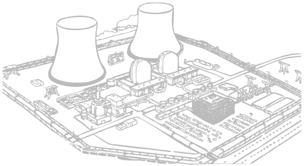

The ISO 31 000 standard on risk management

Eric Marsden

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> *Govern well thy appetite, lest Sin*
> *Surprise thee, and her black attendant Death.*
>
> — John Milton, Paradise Lost

The ISO 31000 standard

- An international standard that provides **principles** and **guidelines** for **effective risk management**
  - published in 2009, revised in 2018
- Generic approach:
  - not specific to any industry or sector
  - can be applied to any type of risk (financial, technological, natural, project)
  - can be applied to any type of organization
- A brief standard (24 pages)
- Provides foundations for discussing risk management and undertaking a critical review of an organization's risk management process

The ISO 31000 standard: scope

- Includes:
  - **definitions** and terms relevant to risk management
  - a set of **principles** that inform effective risk management
  - recommendations for establishing a **risk management framework**
  - recommendations for establishing a **risk management process**
- Does not include:
  - detailed instructions/guidance on how to manage specific risks
  - advice relevant to any specific domain
  - any elements related to certification

Related standards

International Organization for Standardization

- The International Organization for Standardization (ISO) is an international, membership-based NGO
  - based in Geneva, represented in 165 member countries
  - has published over 19 000 international standards
  - Web: `www.iso.org`
- ISO Guide 73:2009 on *Risk management – Vocabulary*
  - provides definitions for commonly used terminology in risk management and risk assessment
- ISO 31004:2013 on *Risk management – Guidance for the implementation of ISO 31000*
  - how do I implement ISO 31000 in my organization?
- ISO 31010:2009 on *Risk management – Risk assessment techniques*
  - guidance on selecting and applying systematic techniques for risk assessment

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Background to development of ISO 31000 standard

- The COSO framework on Enterprise Risk Management
  - mostly internal control/auditing: sees risk management primarily as a **compliance** activity
  - ISO 31000 sees risk management as a **strategic process** for making **risk-adjusted decisions**
- The Australian/New Zealand risk management standard, AS/NZS 4360
- Work started on ISO 31000 in 2005, using AS/NZS 4360 as a first draft
  - consensus-driven process with input from risk management professionals around the world
- Standard published in 2009, well received by critics
  - revised version published in 2018 (simplifications)

Some controversy in the standard's creation

- The IEC *Advisory Committee on Safety* removed its support from the ISO working group, arguing that:
  - safety risks are a special case and should be excluded from a general-purpose risk management process
  - any risk to people is unacceptable
- Position of the ISO working group on risk:
  - most human activities lead to some safety risks
  - a uniform process for managing risks is useful

IEC: International Electrotechnical Commission

Source: Purdy (2010). *ISO 31000:2009—Setting a new standard for risk management*, Risk Analysis 30:6

New notions in the ISO 31000 standard

What's new?

- A new definition of risk
- The notion of *risk appetite*
- The *risk management framework*
- A management philosophy where risk management is an inseparable aspect of managing change and other forms of decision-making

The classical definition of risk

Risk: a combination of the probability and scope of the consequences.

— ISO risk management vocabulary, 2002

More precisely, after Kaplan and Garrick, we ask:

- What can go wrong?
- How likely is it to go wrong?
- If it does go wrong, what are the consequences?

Further reading: Kaplan & Garrick (1984), *On the quantitative definition of risk*, Risk Analysis 1:1

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The classical definition of risk: example

Scenario	Annual probability	Consequences
Fire on tank F	$0.45 \cdot 10^{-4}$	3 killed, 20 M€ loss
Fire on tank F	$1.2 \cdot 10^{-4}$	1 injured, 20 M€ loss
Small leak on pipe D	$3 \cdot 10^{-3}$	1 M€ equivalent of environmental damage
Large leak on pipe D	$1 \cdot 10^{-3}$	20 M€ equivalent of environmental damage
…	…	…

Risk on this installation is the set of all the lines in this table.

Classical definition and financial risks

Risk = set of triples $\langle \text{scenario}_i, p_i, \text{consequence}_i \rangle$

For financial risks (where consequences can be all uncontroversially be expressed in monetary units), can be converted into an **expected loss**.

Risk is then the mathematical expectation of the total loss.

$$\mathbb{E}(loss) = \sum_i p_i \times \text{consequence}_i$$

This definition also works when some consequences are positive

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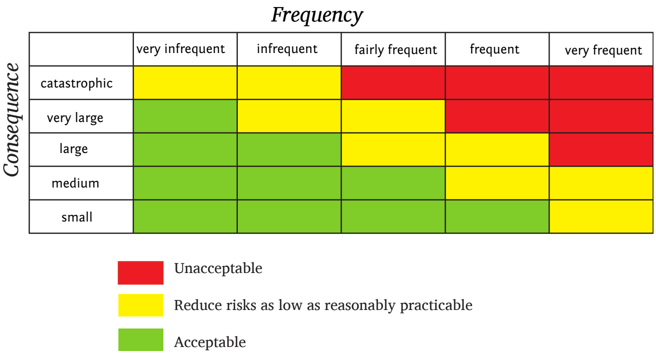
Classical definition and safety risks

Place each scenario in your organization's risk matrix, according to its probability and level of consequences.

Examine whether the sum of possible outcomes is acceptable.



For safety risks, all consequences are negative

A new definition of risk

Risk: the *effect of uncertainty on an organization's ability to meet its objectives*

A new definition of risk

Risk: the *effect* *of* *uncertainty* *on an organization's ability to meet its* *objectives*

An effect is a **deviation** from what was expected, which can be positive or negative.

Safety risks are generally negative (losses, deaths, pollution). Financial risks may be positive. This definition is relevant for safety, financial risks, strategic risks, project risks.

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A new definition of risk

Risk: the *effect* *of* *uncertainty* *on an organization's ability to meet its objectives*

Lack of information or knowledge concerning an event, its consequences or its likelihood

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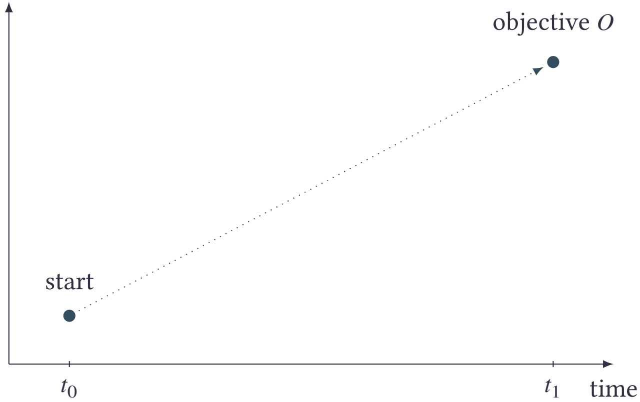
A new definition of risk

Risk: the *effect of uncertainty on an organization's ability to meet its objectives*

Makes the role of objectives explicit: an activity is only undertaken to reach some goal. Objectives can be financial, health and safety, environmental goals. They can apply at a strategic level, or per project, per product, per site.

This definition leads to more transparency in discussions with stakeholders because objectives (possibly competing) are made explicit.

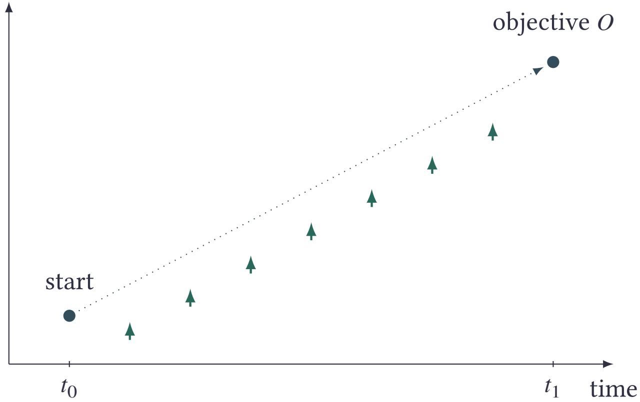
A new definition of risk



The organization establishes its objectives: at time t_1 it wants to be at position O.

Figure adapted from slides by Prof. G. Motet (INSA Toulouse)

A new definition of risk

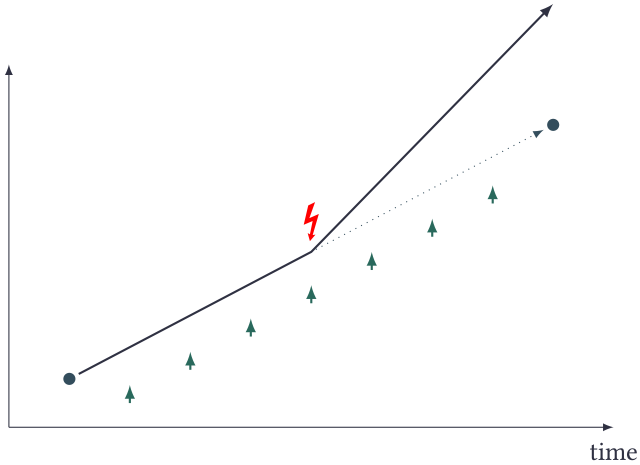


The organization establishes its objectives: at time t_1 it wants to be at position O.

It establishes an **action plan** to move from its current position to position O.

Figure adapted from slides by Prof. G. Motet (INSA Toulouse)

A new definition of risk

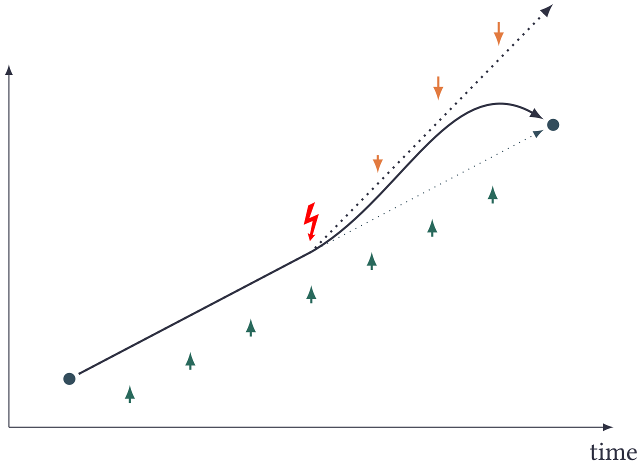


The presence of uncertainty means that **unexpected perturbations** can cause deviations from the plan defined at t_0. If unchecked, these would mean that the organization does not achieve its objective of reaching position O.

This is *risk*, the effect of uncertainty on the possibility of reaching your objectives.

Figure adapted from slides by Prof. G. Motet (INSA Toulouse)

A new definition of risk



The risk management activity consists of trying to anticipate and looking out for deviations from the plan, and implementing **corrective actions** so that the organization's objectives are reached despite the unexpected perturbations.

Figure adapted from slides by Prof. G. Motet (INSA Toulouse)


Risk
appetite

Concept of "risk appetite"

- **Risk appetite**: the amount and type of risk that an organization is prepared to pursue, retain or take in pursuit of its objectives
- Represents a balance between the potential benefits of innovation (and risk) and the threats that change inevitably brings
- Helps to guide people within the organization on the level of risk permitted and encourage consistency of approach across an organization
- Generally expressed (for a company) by a broad statement of approach, which is written by the board

Expressing an organization's risk appetite: example

> *The Organization operates within a low overall risk range. The Organization's lowest risk appetite relates to safety and compliance objectives, including employee health and safety, with a marginally higher risk appetite towards its strategic, reporting, and operations objectives. This means that reducing to reasonably practicable levels the risks originating from various medical systems, products, equipment, and our work environment, and meeting our legal obligations will take priority over other business objectives.*

— Risk appetite statement used by a health-care organization

Source: *Understanding and Communicating Risk Appetite*, COSO, 2012

Expressing an organization's risk appetite: example

	Willingness to accept risk				
	Low		Medium		High
	1	2	3	4	5
Earnings volatility				■	
Capital requirements	■				
Reputation			■		
Credit ratings		■			
Regulatory standing		■			

Appetite may vary across risk categories

Source: *Understanding and articulating risk appetite*, KPMG, 2008

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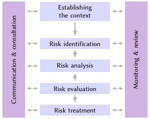
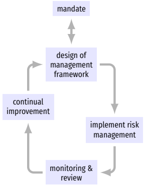
Components of the standard

The standard comprises three main elements:

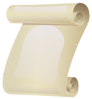
▷ the **risk management process**
  - how are risks identified, analyzed and treated?



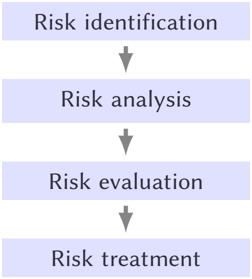
▷ the **risk management framework**
  - the overall structure and operation of risk management across the organization
  - similar to the plan/do/check/act (PDCA) cycle



▷ a set of **principles** which guide risk management activities



The ISO 31000 risk management process



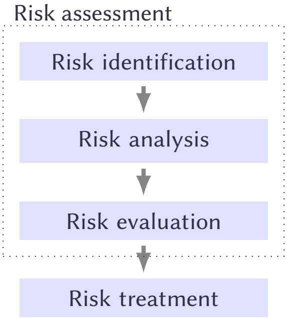
Risk identification: what could prevent us from achieving our objectives?

Risk analysis: understanding the sources & causes of the identified risks; studying probabilities and consequences given the existing controls, to identify the level of residual risk.

Risk evaluation: comparing risk analysis results with risk criteria to determine whether the residual risk is tolerable.

Risk treatment: changing the magnitude and likelihood of consequences, both positive and negative, to achieve a net increase in benefit.

The ISO 31000 risk management process



The ISO 31000 risk management process

Establishing the context

↓

Risk identification

↓

Risk analysis

↓

Risk evaluation

↓

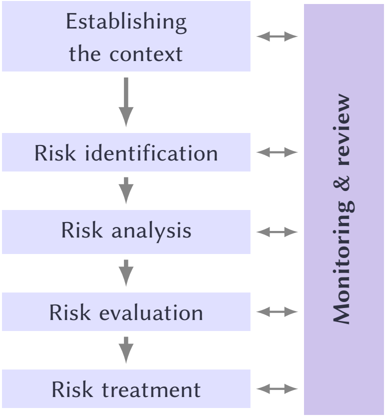
Risk treatment

Define the scope for the risk management process, define organization's objectives, establish the risk evaluation criteria.

Includes:

- **external context**: regulatory environment, market conditions, stakeholder expectations
- **internal context**: organization's governance, culture, standards and rules, capabilities, existing contracts, worker expectations, information systems, etc.

The ISO 31000 risk management process



Monitoring and review

Measure risk management performance against indicators, which are periodically reviewed for appropriateness.

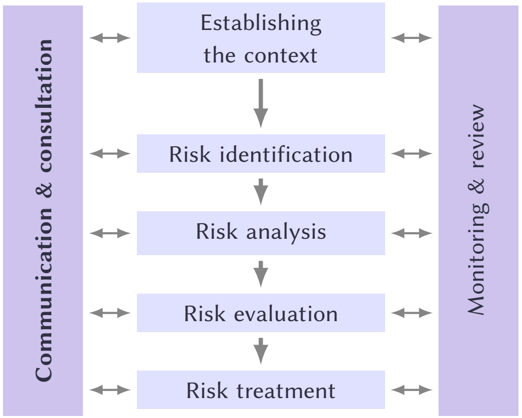
Check for deviations from the risk management plan.

Check whether the risk management framework, policy and plan are still appropriate, given organizations' external and internal context.

Report on risk, progress with the risk management plan and how well the risk management policy is being followed.

Review the effectiveness of the risk management framework.

The ISO 31000 risk management process



Communication and consultation

Early on: helps understand stakeholders' interests and concerns, to check that the risk management process is focusing on the right elements.

Later on: helps explain the rationale for decisions and for particular risk treatment options.

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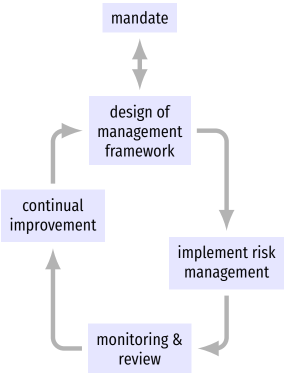
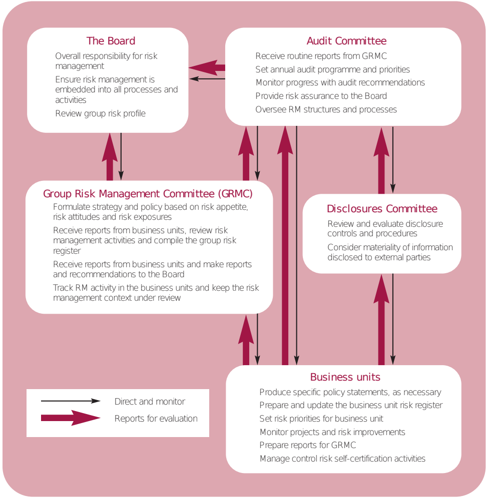
The risk management framework

- Determines how risk management is integrated with the organization's management system
- Should include:
  - **risk architecture**: roles and responsibilities of individuals and committees that support the risk management process (who "owns" different risks?)
  - **strategy**: objectives of the risk management activity in the organization
  - **protocols**: how the strategy will be implemented and risks managed (procedures, indicators, risk reporting and escalation procedures)



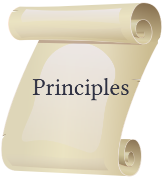
Sample risk architecture & responsibility allocation



1. RM responsibilities for the CEO / Board:
   - Determine strategic approach to risk and set risk appetite
   - Establish the structure for risk management
   - Understand the most significant risks
   - Manage the organisation in a crisis
2. RM responsibilities for the business unit manager:
   - Build risk aware culture within the unit
   - Agree risk management performance targets
   - Ensure implementation of risk improvement recommendations
   - Identify and report changed circumstances / risks
3. RM responsibilities for individual employees:
   - Understand, accept and implement RM processes
   - Report inefficient, unnecessary or unworkable controls
   - Report loss events and near miss incidents
   - Co-operate with management on incident investigations
4. RM responsibilities for the risk manager:
   - Develop the risk management policy and keep it up to date
   - Document the internal risk policies and structures
   - Co-ordinate the risk management (and internal control) activities
   - Compile risk information and prepare reports for the Board
5. RM responsibilities for specialist risk management functions:
   - Assist the company in establishing specialist risk policies
   - Develop specialist contingency and recovery plans
   - Keep up to date with developments in the specialist area
   - Support investigations of incidents and near misses
6. RM responsibilities for internal audit manager:
   - Develop a risk-based internal audit programme
   - Audit the risk processes across the organisation
   - Receive and provide assurance on the management of risk
   - Report on the efficiency and effectiveness of internal controls

Source: *A structured approach to Enterprise Risk Management*, Airmic/Alarm/IRM, 2010

How do the components fit together?



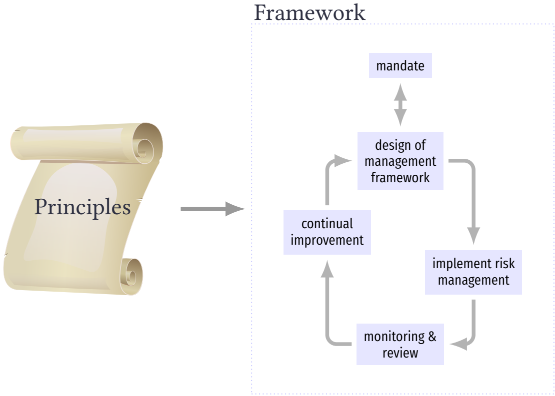
Principles should influence the design & implementation of organization's risk management framework and process

Risk management...

- ▷ creates and protects value
- ▷ is based on the best information
- ▷ is an integral part of organizational processes
- ▷ is tailored
- ▷ is part of decision-making
- ▷ takes human and cultural factors into account
- ▷ explicitly addresses uncertainty
- ▷ is transparent and inclusive
- ▷ is systematic, structured and timely
- ▷ is dynamic, iterative and responsive to change
- ▷ facilitates continual improvement of the organization

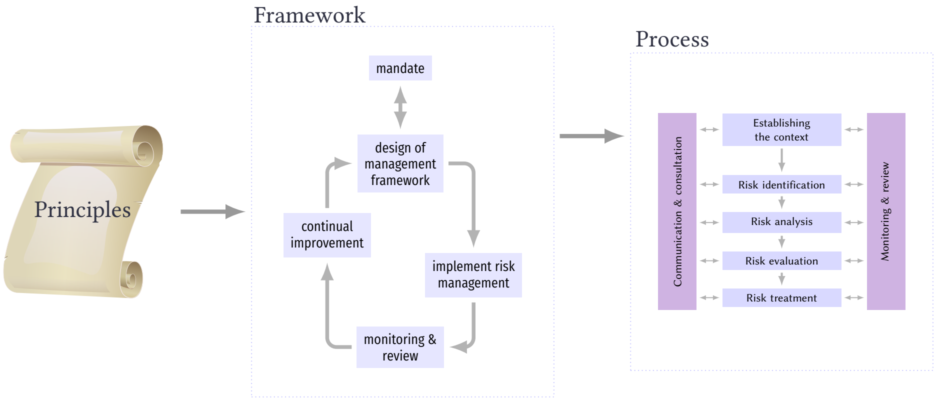
How do the components fit together?

Principles guide the creation of the framework

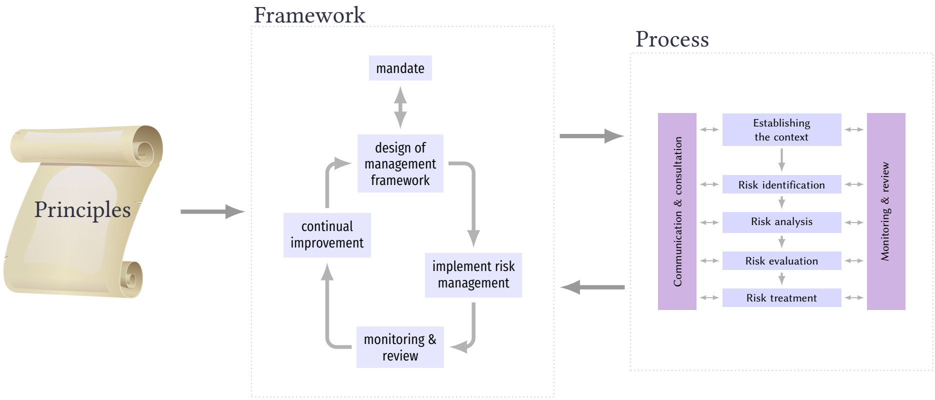


How do the components fit together?

The framework defines the risk management process



How do the components fit together?

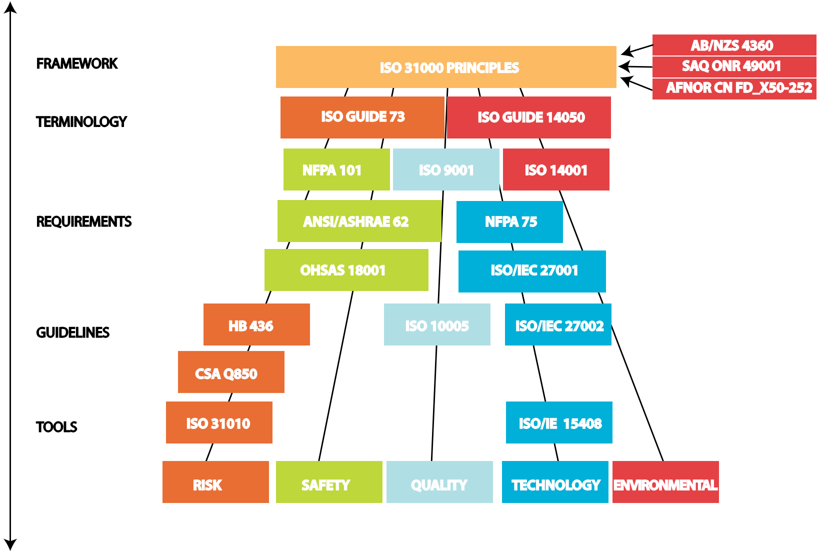


Feedback on the performance of the process is used for monitoring and reviews

A non-certifiable standard

- Many ISO standards are **certifiable**: your organization can obtain (purchase!) a certificate from an accredited conformity assessment body stating that its activities on a specific perimeter conform to the standard
  - example: many large organizations certify their quality management system to the ISO 9001 standard
- The 31000 standard provides **guidance** rather than **requirements**, so is “not intended for the purposes of certification”

Relationship with other standards



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Reading the standard

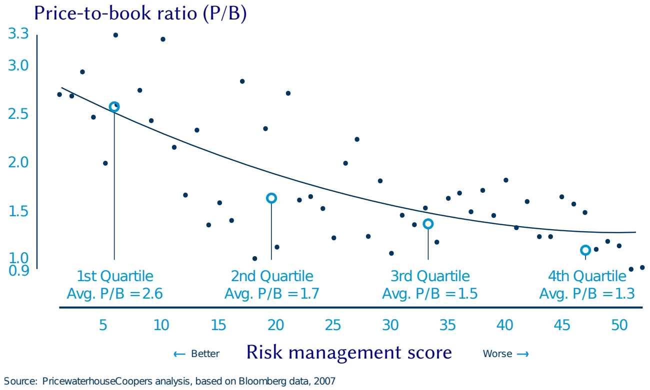
You can purchase the ISO standard in PDF format from the ISO Store for a “mere” 80€.

Or you can consult the publication of the Bureau of Indian Standards

- identical to ISO 31 000:2009 *Risk management — Principles and guidelines*
- made available to interested readers on the web “to promote the timely dissemination of this information in an accurate manner to the public”

→https://web.archive.org/web/20140822235145/https://law.resource.org/pub/in/bis/S07/is.iso.31000.2009.pdf

Importance of effective risk management



Importance of effective risk management for safety risks is evident.

For financial risks, evidence shows that the financial markets value good risk management, and better ratings of risk management performance lead to lower capital costs for firms.

Source: PriceWaterhouseCoopers report *Seizing opportunity: linking risk and performance*, 2009

Image credits

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- ▷ Venus flytrap (slide 15): Aurore D via `flic.kr/p/5qdqE7`, CC BY-NC-ND licence

Further reading

- *A structured approach to Enterprise Risk Management (ERM) and the requirements of ISO 31000*, Airmic/Alarm/IRM, 2010, from `theirm.org/media/886062/ISO3100_doc.pdf`

- *La norme ISO 31000 en 10 questions*, G. Motet, available (in French) from `foncsi.org/fr/publications/cahiers-securite-industrielle/10-questions-norme-ISO31000/`

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