Before we start...

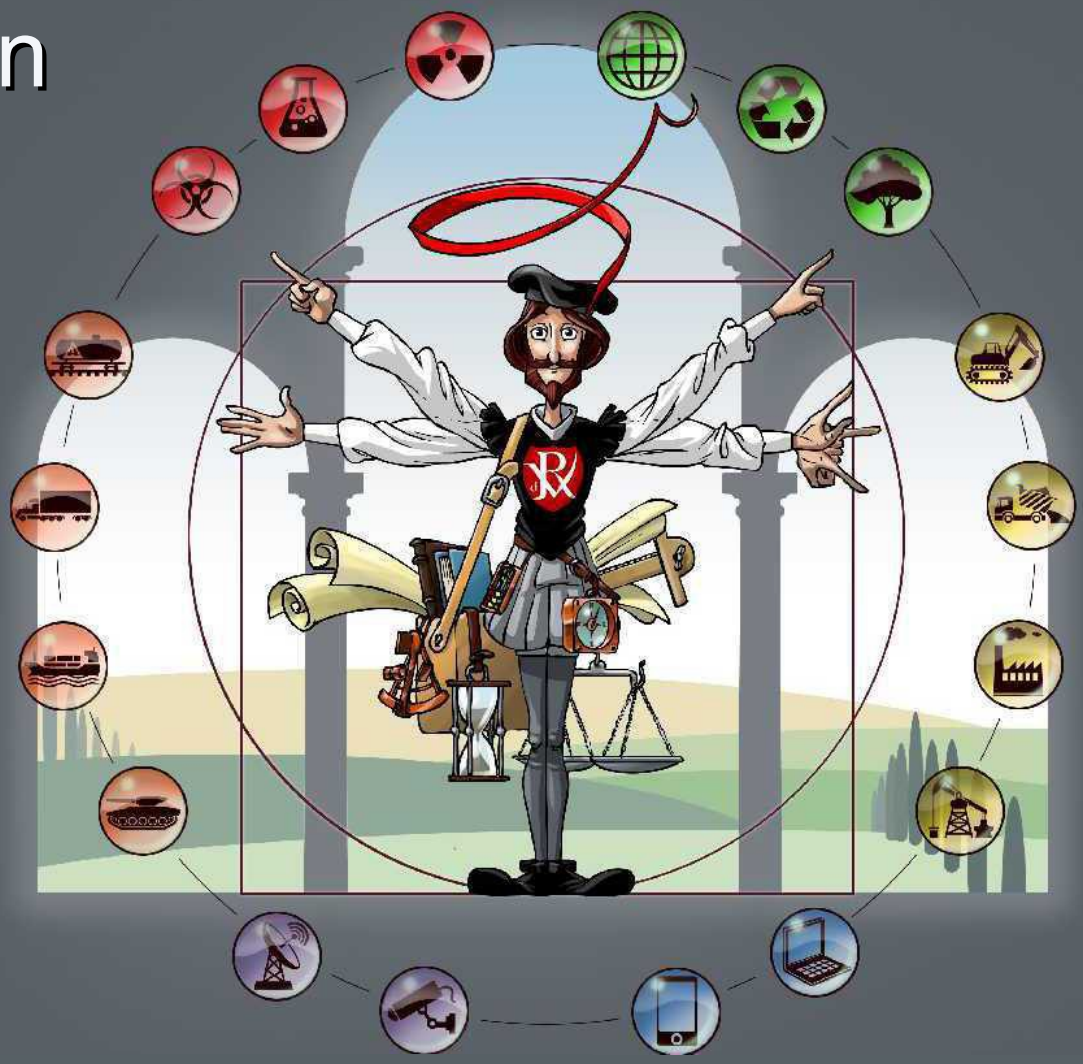
	Known to self	Unknown to self
Known to others	Arena	Blind-spot
Unknown to others	Facade	Unknown

We believe that through information and science we can better the world

Disclosure is information

Risk is information about:
- future behaviour,
- environmental impacts,
- governance, social,
- sustainability

Information is risk
- miscommunication,
- malignant use,
- lost IP



By Dr. Franco Oboni, Ph.D. & C. H. Oboni

RISKOPE

Everyone talks about risk. Why? What risks? What for? Cont'd

Sustainable and well balanced de-risking generates value. ESG values result from 360-understanding of risks.

Risks are generated by hazards hitting any area of a project/ operation. ESG consequences can be ubiquitous.

Hazards may impact any of the ESG, central factors in measuring the sustainability and ethical impact of an investment in a company or business.

Project/ startup/ process valuation – holistic (multi-hazard) risk analyses bring value at any stage of development!

(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

Everyone talks about risk.
Why? What risks? What for?

When attempting to perform a risk assessment (RA) it is important to define:

-the “viewing angle” (corporate, investor, regulators, public, etc.),
-the success/ failure criteria (correponding to viewing angle),
-the resulting multi-dimensional consequences (“ “ “)

If any of those is missing or unclear any RA will be meaningless or at least misleading. Disclosure may even be unethical and ESG misinterpreted.

(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

Different point of view, different consequences on the same information base!

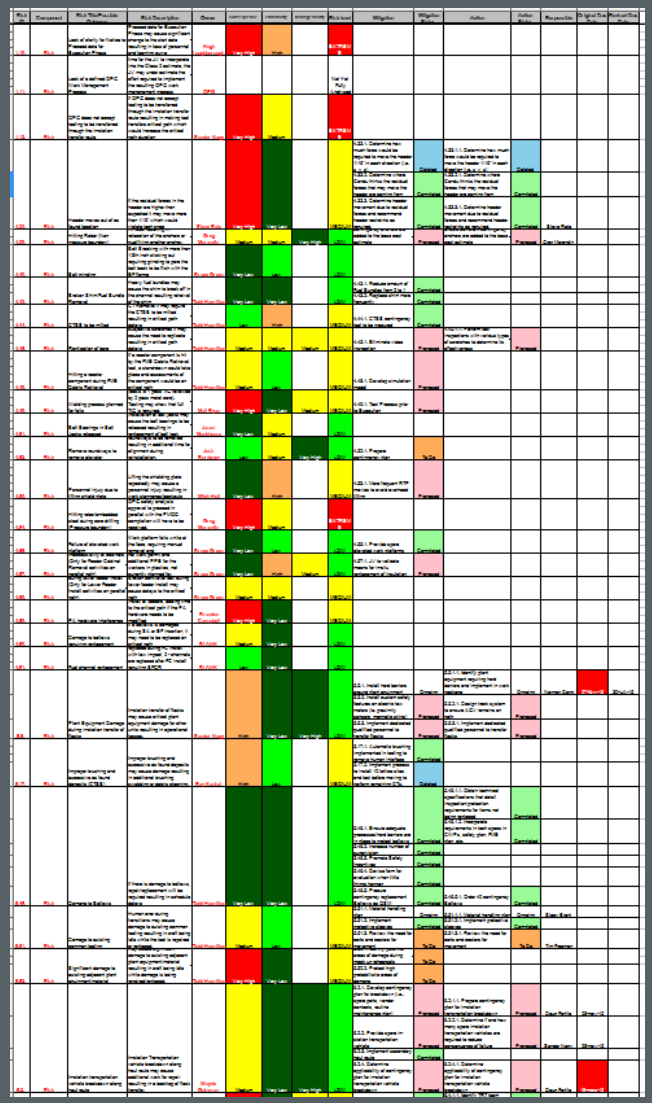
"viewing angle" (corporate, investor, regulators, public):
Success/ failure criteria ?
Multi-dimensional consequences?

Why do we need to be so “precise” in the definitions?

We don't want our RA, hence NI43-101 disclosure to add another layer of fuzziness by using improper definitions.

We often have clients calling us because they have a risk assessment that means nothing, the classic 200 “yellows” case....

In those conditions ESG disclosure is poor, misleading at best.



(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

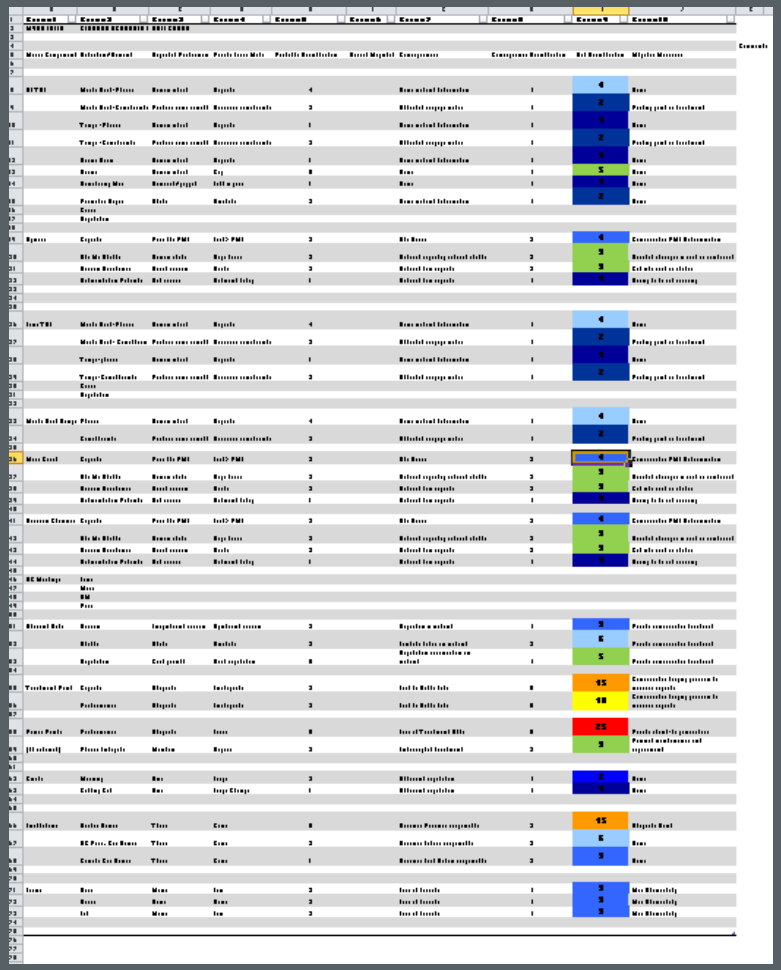
Why do we need to be so “precise” in the definitions? (Cont'd)

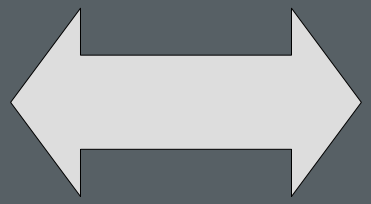
Relevant (to the success/failure criteria) triggering events need to be included to understand what generates ESG value losses... Hazard Identification is paramount!

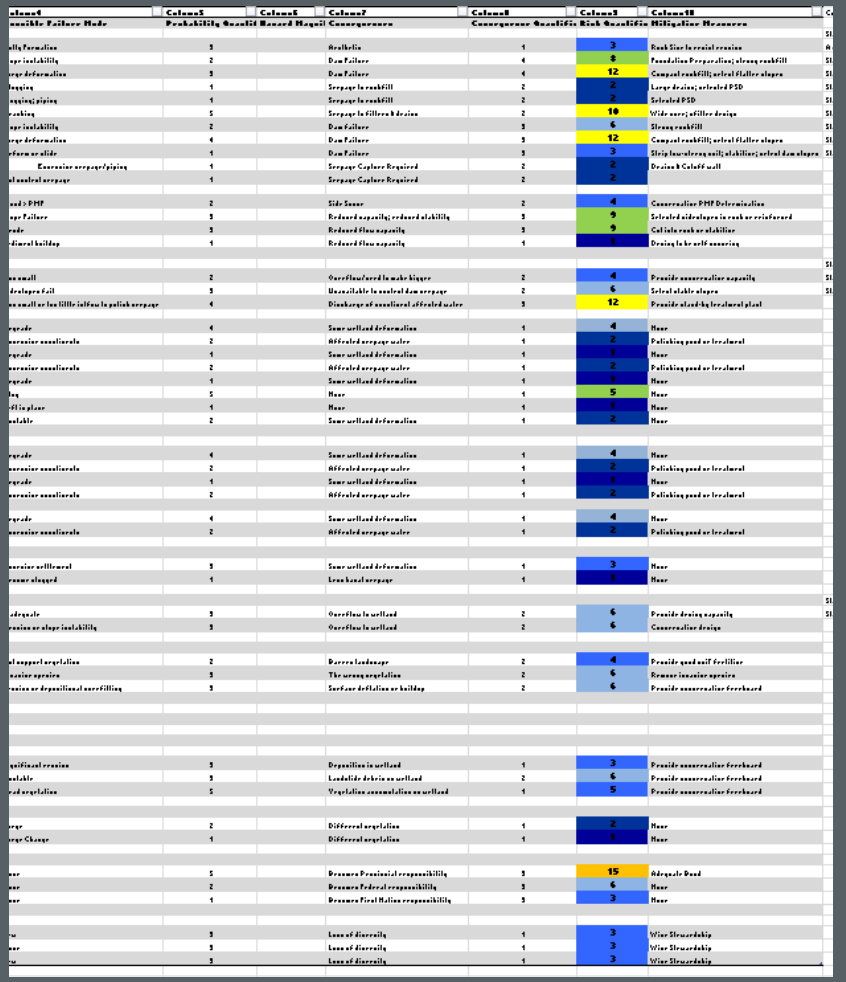
Otherwise the risk register is full of noise, misleading.

This is particularly important when looking at the relationship between the disclosure requirements intended for investors following, for example, NI43-101.

Good luck comparing these risk assessments. Which one has better ESG values, sustainability and ethical values!?







(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

NI43-101 reports should provide risk information about a mine to prospective investors*

*(at any stage of development)

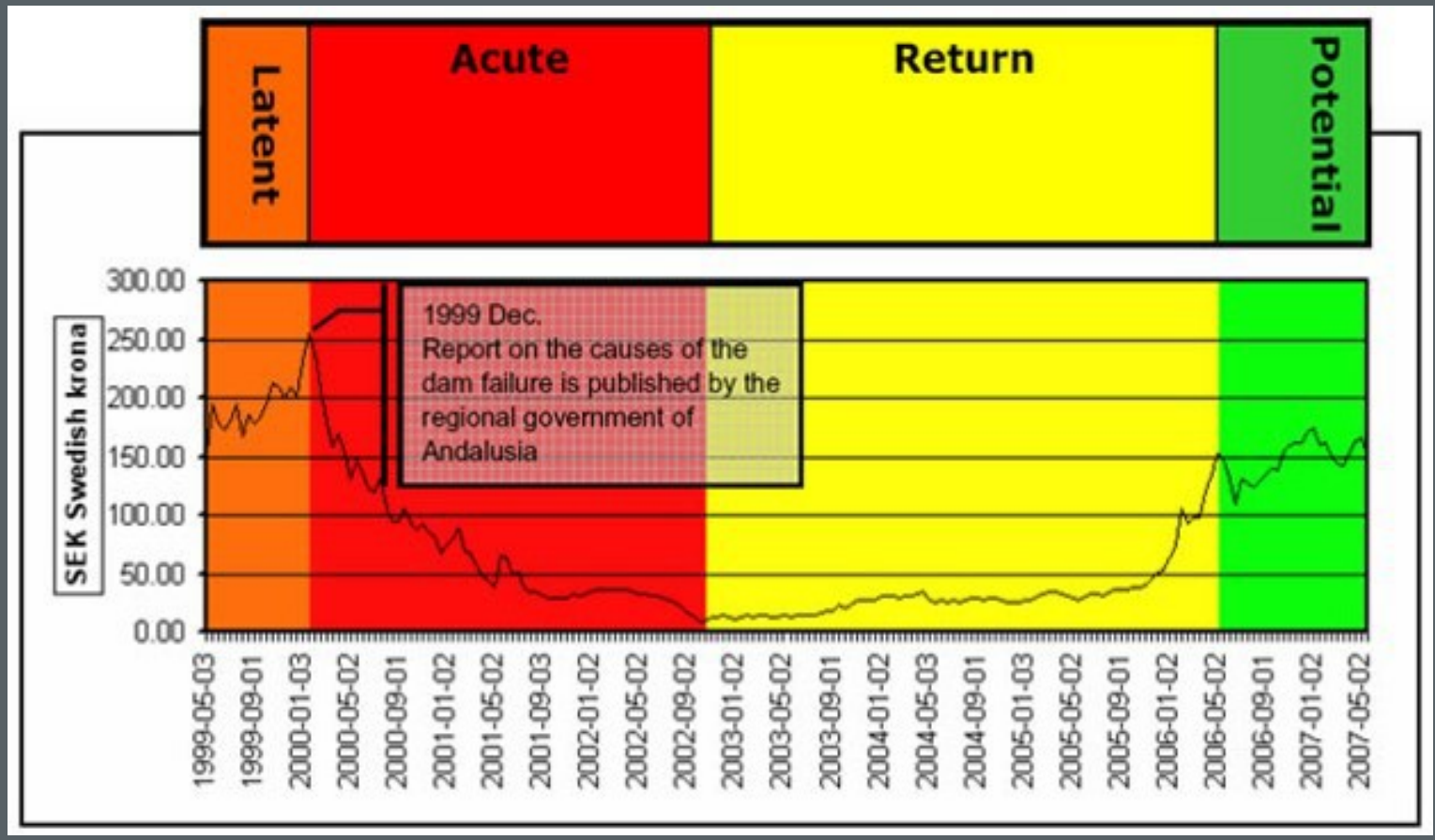
Numerous factors generally not fully/transparently included in reports can turn a great prospect into a financial disaster, with dire consequences to the investors.

ESG disclosure can be completely skewed. The culprit can be the access road! Or:

- Logistics!
- Climate change!
- Energy!
- …. and/or Tailings Dams and all related hazards

(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

NI43-101 reports should provide risk information about a mine to prospective investors (Cont'd)



… having money “frozen” for 5+ years is critical for investors

Never jump to conclusions: risks are sometimes counter-intuitive!

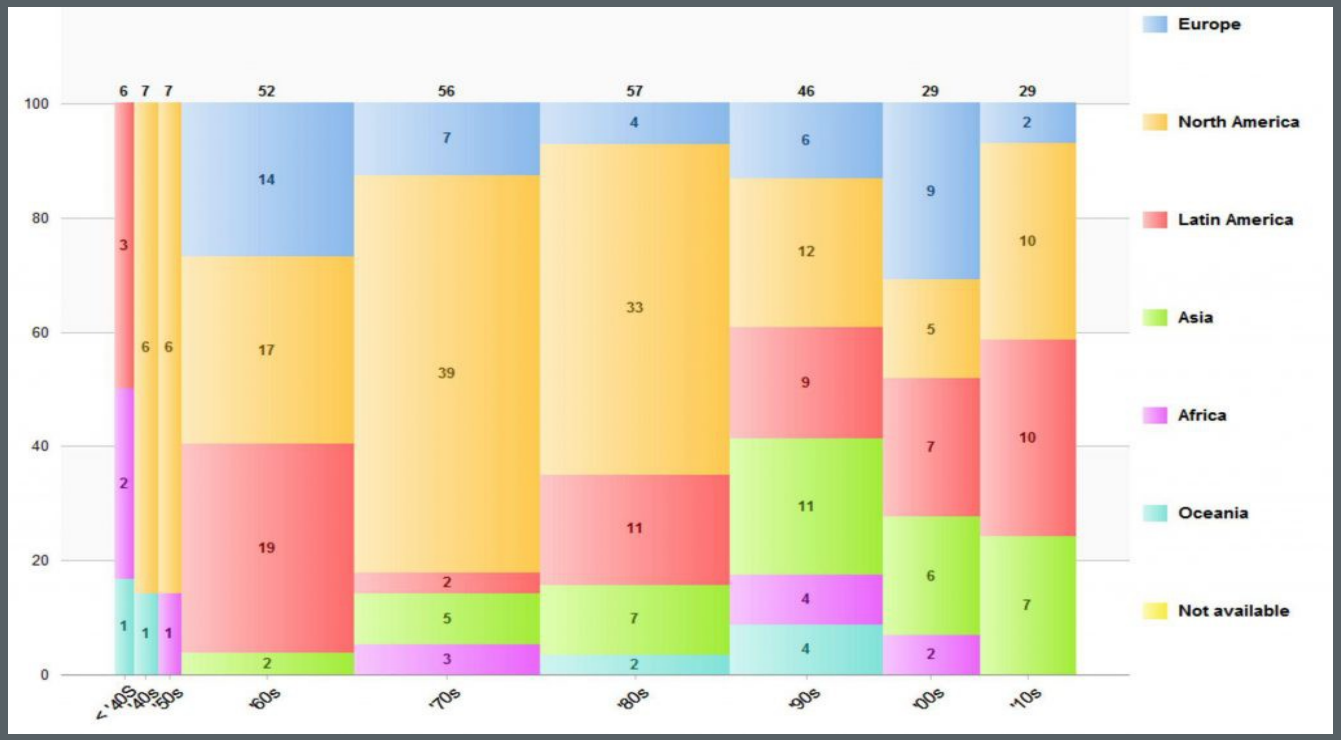
Recent failures of tailings facilities brought back this particular issue with great emphasis.

BUT, from a disclosure point of view never forget:

a) Some other operational risk may indeed significantly affect share values and ability to conduct business.
b) Not all failures are born equal....

Media have strong incentives to add “vivid” cases to disclosure, but forget, possibly more significant, others.

Never jump to conclusions: risks are sometimes counter-intuitive! (Cont'd)



We know (historically, by models) the rate/probability of failure of Tailings Dams!

We know the cost of failures

(by experience... used to be 250M$, escalated to 0.5B$ ….now could be as big as....several B$.
Hence we know the risk....BUT....

Never jump to conclusions: risks are sometimes counter-intuitive! (Cont'd)

The share value of BHP (BHP Billiton Limited (ADR), co-owner of Samarco. It is impossible to determine, by observing the graph when the Samarco disaster occurred.

(actual date was 5th Nov 2015)!

(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

Never jump to conclusions: risks are sometimes counter-intuitive! (Cont'd)

Vale SA

(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

Never jump to conclusions: risks are sometimes counter-intuitive! (Cont'd)

Mount Polley's, Imperial Metals Corp

(actual date was 4th Aug 2014)!

(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

Never jump to conclusions: risks are sometimes counter-intuitive! (Cont'd)

The Expert Panel opinion report on the Mt Polley tailings facility failure recommended that all proposed new tailings facilities should include a bankable feasibility study, but “bankable” is not an assurance either. It can be misleading..

For example, IFC guidelines sure are impressive, but a IFC compatible report can be turned into an impressive series of blanket statements and tell close to nothing.

What are the critical risks that should be disclosed in NI43-101?

As mentioned earlier, unless you define a failure criteria and perform a 360-risk assessment you cannot answer that question!

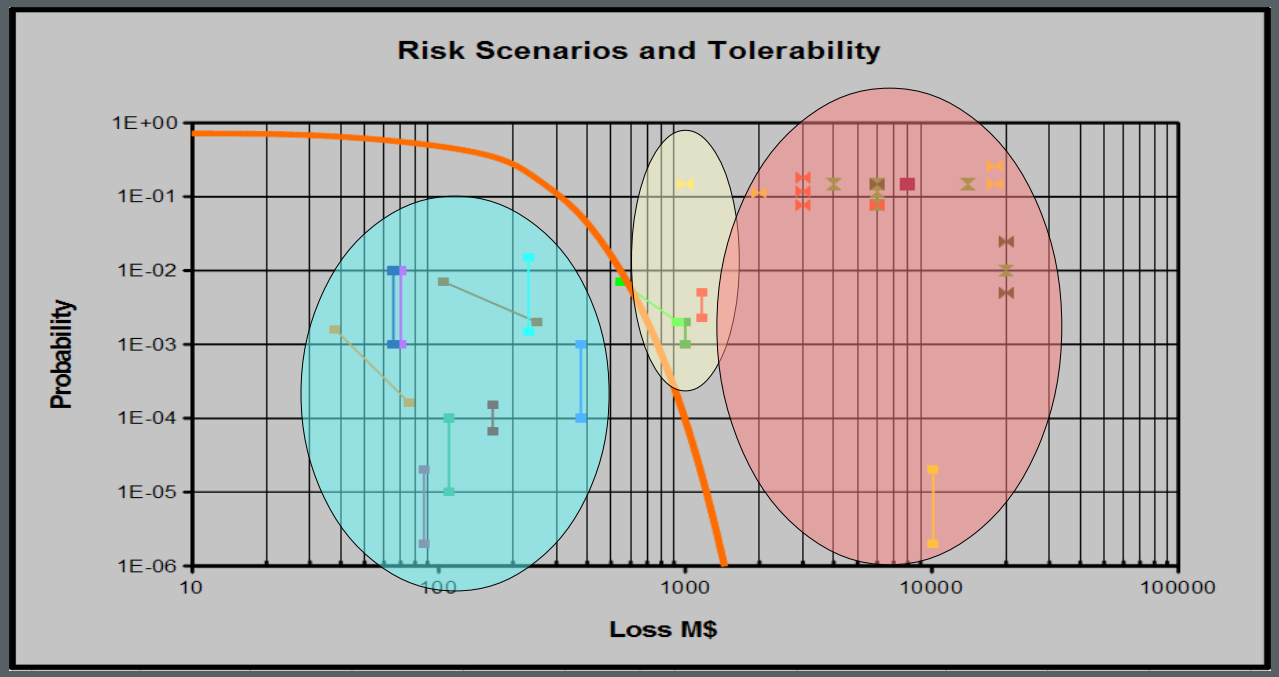
Thus it is reasonable to ask: should an NI43-101 report contain information about critical mine's facilities (risks) such as tailings, access roads, logistics, etc..?
And, if positive, which ones? YES, and ALL!

Should NI43-101 report include holistic convergent scalable and drillable risk assessments? YES!

What are the critical risks that should be disclosed in NI43-101? (Cont'd)

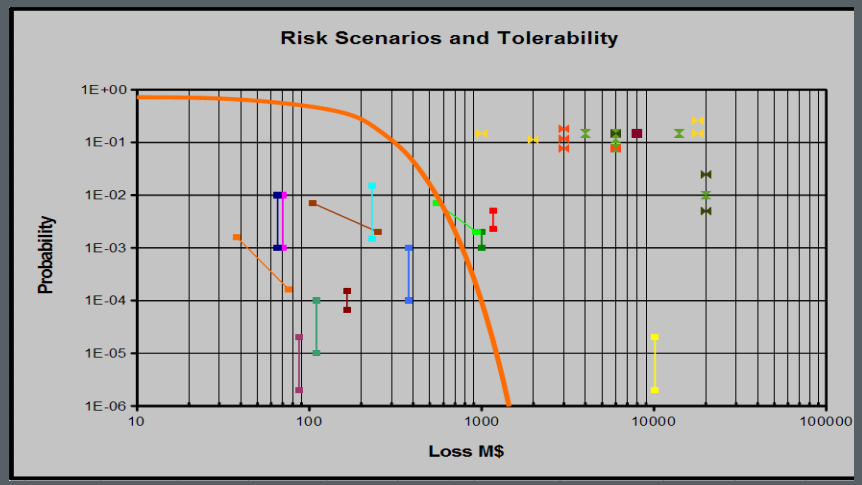
Again, if positive, convergence should cover at least:

tailings facilities and dumps,
ingress/egress (logistic and supplying infrastructures),
energy,
closure,
Etc. and all their Hazards and Inter-Dependencies Generating ESG.

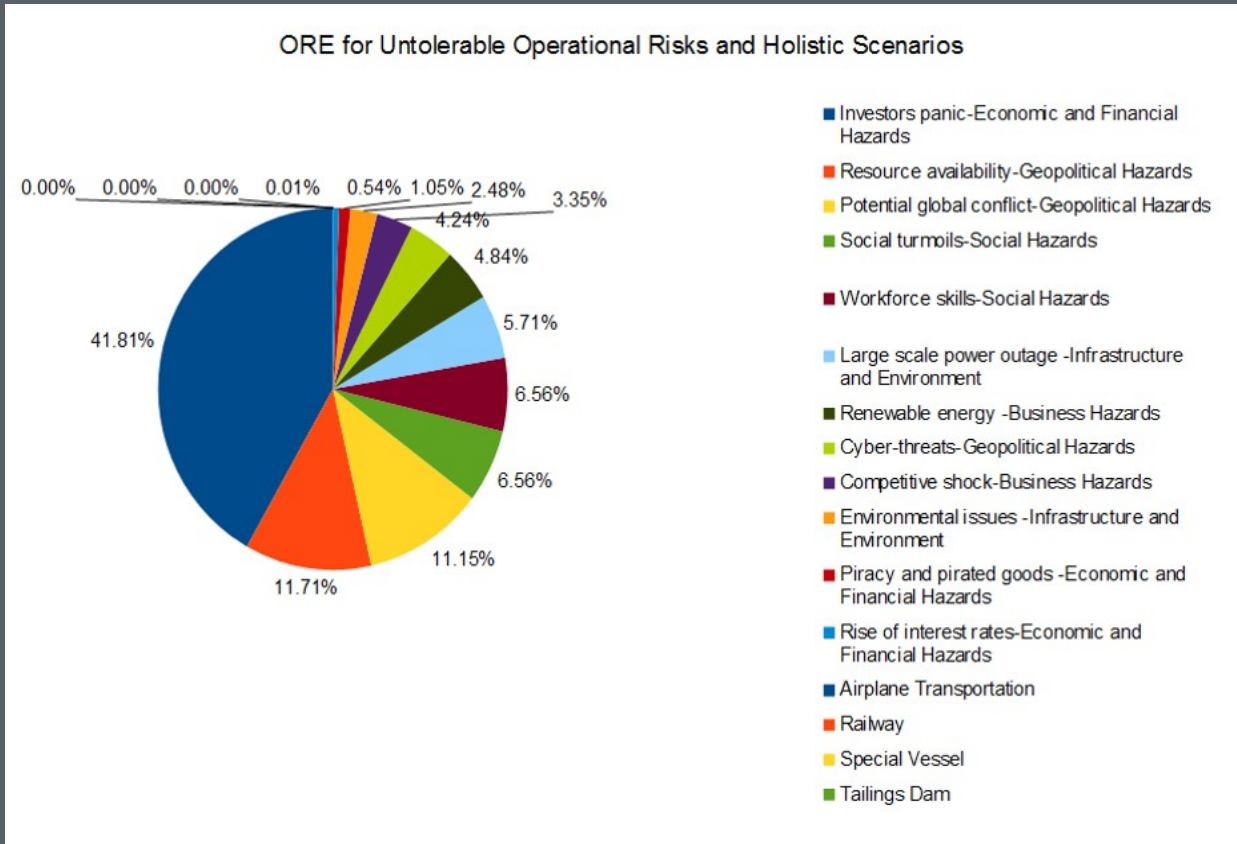


(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

What are the critical risks that should be disclosed in NI43-101? (Cont'd)



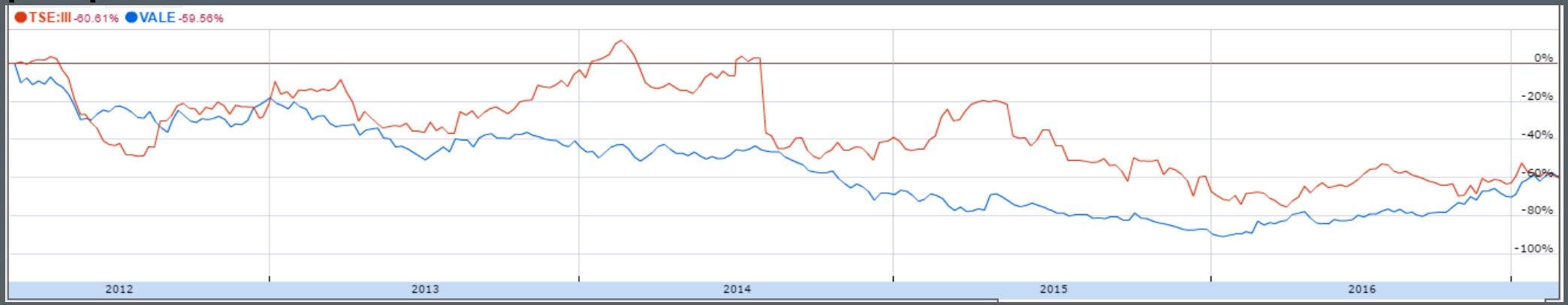
Tolerable, intolerable, operational, tactical, strategic risks can be defined and disclosed.



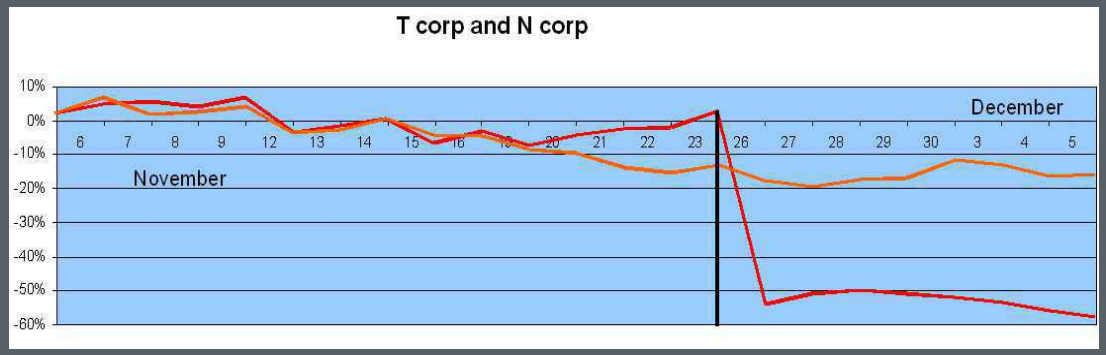
(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

What are the critical risks that should be disclosed in NI43-101? (Cont'd)

There is no answer unless a serious study is undertaken and the result depends on the company. Below Imperial vs Vale. One „falls“ the other does not blink. Imperial Metal has 3-4 properties, Vale has mines in 30 countries...



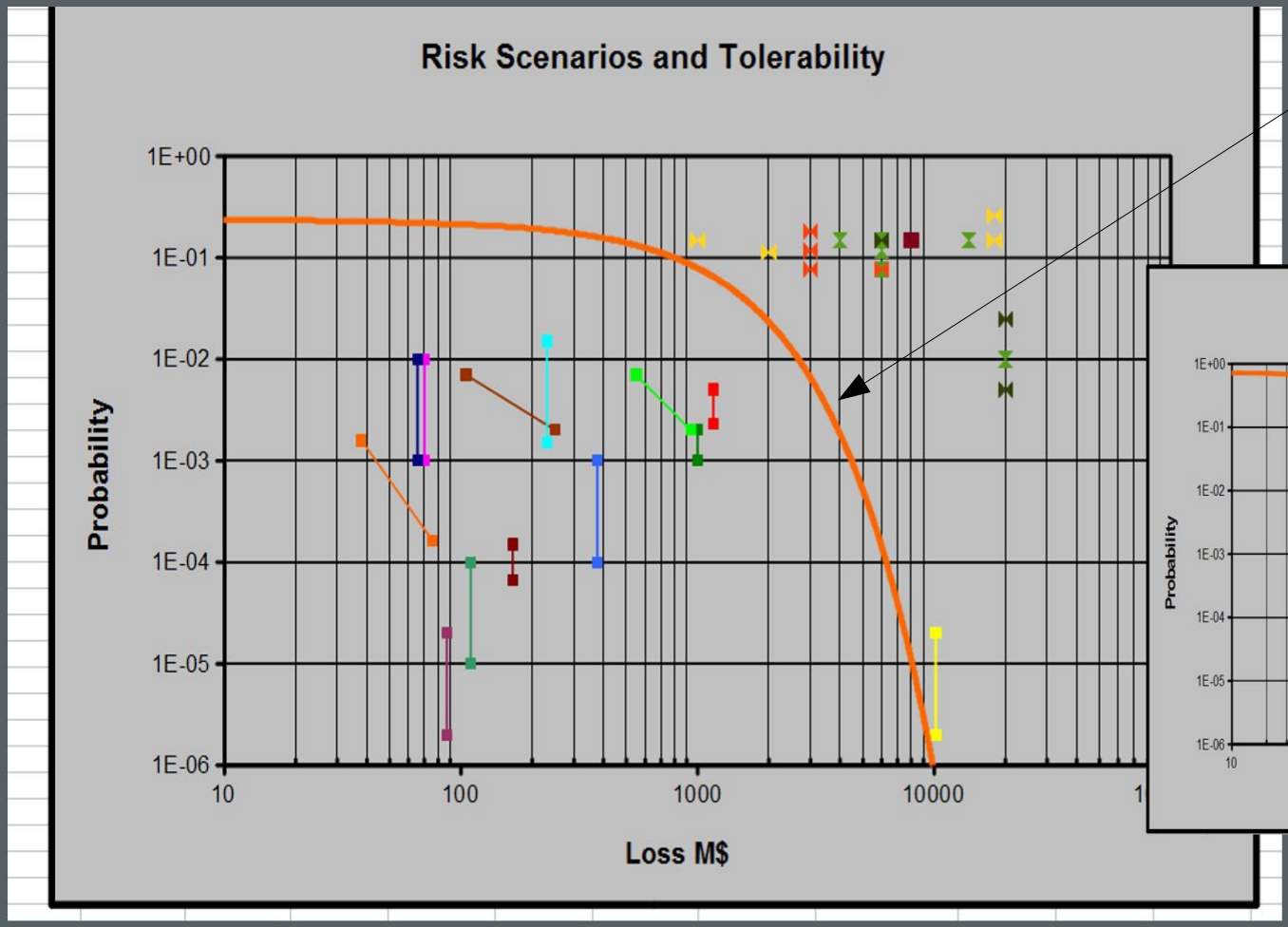
Something similar occurred when Teck and Novagold announced withdrawing from the Galore Mine project....



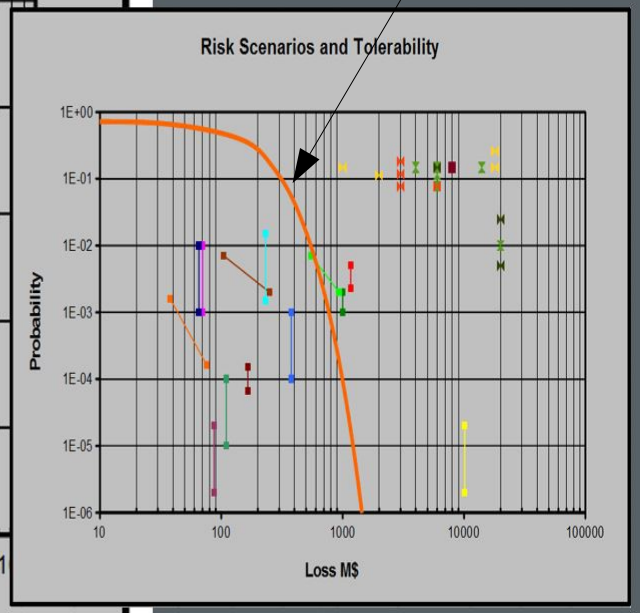
(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

What are the critical risks that should be disclosed in NI43-101? (Cont'd)

Going back to the different view-angle



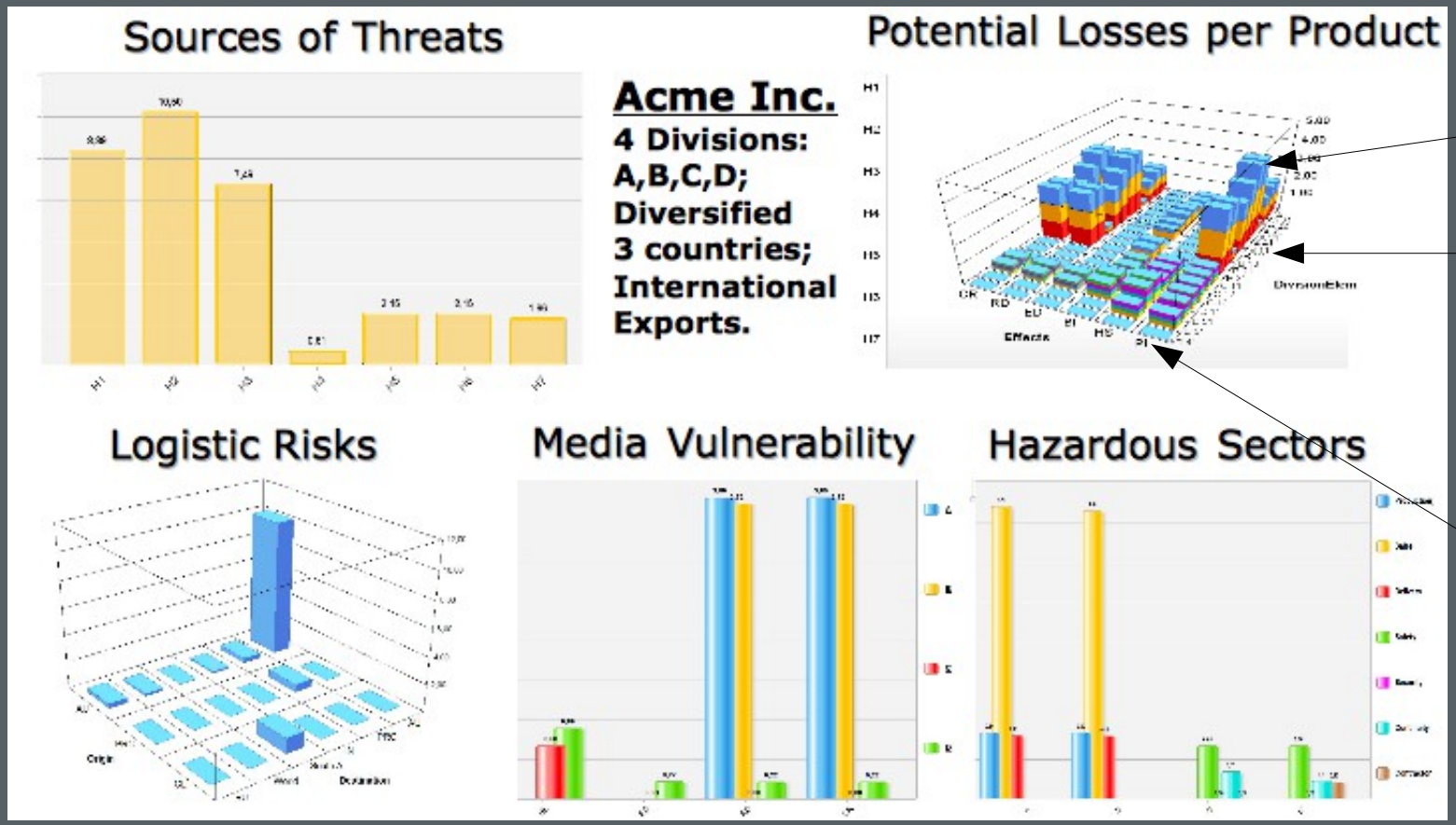
Corporate vs. investor or CEO



(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

Let's look at some examples of transparent Risk Assessment!

Risk assessments should be displayed as dashboards. The various „viewing angles“ lead to different dashboards.



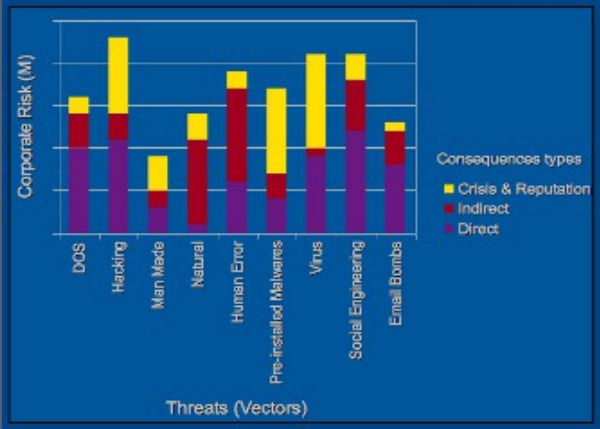
Each column diplays the risk (from various hazards).

Each y-row corresponds to a macro element of the operation (dam, road, etc..).

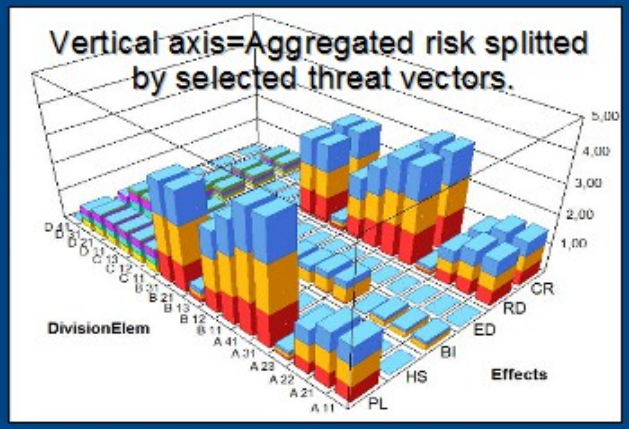
Each x-row displays Environmental, Physical, BI, Crisis potential and reputational damages...ESG impacts...

...which should include cyber attacks (possible up to „real-time“)!

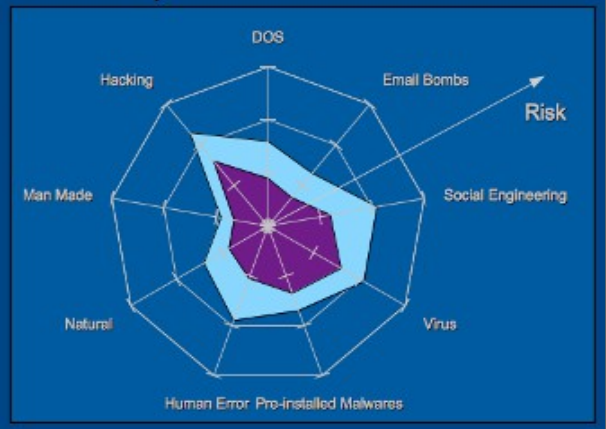
Aggregated Risks by Threat Vector splitted by consequence type.



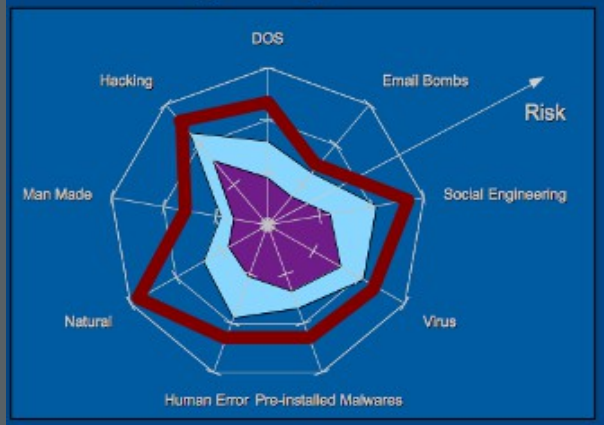
Divisions=considered eco-system elements; Effects=consequence types;



Today's risk by threat vector based on present general and last period vulnerabilities.



Vulnerability Management Simulator



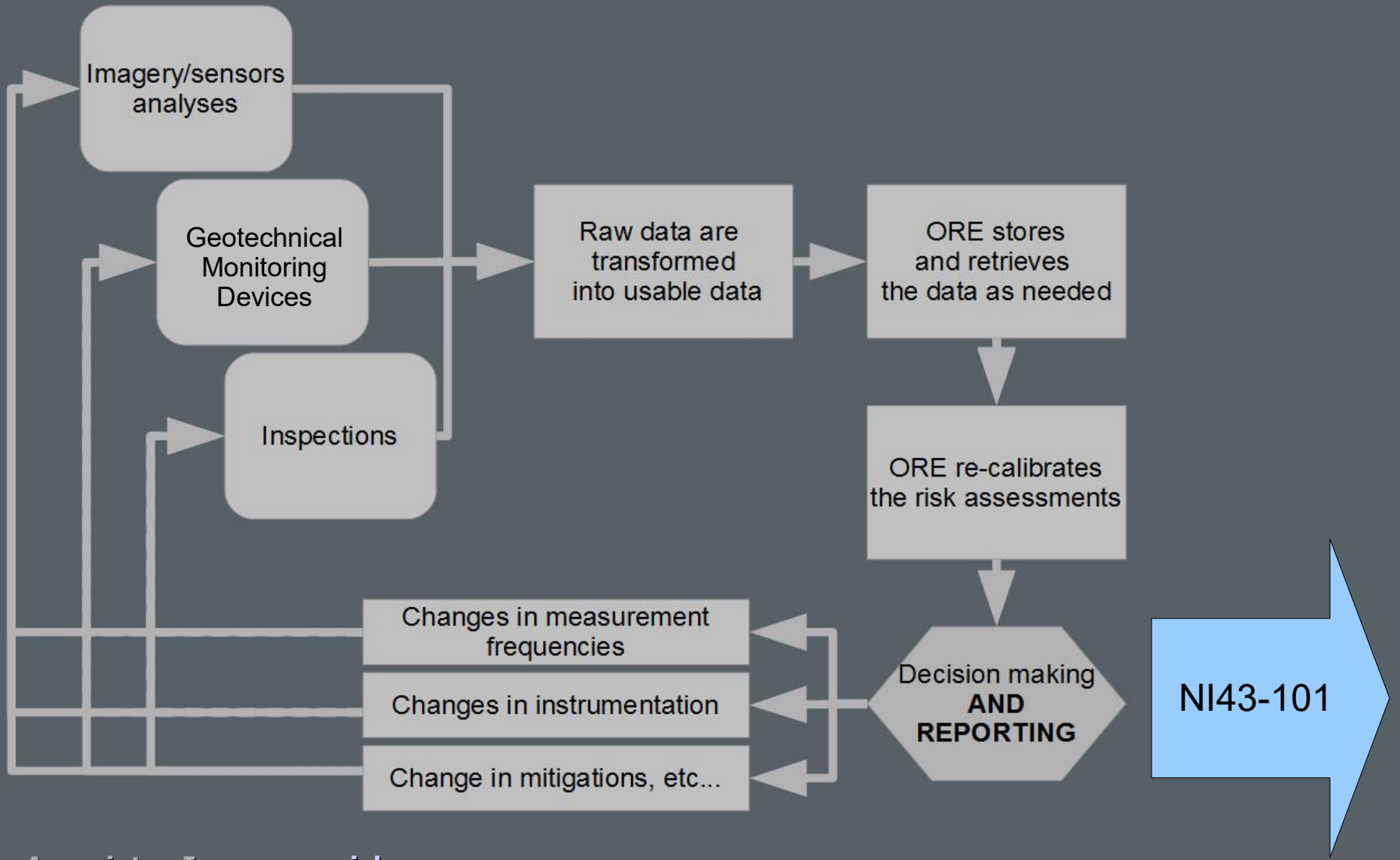
Mitigation Simulator

Countermeasure Efficiency Analysis per Threat Vector

Threat Vector	Efficiency
DoS	3
Social Eng.	1
Malware	4
.....	....

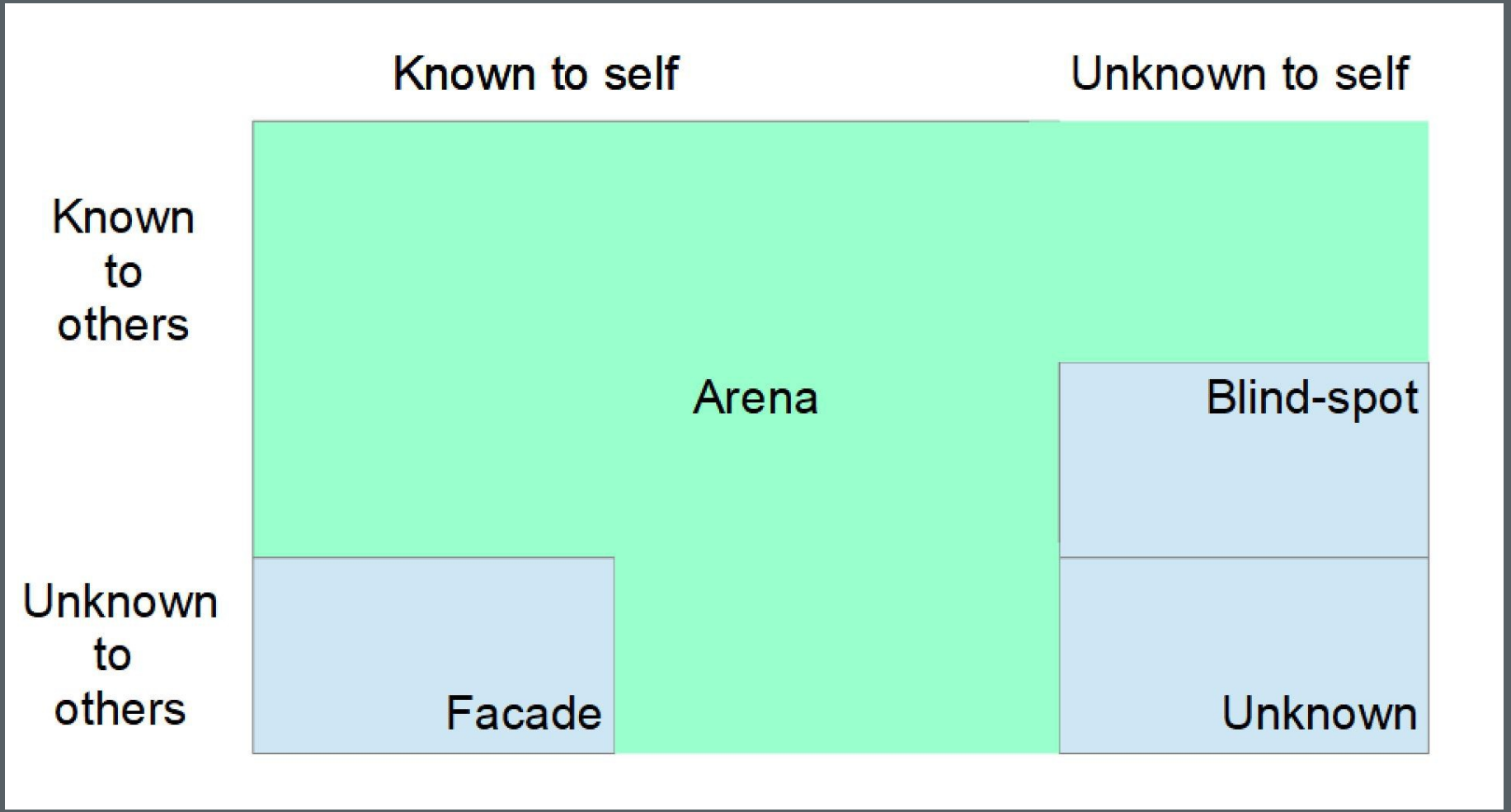
(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

...and this is how transparent risk assessments should integrate in time with NI43-101 reporting!



(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com

Now we can finish...



Conclusions?

If considering investment in a new mine or investment in a mine upgrade project read the NI43-101 report but don't think it is enough.

It is time to get the full picture and understand a few specific points about what risks really matter to you, the investor.

If considering a new project perform a 360-multihazard quantitative risk assessment. It is time to understand what risks you are facing and rationally mitigate them.

(c)Oboni Riskope Associates Inc. www.riskope.com
foboni(a)riskope.com