

# Challenges in High-Tech, illustrated in the medical domain

by *Gerrit Muller*      University of South-Eastern Norway-NISE

e-mail: `gaudisite@gmail.com`

`www.gaudisite.nl`

## Abstract

A short description is given of the medical domain, which is used to illustrate what technical challenges are present in high-tech development organizations.

A top list of technical challenges: Market dynamics, reliability, interoperability, security, power and creativity is presented and every challenge is briefly discussed.

The potential roles for new technical people are described and the future career possibilities.

## Distribution

This article or presentation is written as part of the Gaudí project. The Gaudí project philosophy is to improve by obtaining frequent feedback. Frequent feedback is pursued by an open creation process. This document is published as intermediate or nearly mature version to get feedback. Further distribution is allowed as long as the document remains complete and unchanged.

September 6, 2020

status: concept

version: 1.0



# Conventional X-ray systems

---



EasyDiagnost URF



Integris Allura Cardio-Vascular

# Typical X-ray results

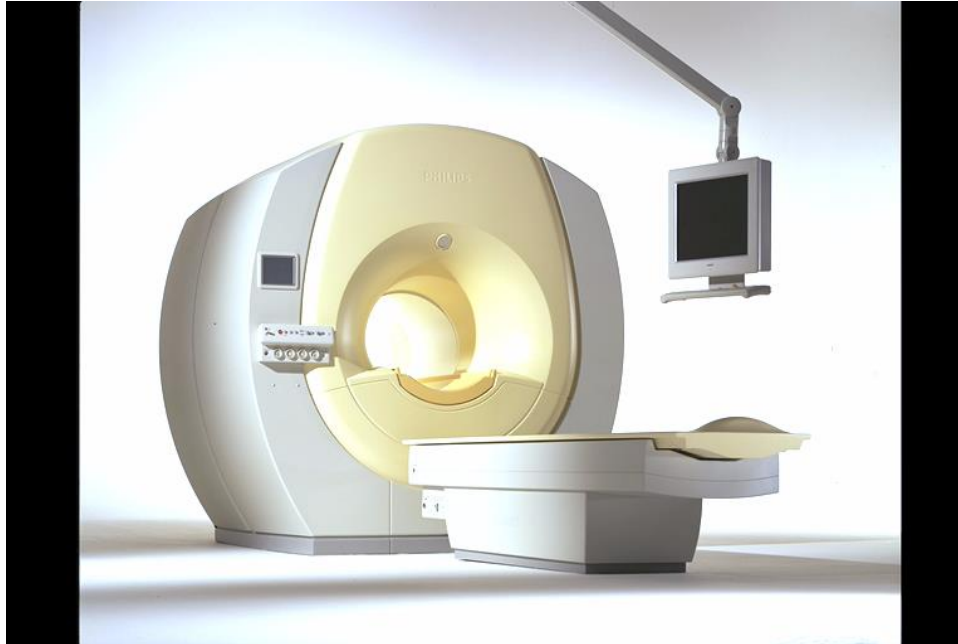


Thorax rad-image



Cardio Vascular images on monitors

# Magnetic Resonance Imaging, MRI scanners



Intera MR scanner



Gyrosan NT

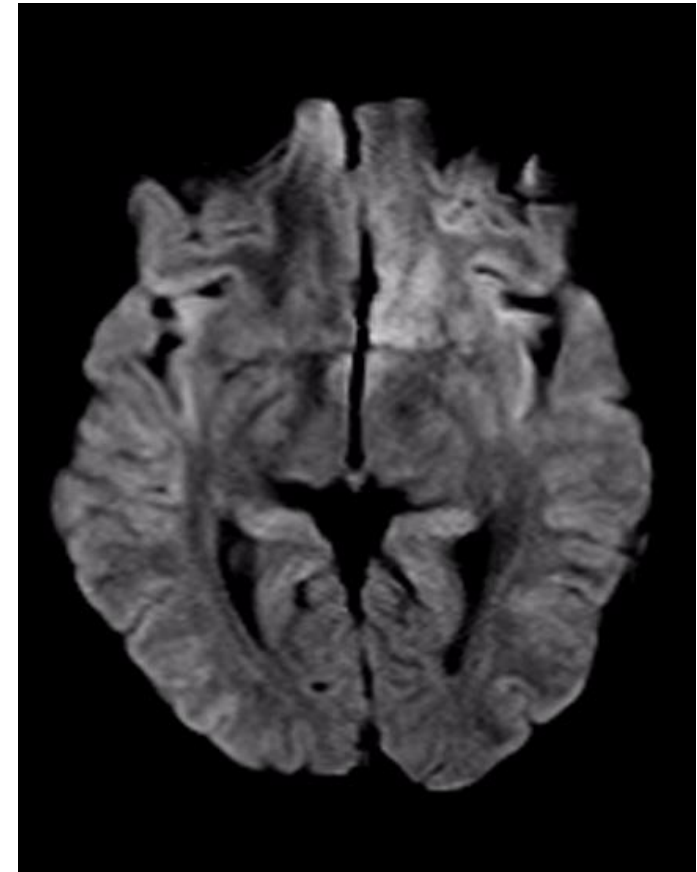




# Results from CT and MRI scanners



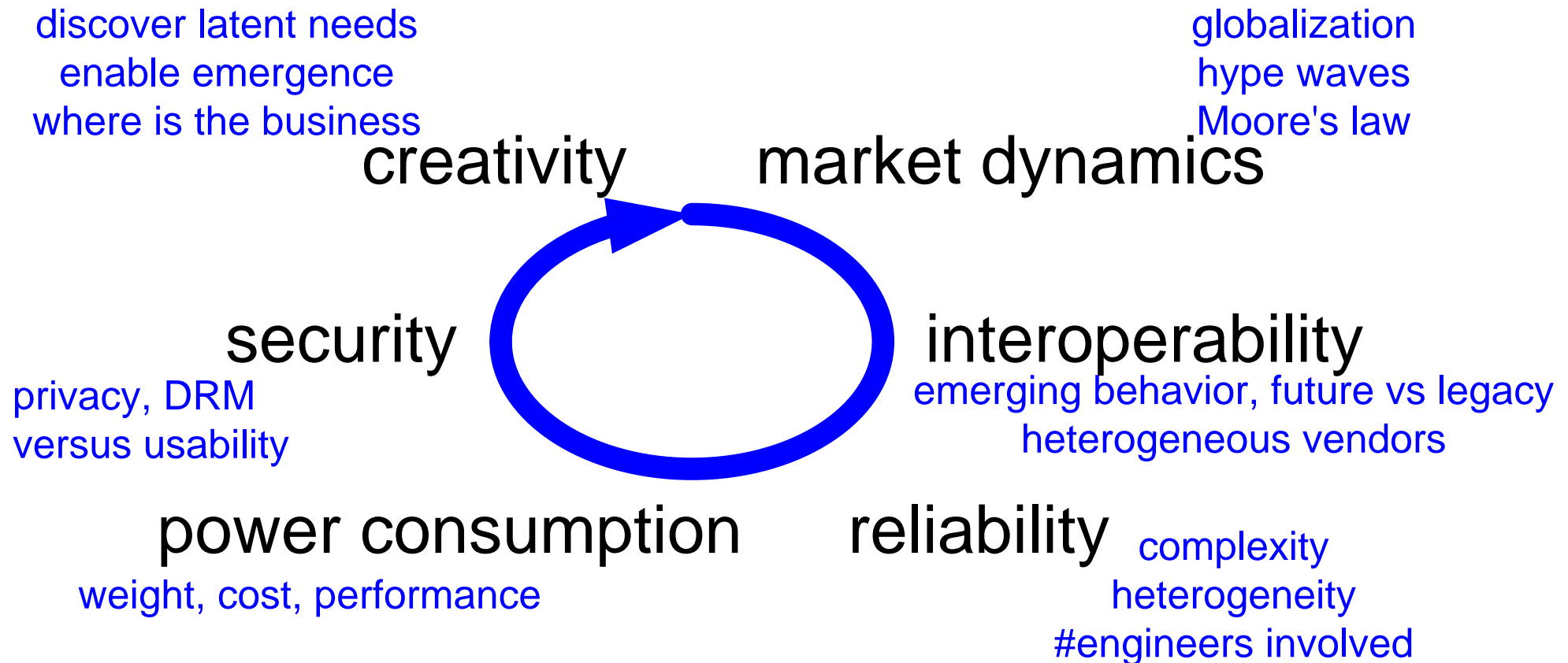
virtual endoscopy based  
on CT images



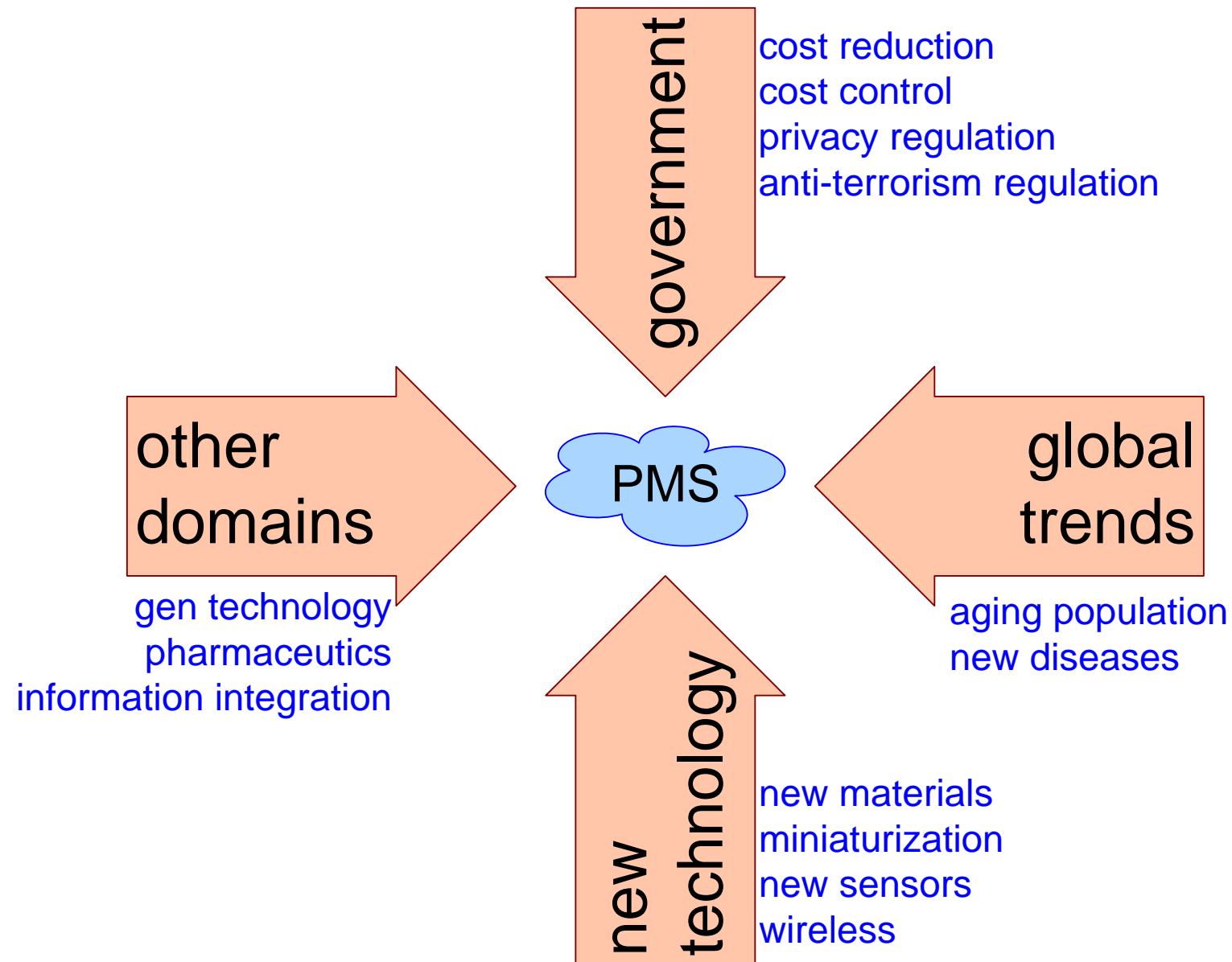
MRI image  
of the brain

# Hit list of challenges

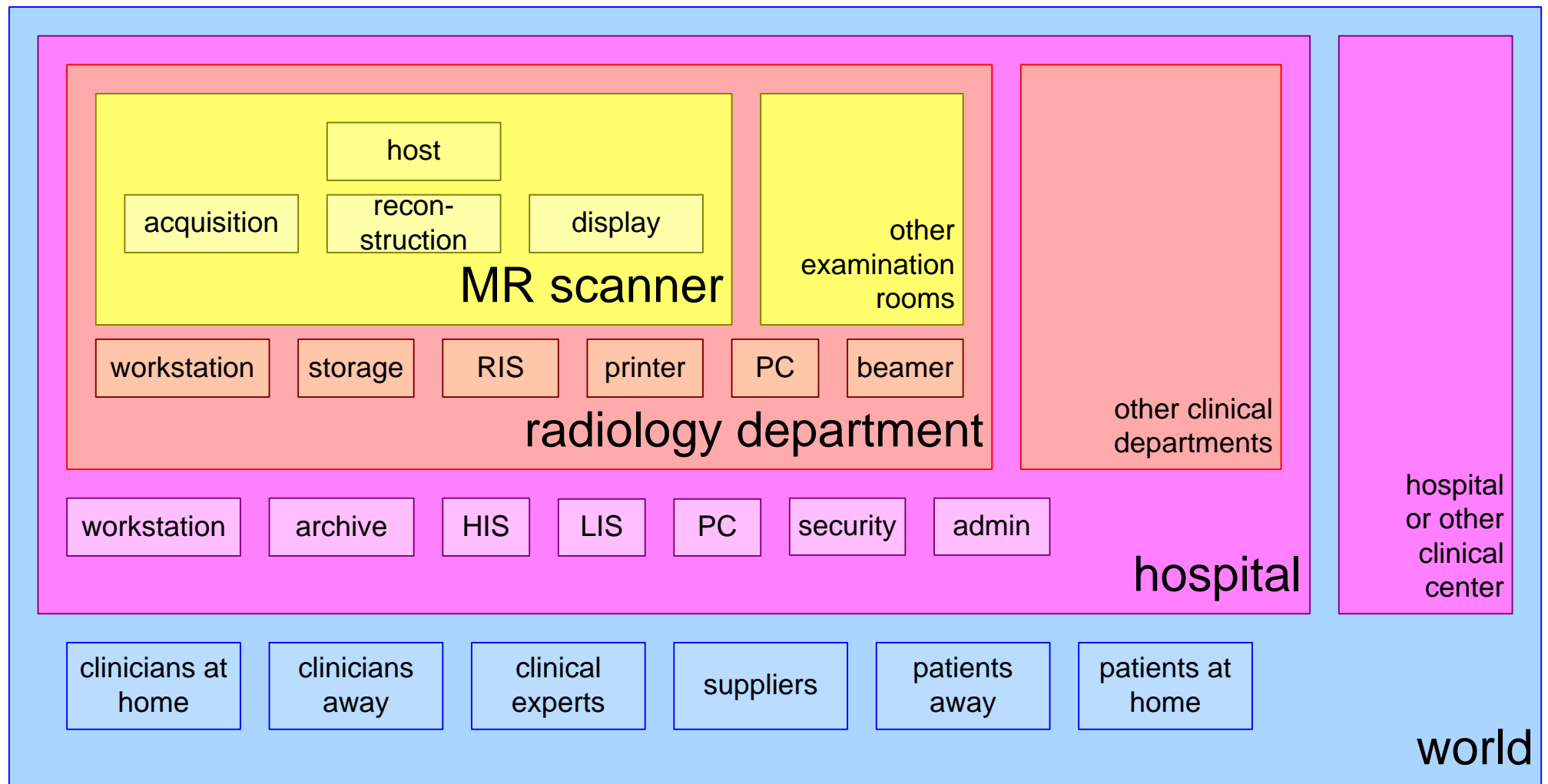
---



# Market dynamics in medical



# Interoperability: systems get connected at all levels





# Multi dimensional interoperability

---

integrating **multiple**

applications

clinical analysis  
clinical support  
administrative  
financial  
workflow

in **multiple**

languages

cultures

USA, UK,  
China, India,  
Japan, Korea  
France, Germany  
Italy, Mexico

delivered by **multiple**

vendors

Philips  
GE  
Siemens

based on **multiple**

media, networks

DVD+RW  
memory stick  
memory cards  
bluetooth  
11a/b/g  
UTMS

and **multiple**

standards

Dicom  
HL7  
XML

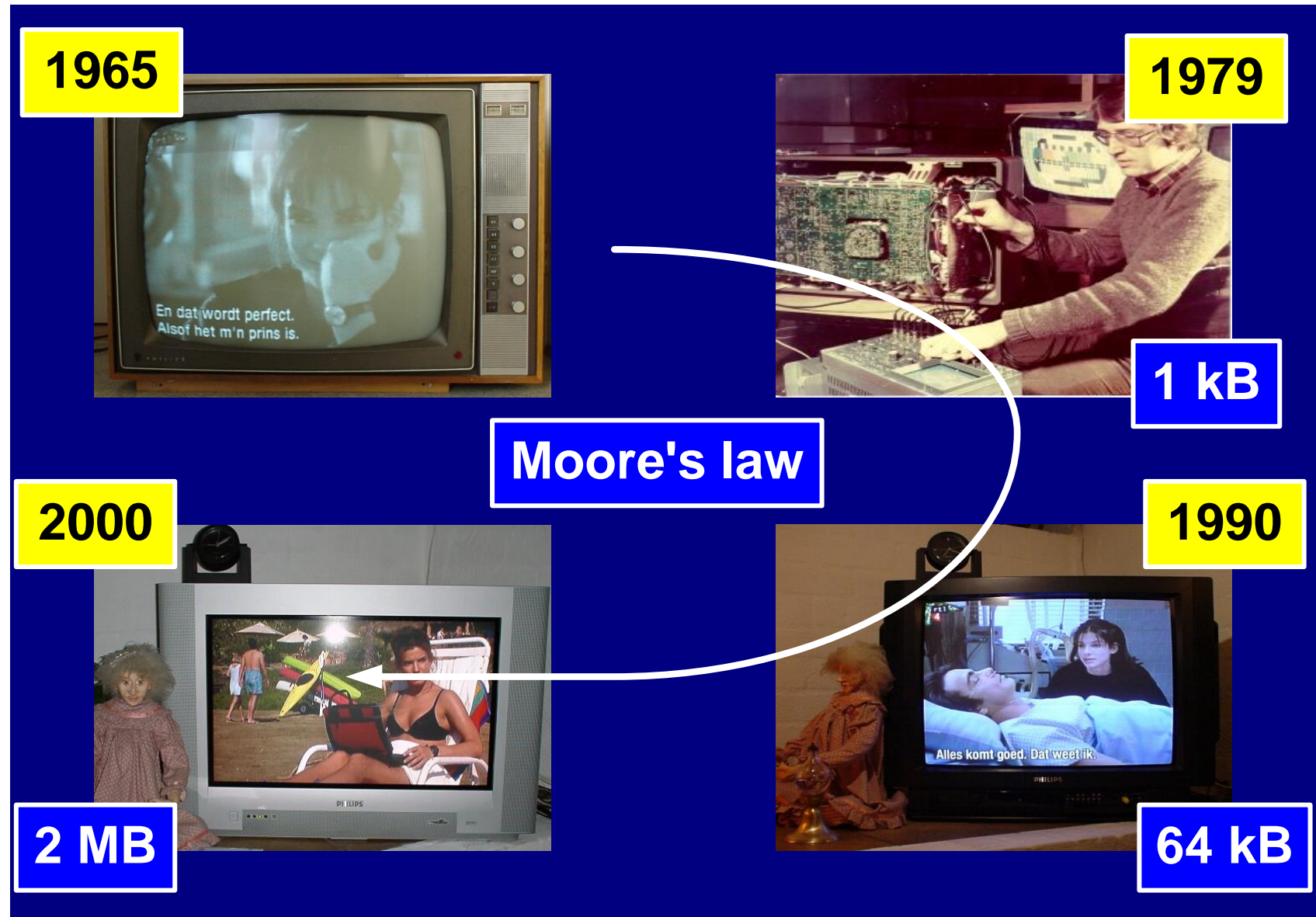
and **multiple**

releases

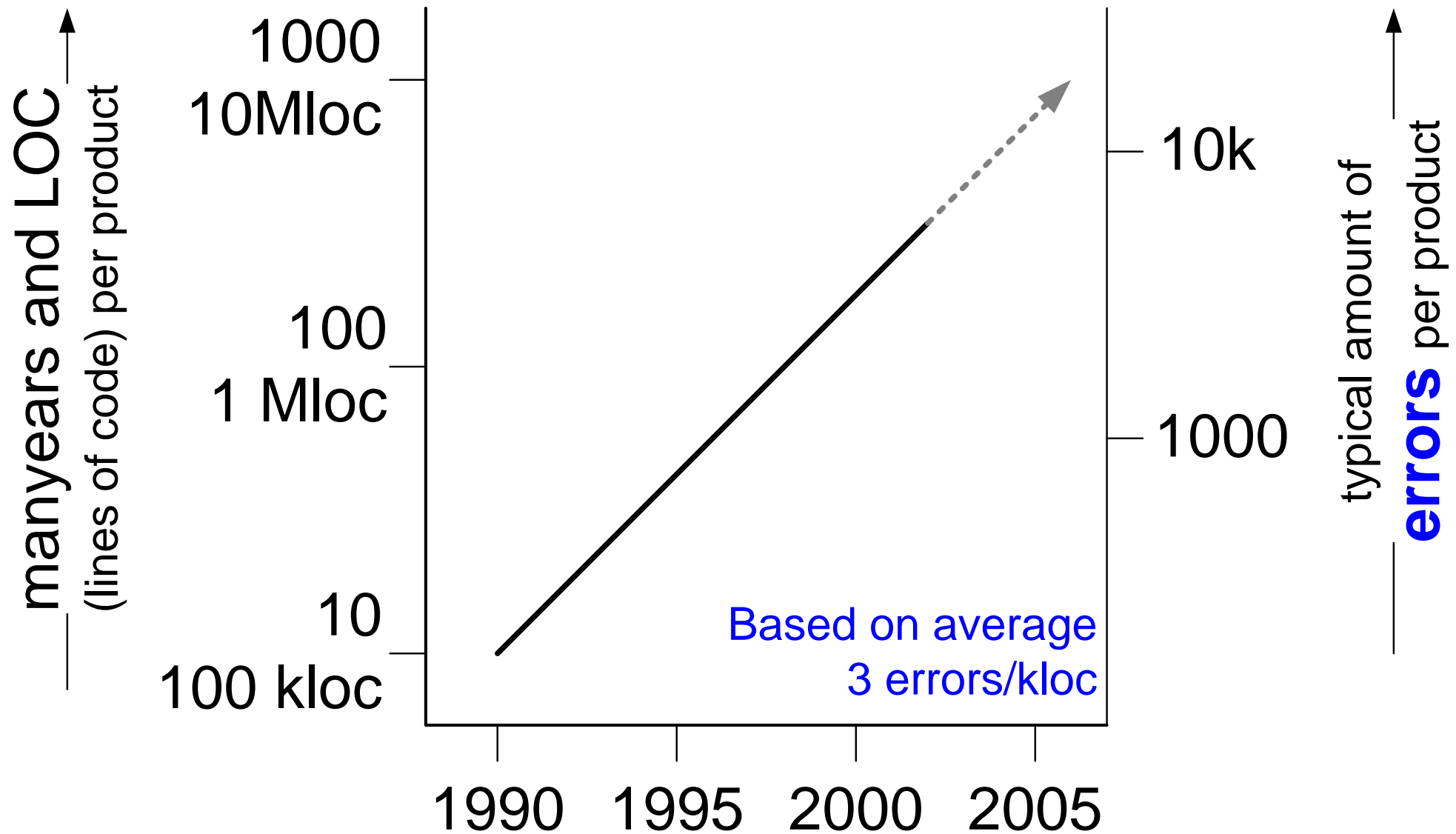
R5  
R6.2  
R7.1

# SW increase in televisions

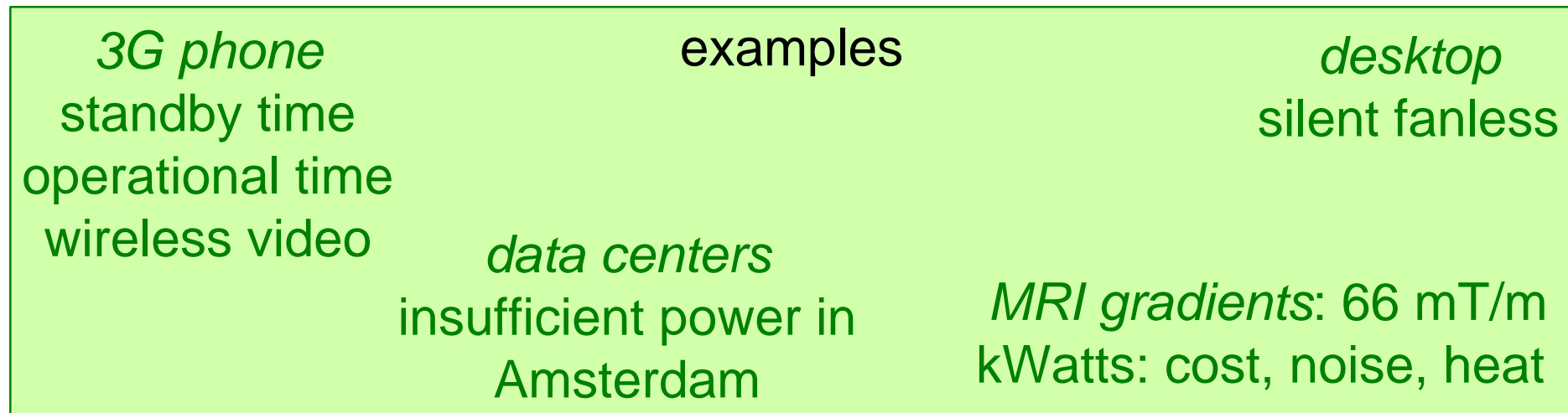
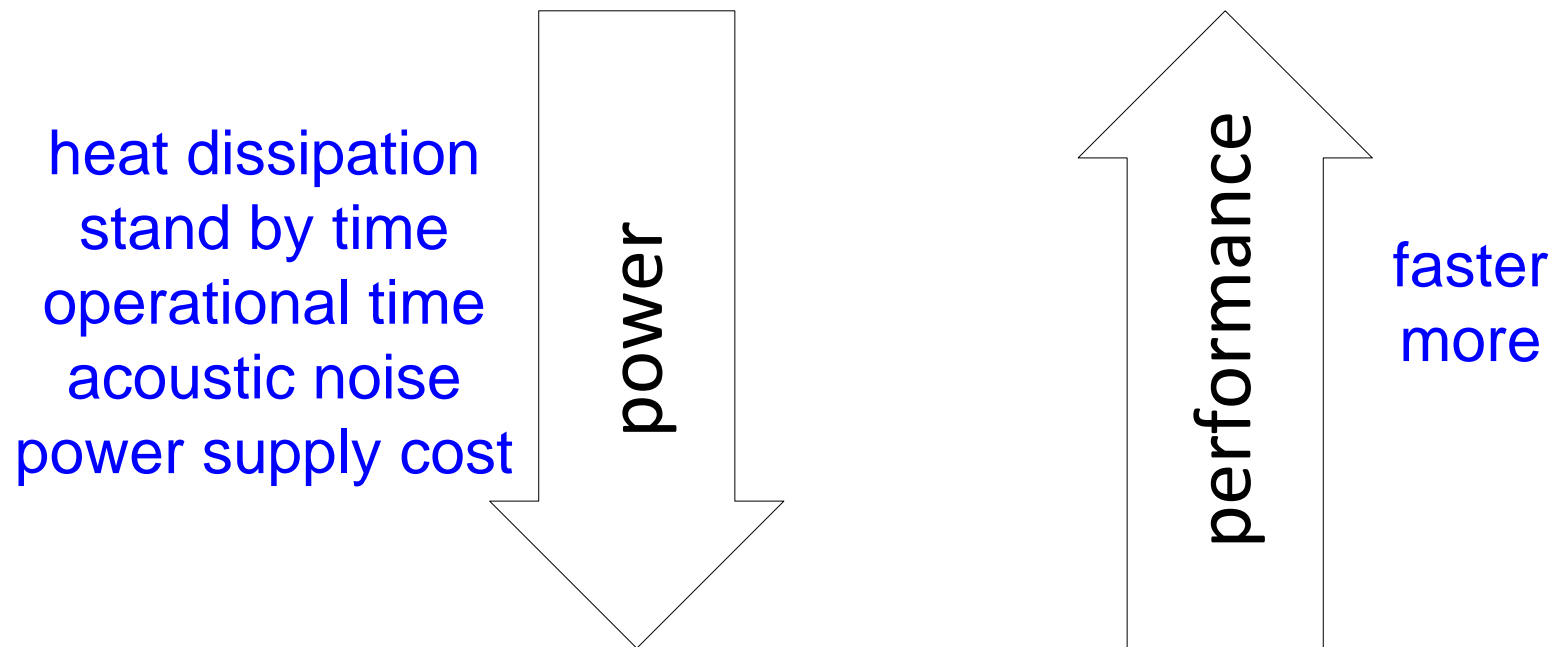
From: COPA tutorial, Rob van Ommering



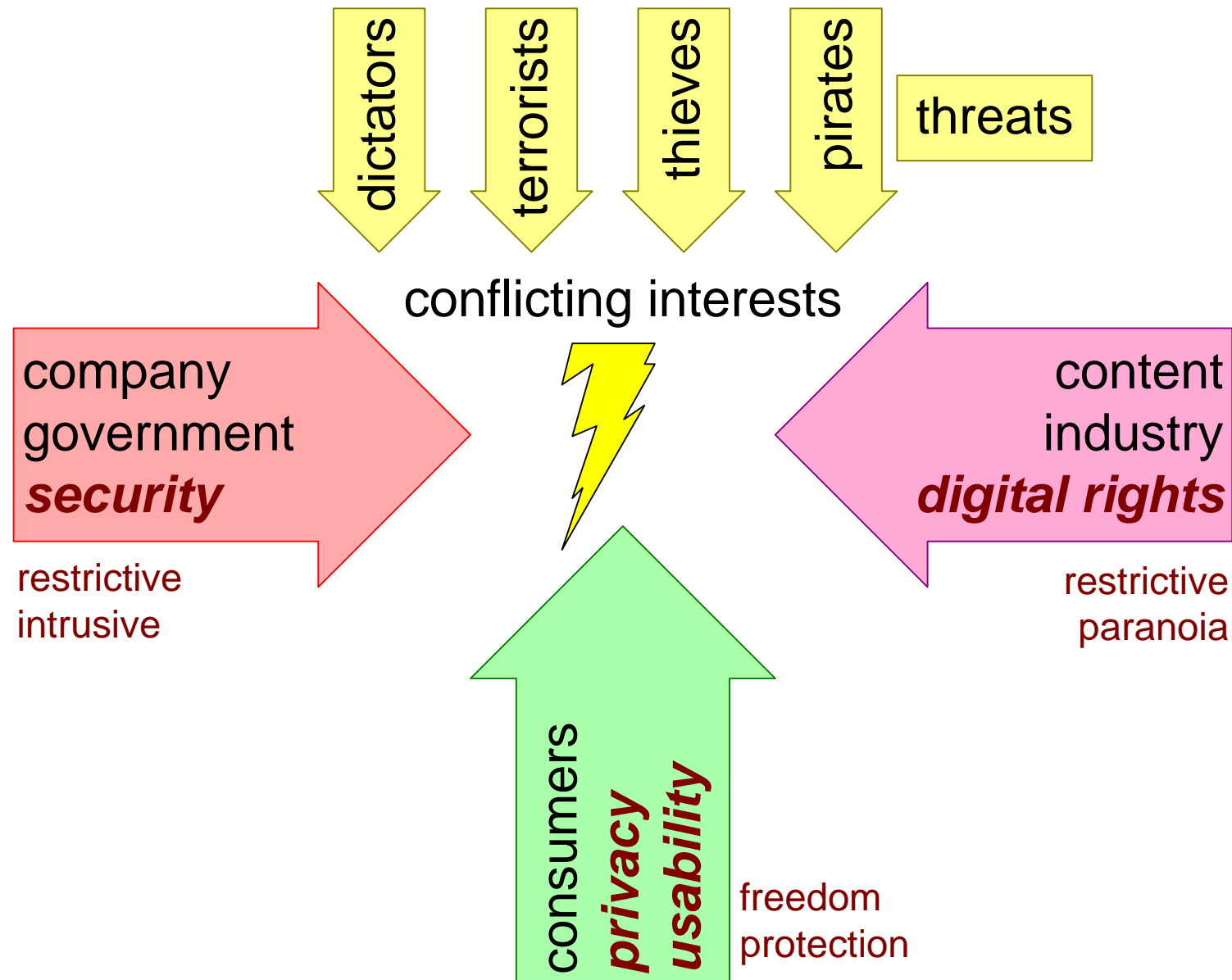
# Increase of software threatens Reliability



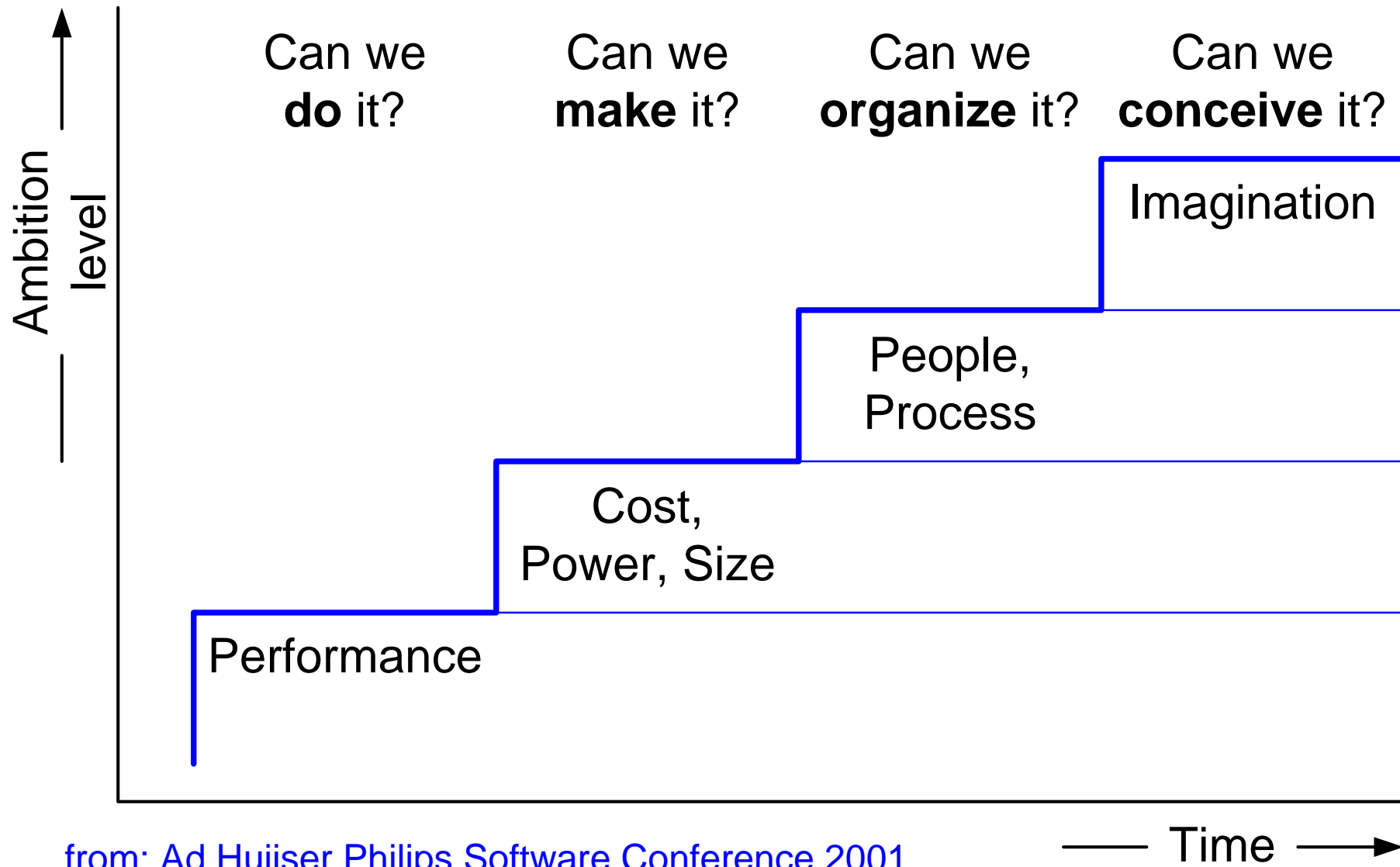
# Power consumption and dissipation



# Security conflicting interests



# Creativity as limiting factor



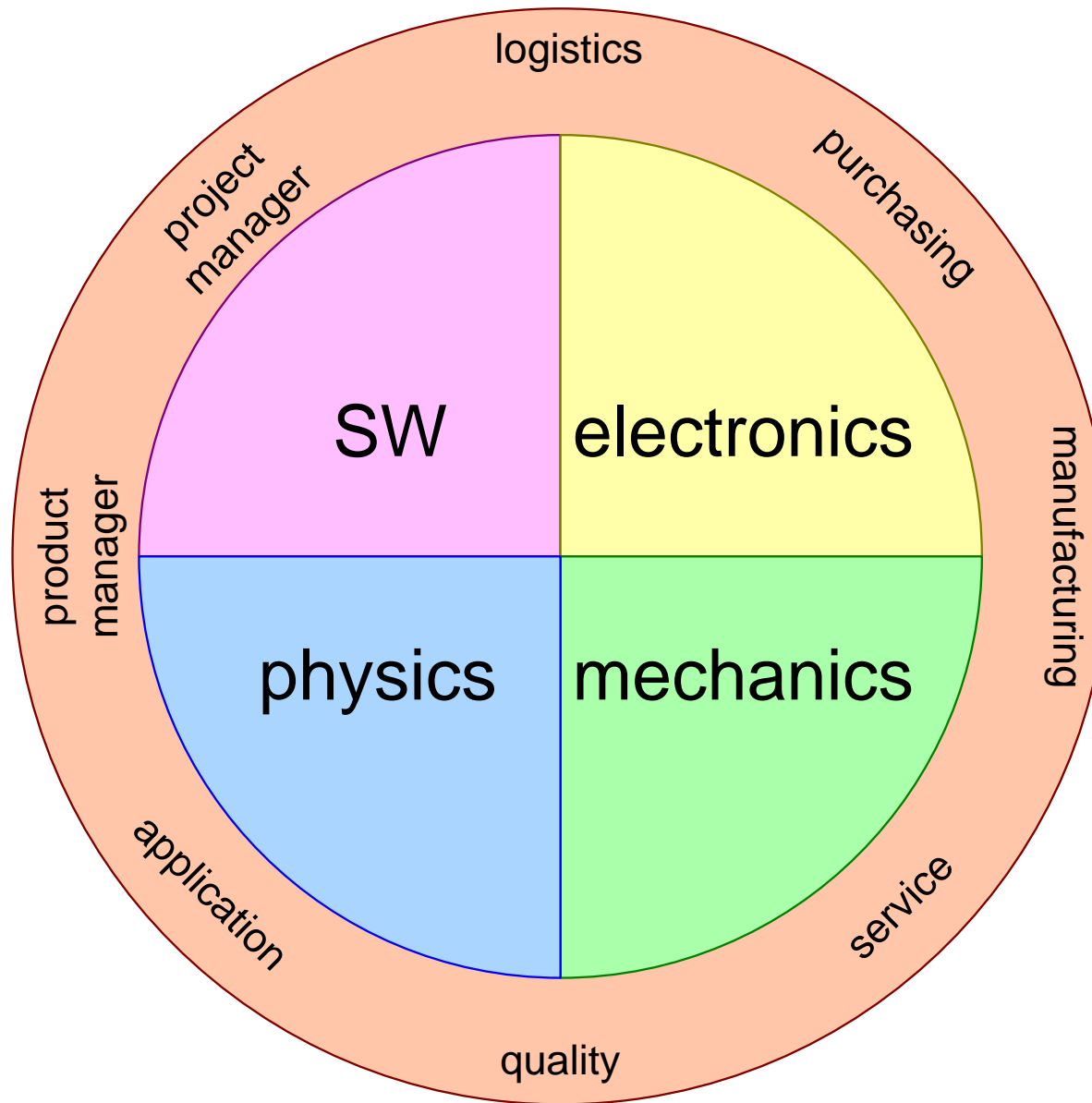




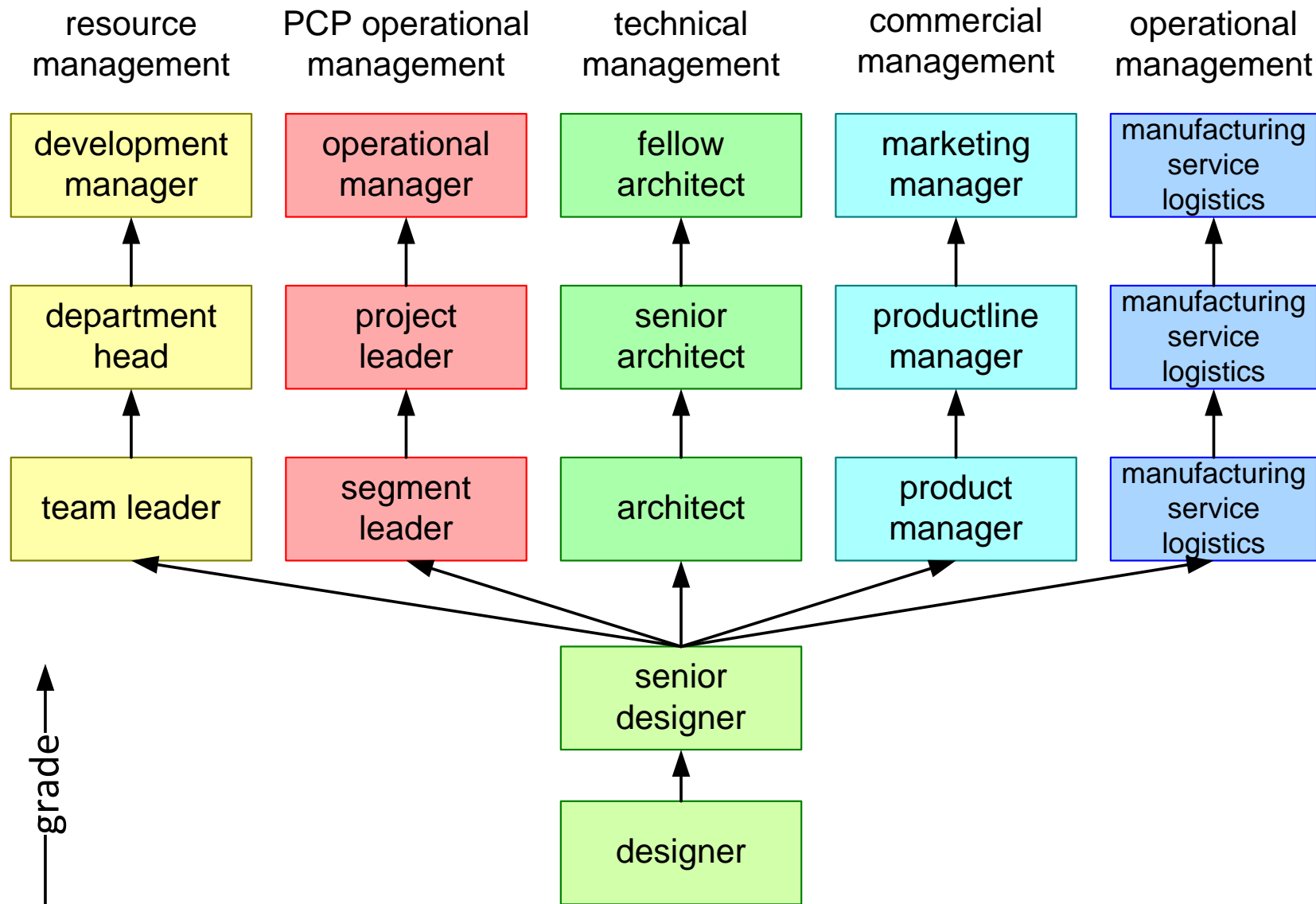
What can **You** do  
for our ~~country~~ ?  
company

# Multi disciplinary teamwork

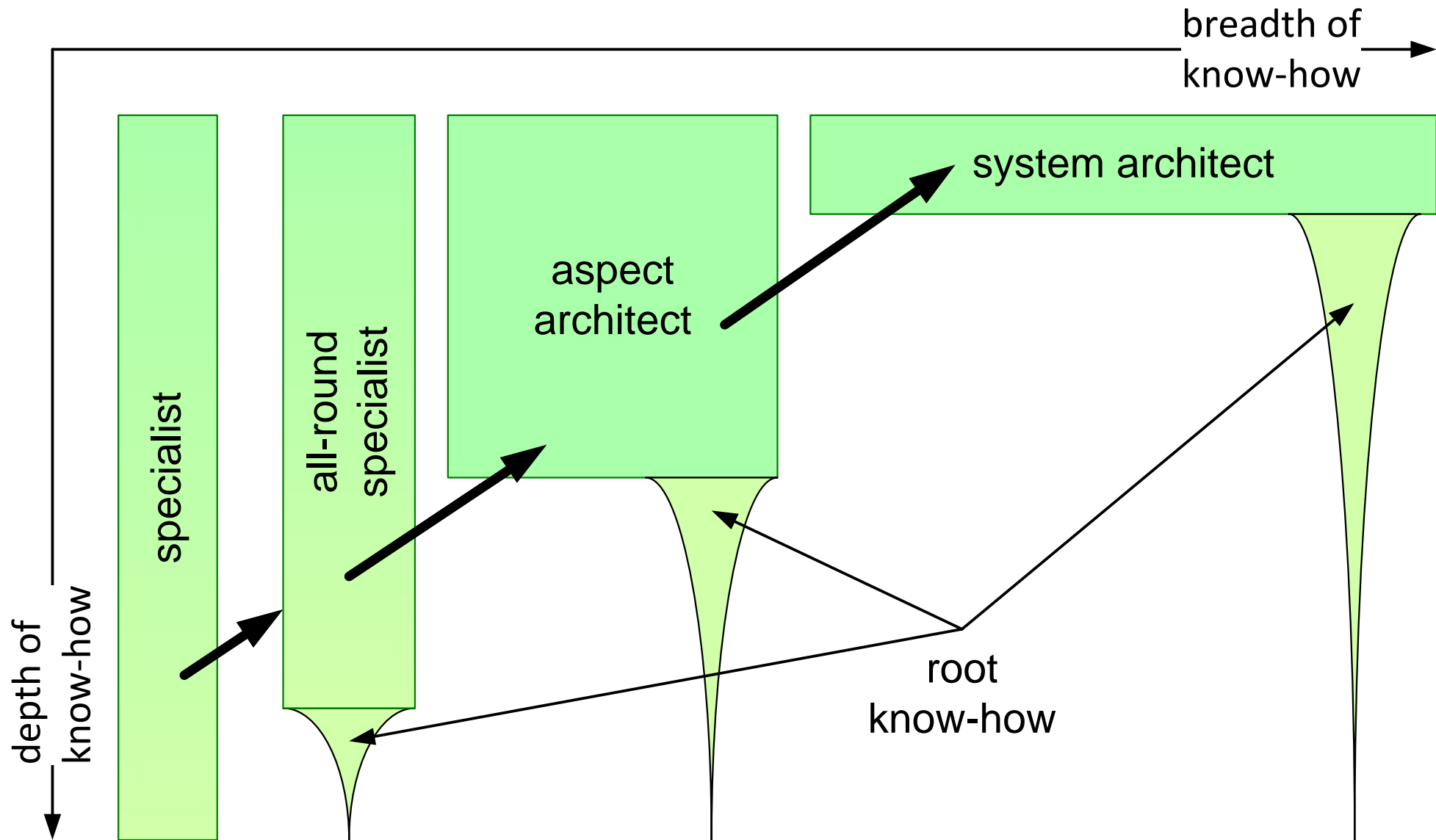
---

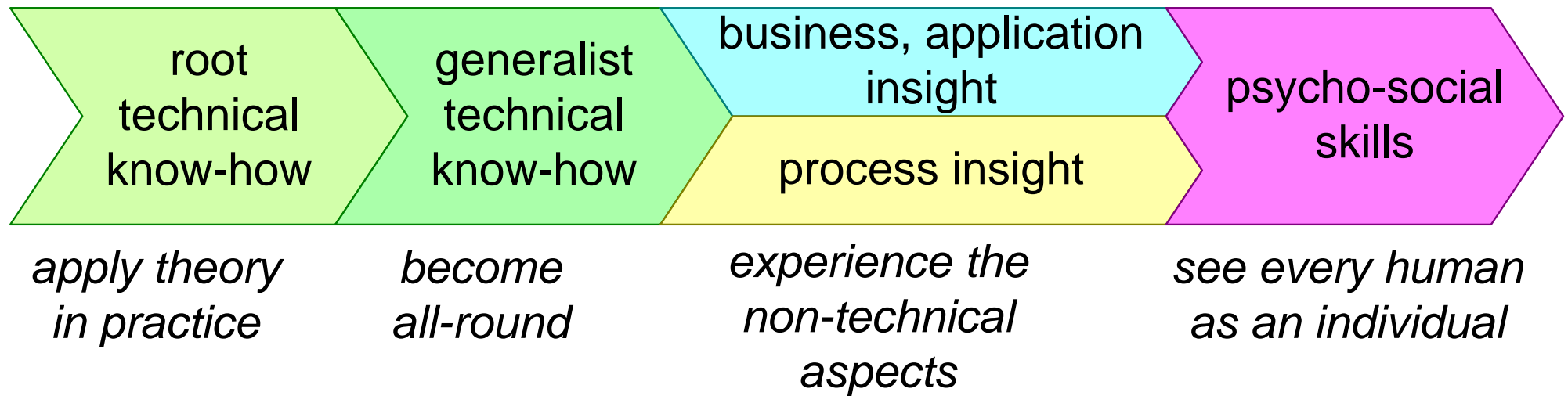


# Multi ladder career paths

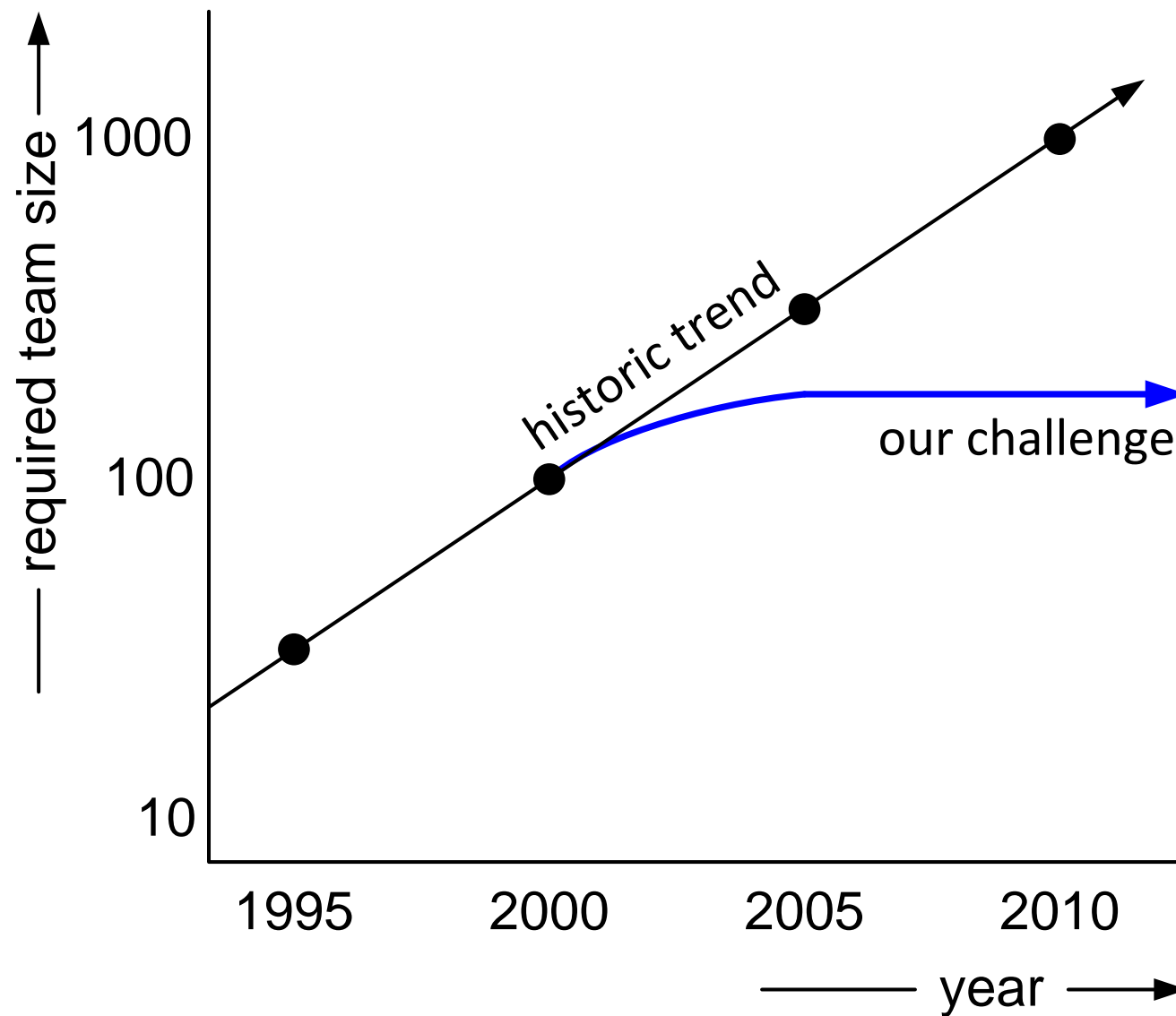


# Technical specialists and generalists are needed





# More designers are needed all the time (unless..)





Use your brains to **Design Your Own Future**



We can use your brains!