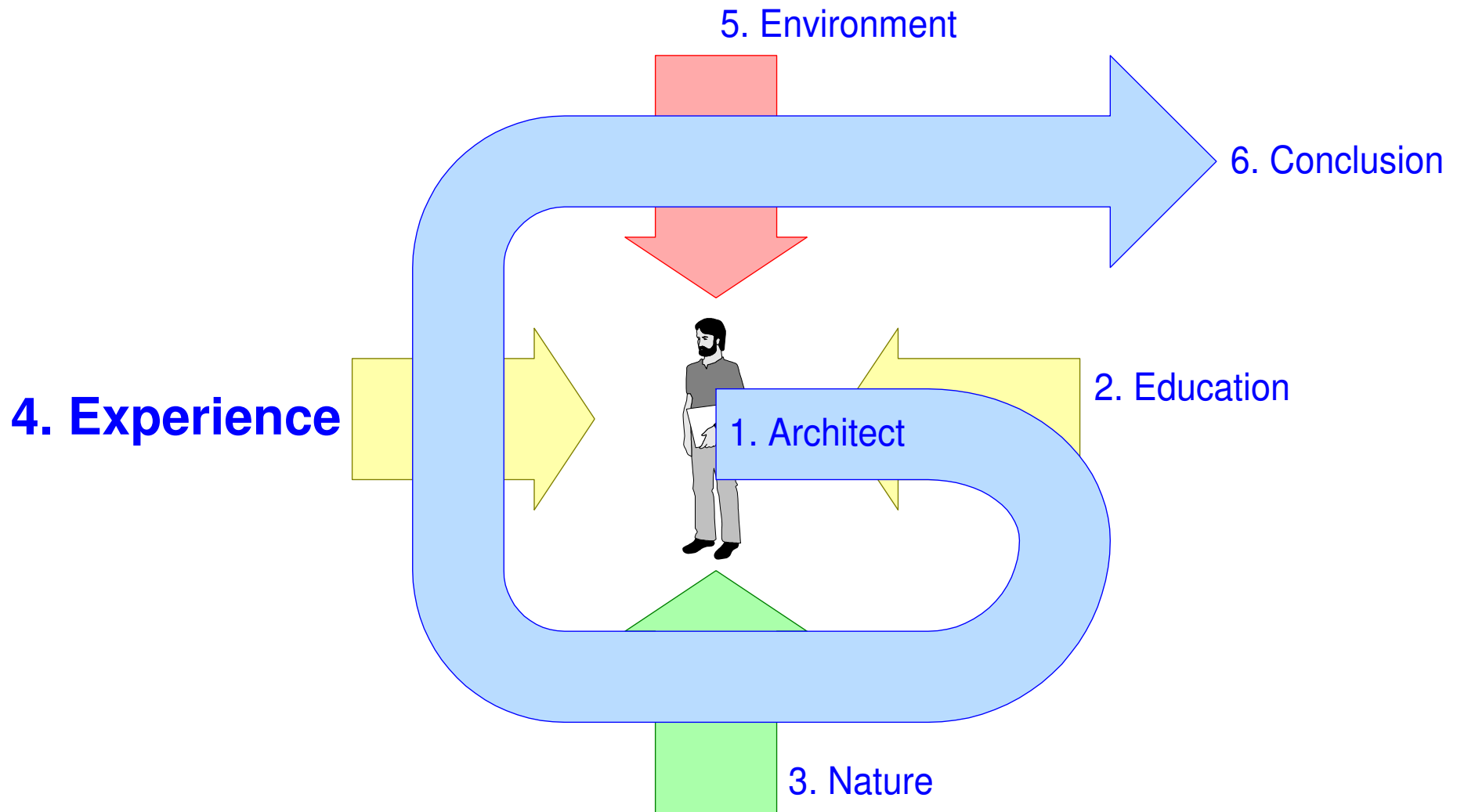


Project Leader vs System Architect

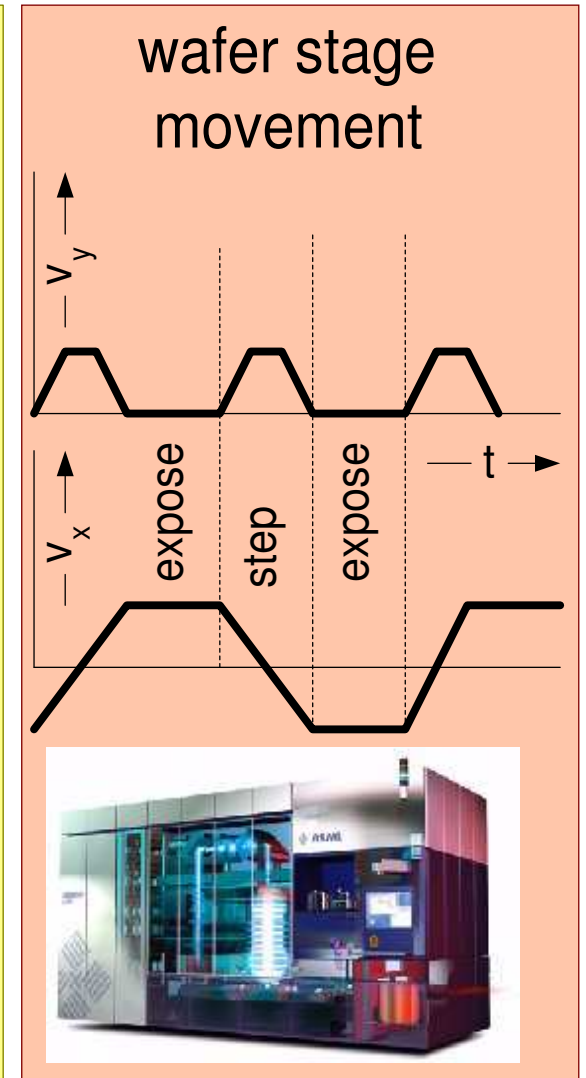
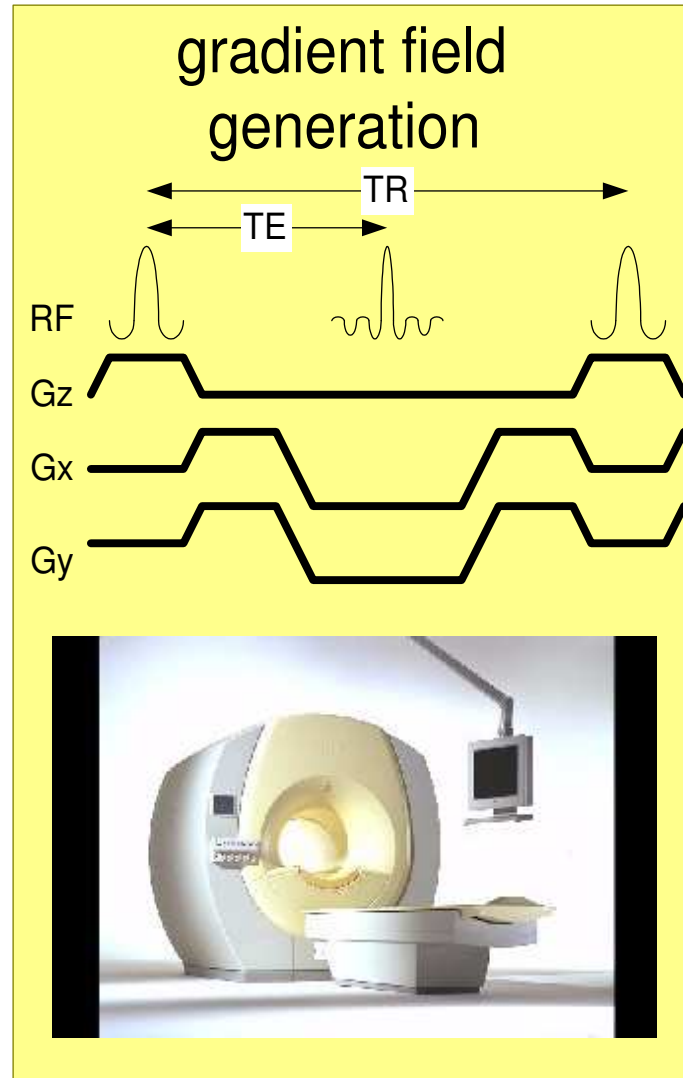
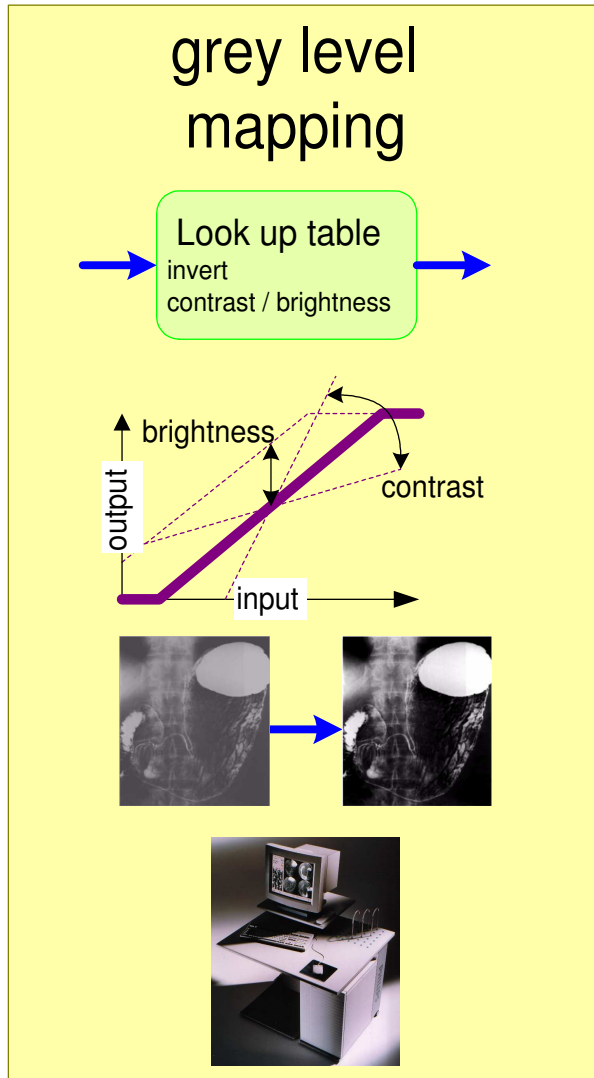


Most Discriminating Characteristics

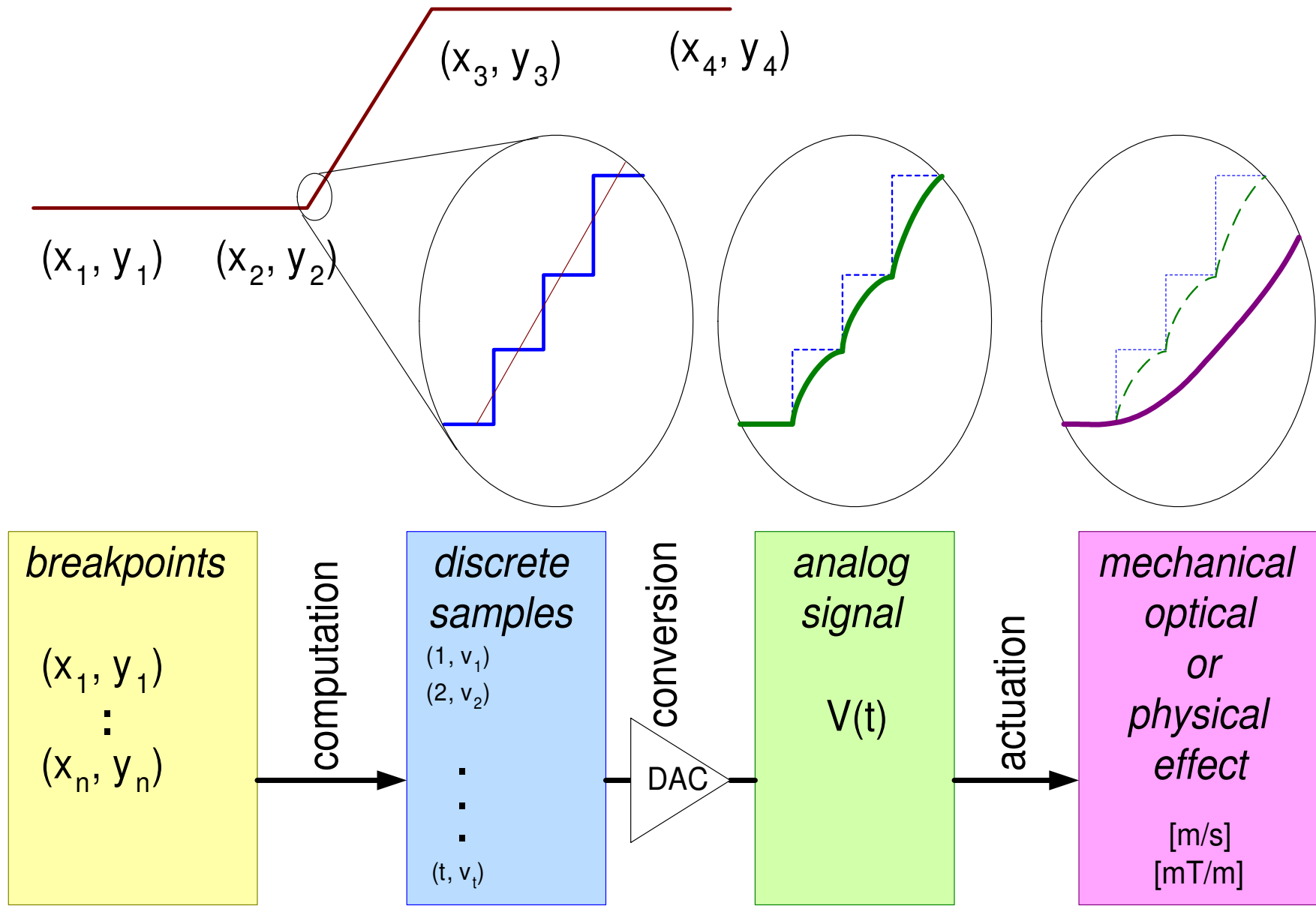
- Generalist
- Multi-tasking
- Authority by expertise
- Constructive critical
- Balance between conceptual and pragmatic



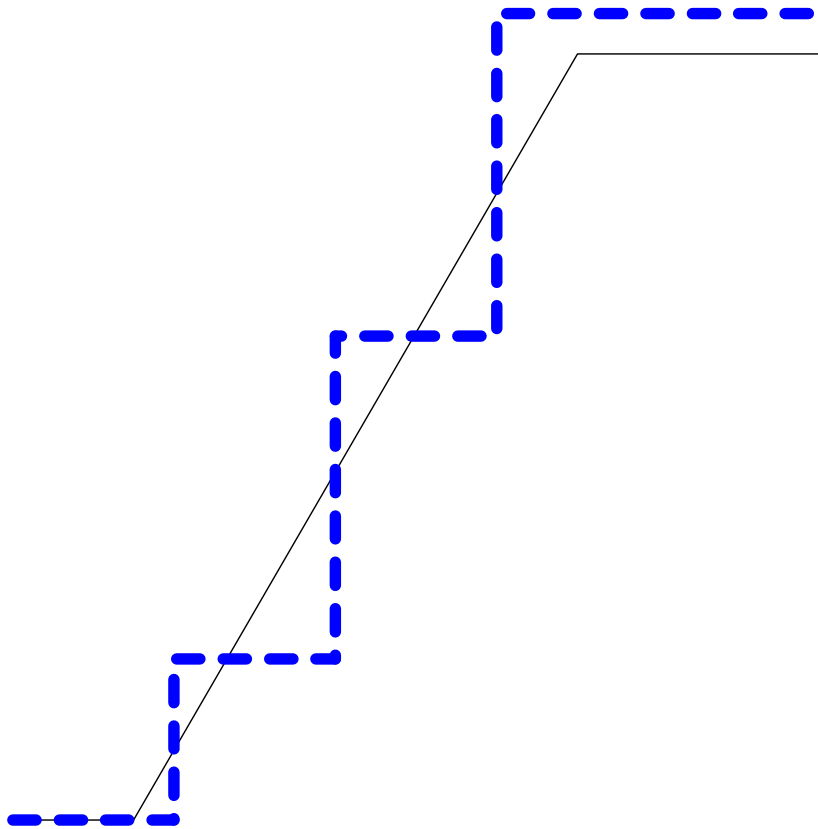
Example: Trapezoid Pattern



From SW input to physical Effect



Discretization effects



input is discrete
output is discrete

potential problems:

staircase effects

not all values can be reached

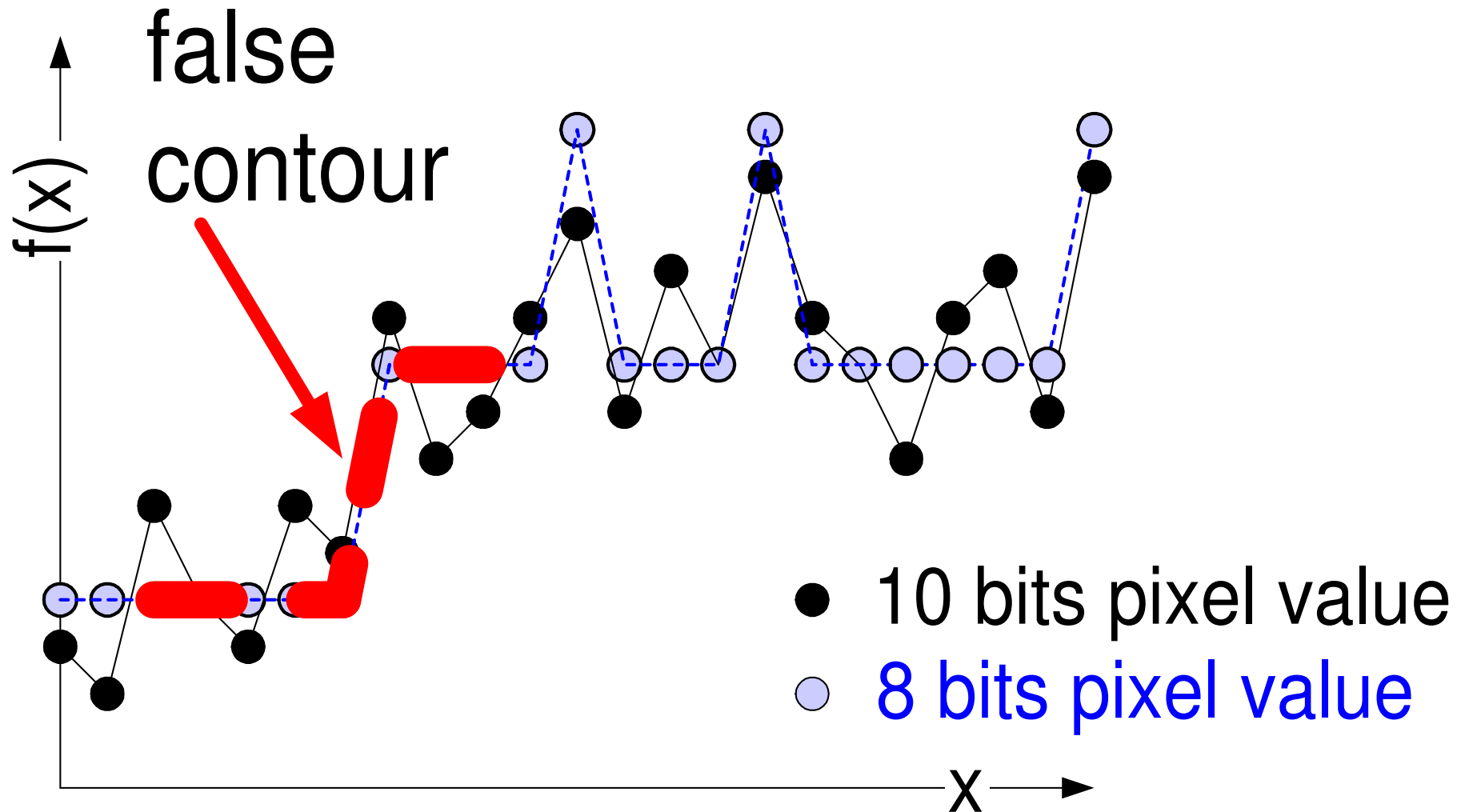
impact on frequency domain

broken invariants (surface)

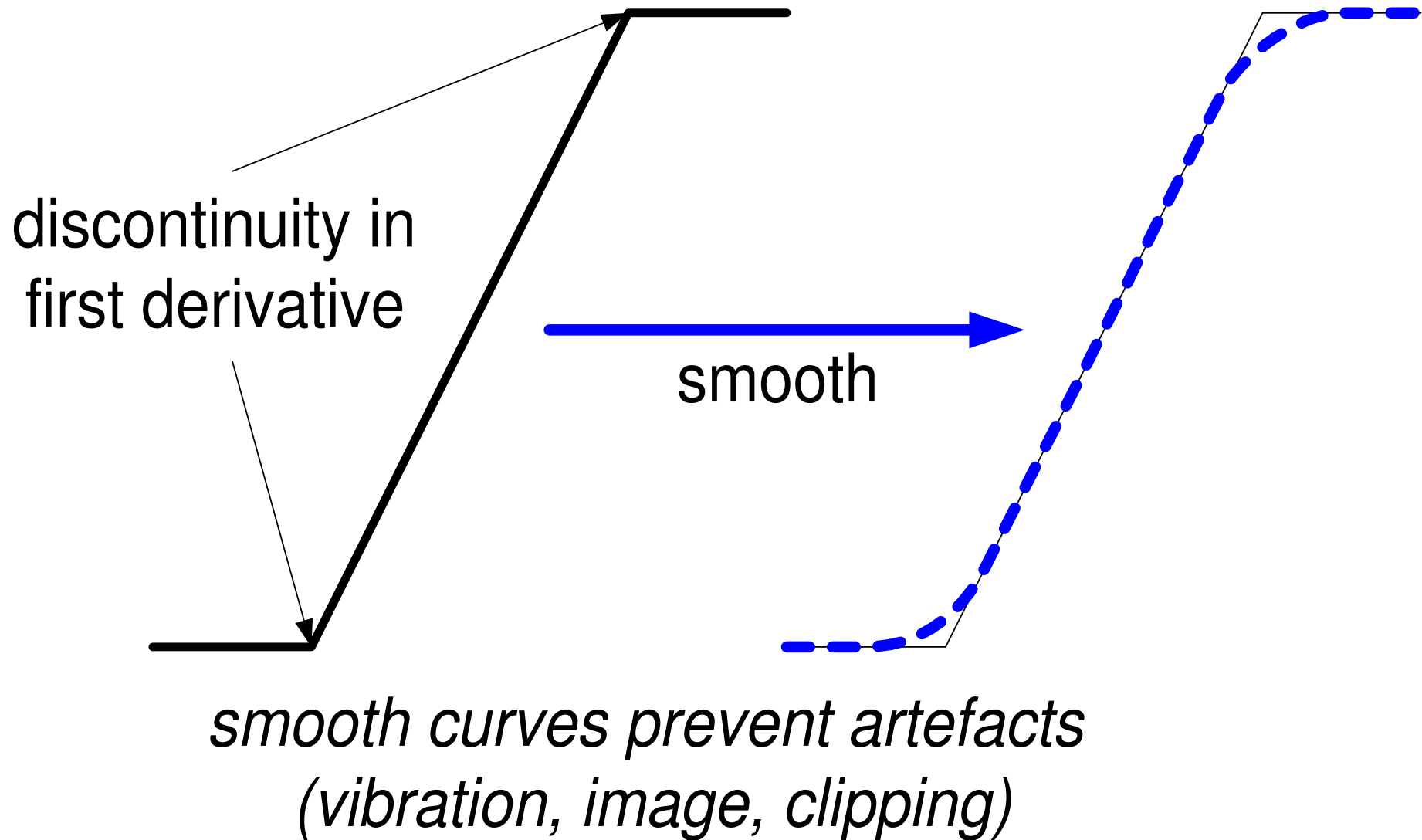
potential benefits:

optimized algorithms (fixed point)

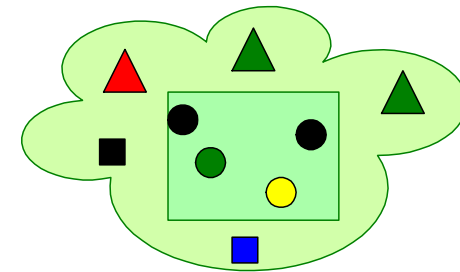
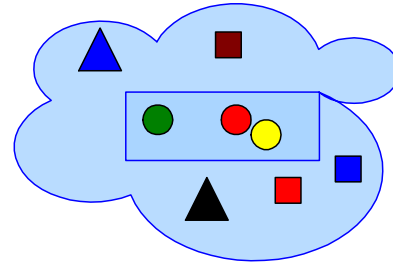
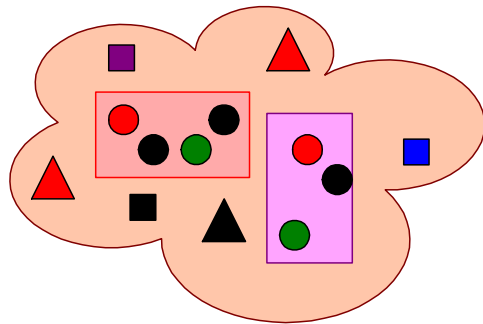
Example of Discretization Problem



Example of Generic Smoothing Consideration



Architects Collect a Rich Set of Patterns



time →

architects move from:
product to product
environment to environment

architects experience:
thousands of patterns
design patterns in systems
process patterns in environments
human patterns in environments

legend



environment



system



design pattern

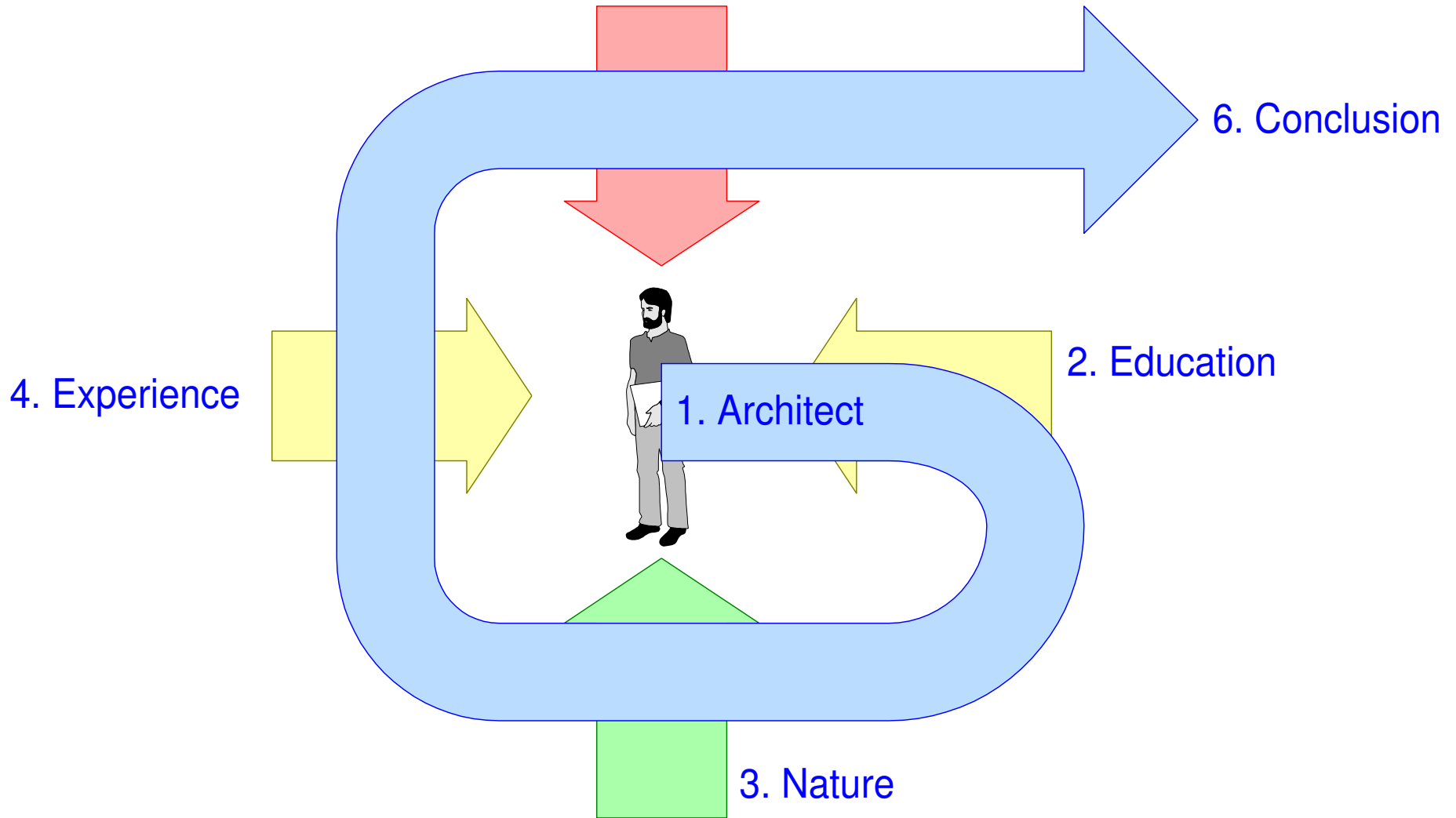


process pattern

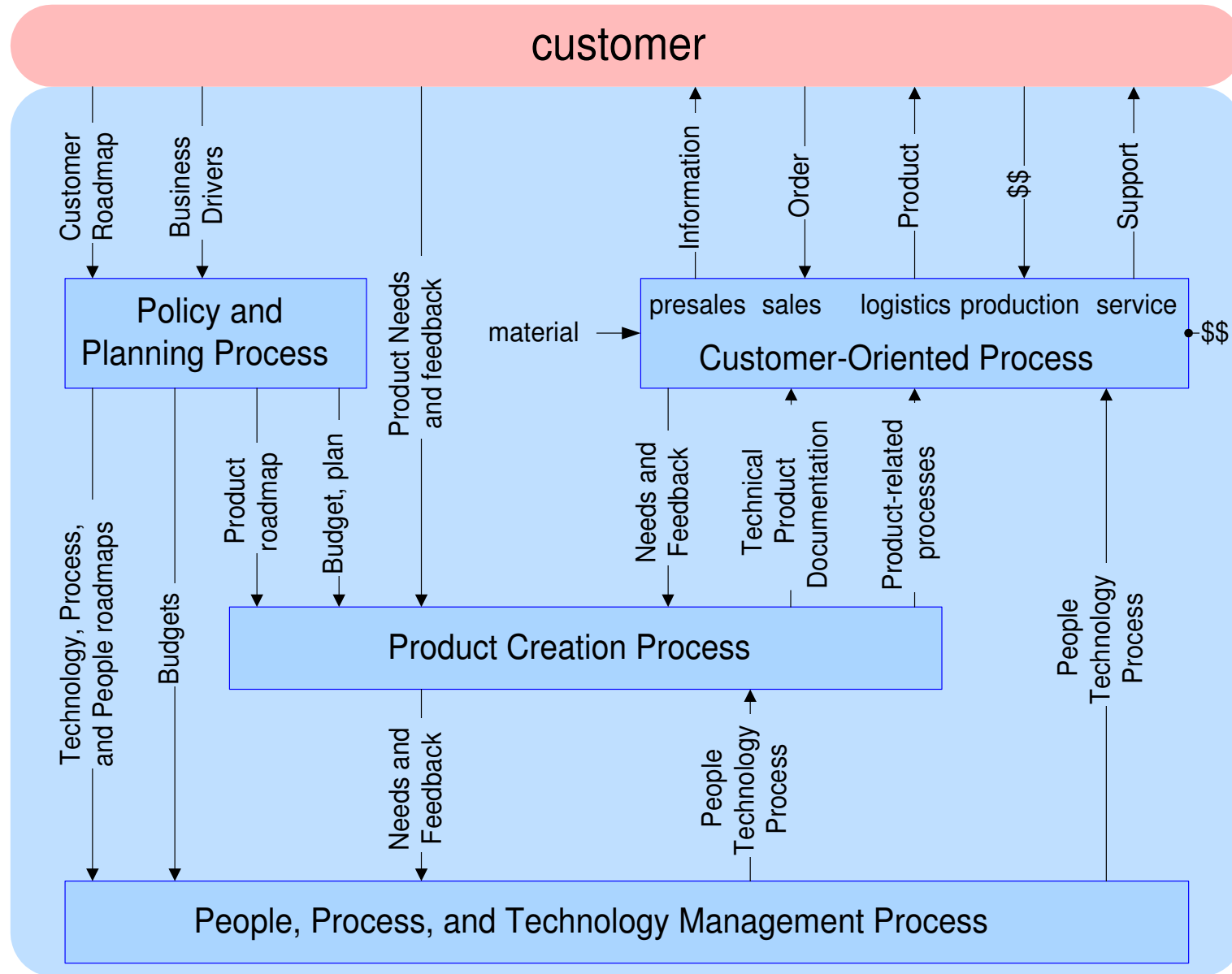


human pattern

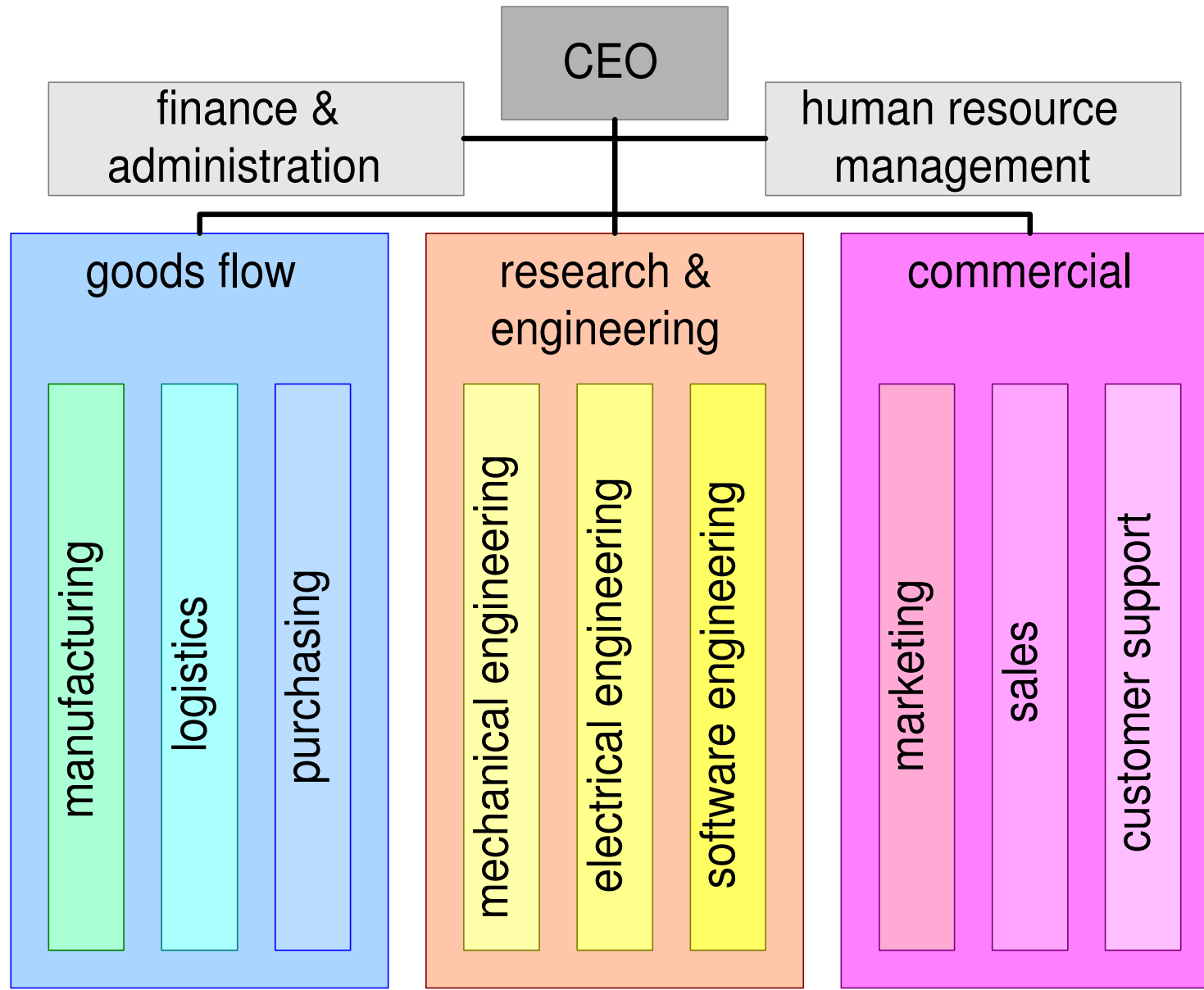
5. Environment



Simplified Decomposition of the Business



Line Organization Stovepipe



Business Organization Stovepipe

business unit 1
product/market oriented

project 1

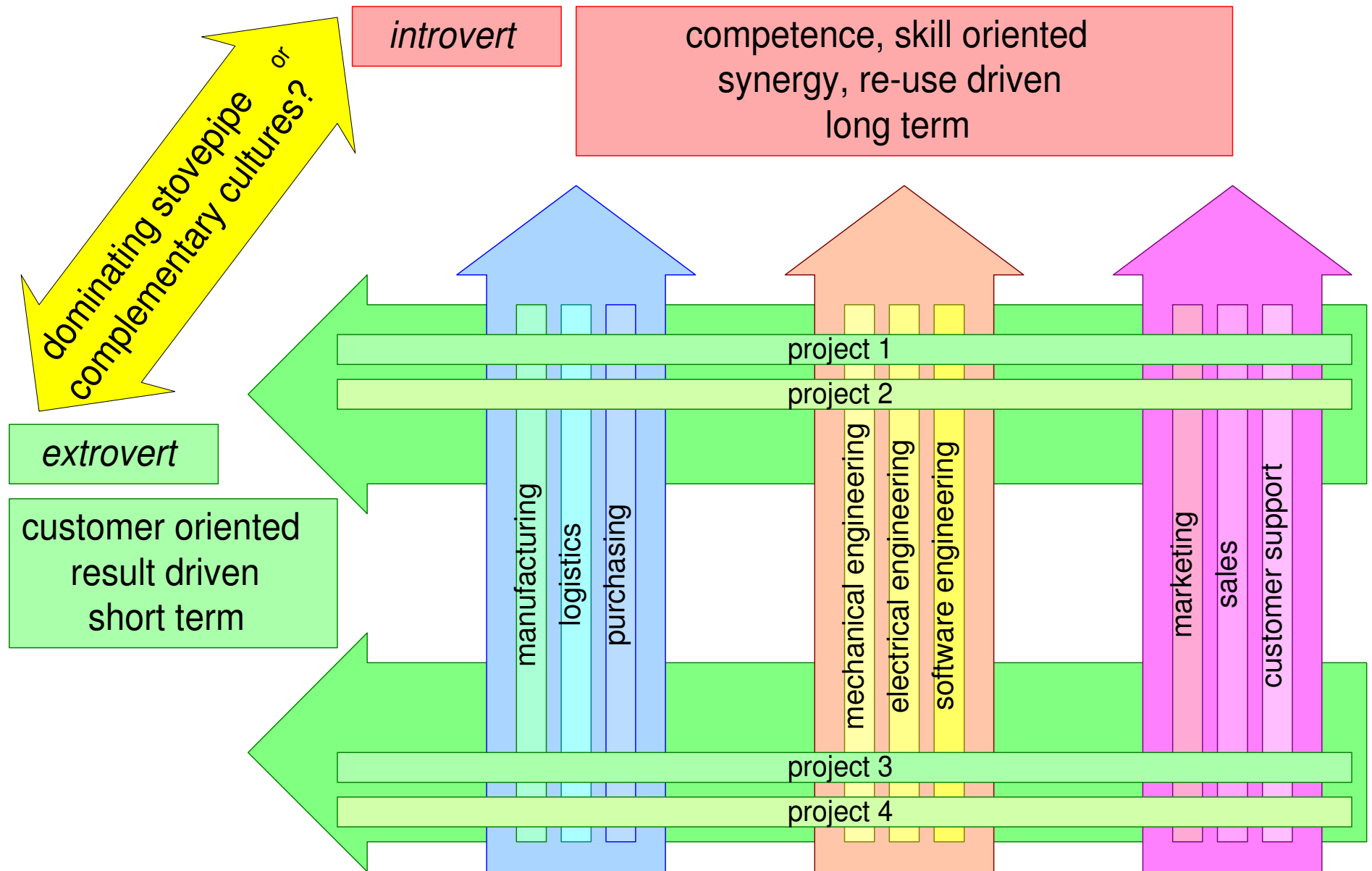
project 2

business unit 2
product/market oriented

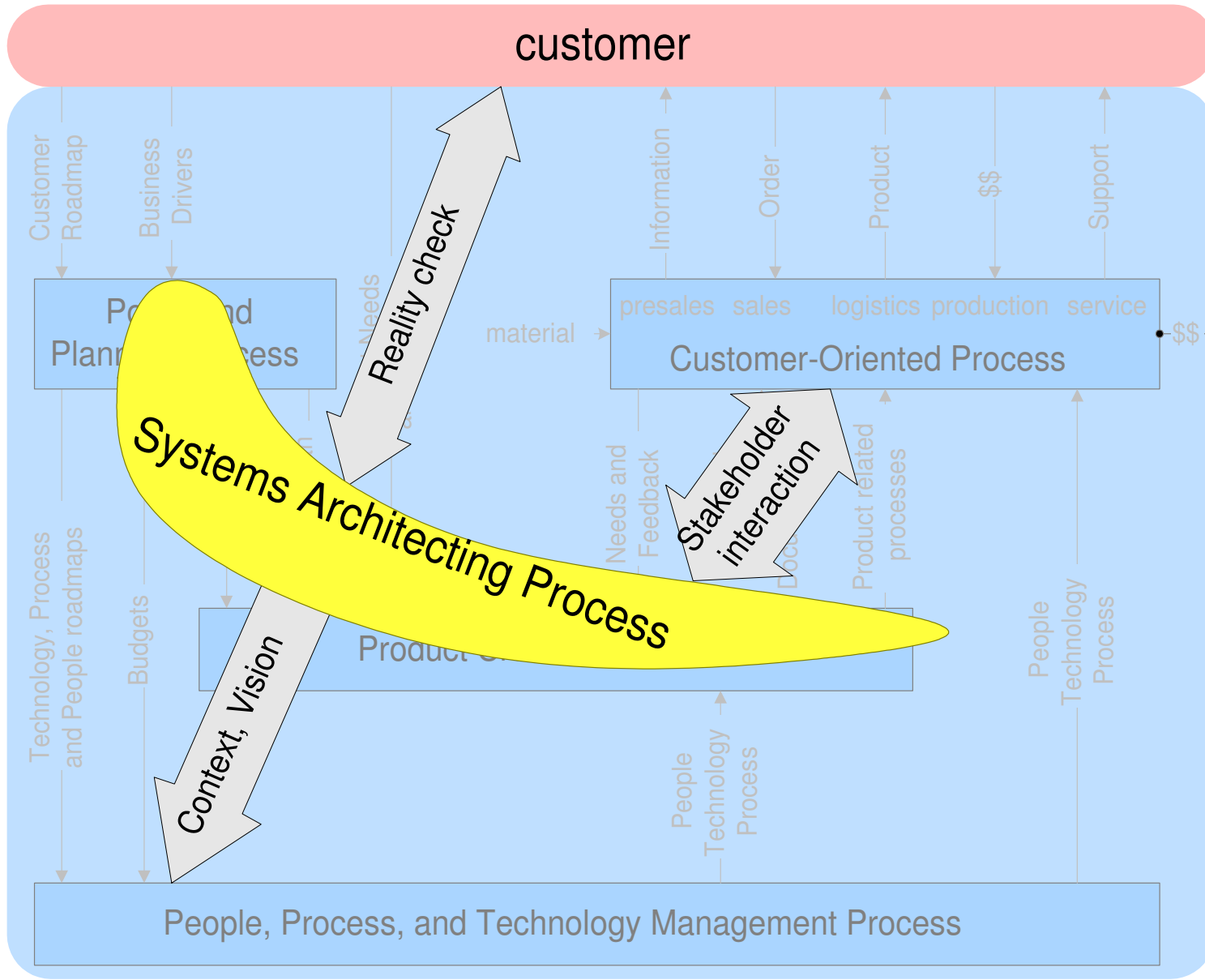
project 3

project 4

Different Concerns

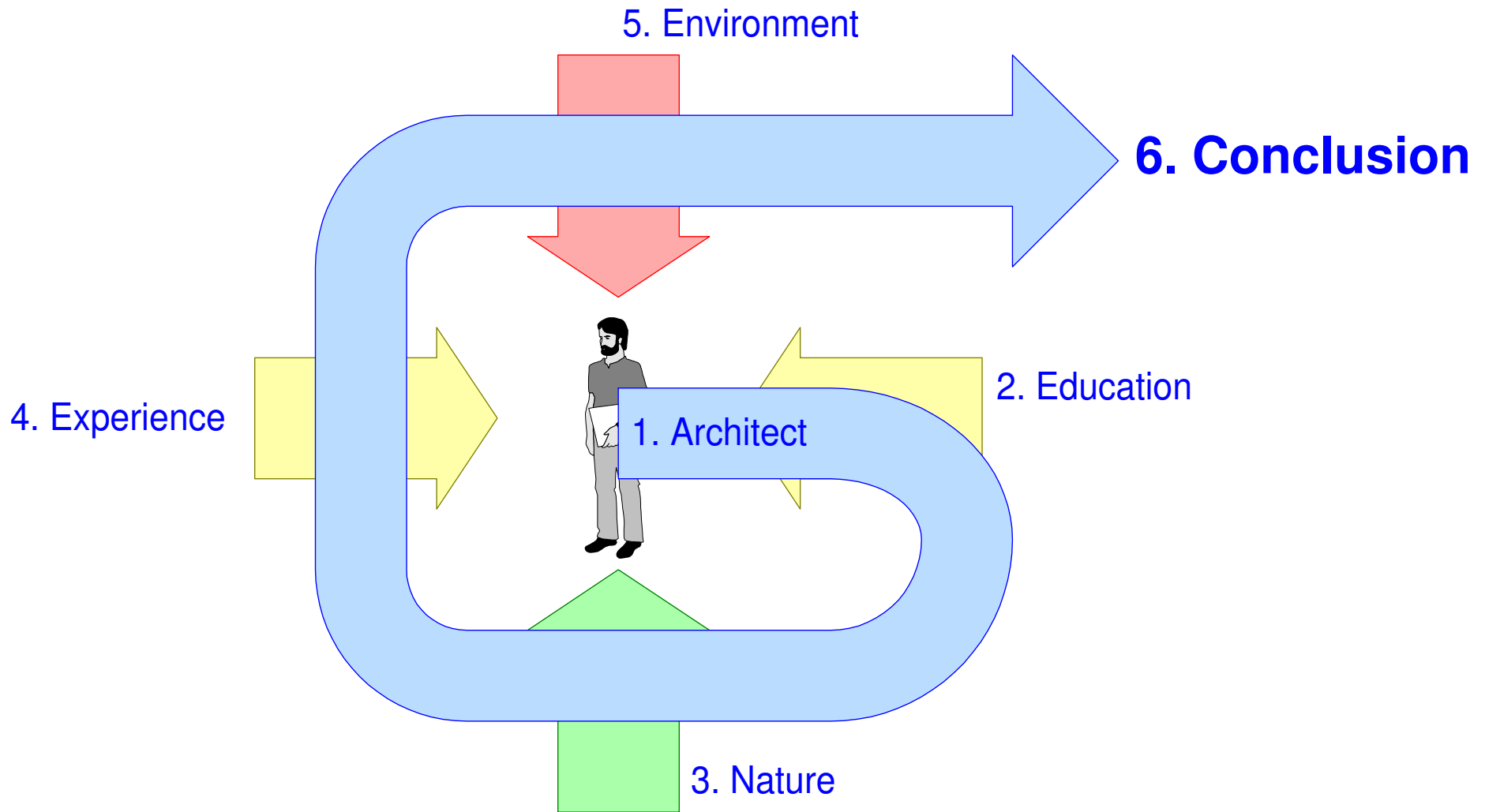


Positioning System Architecting



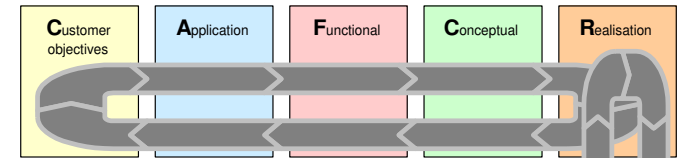
What Can We Do to Improve the Environment?

systems engineering as discipline
job rotation
stimulate architect exposure
stretch all engineers
cultivate customer & market oriented culture
share and invest in future exploration and vision



Conclusion

Environment :
stimulate job rotation
expose engineers
recognize multi-disciplinary



Experience :
>1000 design patterns
and process patterns



Education :
How to educate, stimulate
depth and breadth?

Nature :
Foster engineers with
architect potential