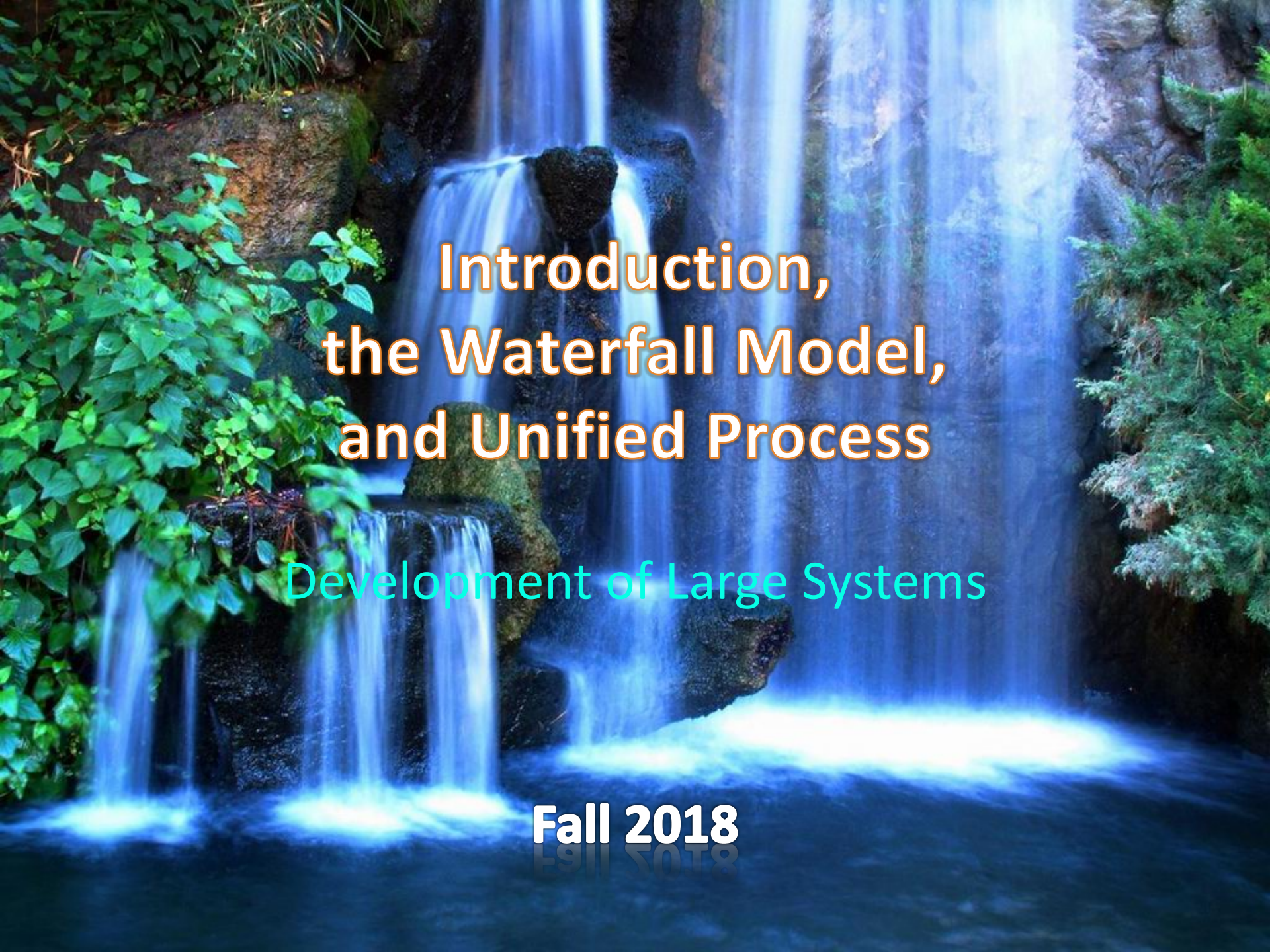
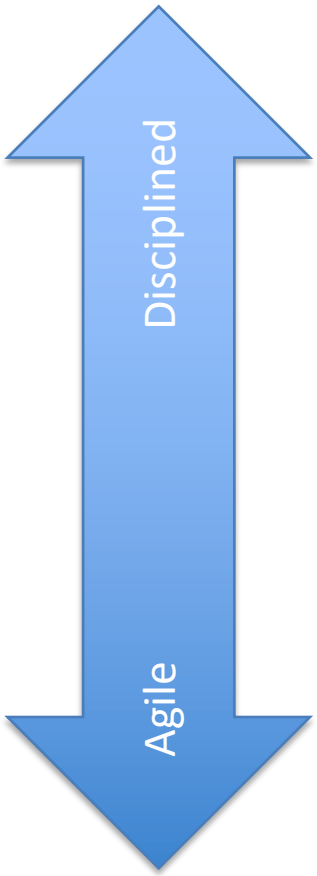


Introduction, the Waterfall Model, and Unified Process

Development of Large Systems

Fall 2018

Paradigms



- Predictive
  - Waterfall
- Iterative (and incremental)
  - Unified Process
- Adoptive
  - Scrum and XP

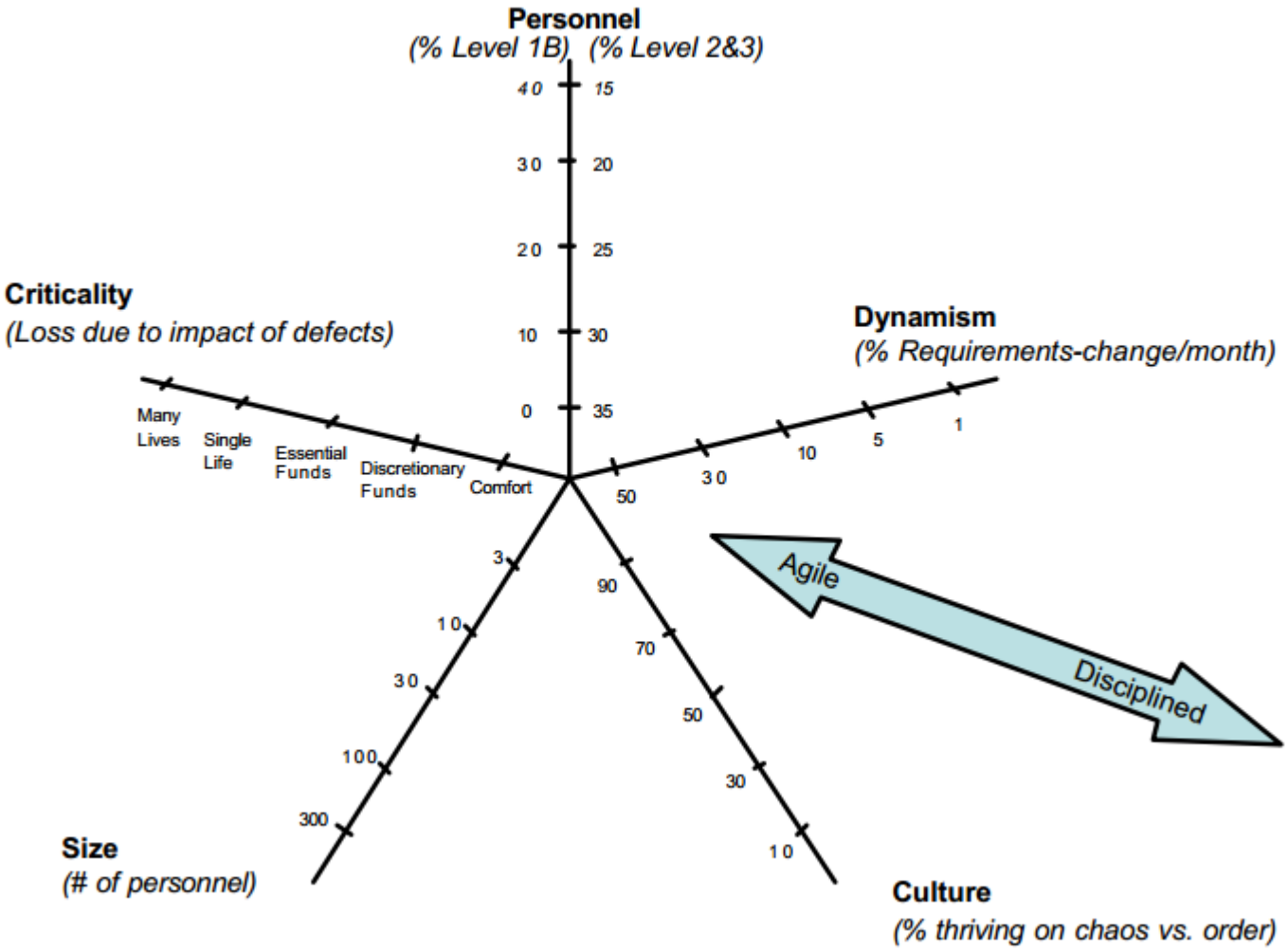
Decision Theory

- Economic man
  - Knows everything
  - Always makes the perfect decisions
- Administrative man
  - Knows a lot
  - Makes qualified decisions
- Muddling through
  - Knows little
  - Can determine whether decisions go in the right direction.

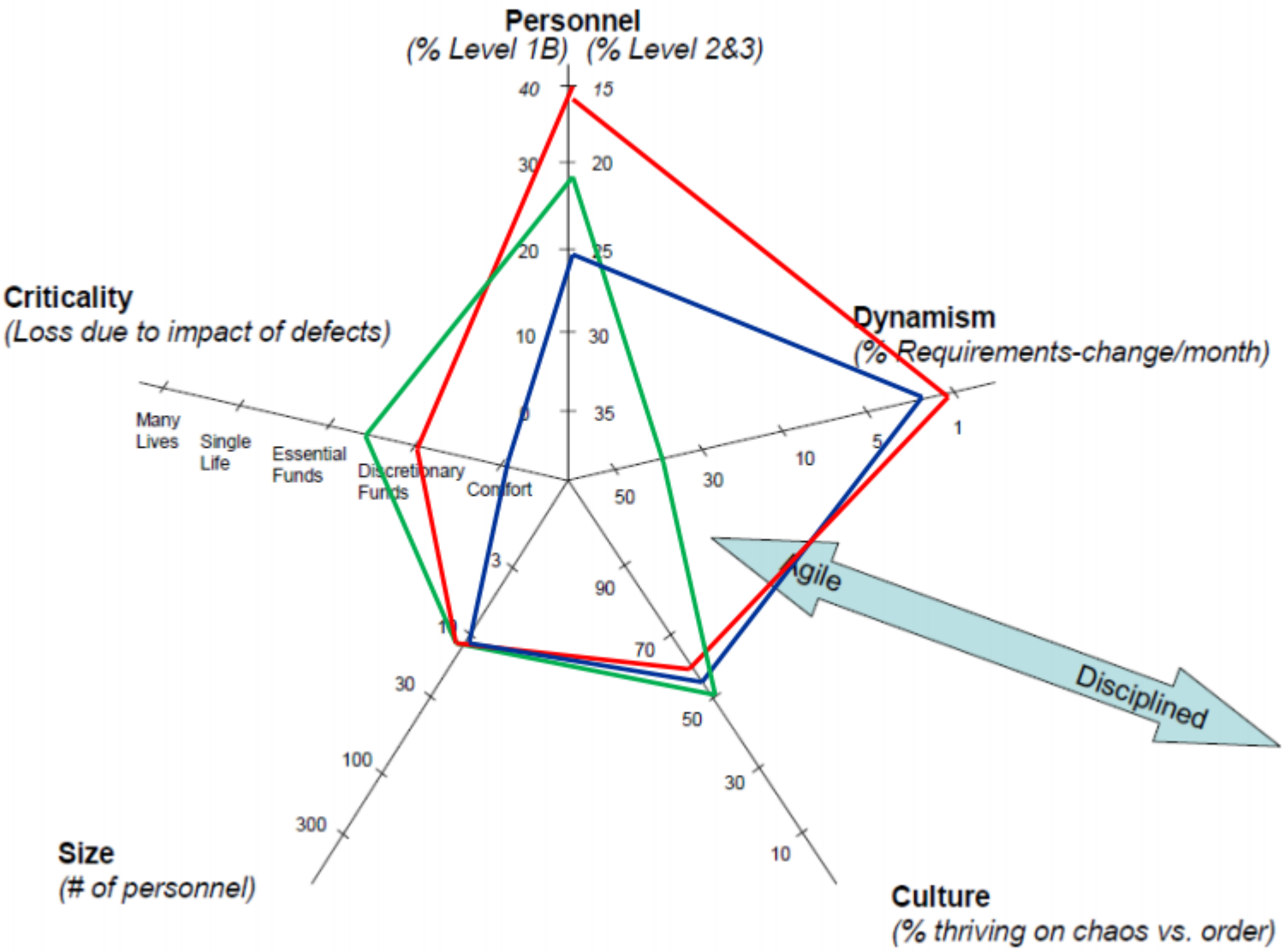
Uncertainty

- Routine
  - Known problem and known solution
- Problem solving
  - Known problem but Unknown solution
- Problem definition
  - Unknown problem and unknown solution

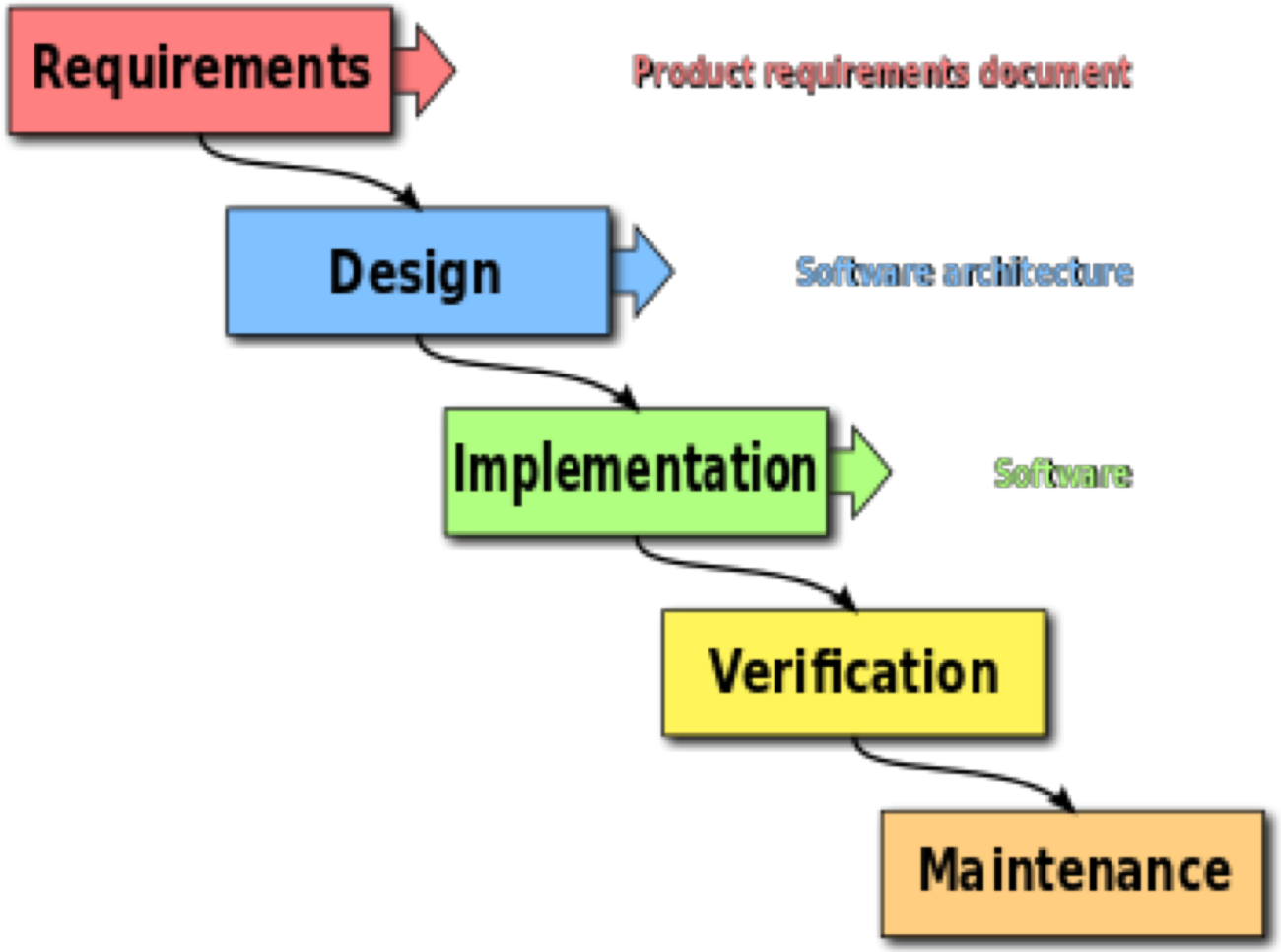
Boehm's spider web



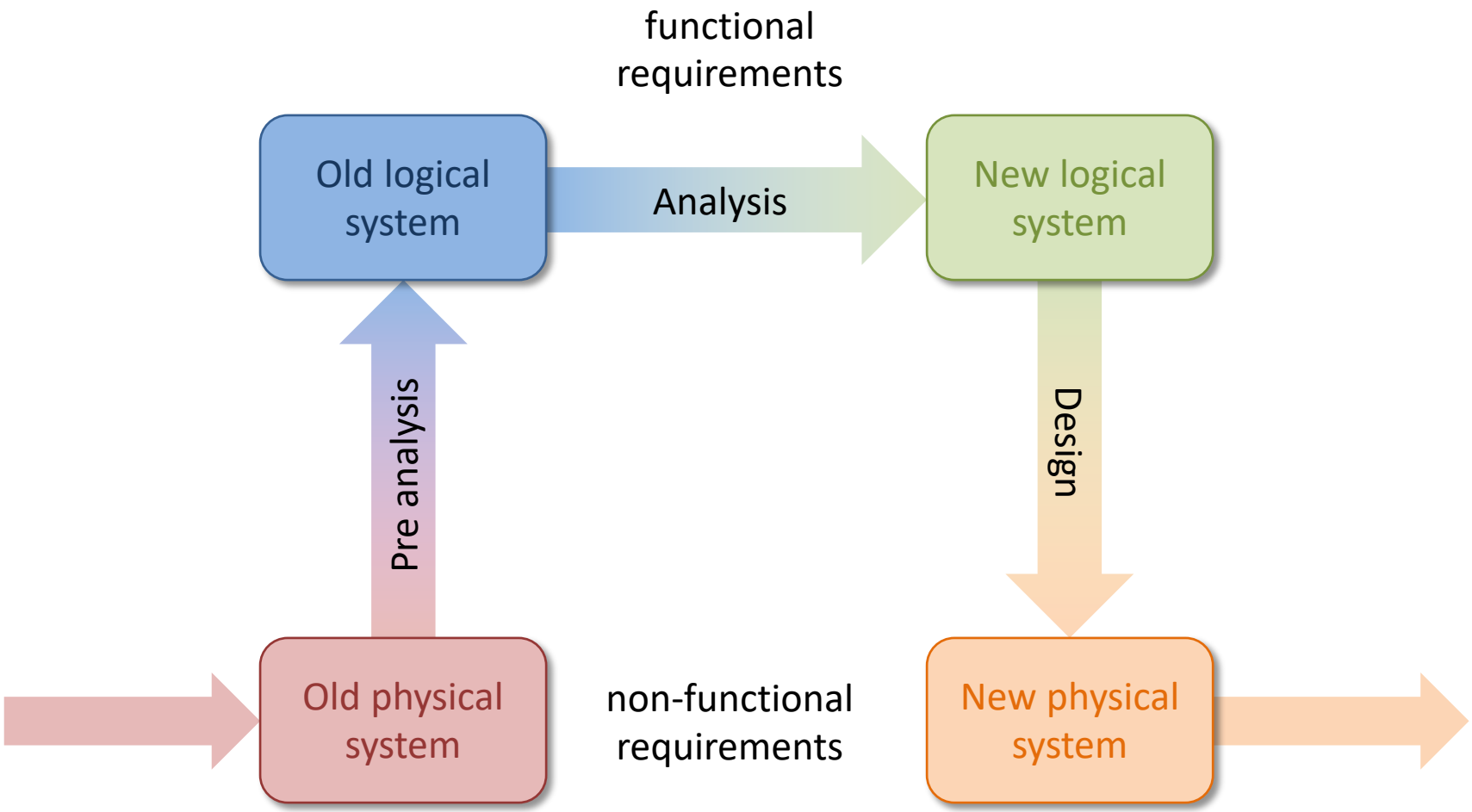
Example


Personnel
(% Level 1B) (% Level 2&3)
40
30
20
10
0
15
20
25
30
35
Criticality
(Loss due to impact of defects)
Many Lives
Single Life
Essential Funds
Discretionary Funds
Comfort
Dynamism
(% Requirements-change/month)
1
5
10
30
50
90
Agile
Disciplined
3
10
30
100
300
50
70
30
10
Size
(# of personnel)
Culture
(% thriving on chaos vs. order)

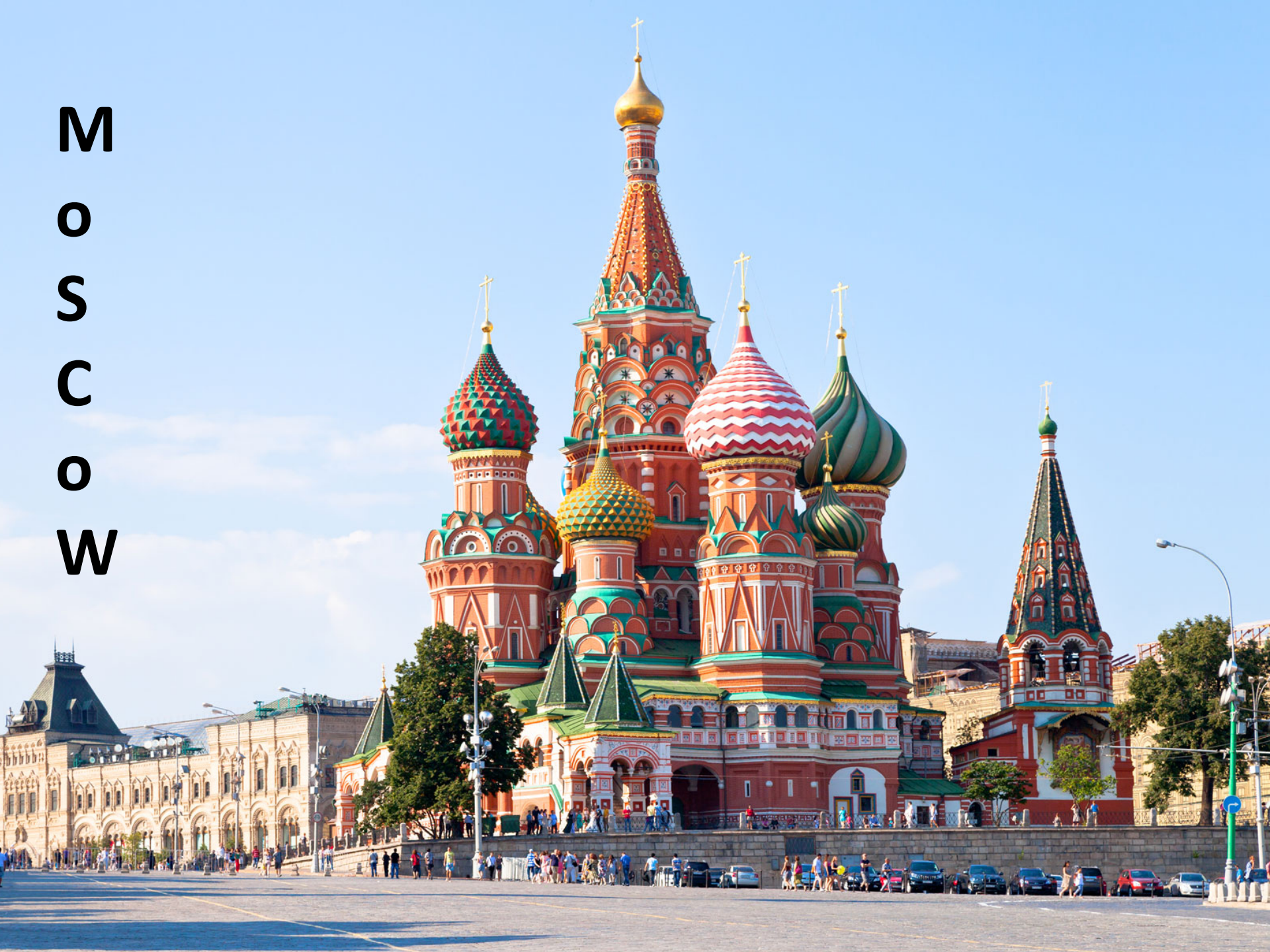
Waterfall Model

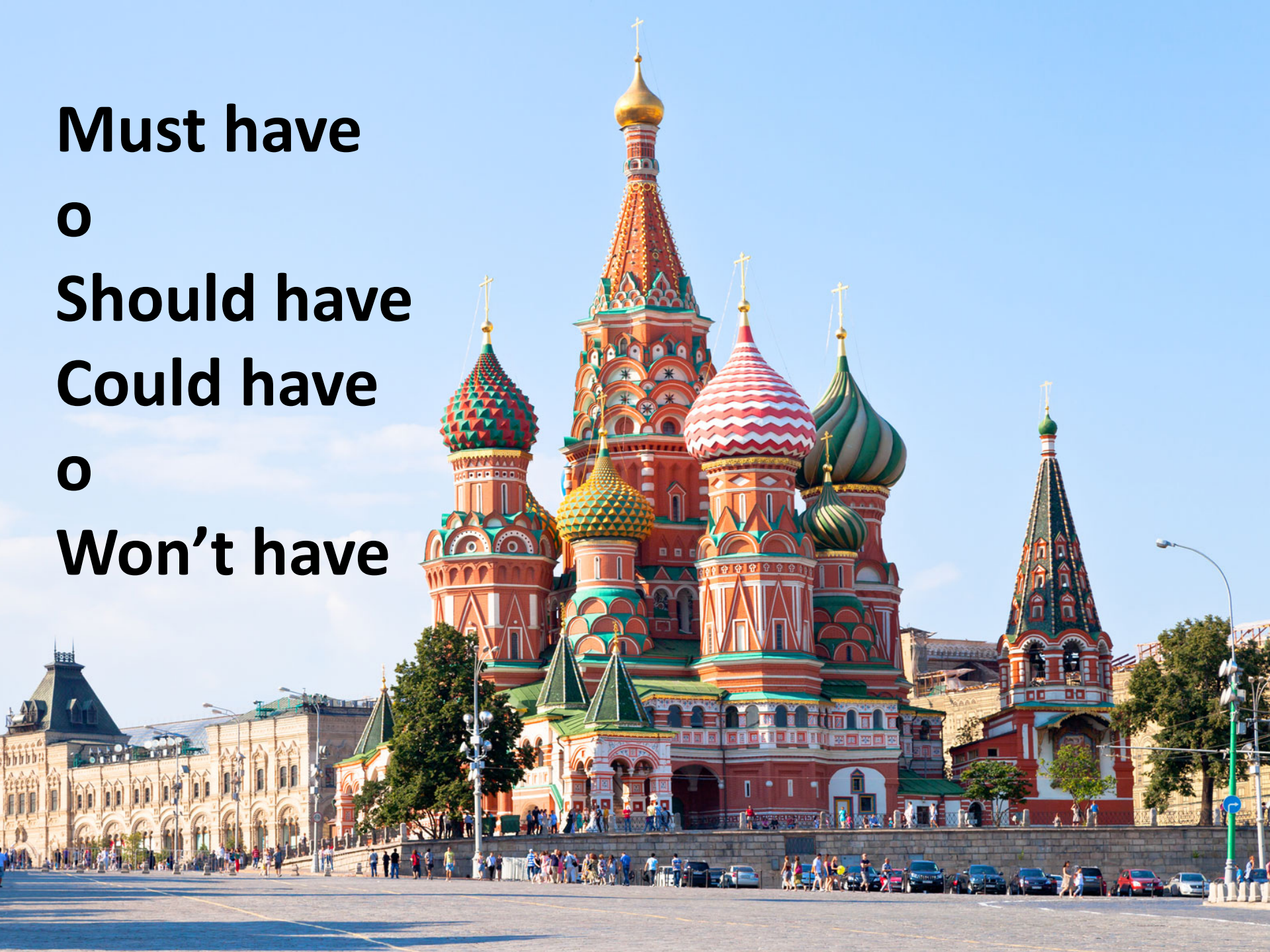


Requirements



Moscow




Must have
o
Should have
Could have
o
Won’t have

Requirements - risks

- Requirements are about **what** is required

- Functional requirements
- Nonfunctional requirements
- The right system
- The right requirements
- Incomplete requirements
- Wrong requirements
- Missing requirements

- Business Modelling and LEAN Value Stream Analysis may be used to develop the right system
- When do we estimate and submit the tender

Analysis & Design

- The analysis helps understanding the required system and the production of necessary documentation
- A requirement/design matrix can be used to manage that all requirements are met and that all design is based on a requirement
- Design is about **how** the requirements may be fulfilled

Implementation

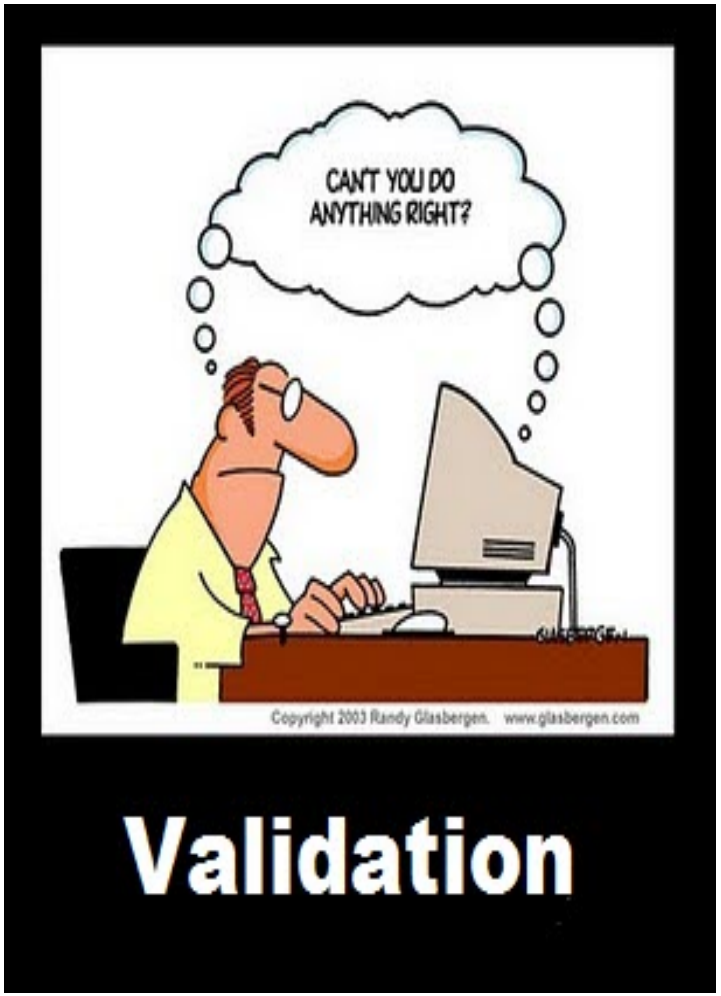
- Is the architecture in place
- Is the code standard in place
- Is the proper use of design patterns in place
- Are the test cases in place

- Then code ☺

- Are development and test environments in place

Test and Verification

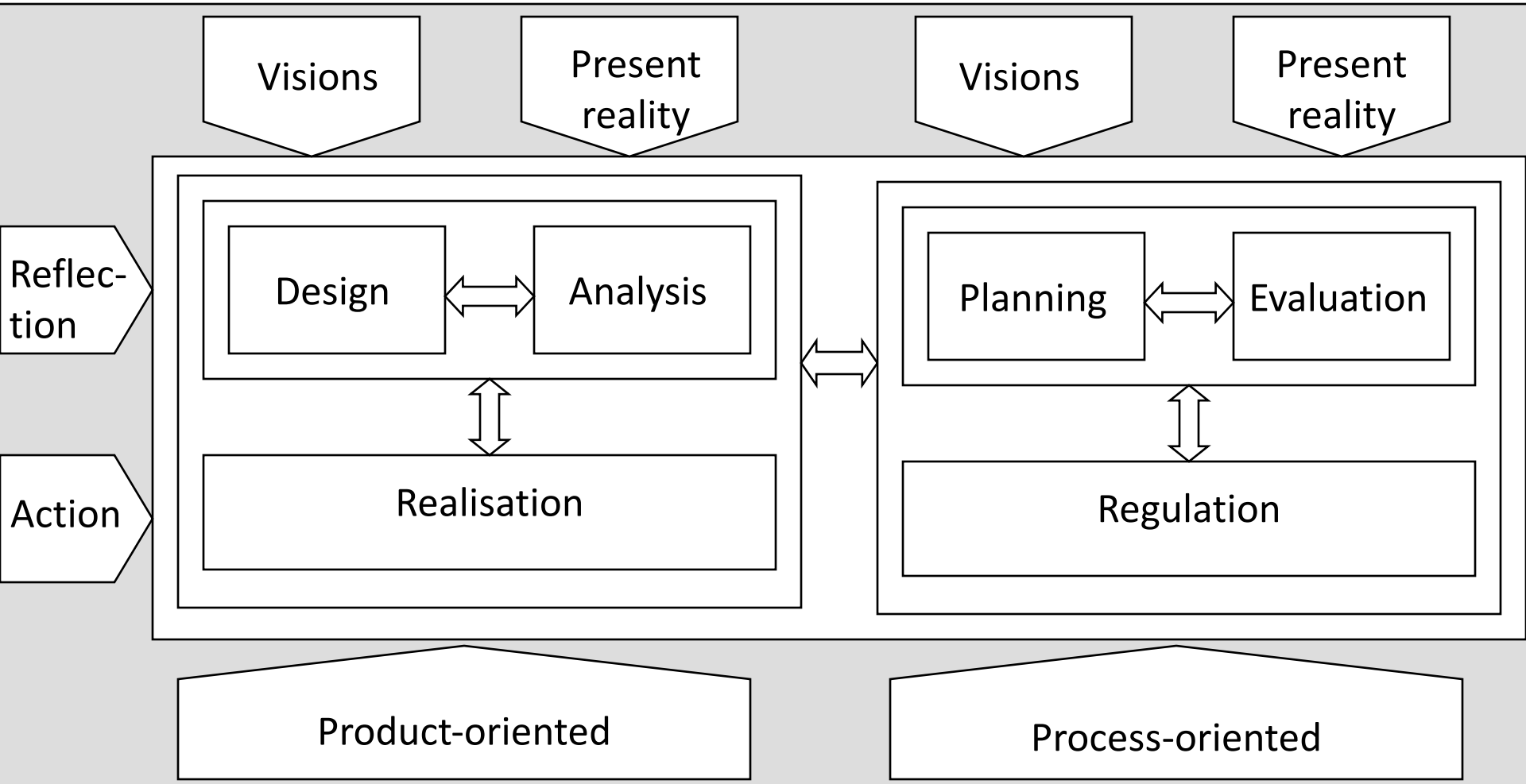
- Do the test cases cover all scenarios and requirements
- Can all test cases be run without errors
- Are all the system requirements fulfilled
- Can the system be used
- Did we cater for all activities (and not just 40%)



Waterfall disadvantages

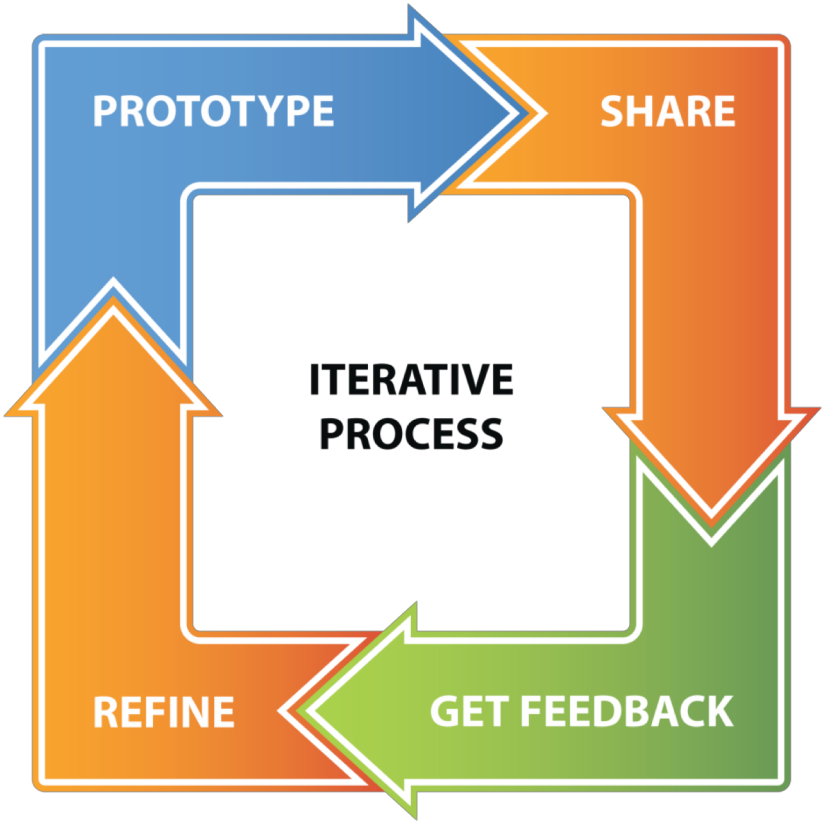
- One Big Bang delivery
- Perhaps after very long time
- New or changed requirements will lead to considerable rework
- New technologies are not considered
- User's needs or requirements may have changed when the product is delivered

Where does Waterfall fit?



Agile Manifesto

Iterative and Incremental



Plan > Do > Check > Act