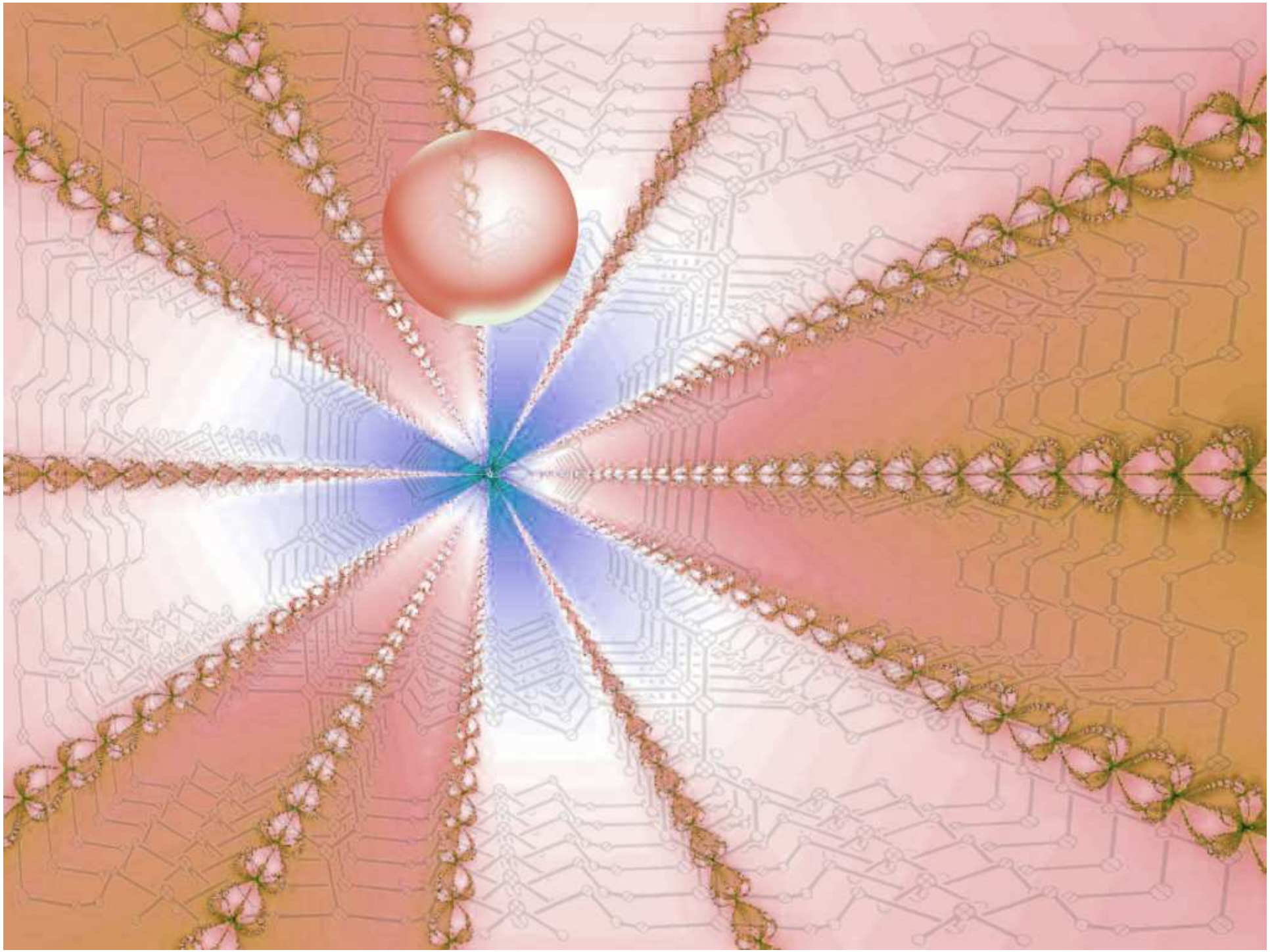


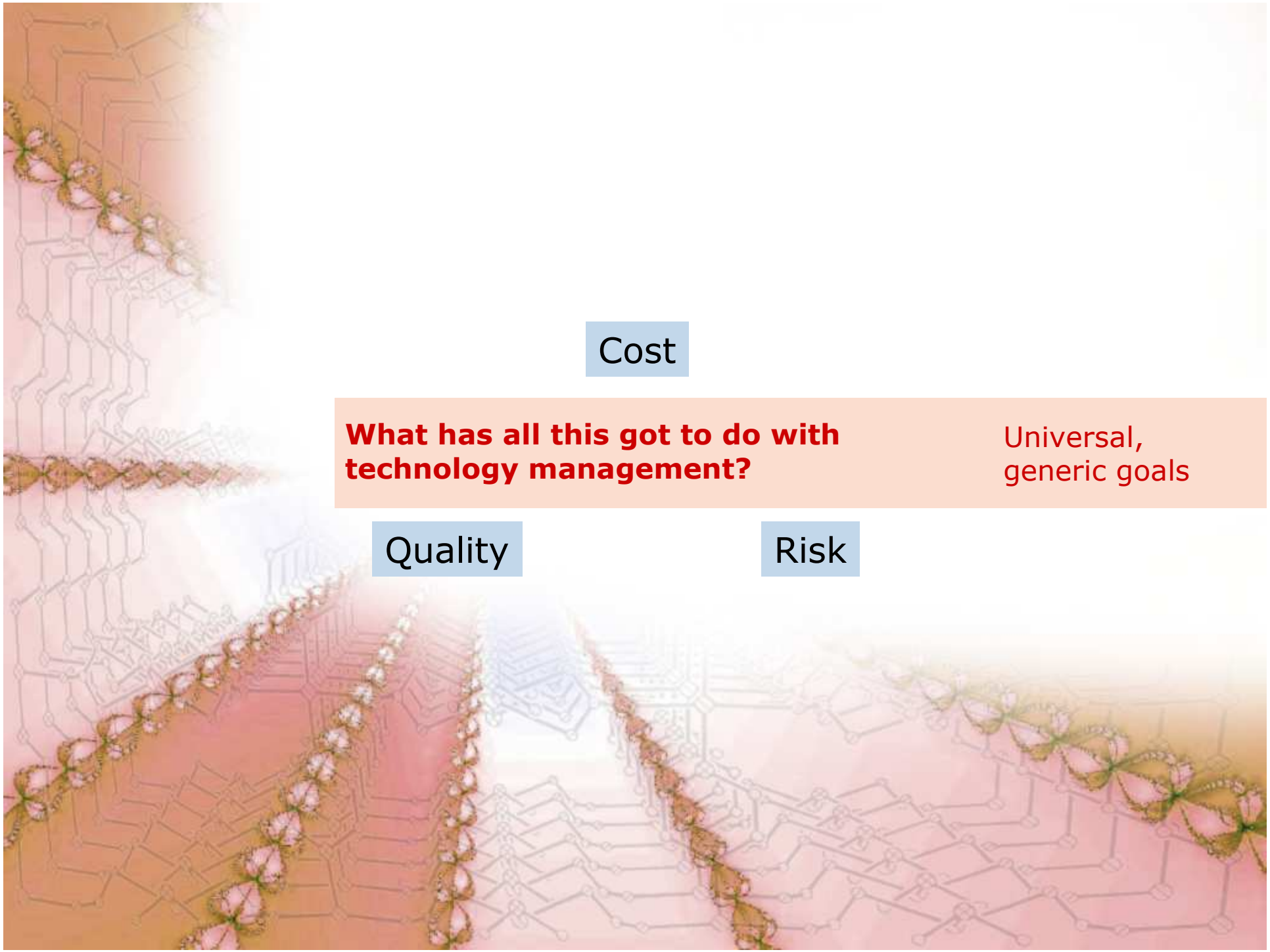
Technology management

- Review of yesterday's work, introduction.
- Workshop: successes & gaps in IMP technology management.
- Three basic purposes that technology fulfils.
- Cost and productivity; also risk, stability and quality.
- Introducing the idea of renewal.
- A systems approach to renewal.
- Discussion: gap analysis of current situation.
- Towards a structure to ensure focused technology

Technology management

- Three basic purposes that technology fulfils
  - Managing costs and productivity
  - Managing risk, stability and quality

  Universal, generic goals
  - Pursuing complex corporate goals: renewal


Cost
What has all this got to do with technology management?
Universal, generic goals
Quality
Risk

The goals of technology management are to meet the requirements of the organisation. There are to kinds of generic ways of doing this. There is also the strategic approach. The generic approaches do not need outside tasking. Solving "strategic" issues, by contrast, demands complex agreements.

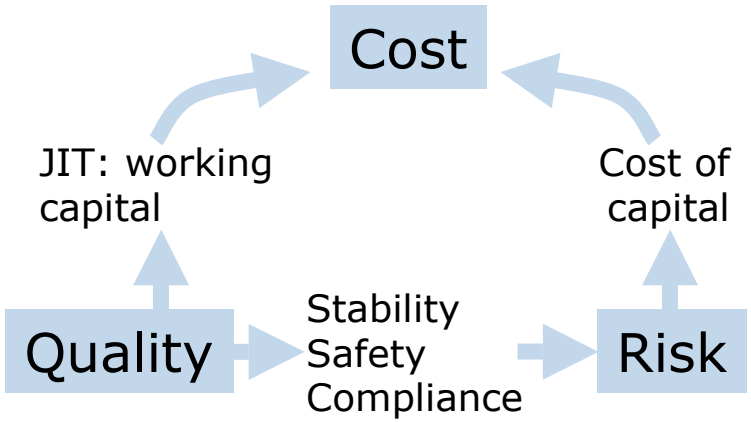
Cost

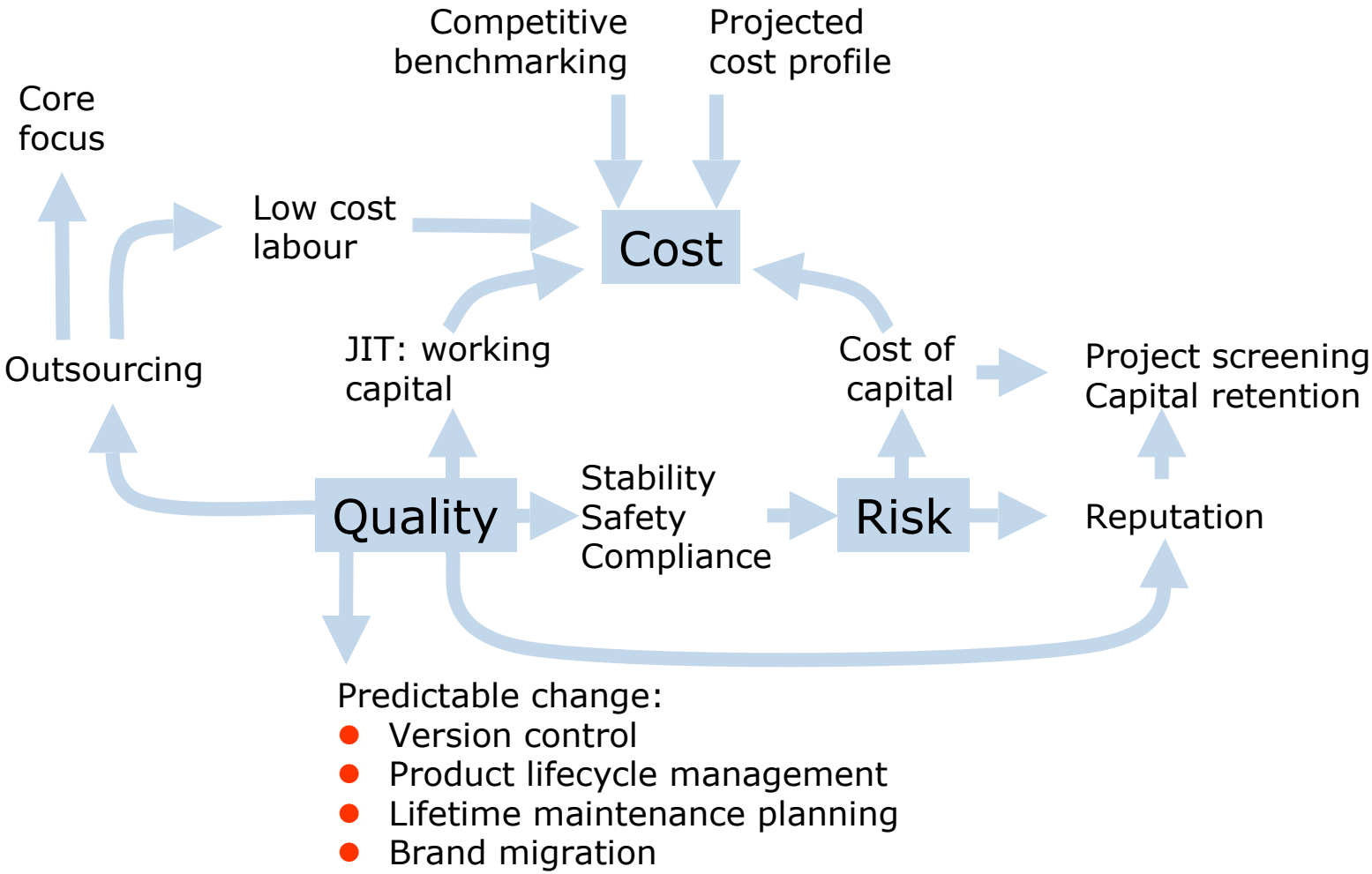
What has all this got to do with technology management?

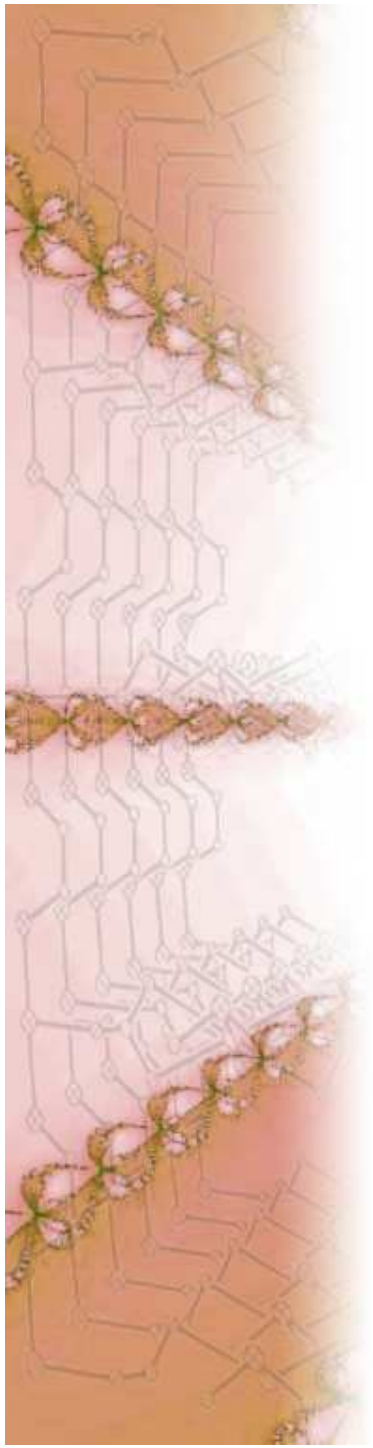
Universal, generic goals

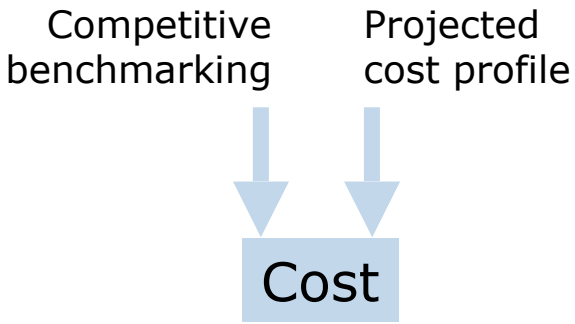
Quality

Risk


Cost
JIT: working capital
Cost of capital
Quality
Stability
Safety
Compliance
Risk


Competitive benchmarking
Projected cost profile
Core focus
Low cost labour
Cost
Outsourcing
JIT: working capital
Cost of capital
Project screening
Capital retention
Quality
Stability
Safety
Compliance
Risk
Reputation
Predictable change:
Version control
Product lifecycle management
Lifetime maintenance planning
Brand migration



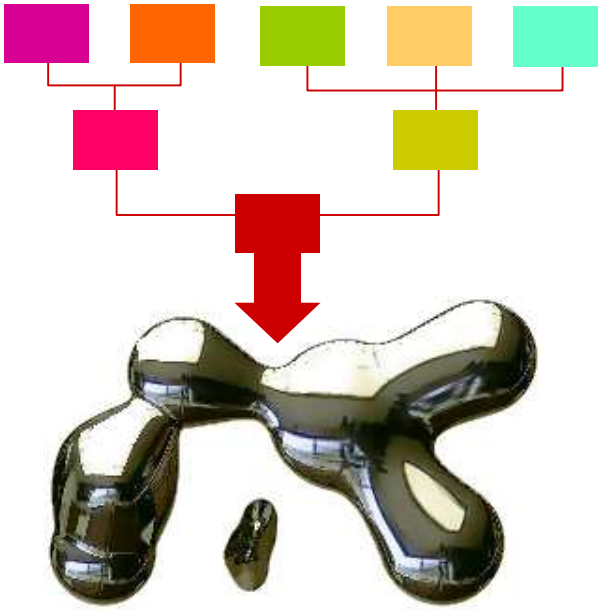


Simple analysis of competitive forces, costs and regulatory requirements show where organisational and technological change is needed. It sets targets that technologists can pursue.

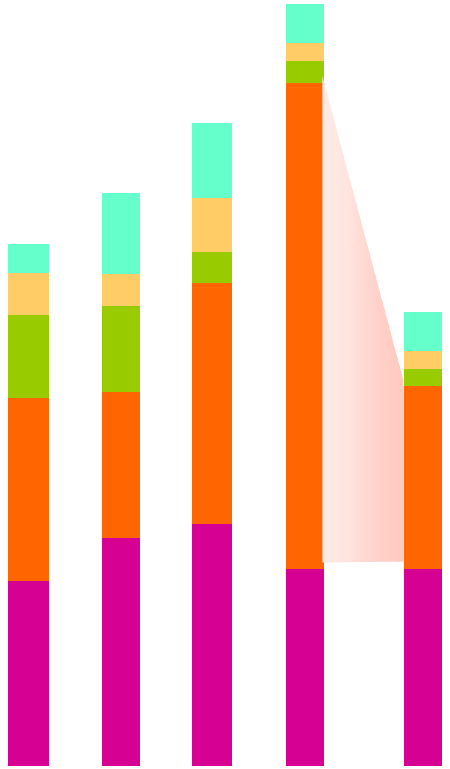
There are three useful approaches to this:

- Understanding the supply cost chain
- Benchmarking this against others
- Looking forward

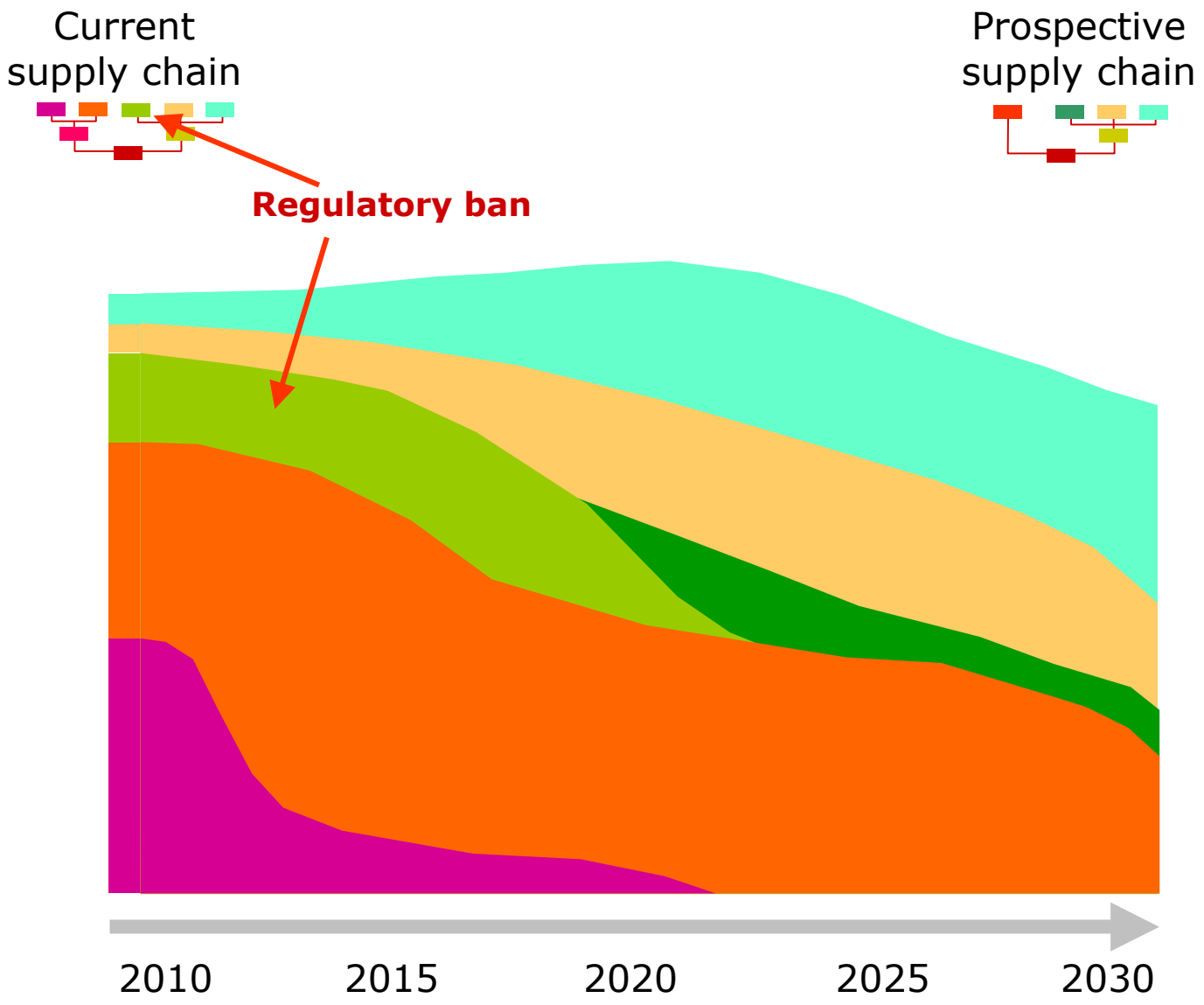
Our costs



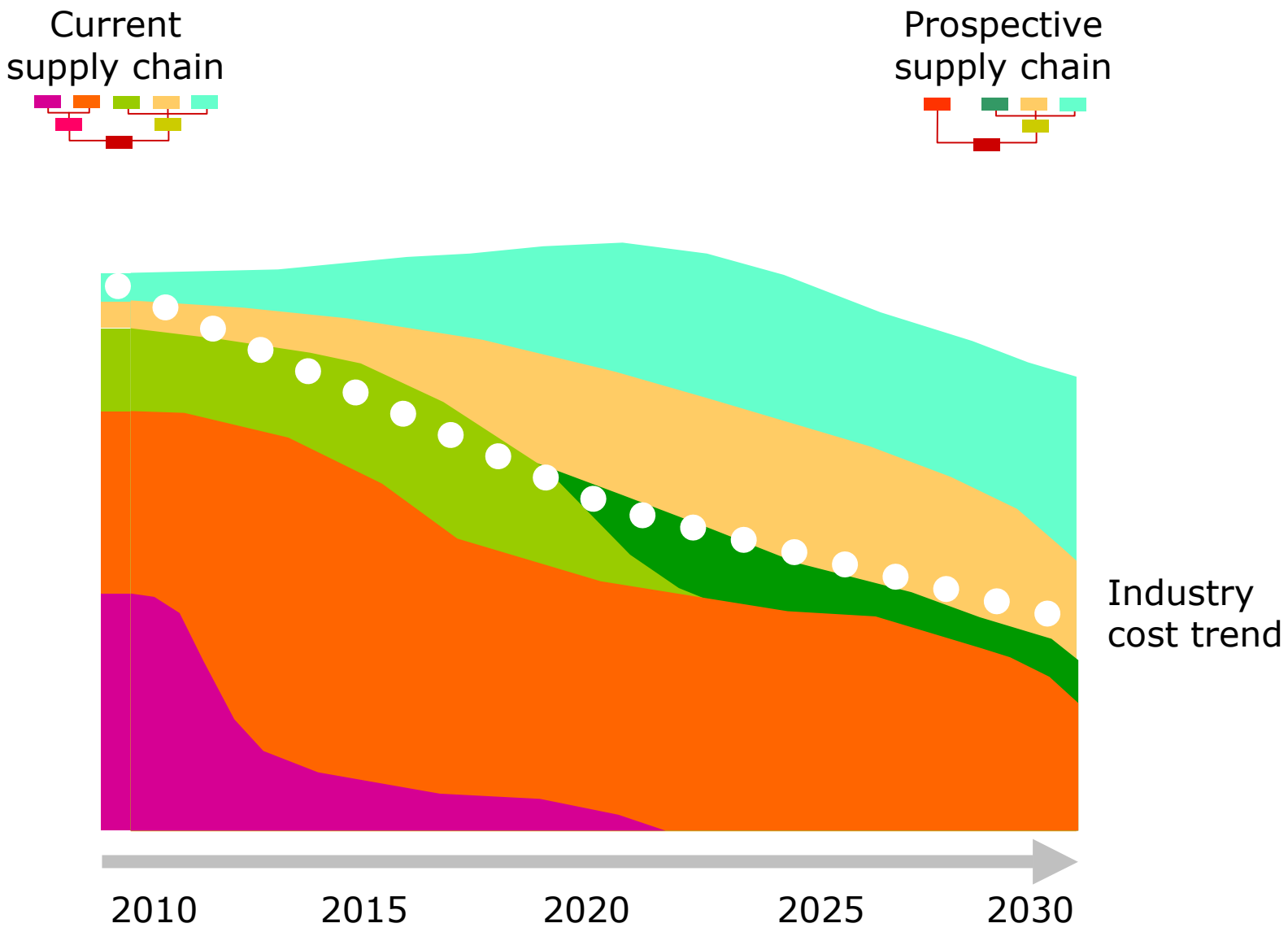
Other organisations

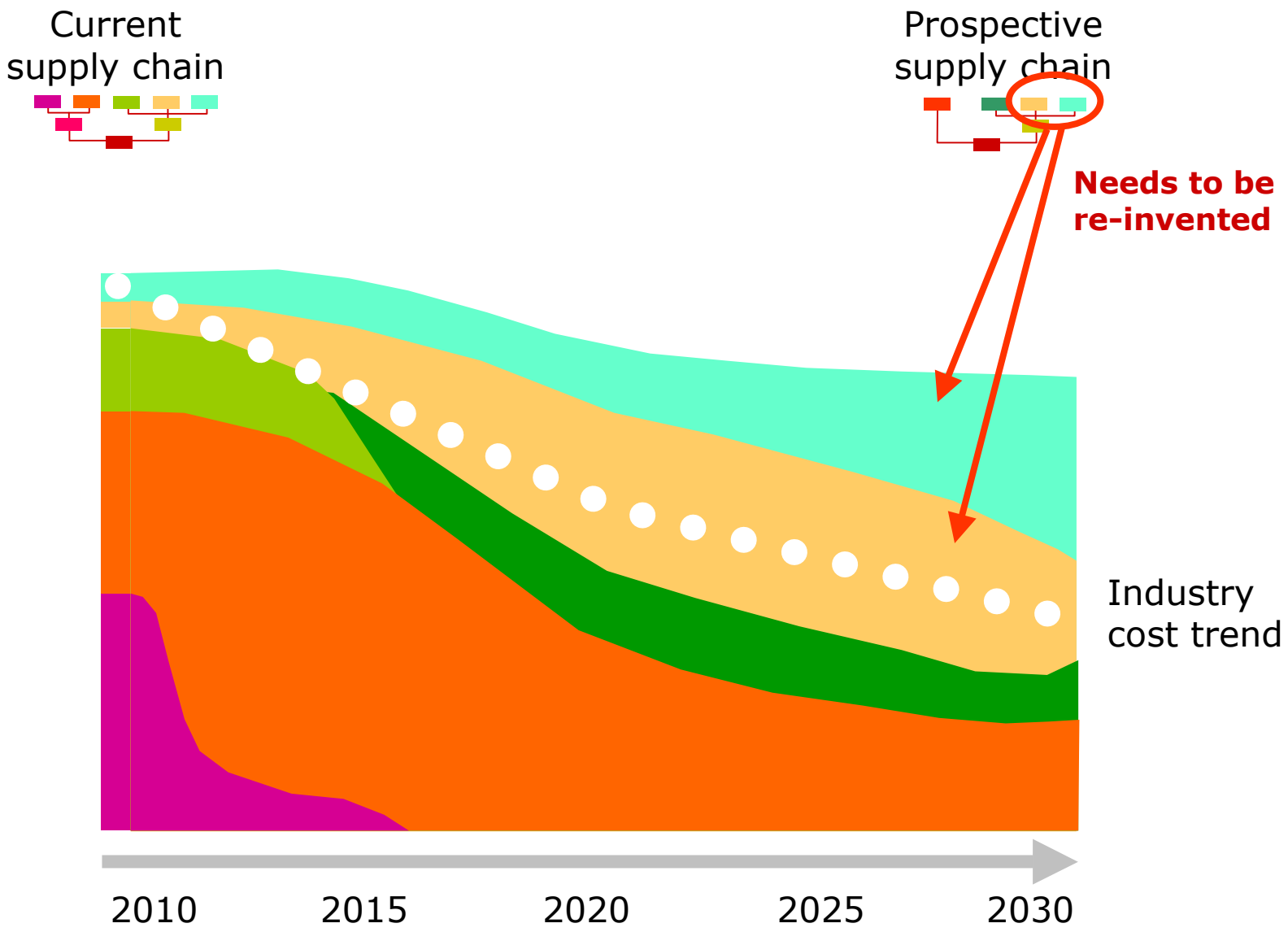


- Understanding the supply cost chain
- Benchmarking this against others
- Looking forward



.. But what is happening to the rest of the industry?

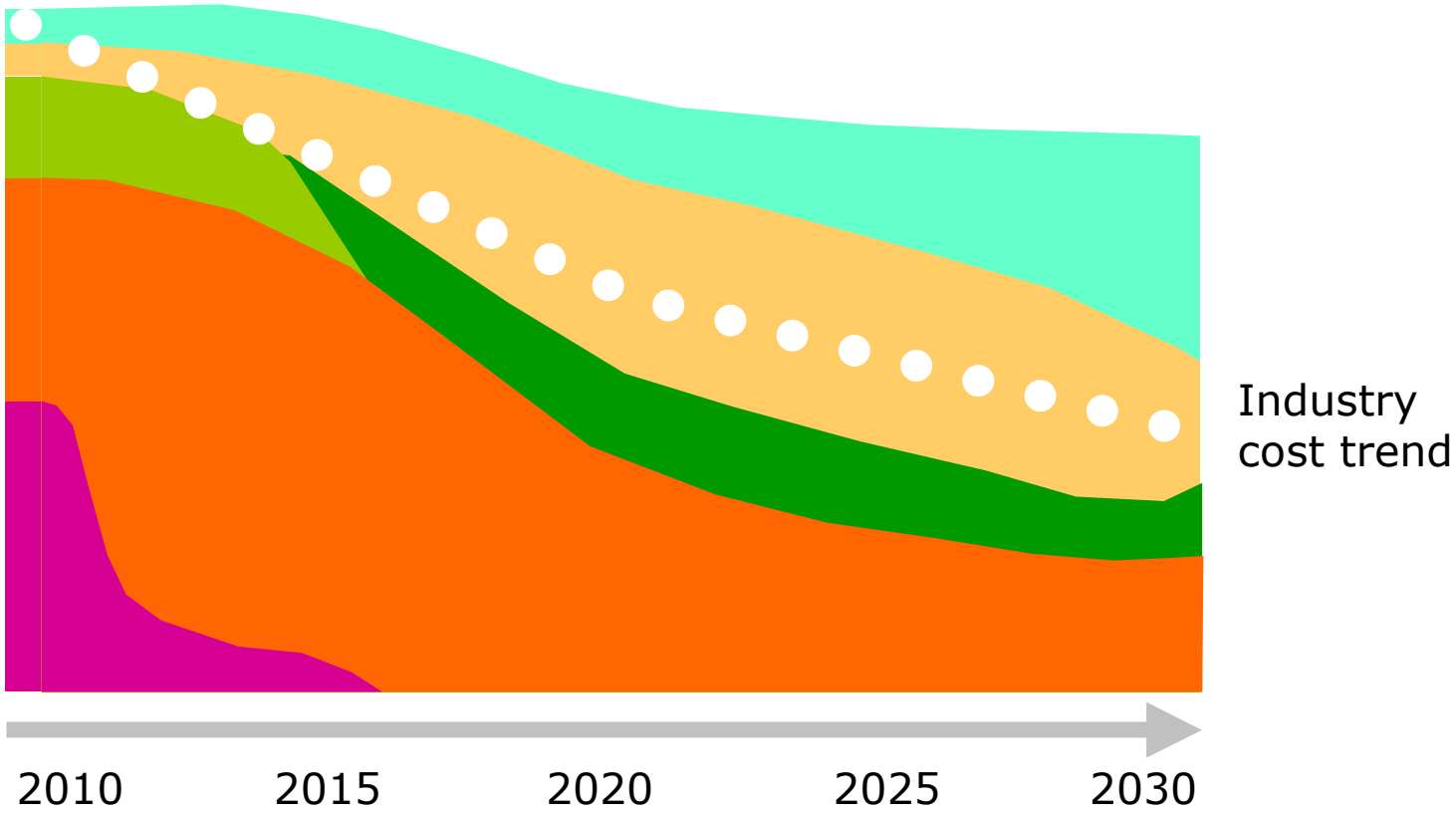

Current
supply chain
Prospective
supply chain
Industry
cost trend
2010
2015
2020
2025
2030



Here are the most profound conventional cost cuts we can manage, which are not good enough.

Simple analysis of competitive forces, costs and regulatory requirements show where organisational and technological change is needed. It sets targets that technologists can pursue.

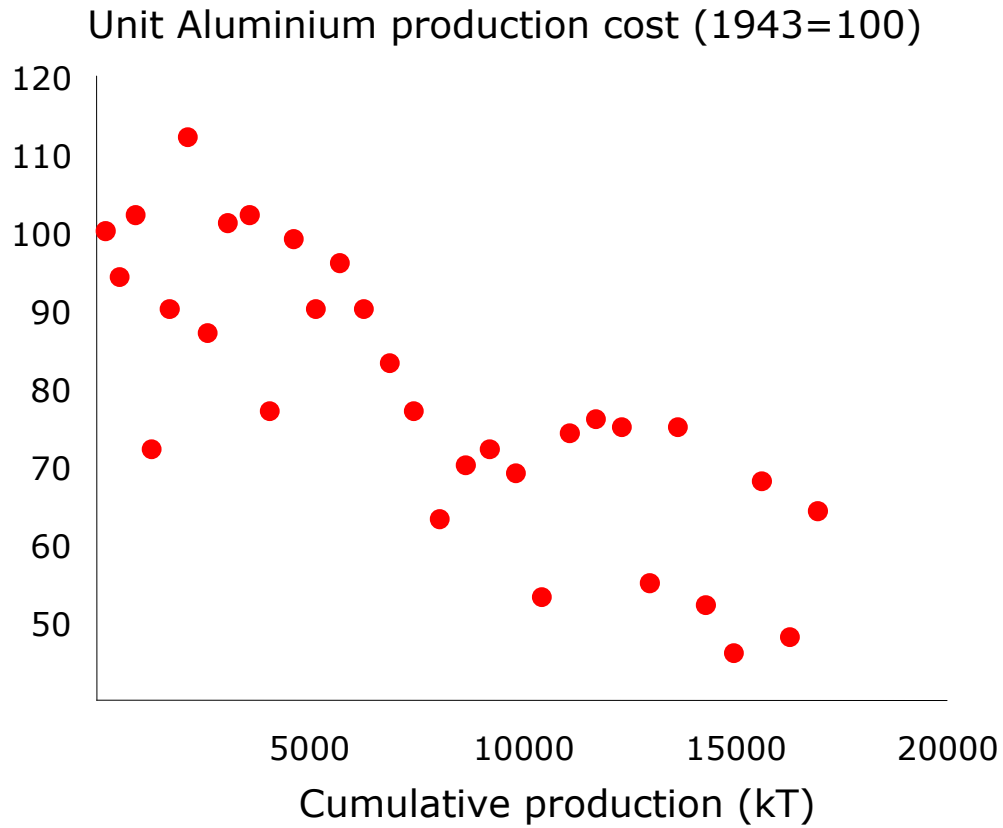
Forecasting tools are well-understood.



Simple analysis of competitive forces, costs and regulatory requirements show where organisational and technological change is needed. It sets targets that technologists can pursue.

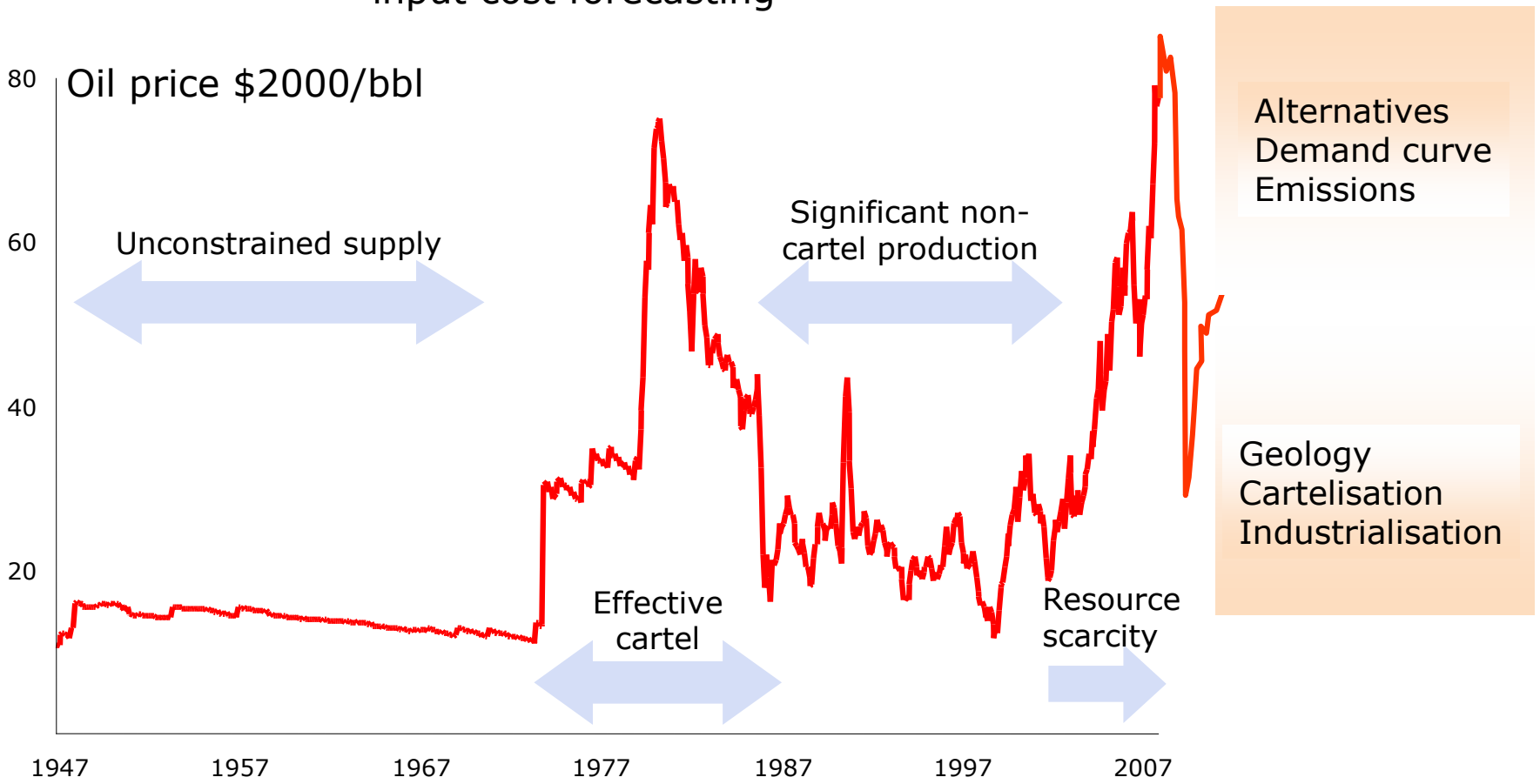
Forecasting tools are well-understood.

Costs: the experience curve.
input cost forecasting

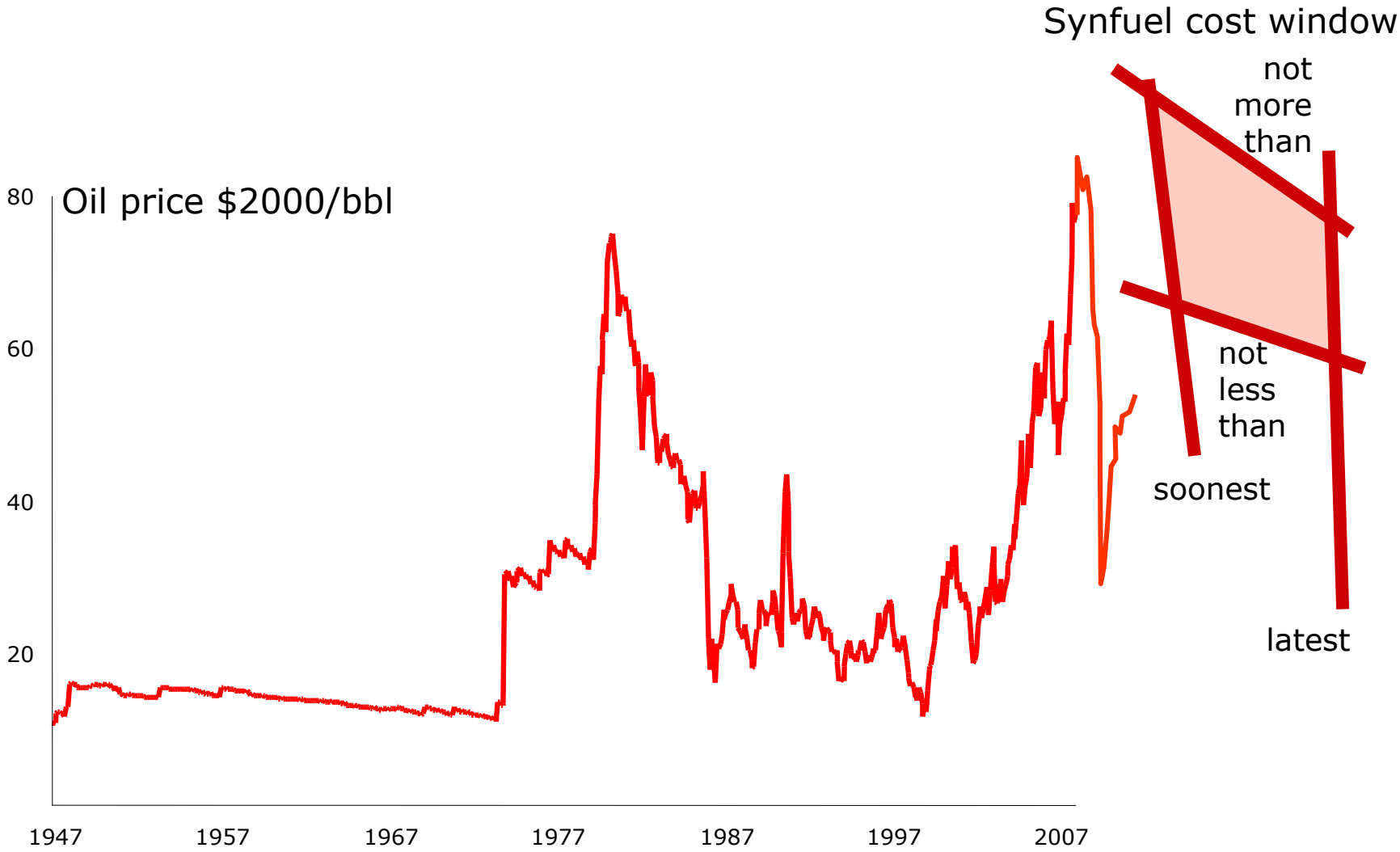


You can also “frame” the future evolution with limits

Costs: the experience curve.
input cost forecasting

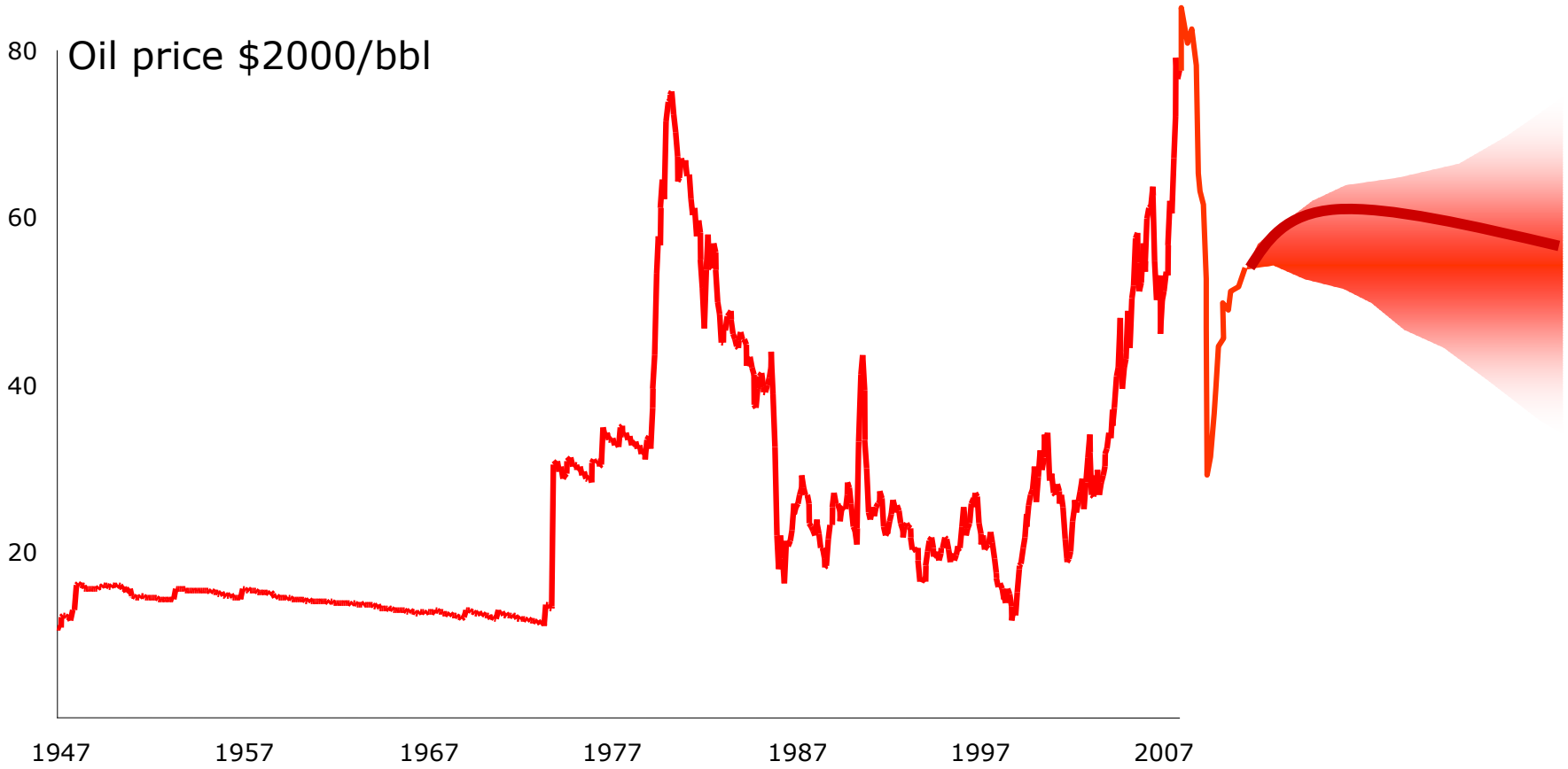


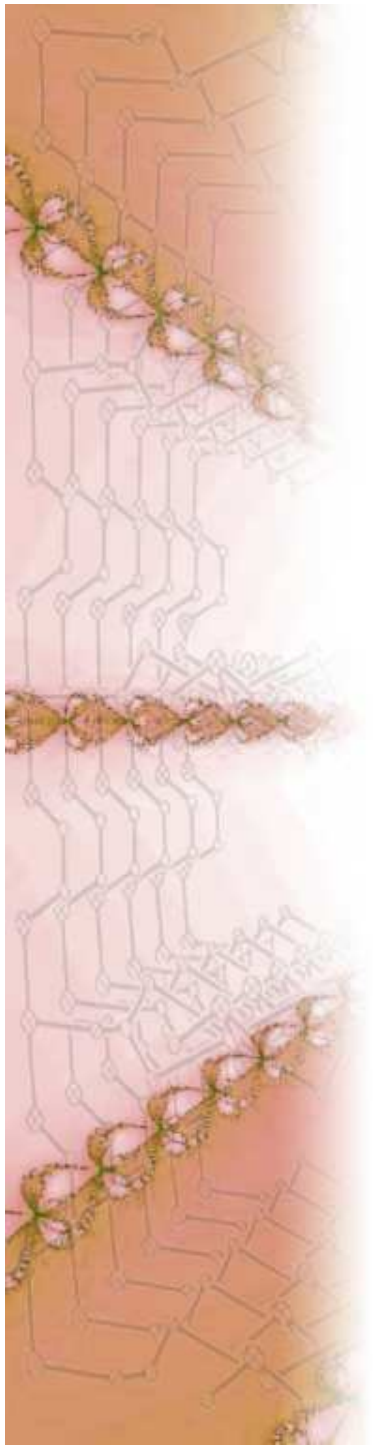
You can also “frame” the future evolution with limits
Econometric modelling: use with care



Econometric modelling: use with care

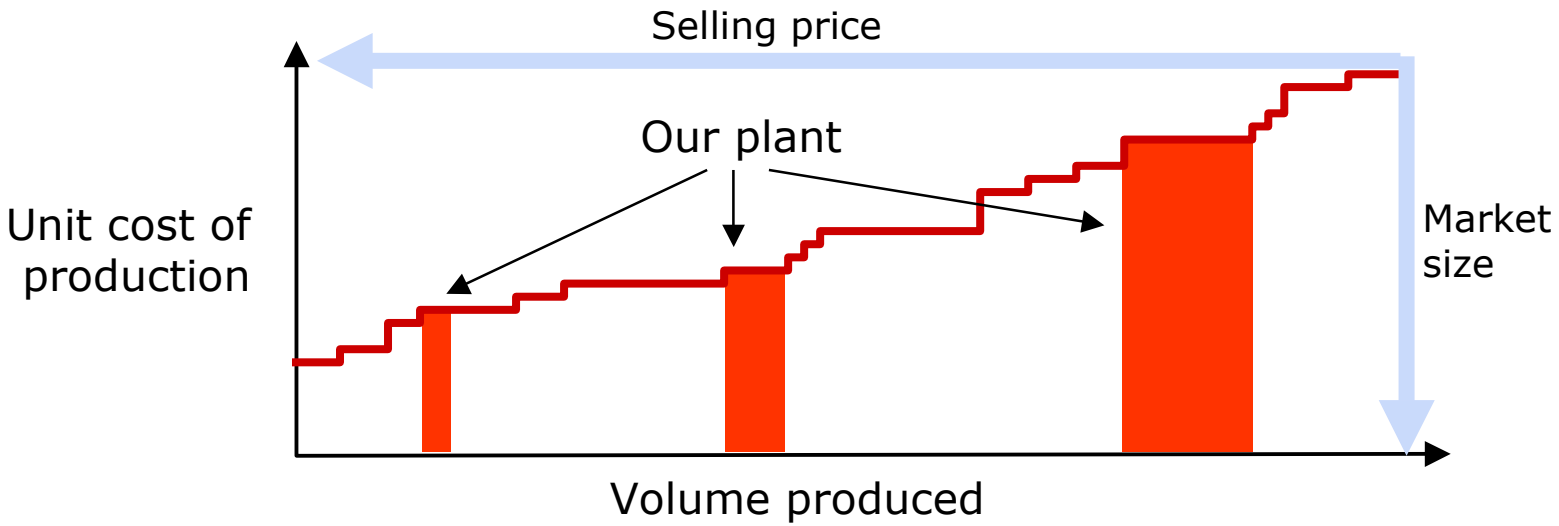
- May obscures the assumptions
- Complexity not trusted by users
- Only as good as the model

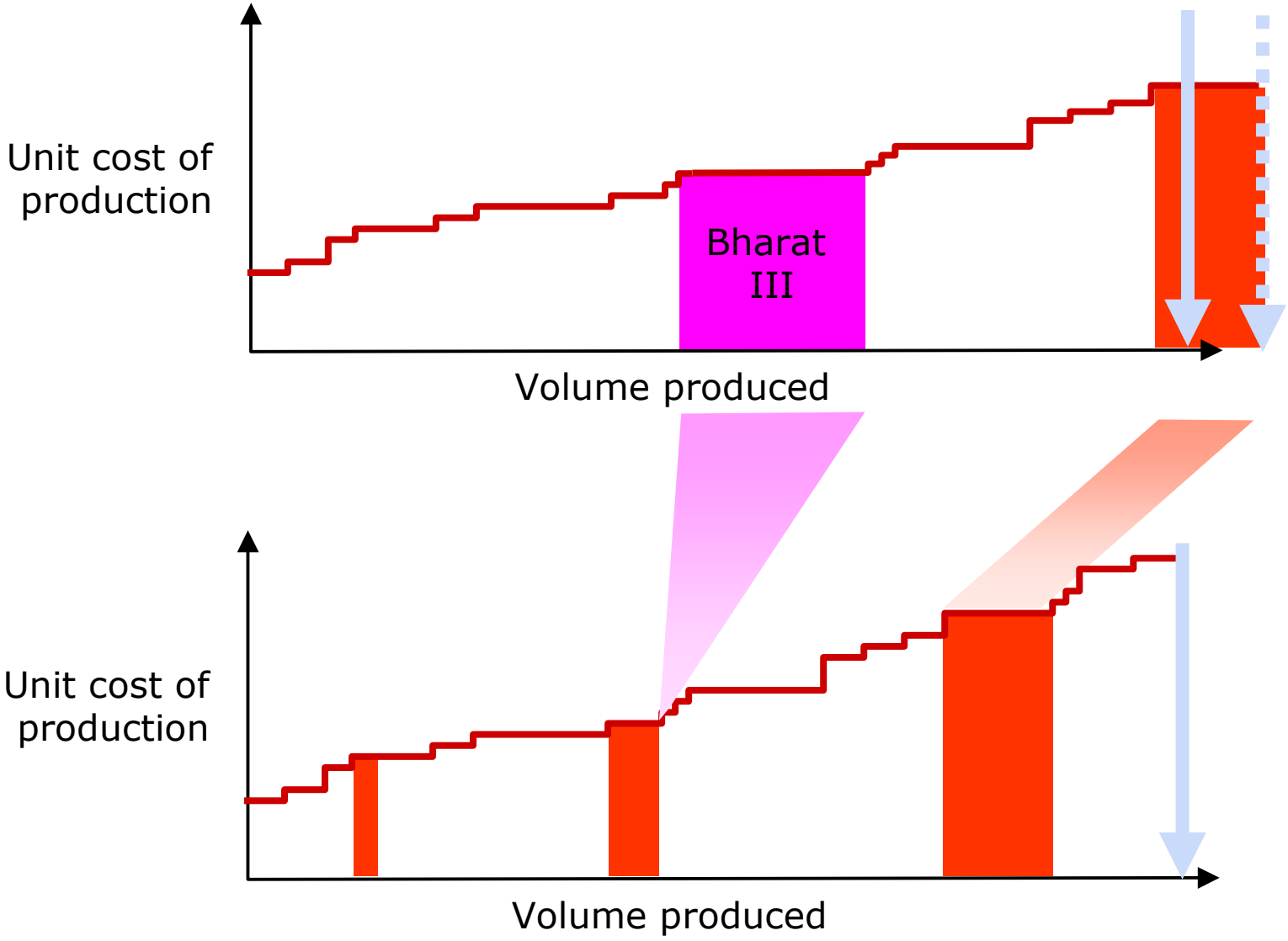




Costs: the experience curve.
input cost forecasting
supply curve volume estimates

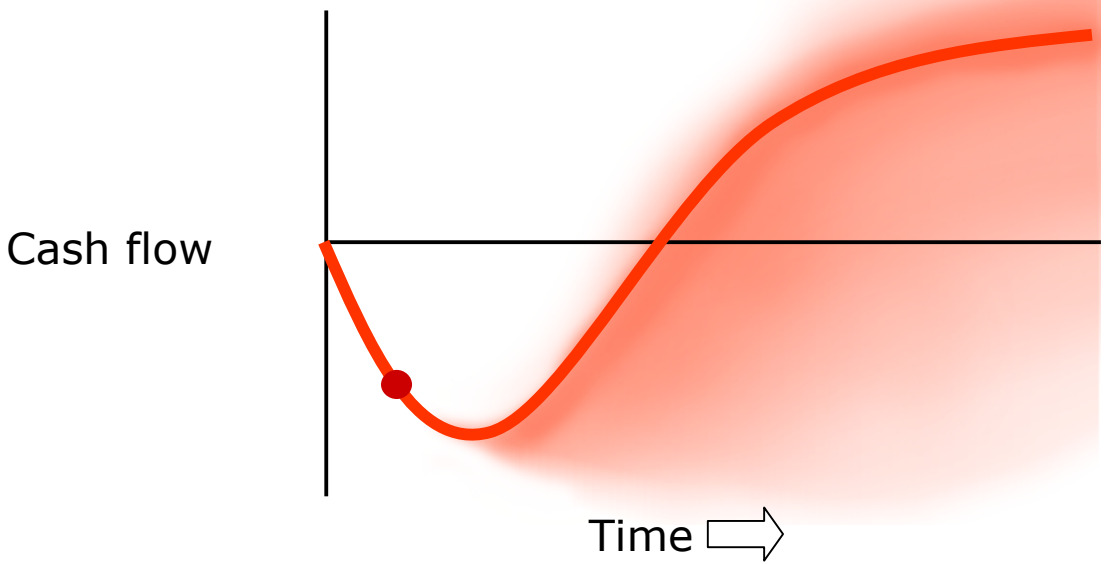
Costs: the experience curve.
input cost forecasting
supply curve volume estimates

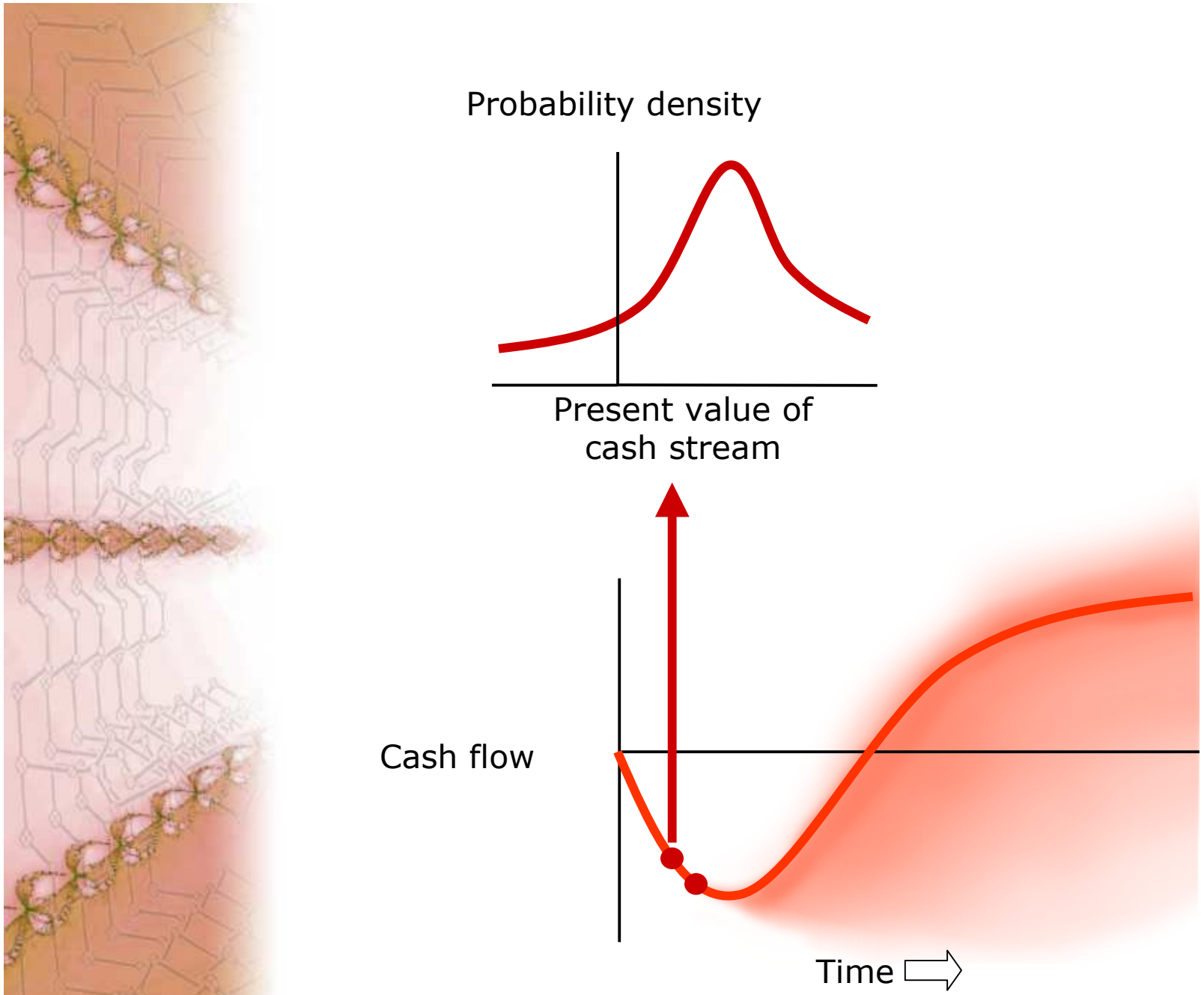


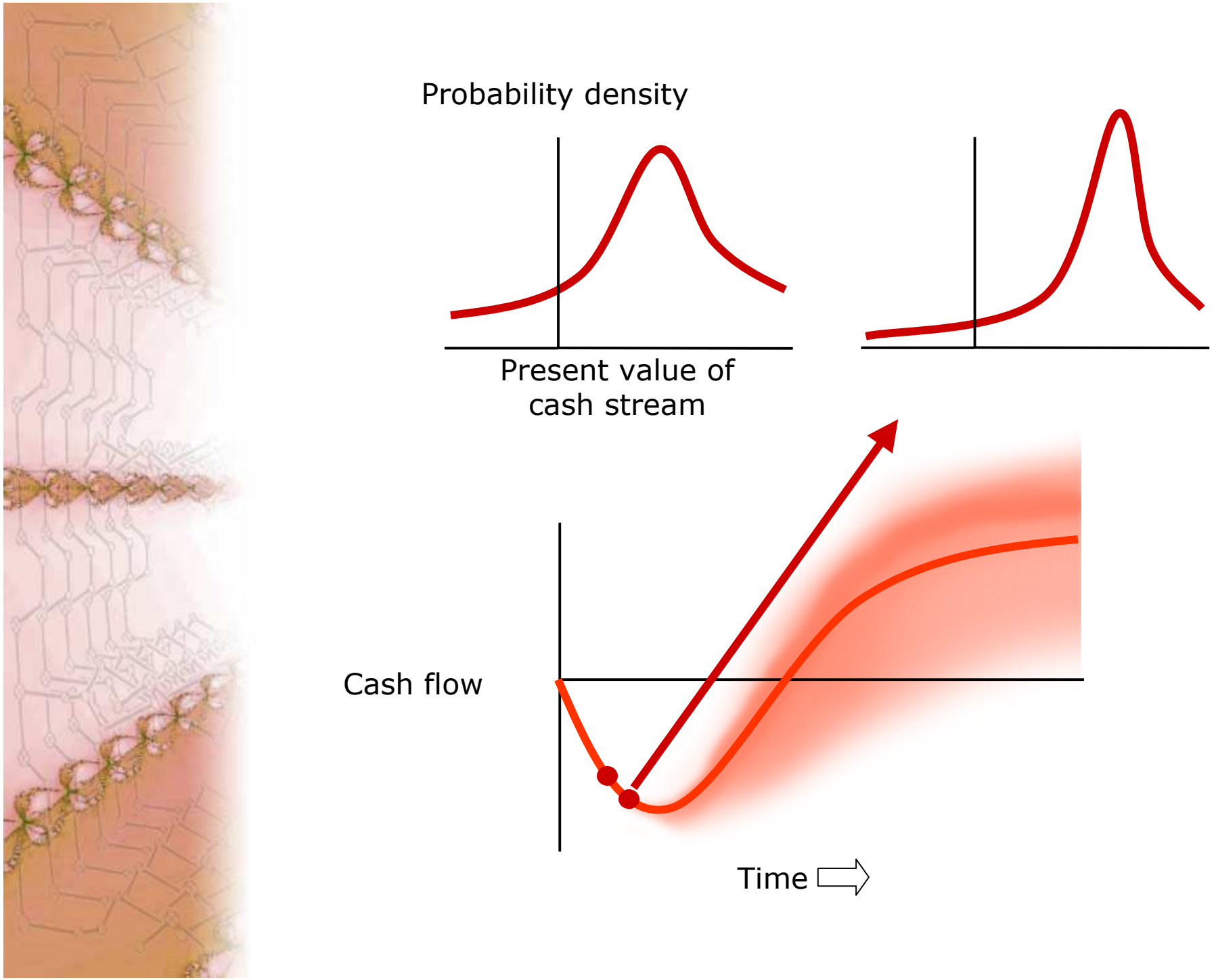

Unit cost of production
Bharat III
Volume produced
Unit cost of production
Volume produced

Costs: the experience curve.
input cost forecasting
supply curve volume estimates

Valuing information




Probability density
Present value of
cash stream
Cash flow
Time


Probability density
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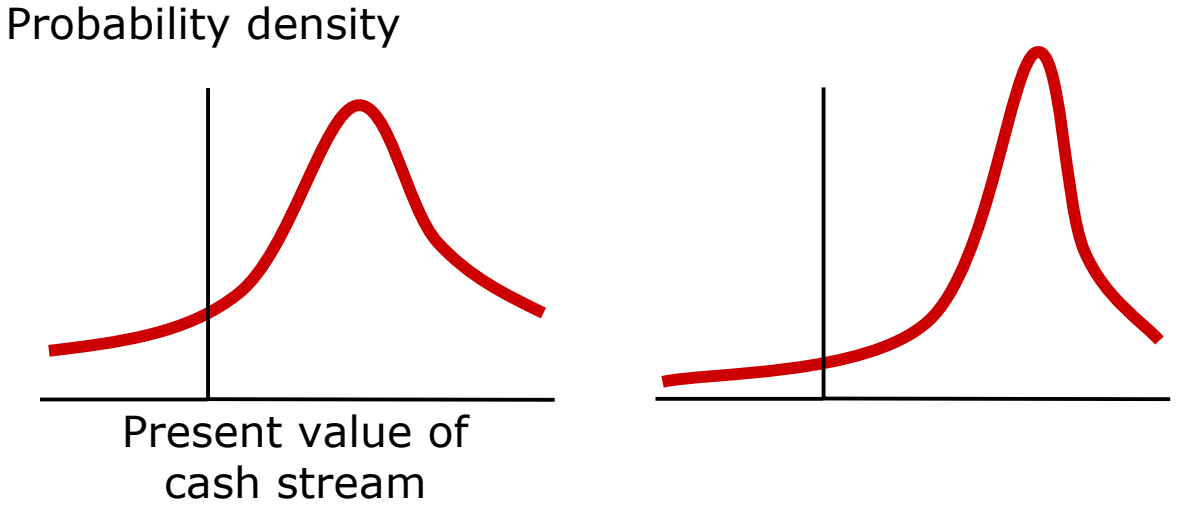
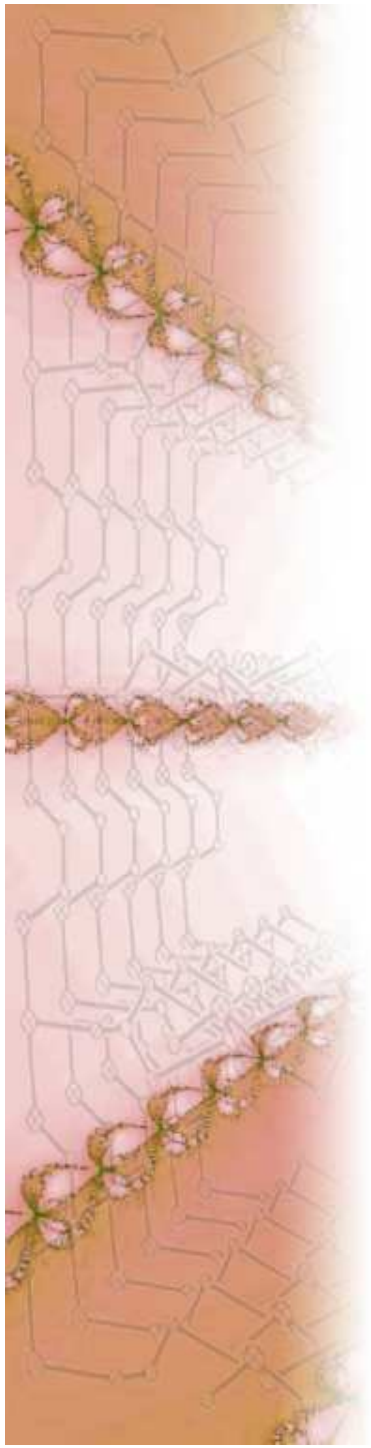
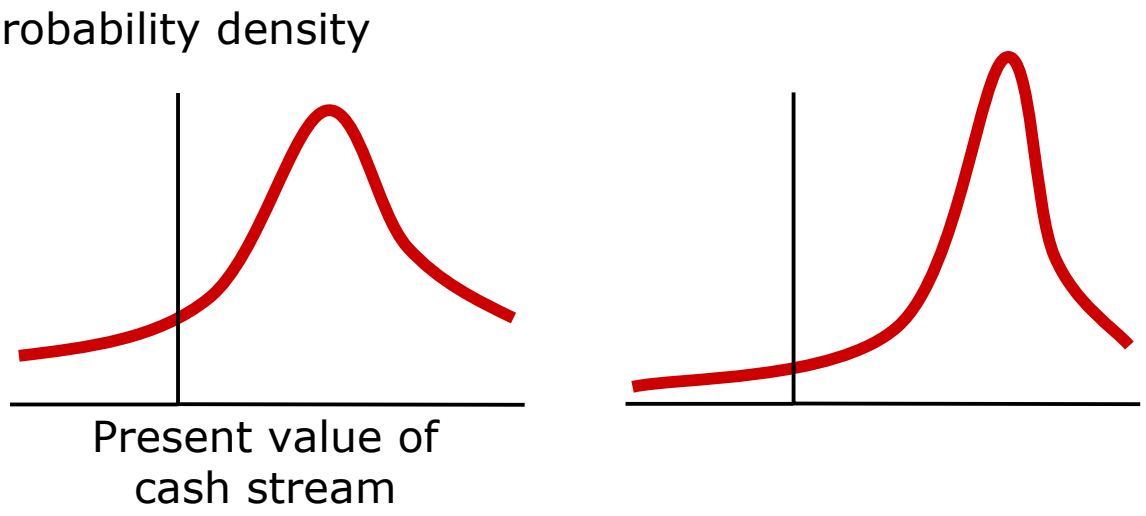
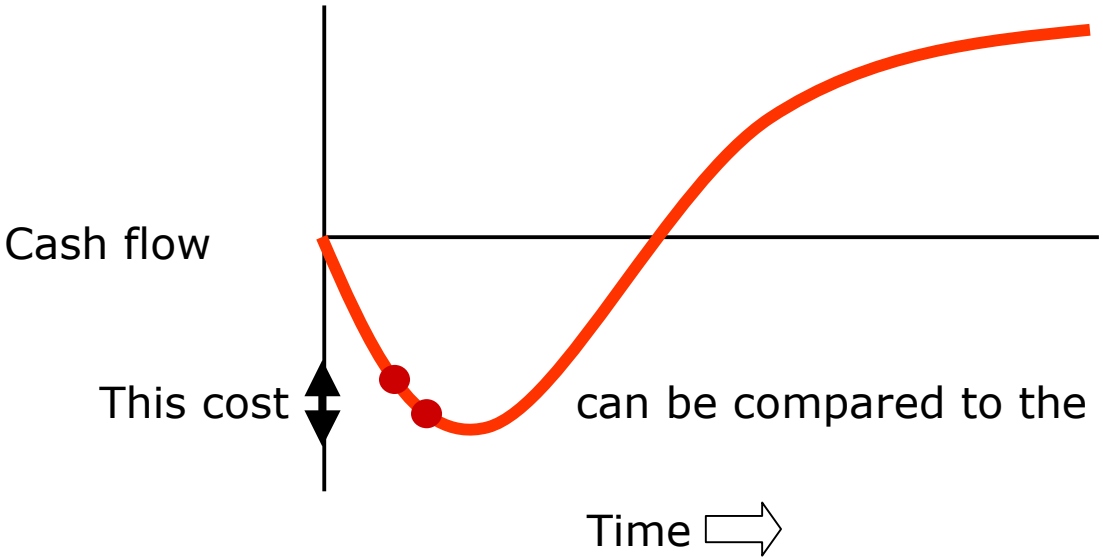


This difference is exactly equivalent to a financial option. That is, there is a difference in risk between the two cases that can be valued, using standard market techniques.

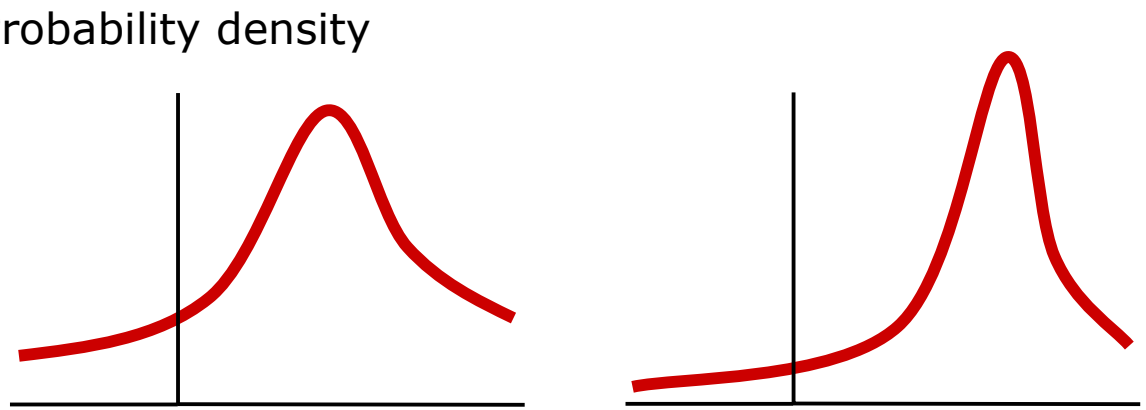






can be compared to the option value

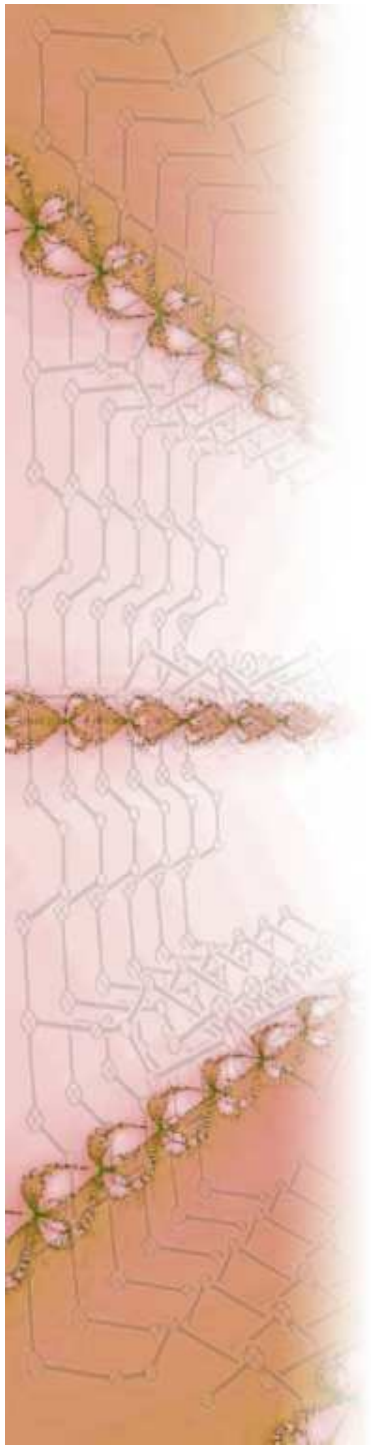
That gives a rational basis on whether to proceed or not.



To achieve this, there needs to be a technology put in place. Clearly, geologists evaluate the stratigraphy as the drilling proceeds. What is needed is a firm system – automated, Bayesian calculations based on past experience or collective judgments based on past experience – that creates these probability densities.

“Technology” does not always look like a machine. Much more often, it is a system made up of people and information.

That gives a rational basis on whether to proceed or not.



“Risk” is used to mean the chance that things will go wrong

Cost

Quality

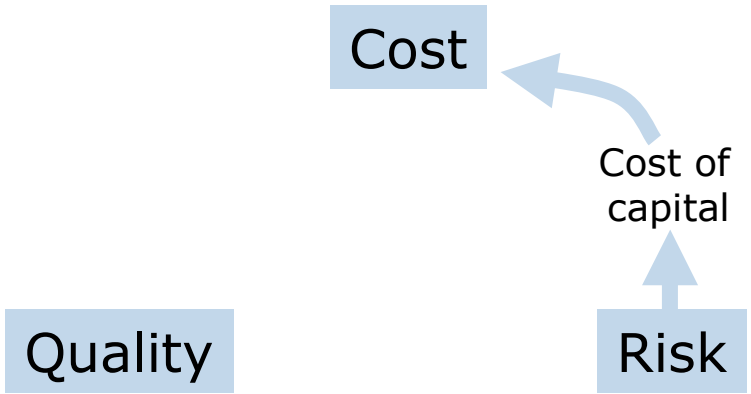
Risk

That gives a rational basis on whether to proceed or not.

“Risk” is used to mean the chance that things will go wrong

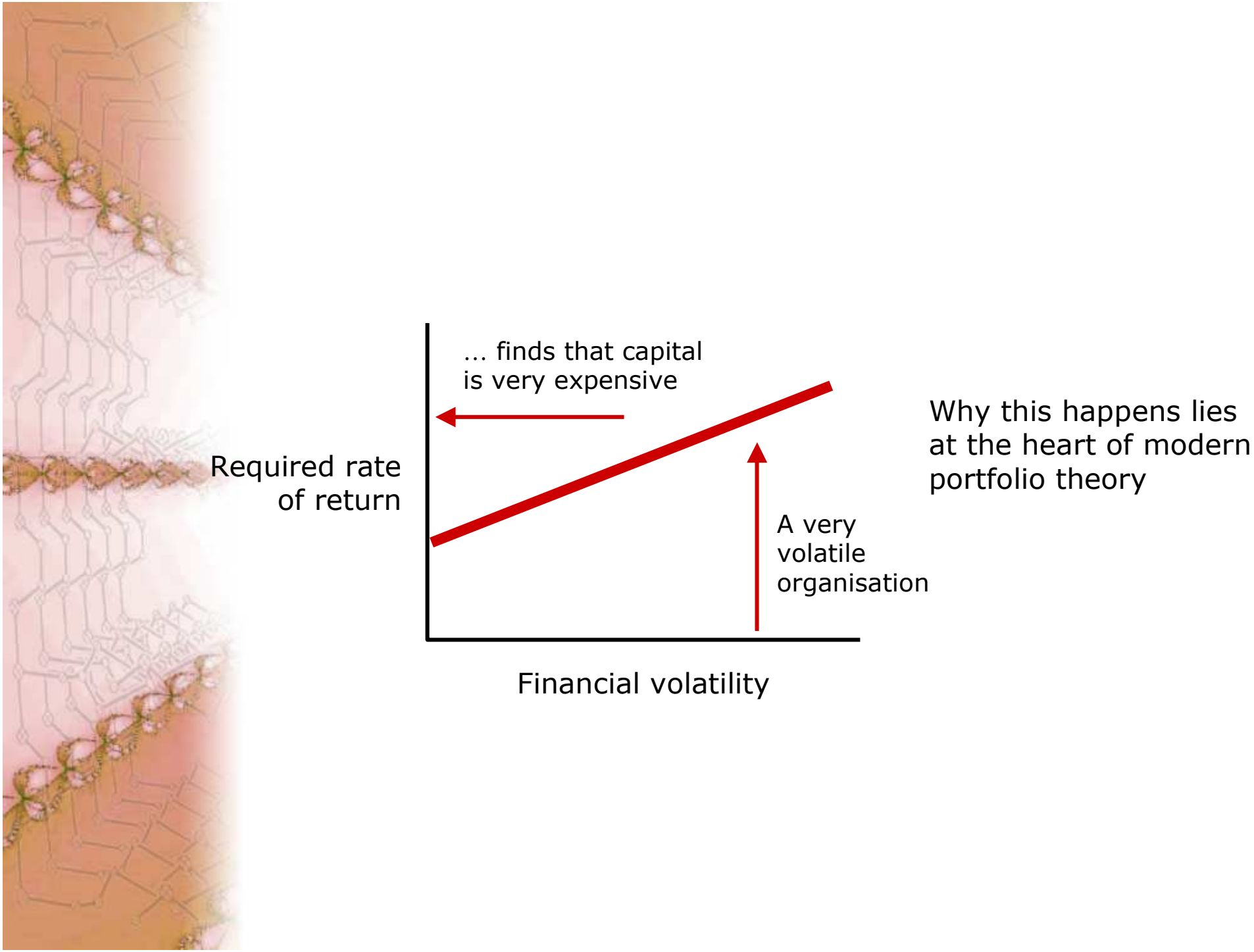
... but it is also used to mean “financial volatility”

“Risk” is used to mean the chance that things will go wrong



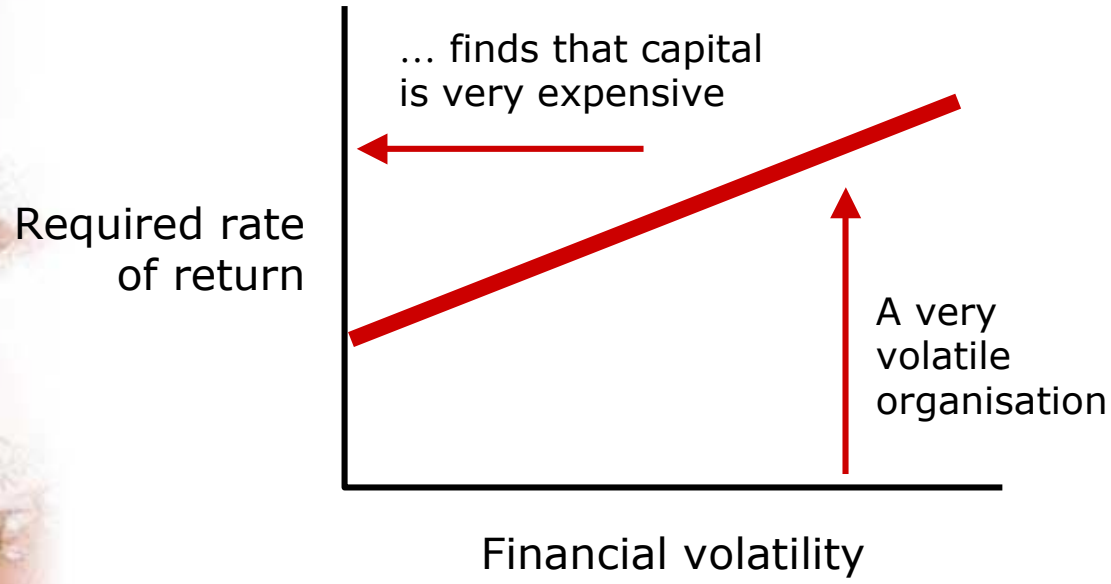
Why this happens lies at the heart of modern portfolio theory

… but it is also used to mean “financial volatility”



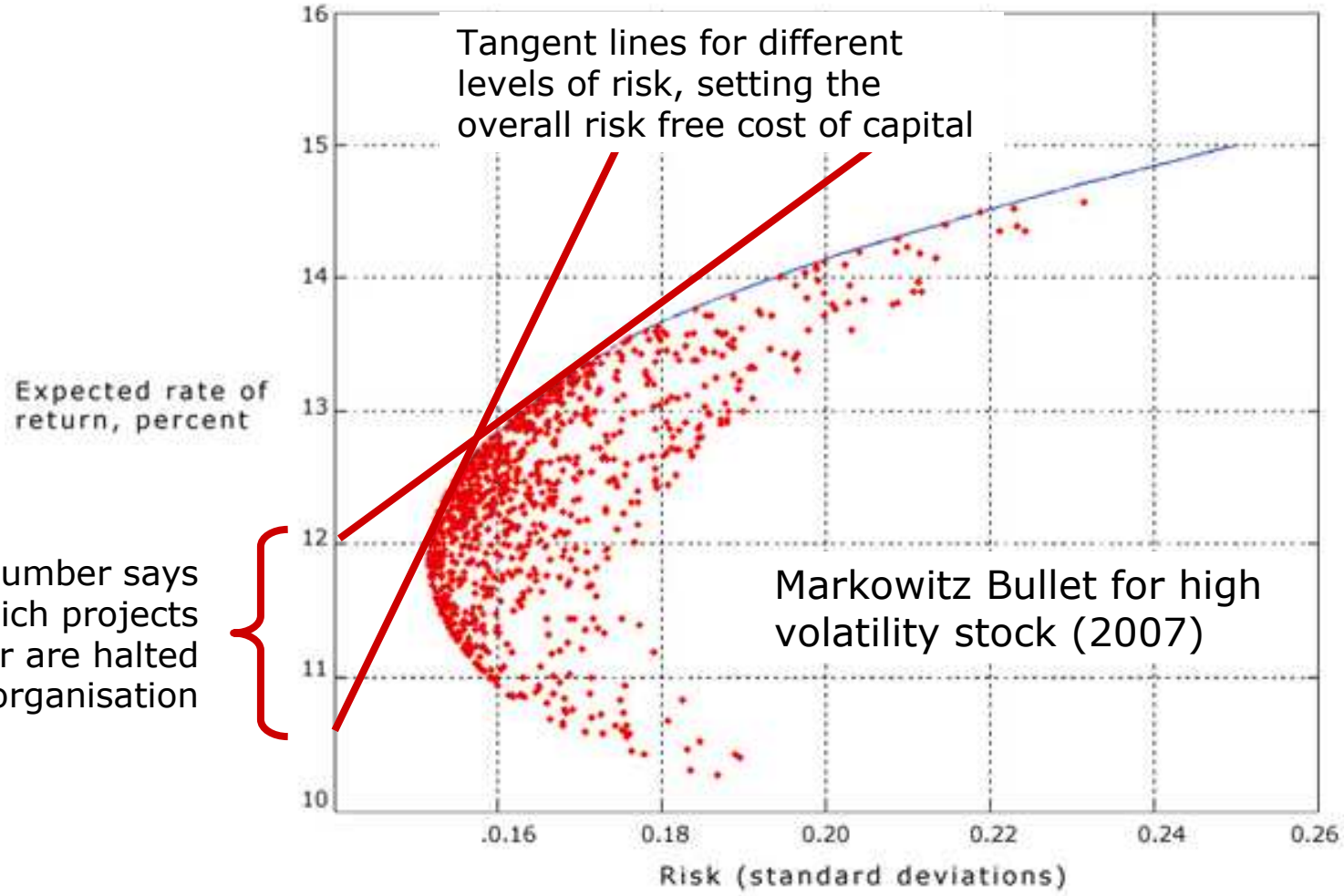
Why this happens lies at the heart of modern portfolio theory

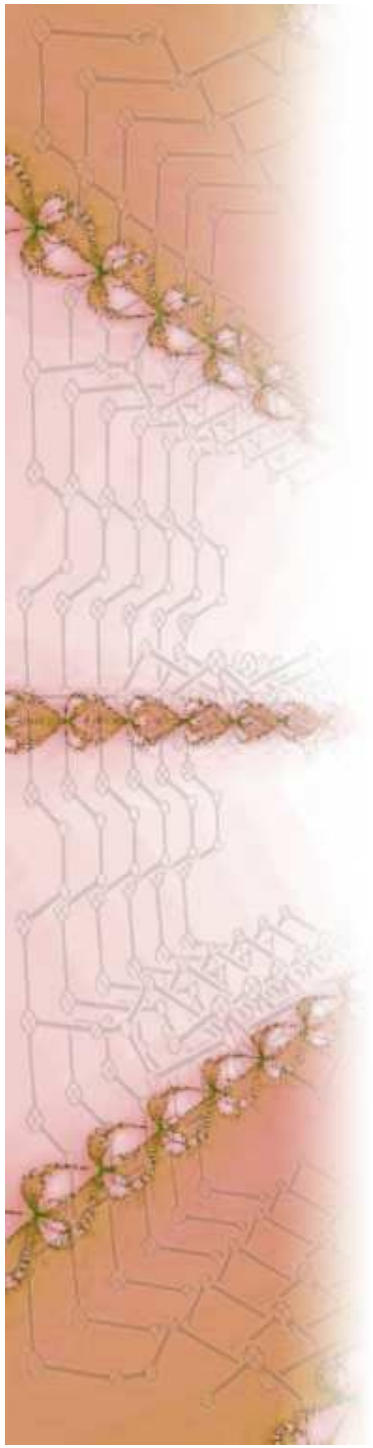
Any technology or practice which reduces economic volatility, without proportionately reducing profit, adds value. It is possible to calculate exactly how much.



... and that kills a lot of technology projects.

Any technology or practice which reduces economic volatility, without proportionately reducing profit, adds value. It is possible to calculate exactly how much.





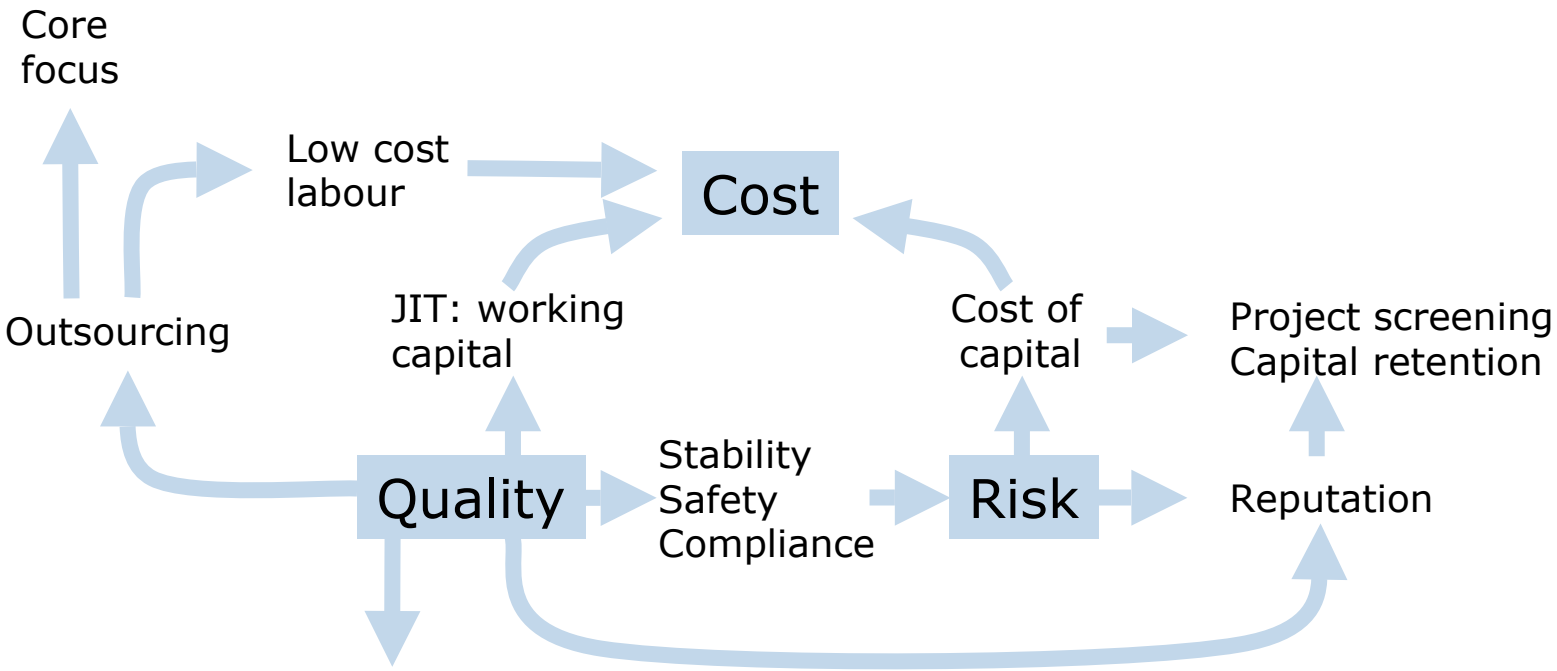
Cost

Quality

Risk

Quality control also has some negative features.

- It “fossilises” practice, and puts innovation on autopilot
- Combined with re-engineering, it prevents dialogue
- It selects for a particular mind set, which we will meet later.



Predictable change:

- Version control
- Product lifecycle management
- Lifetime maintenance planning
- Brand migration

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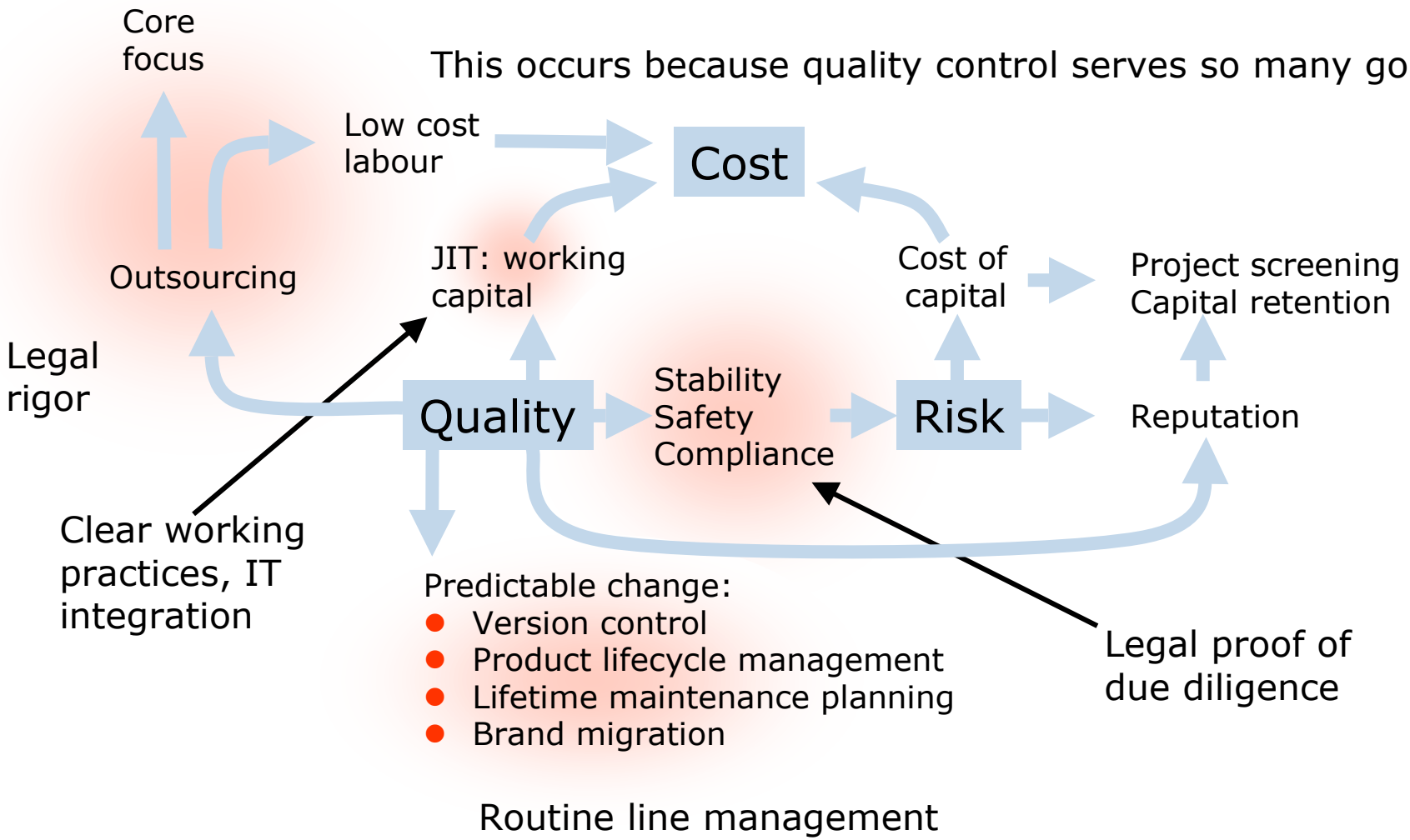
This occurs because quality control serves so many goals



Routine line management

Quality control also has some negative features.

- It “fossilises” practice, and puts innovation on autopilot
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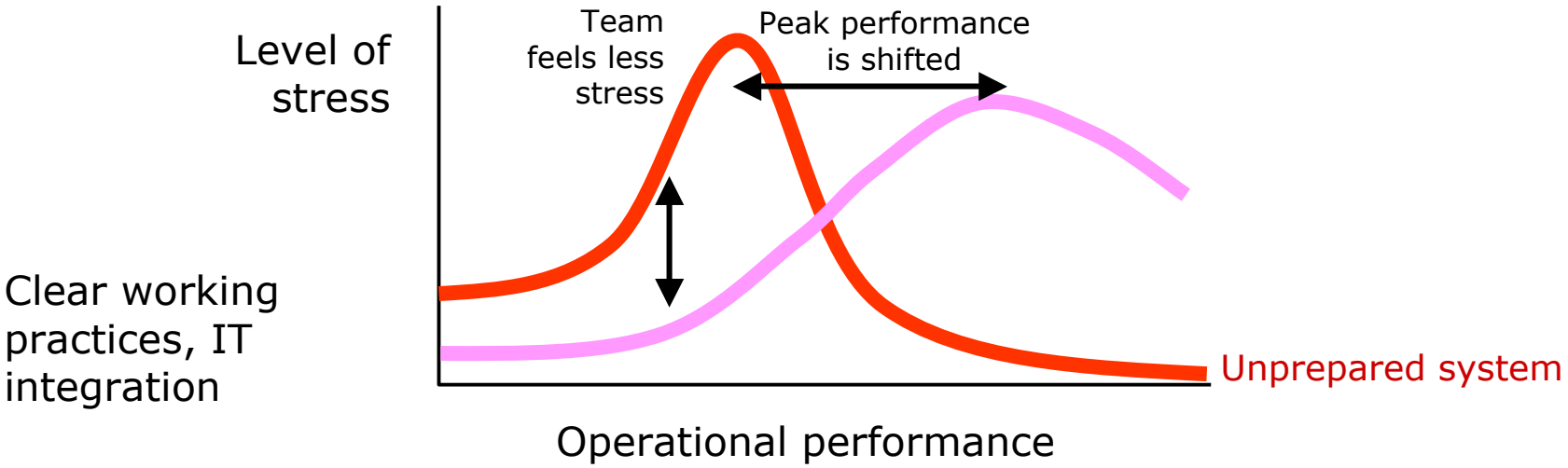
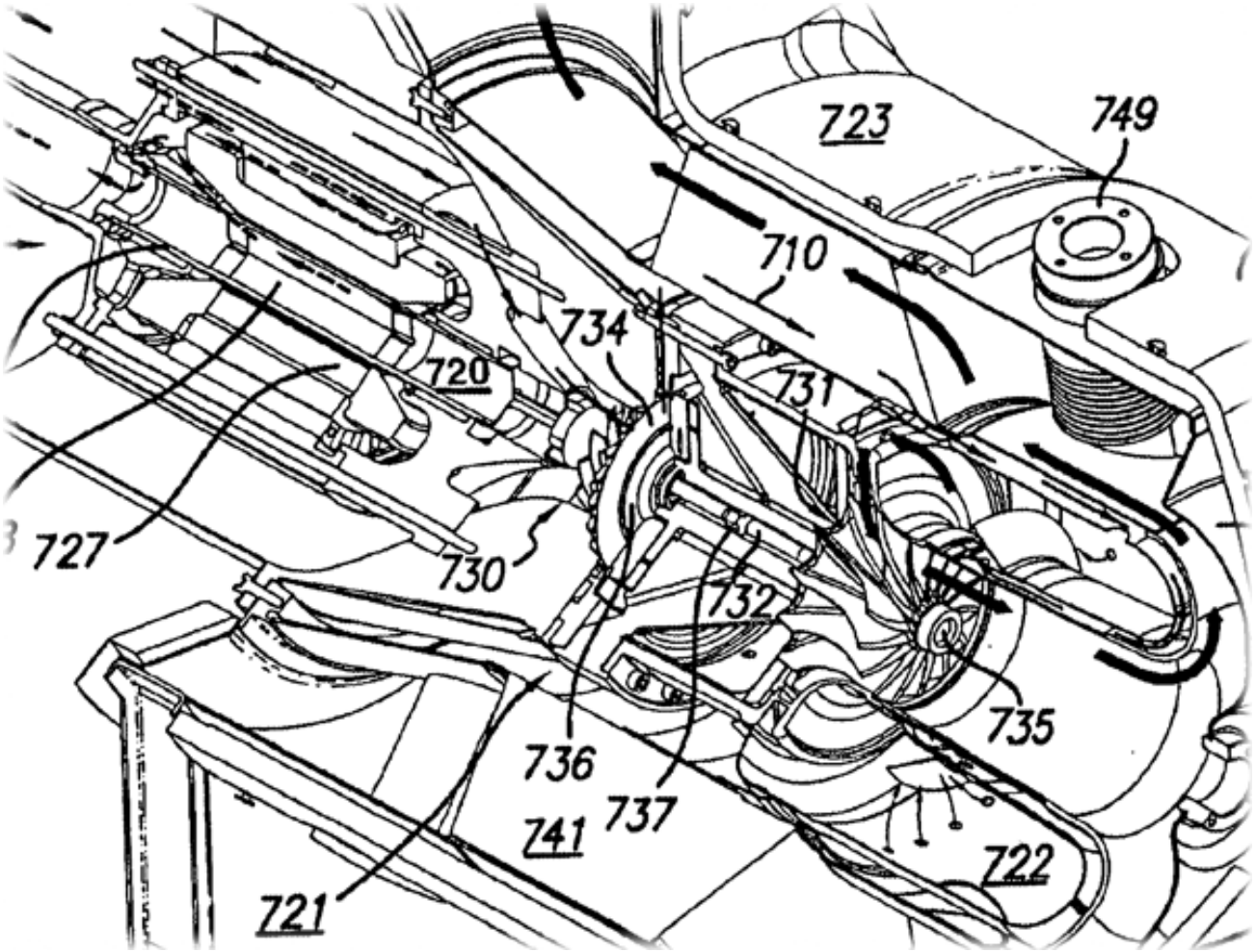
This occurs because quality control serves so many goals

Yerkes-Dodson performance peaks



‘Clarity’ must precede ‘quality’: clear goals, clear roles.



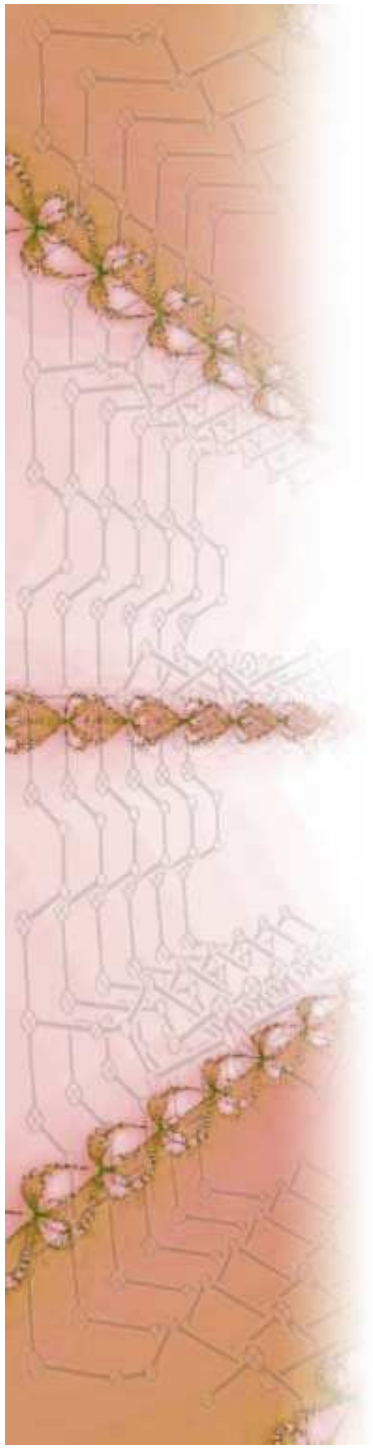
Failure to fully agree the basic functional specification leads to costly modifications later. In US military procurement, ‘specification creep’ leads to average 63% cost over-runs.

‘Clarity’ must precede ‘quality’: clear goals, clear roles.

Clarity within a team produces extraordinary results. Using full-team check lists in surgery cut deaths by 47%, non-fatal complications by 36%

Failure to fully agree the basic functional specification leads to costly modifications later. In US military procurement, ‘specification creep’ leads to average 63% cost over-runs.

‘Clarity’ must precede ‘quality’: clear goals, clear roles.



What has all this got to do with technology management?

The goals of technology management are to meet the requirements of the organisation. There are to kinds of generic ways of doing this. There is also the strategic approach.

Here, we have thought about the generic approaches: that is, things that are self-evidently good to do.

- Technologies which reduce costs, or meet specific cost targets
- Technologies which reduce risk, volatility or both of these together.

These things, although they are self-evident, cannot be done in isolation. It is essential to interact at length with the “problem owners”. This takes social skills that are not always developed as well as they might be in laboratories and engineering centres.

Dealing with busy, powerful people is a skill set that technologists need to develop if they are to be *allowed* to manage technology for the organisation

These things, although they are self-evident, cannot be done in isolation. It is essential to interact at length with the “problem owners”. This takes social skills that are not always developed as well as they might be in laboratories and engineering centres.

The next section is going to discuss strategic technology management: that is, working with the strategy process to show where technology can take things forward. However, as we shall see, achieving this requires complex systems and social skills.