Engineering Risk Management
Lecture 11

Risk Governance

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It's the Risk Governance, stupid!

Risk Governance can be defined as the totality of actors, rules, conventions, processes and mechanisms concerned with how relevant risk information is collected, analysed and communicated, and how management decisions are taken.

Risk Governance starts with good Corporate Governance and integrated board management, conditioned by:

(i) Diversity: strategically targeted composition of the board team

(ii) Trust: constructive and open-minded board culture

(iii) Network: efficient board structure

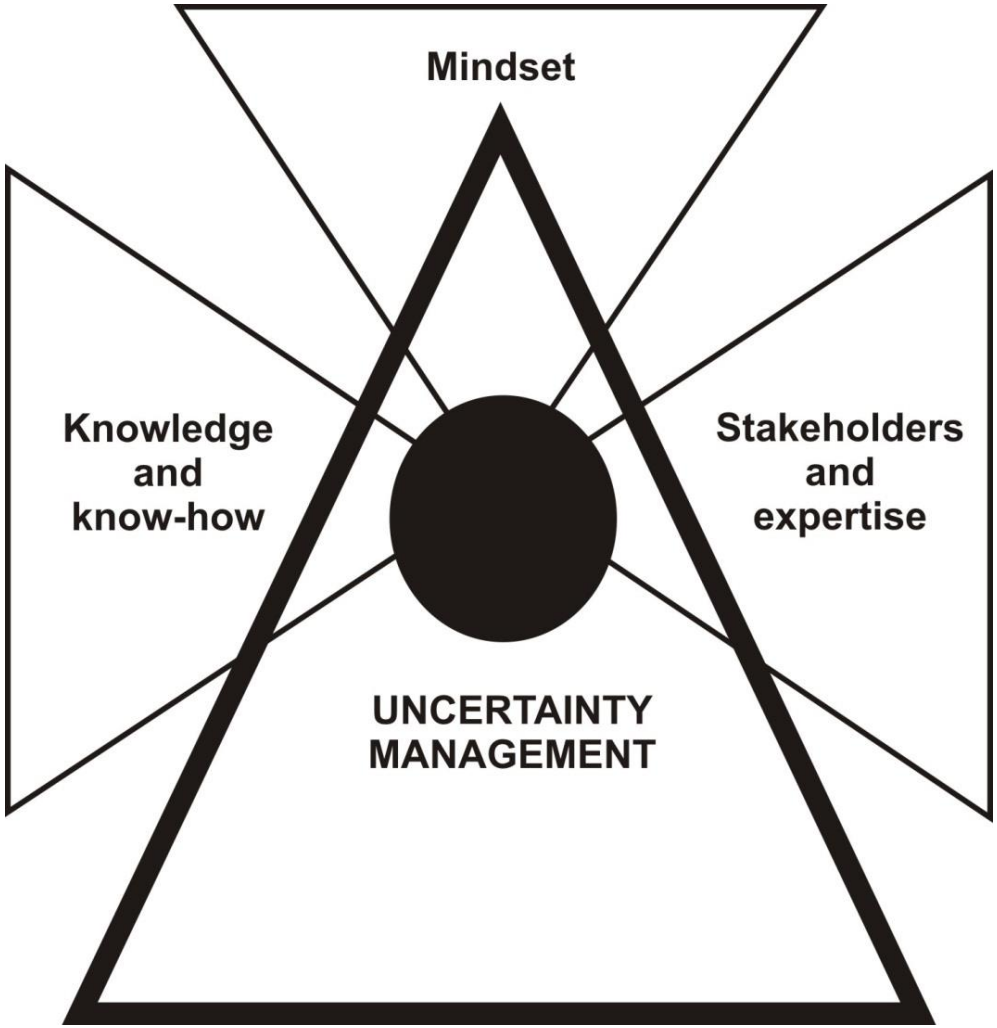
(iv) Vision: stakeholder-oriented board measures of success

Although these preconditions of success have been proven in a variety of studies, they seem to be very hard to achieve by organizations. In the light of the recent economic crises, put it this way: "How can a team of committed board members with individual IQs above 120 have a collective IQ of 60?"

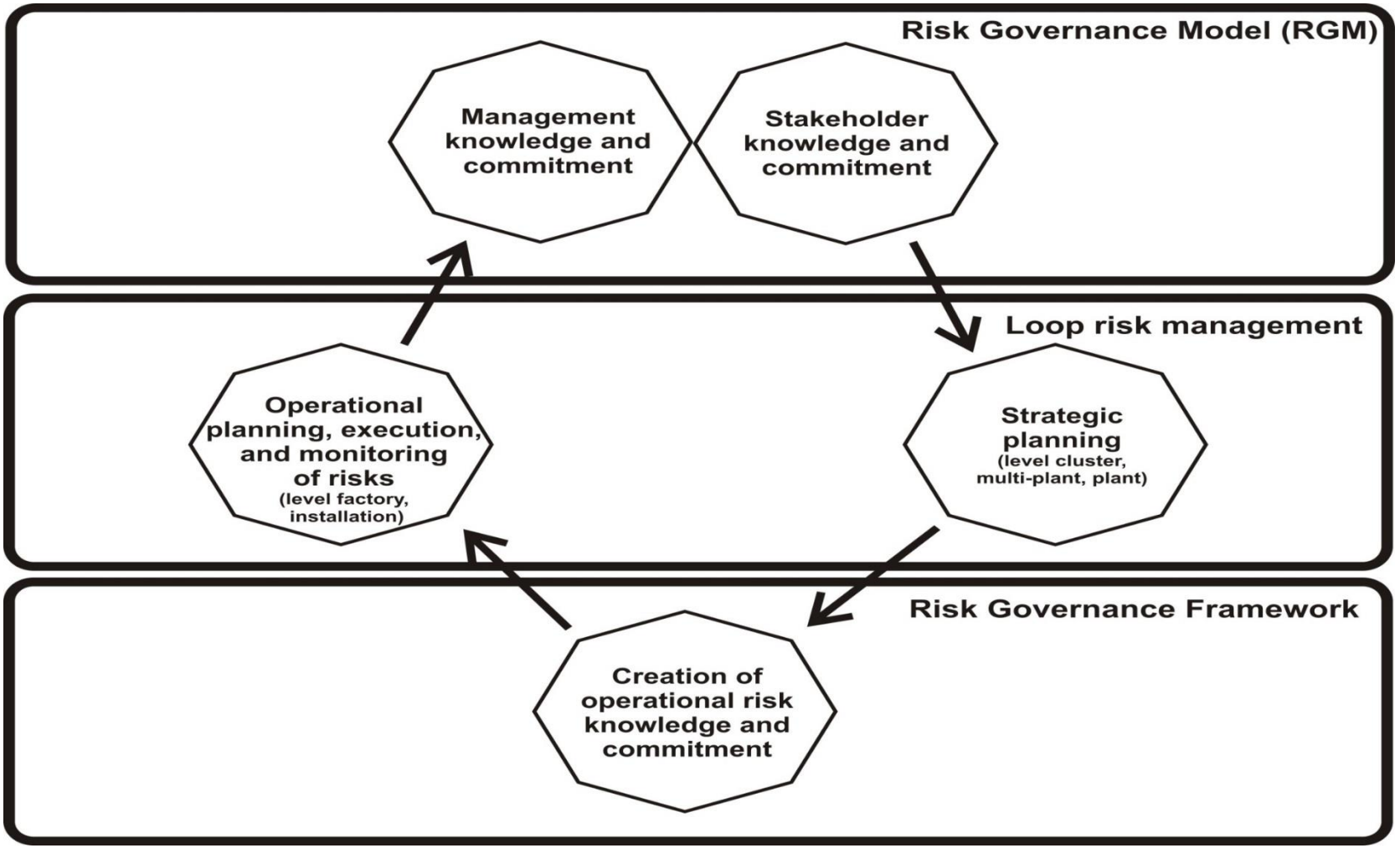
Risk Governance

- Principal agent theory / shareholder model / Anglo Saxon model
- Stakeholder model / Rijnland model
- Anyway, Risk Governance requires generalism, strategic viewpoint, and holism

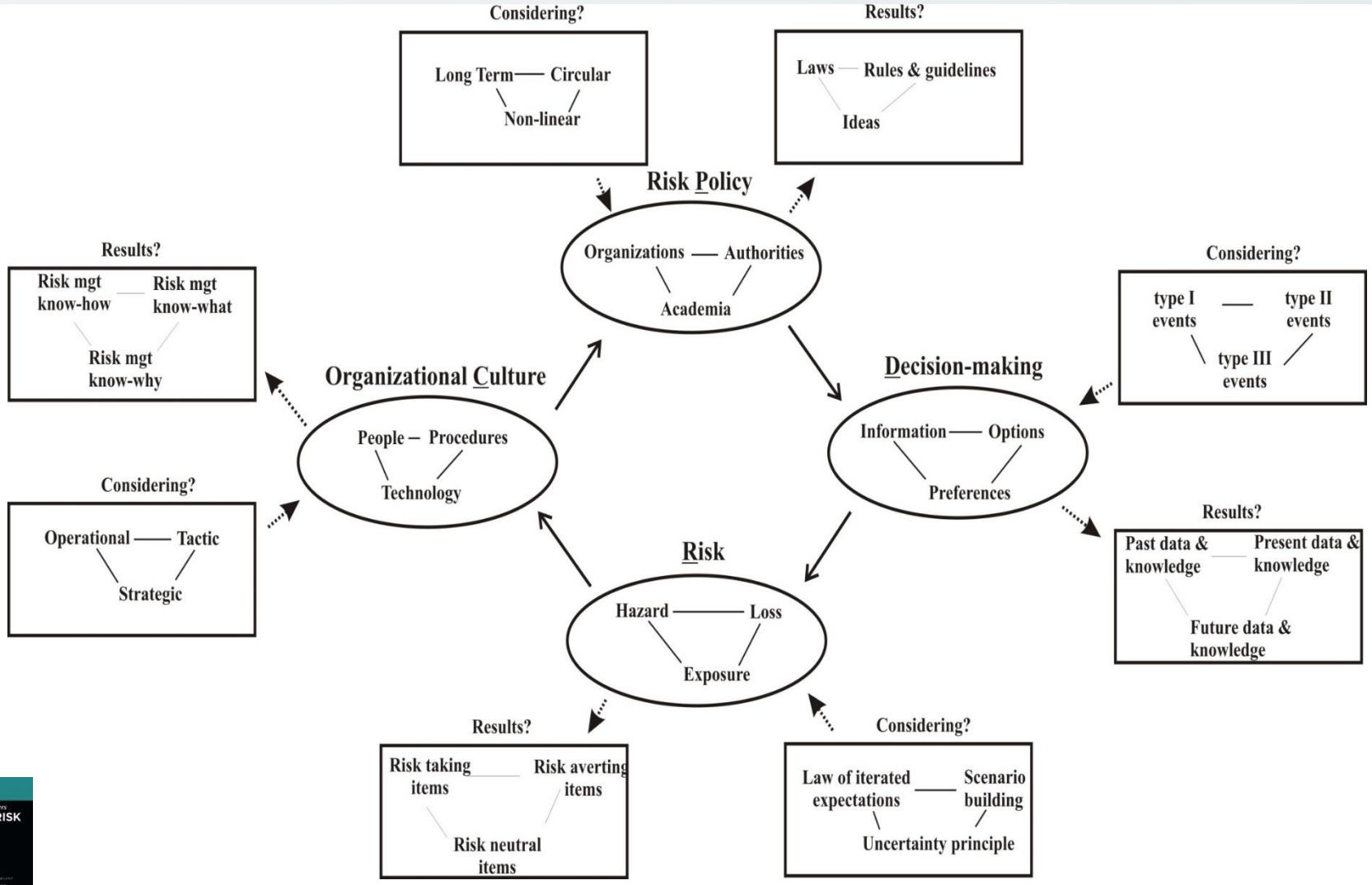
Remember from Lecture 1: Risk management – Uncertainty management? Approach to adequately govern risks?



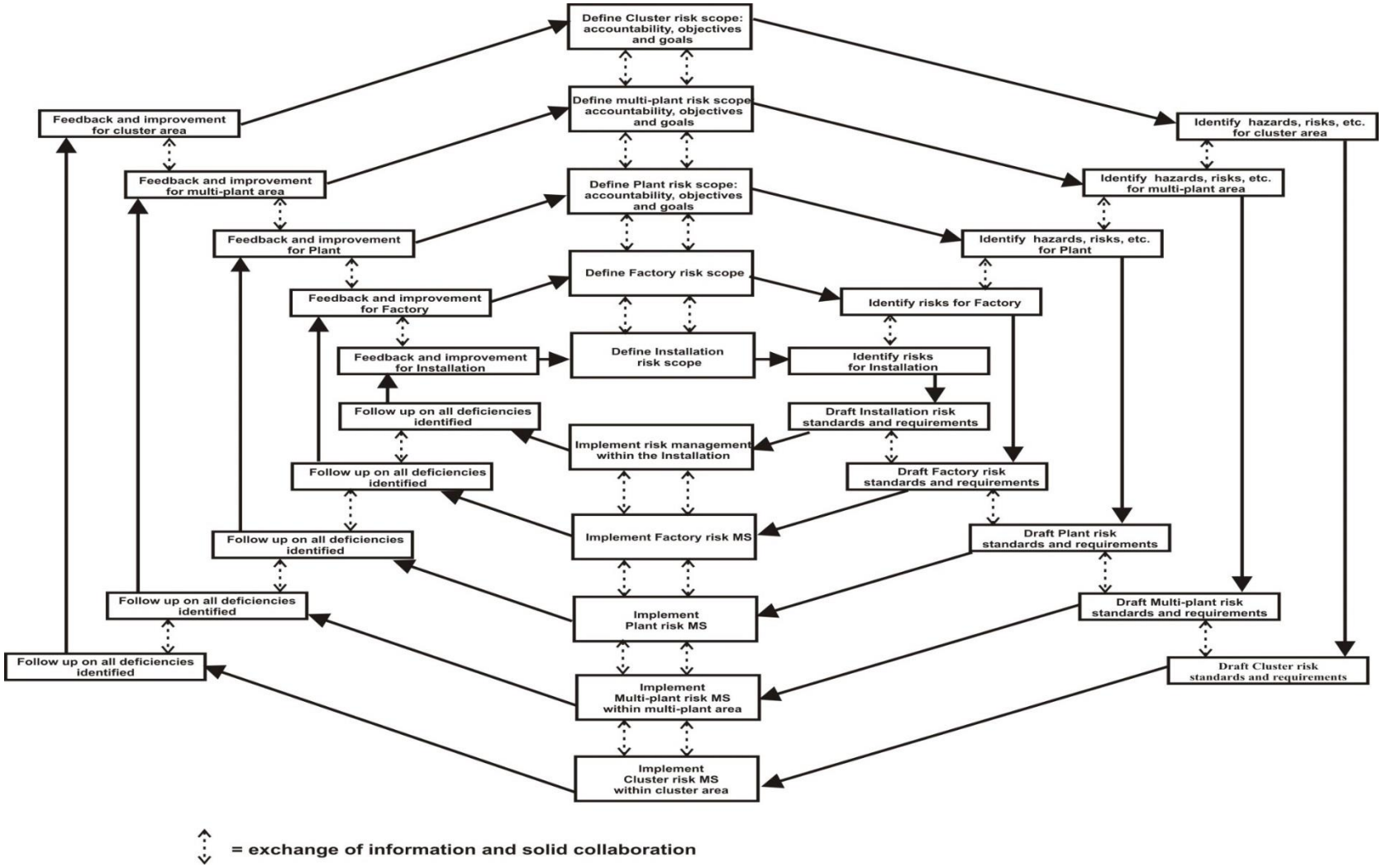
A Risk Governance PDCA



Mindset: Risk Governance Model



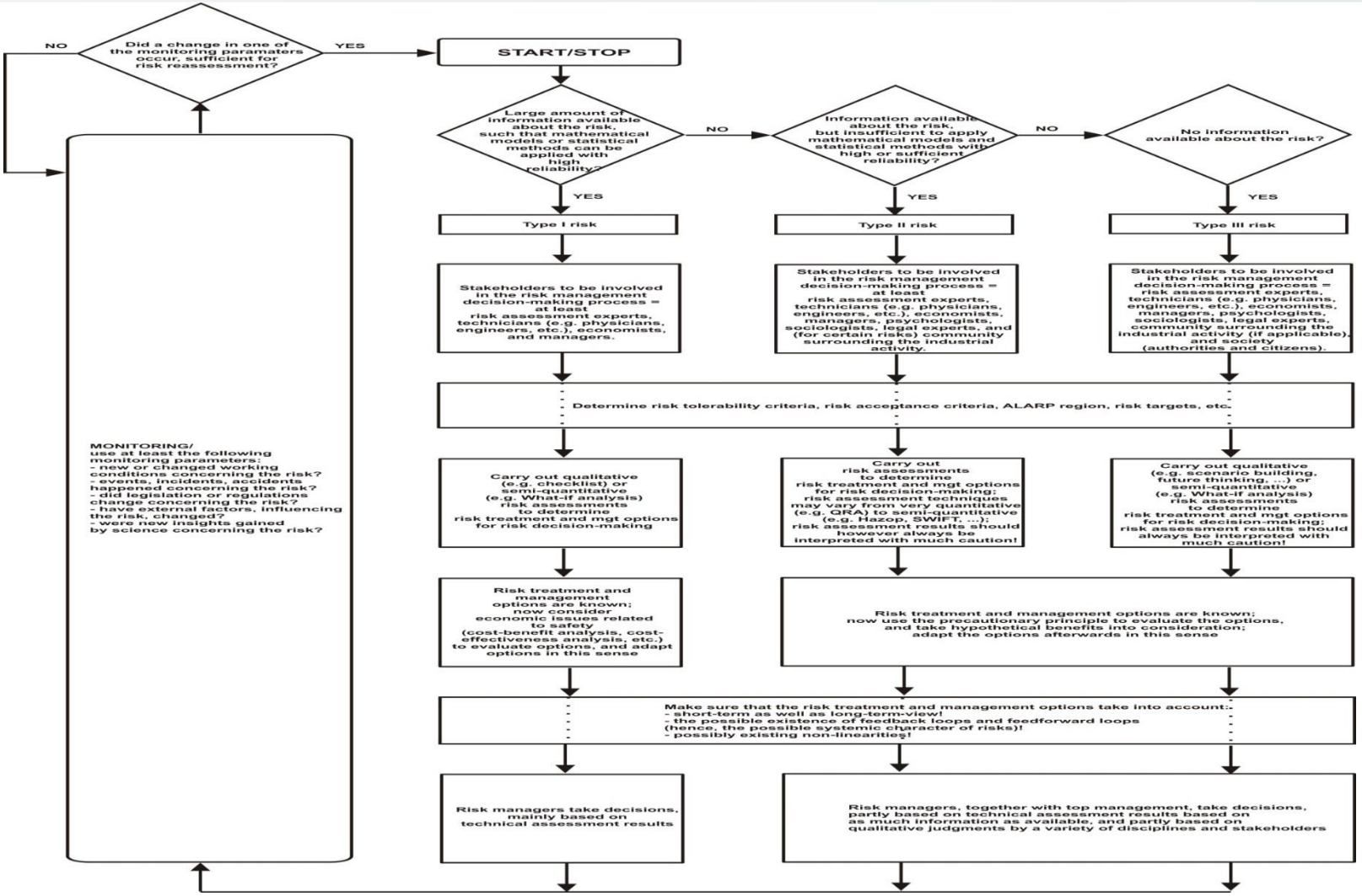
Knowledge and know-how:
Loop Risk Management



Safety Management System – 12 items

1. Safe work practices (procedural and adm control of work activities, safety reviews, MOC procedures, …), including emergency planning and procedures!
2. Safety training
3. Group meetings
4. Pursuing in-house safety rules and complying with regulations
5. Set of basic safety rules and regulations
6. Safety promotion
7. Contractor and employee evaluation, selection and control
8. Safety inspection, monitoring and auditing
9. Maintenance regimes
10. Hazard analysis and incident investigation and analysis
11. Control of movement and use of dangerous goods
12. Documentation control and records

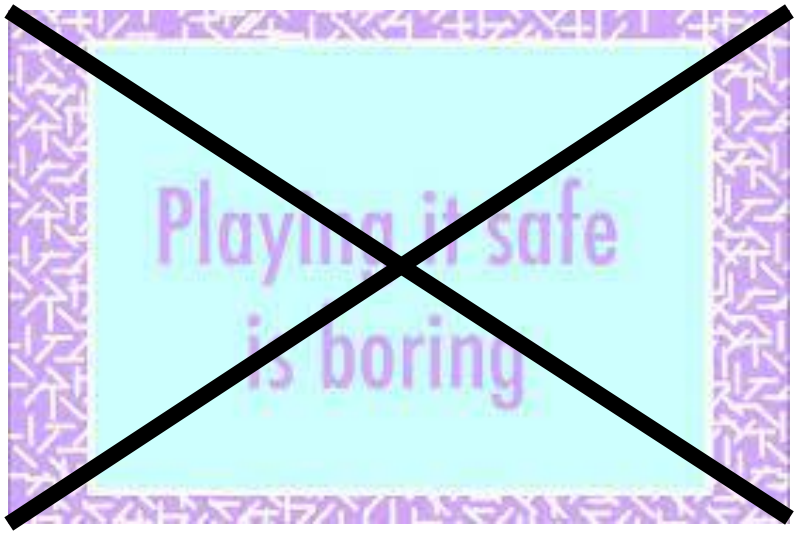
Stakeholders and expertise:
Risk Governance Framework



Exercise - Assignment

- Discuss how ‘engineering risk management’ can be applied in industrial practice for dealing with ‘domino effects’ (escalating events, knock-on accidents) in a chemical industrial area.

Securing organizations:
Playing it safe or Playing with safety



Presentation outline

- Why? – Safety Concerns
- What? – Safety Matters
- Easy? – Safety Bothers
- How? – Playing with Safety
- New? – Safety Futures
- Who? – Safety Scores
- The End. – The Safety Tail/Tale:

  A Never-ending Story.

Remark:
'Safety' = 'Safety + Security'

Why?
Safety Concerns

(i) everyone
(ii) safety anxieties

Why? - Safety Concerns (i)

- All stakeholders

Why? - Safety Concerns (ii)

- **Prudence due to industrial activities** should be present in every industry, and certainly also in the hazardous materials using industries
- **Characteristics of chemicals using industries**: use of hazardous materials, existence of chemical industrial parks, license to operate/acceptability linked with reputation, high uncertainties linked with debatable opinions
- **Belgium & The Netherlands:** densely populated area combined with highly concentrated chemical industrial activities
- The Rotterdam Port Area is part of the **"ARRRA"** and is extremely important for the Dutch (/Belgian/German/European) economy

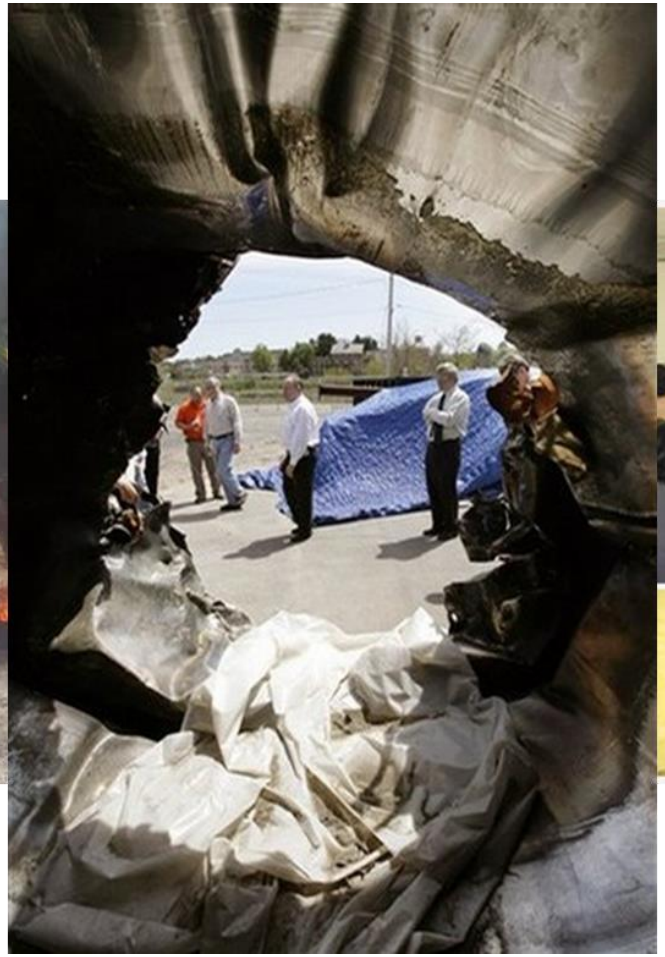
What?
Safety Matters

(i) Good News: Focus on Safety
(ii) Improvement News: The “AND” Story

What? – Safety Matters (i)

http://www.youtube.com/watch?v=2MpsArclaxw

What? – Safety Matters (i)



What? – Safety Matters (i)

- **Specialistic AND Generalistic**
- **Technology AND HOFS**
- **Reactive AND Proactive**
- **Individu AND Group**

- **Short-term** AND Long-term
- **Top-down** AND Bottom-up
- **Normal acc.** AND Disaster
- **Operational** AND Strategic
- **Blue-collar** AND White-collar
- **Simple** AND Complicated

- **Confidential**
- **Static**
- **Practical**
- **Realist/Pragmatic**

- **Analytic**
- **Current practice**
- **Linear**

What? – Safety Matters (ii)

- **Specialistic AND Generalistic**
- **Technology AND HOFS**
- **Reactive AND Proactive**
- **Individu AND Group**

- **Short-term AND Long-term**
- **Top-down AND Bottom-up**
- **Normal acc. AND Disaster**
- **Operational AND Strategic**
- **Blue-collar AND White-collar**
- **Simple AND Complicated**

- **Analytic AND Systemic**
- **Current practice AND Innovation**
- **Linear AND Cyclic**

- **Confidential AND Transparant**
- **Static AND Dynamic**
- **Practical AND Theoretical/Fundamental/Conceptual**
- **Realist/Pragmatic AND Dreamer/Idealistic**

Easy?
Safety Bothers

(i) Safety Leads to Headaches
(ii) Safety Disturbs

Easy? - Safety Bothers (i)

- Measures to take to be safe (**how safe is safe enough?**)
- Possible **costs** (all types, not only financial) of minor and major **accidents**
- **Safety investments**
- Strategic decisions (game-theory - **what do others do w.r.t. safety?**)
- Competences available / **Company memory**
- **…**

- License to operate / **authorities & politics**
- **Media**
- **Academia**

Easy? - Safety Bothers (ii)

- **1999:** "*Throughout the evolution of the chemical industry, safety has been treated as an afterthought. It is the tag-along in a group of kids on the playground: at times annoying yet unavoidable.*"

  Osborne L., Process Safety Progress 18(4): W5

  Chemical engineering students were invited to write an essay on a safety topic. The quotation is from the winning essay.

- **2012:** "*A picture is slowly emerging of chemical industrial clusters that will set their own sustainability standards through intensive collaboration.*"

  Reniers G. & Amyotte P., Journal of Loss Prevention in the Process Industries, 25, p.227-231.

How?
Playing with Safety

(i) …so that it gets dangerous
(ii) …so that it gets safer

How? - Playing with Safety (i)

- Closed-mindedness ('**been there, done that, seen that**')
- No or **few innovations** (a.o. regarding using risk assessments)
- **Inadequate investments in prevention**
- **Perceiving** safety as a cost
- Considering safety as being evident (**complacency**)
- **Insufficient transparency** (towards any stakeholder)
- **Insufficient collaboration** (with competitors, authorities, and academia)
- **Inadequate integration** of safety in business management system
- **Too much focus on compliance**
- **Inadequate company memory**
- **…**

How? - Playing with Safety (ii)
(so that it gets safer!)

- **Open-mindedness** (open for creative new ideas / techniques / solutions to further improve safety) **linked with available budget**
- **Technological and HOFS innovations** (e.g., using innovative risk assessment techniques, company memory conceptual models and/or software, new model of safety culture linked with performance management and total respect management)
- **Trying new collaborations** (e.g., with academia), new safety projects, new safety investments on top of usual investments, high transparency, applying game-theoretical models, …

New?
Safety Futures

(i) Economics of Safety
(ii) What holds the future?

New? - Safety Futures (i)

- **Agreement** between parties committing themselves to trade at a specified time in the future, a good or service at a predefined price. (**good = safety; predefined price = prevention investment**)
  → **Impact** of prevention investment decisions **on future of a company**
- From a prevention investment point of view, **different types of risks should be dealt with differently** (high-uncertainty decisions possibly leading to huge profits always go hand in hand with huge possible losses (Disasters)! Hence, **focus on low-uncertainty decisions for making 'normal' profits**.
- Credo 'Safety not for sale' or 'safety before sale' not true: Story of Safety versus Productivity is comparable to Story of chicken and egg!
- **THERE IS NO ALTERNATIVE**: The right way forward is not to reject the economic approach in safety decision-making, but to improve the tools and their use! (much like risk assessments)
- **Loss Aversion:** We do not gamble with gains, while we tend to gamble with losses (because we really hate to lose)!

New? - Safety Futures (ii)

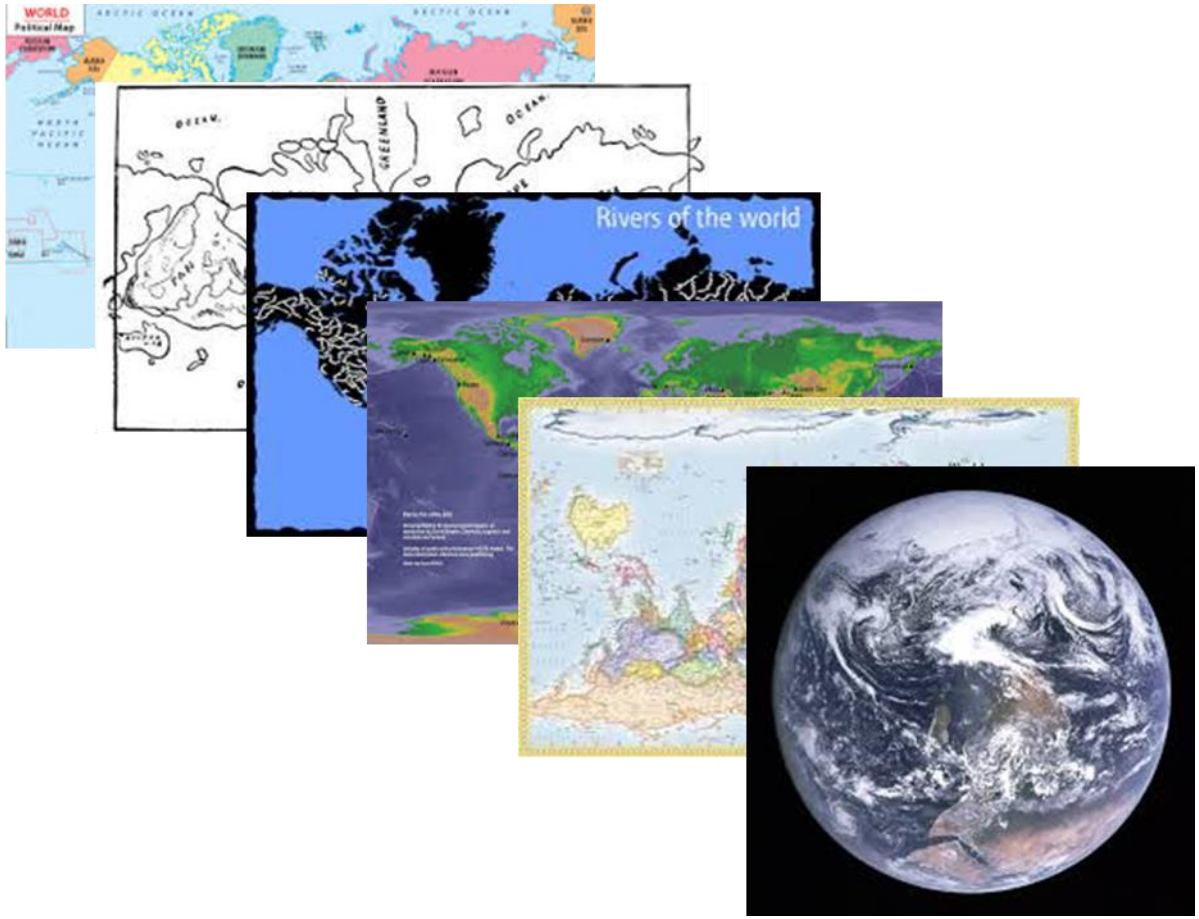
- **Megatrends:** Communication devices, Big data, Collaboration, Sustainability, Performance-based decision-making, Aging, Accelerated urbanization, Resource scarcity
- **Technological improvements and innovations** will lead to more accurateness of risk perception and assessment, better knowledge of uncertainties, better knowledge dispersion, dynamic risk assessment results and real-time risk data processing, more complete data and information, calculation of systemic risks, serious games, changing role of media in communication of risks
- **Globalization:** decrease of risk perception differences, decrease of differences in safety cultures, more integration of safety within other domains, decrease in differences of values of life, decrease in ethical differences
- **'Uncertainty measurement' device** for people and organisations: risk radars, risk dashboards, risk watches,
- Safety apps, safety QR code for equipment, google glasses

Who?
Safety Scores

(i) Good Leadership
(ii) Excellent Leadership

Who? – Safety Scores (i)

- Quality of Perception of Leaders: The map is NOT the territory!



Who? – Safety Scores (ii)

- **Improve the perception of reality** of every member of an organization, and this way make better (individual and group) decisions
- **Organizational alignment**
- Developing the "**Respect culture**" within the organization (we are evolving from a 'risk society' (Beck, 1986) towards a 'respect society')
- Thinking in **"AND"** terms
- Focus on 7 domains for excellence: Productivity, Effectiveness, Quality, **Safety & Security**, Efficiency, Ecology, Ergonomics

The End.
The Safety Tail/Tale: A Never-ending Story.

(i) Does Safety have a tail?
(ii) The Story of the Dinosaurs

The End.
The Safety Tail: A Never-ending Story. (i)

- The Future will be ‘Safe’ and ‘Excellent’, or there will be no future at all!
- Safety is a circle – it never ends!

Some recommendations:

- Safety (or rather: ‘dealing with uncertainty’) should be taught at all levels of education, and in all studies
- Safety thinking should always in some sort be part of technological innovation
- Safety Science should be a true pillar of society if it wants to excell

The End.
The Safety Tale: A Never-ending Story. (ii)

"All I'm saying is <u>now</u> is the time to develop the technology to deflect an asteroid."

(from: Risk-benefit analysis, Wilson and Crouch, Harvard Univ. Press, 2001)

Engineering Risk Management

End of the course