

# Comparing and Contrasting Approaches to Risk Governance

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## 1. Introduction

**Risks** are a major concern for our societies. The unpredictability, uncertainty, unknown location and scope, among others factors, make it difficult for governments and stakeholders to cope with systemic or new risks.

Risk analysis first aims to identify the main **causes of risk** whether due to natural or human-induced hazards, and the associated exposure and vulnerability of affected systems. This is key to assessing and understanding risk, before appropriate measures and tools can be elaborated, for example to reduce or eliminate possible impacts.

The technical and scientific components of the analysis must be undertaken within a comprehensive risk governance process, which implies that adequate institutions, policies or frameworks, coordination and cooperation are in place and operational. This is essential to take optimal risk-informed decisions, reduce negative consequences and enhance public trust.

Many policies and frameworks underline the importance of risk governance, set principles, establish priorities, recommend processes or propose other forms of recommendations. The International Risk Governance Council (**IRGC**), now at the École Polytechnique Fédérale de Lausanne - EPFL, Switzerland and other partners have been working together since 2003 to develop the **“IRGC Risk Governance Framework”**. Their work continues and elaborates on important milestones in risk governance, such as for example the "Red Book" published in 1983 by the US National Research Center.

Organisations of the United Nations (UN), such as the UN Office for Disaster Risk Reduction (**UNISDR**) and its predecessors have elaborated disaster risk reduction frameworks related to natural hazards through consultative or intergovernmental processes since 1994. The most recent, the **“Sendai Framework for Disaster Risk Reduction 2015-2030”**, was adopted by the Member States at the UN Third World Conference on Disaster Reduction held in Sendai, Japan in March 2015, and endorsed by the UN General Assembly in June 2015. The Sendai Framework scope applies to the risk of all kind of disaster caused by natural to human-induced hazards.

In 2012, the UN Economic Commission for Europe (**UNECE**) published **“Risk Management in Regulatory Framework: Towards a better management of risks”**, based on the work carried out under the auspices of the UNECE Working Party on Regulatory Cooperation and Standardisation Policies. Similarly, the International Organisation for Standards (**ISO**) has *defined “Risk management – Principles and guidelines”* in 2009 (ISO 31000, TC 262); ISO has recently shared a draft revised version **“Risk Management – Framework and Process - Guidelines”** (ISO/CD 31000, TC 262, dated 2016-04-7) which is used in this study.

The Organisation for Economic Co-operation and Development (**OECD**) and its Council at Ministerial Level agreed on concrete recommendation to develop effective risk governance in 2014. Its document entitled **“OECD Recommendation on the Governance of Critical Risks”** proposes a fundamental shift in risk governance towards a whole of society effort.

Considering new, emerging and traditional risks, national governments are re-defining or adapting their strategies, policies, institutions and or mechanisms. Many focus on the need to enhance national security. Prominent examples from **the Netherlands** and the **United Kingdom** are considered in this study.

This study takes into consideration the cited frameworks and examples in consultation with their authors. The **purpose** is to compare and contrast, as well as to identify similarities and useful complementarity to envisage further collaboration for improvement.

**Table 1** summarises the main features of the studied frameworks as a basis for comparative analysis. The table provides key information on the type of instrument, the leading institutional author, their scope or aim, their key priorities, elements and audience or field of application. Relevant information of the frameworks and results of the comparative analysis are presented in item 2.

**The study concludes with recommendations** that were presented at the workshop: “Applying IRGC concepts and instruments for risk governance” in Potsdam on 18-19 October 2016 under the aegis of the IRGC and the Institute for Advanced Sustainability Studies (IASS).

## 2. Comparative analysis

### 2.1 Similarities

- All studied frameworks are concerned with **increasing risks and vulnerabilities, their causes and consequences**. Substantive efforts have been deployed to analyse risks, create and propose frameworks, policies or strategies geared towards identifying risk and improve their governance.
- All studied frameworks consider risk in a **holistic, all hazards or integrative approach, and present linkages to development, governance, regulation or risk governance**.

For instance, IRGC recommends adopting an integrative approach to risk governance. The Sendai Framework for Disaster Risk Reduction “aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors”, which was highlighted by UN Member States during the inter-governmental consultations in 2014 and 2015.

OECD (2014) recommendations go even further, calling its Members to “establish and promote a comprehensive, all-hazards and trans-boundary approach to country risk governance”.

At the national level, the all-hazard approach clearly predominates, presumably to combat the traditional “silo” approach to risk management, which reaches its limits when risk becomes systemic. For instance, the National Security Strategy of the Netherlands indicates: “Central to this strategy (National Security Strategy) is an integrated, **whole-of-government**, and all-hazard approach to Dutch national security” (2007); and the UK: National Risk Register of Civil Emergencies (2015) considers risk related to natural hazards, major accidents, terrorist and other malicious attacks.

- From the examples above, all-hazard approaches are also **linked to development, country risk management or whole-of-government strategy**, which is important. Global and regional level frameworks and national level strategies treat risk and multi-hazard approaches as part of their national governance.
- Even though terminology could differ, the studied frameworks consider the two main **separate phases of risk** as being:
  - (a) Risk assessment: in which ISO 31000 includes risk identification, risk analysis and risk evaluation, and in which IRGC includes risk pre-assessment and risk appraisal comprising itself risk scientific assessment and risk concern assessment; and
  - (b) Risk management: as in IRGC, UNECE and others; or risk treatment, as in ISO 31000.

## 2.2 Framework analysis, risk and governance

- Regardless of terminology, the different frameworks present risk identification or risk assessment as a prerequisite to decision-making or political commitment (governance). The framework analysis below illustrates this.

### Framework for disaster risk reduction (UNISDR)

- In 2004, **UNISDR's** main publication 'Living with Risk' proposed a comprehensive framework for disaster risk reduction (DRR) in the context of sustainable development. **Its central element is risk identification and impact assessment (Figure 1)**. Awareness and knowledge development are considered basic elements to be understood, reach **political commitment** and apply risk reduction measures. Early warning and recovery are part of the cycle. Preparedness provides the linkage to emergency management for a coordinated response to a disaster.

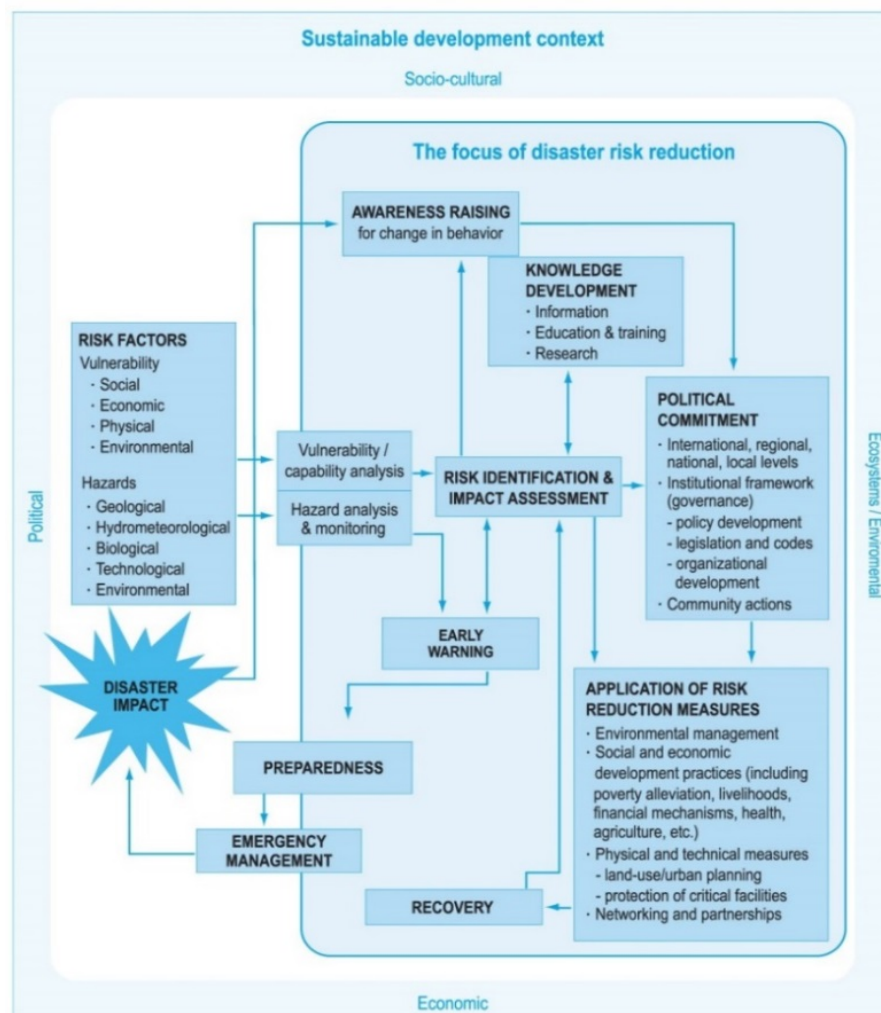


Figure 1: Framework for disaster risk reduction, Living with Risk (UNISDR 2004)

- The DRR framework formulated in 2004 was the basis for the conceptualisation of the Hyogo Framework for Action 2005-2015 agreed at the second UN World Conference on Disaster Risk Reduction held in Kobe in January 2005. The Hyogo Framework sets five priorities for action, the first two being: **governance and risk identification (Figure 2)**.
- Considering lessons learned in applying the Hyogo Framework for Action, new and emerging risks, UN Member States adopted in March 2015, the Sendai Framework for Disaster Risk Reduction 2015-2030.

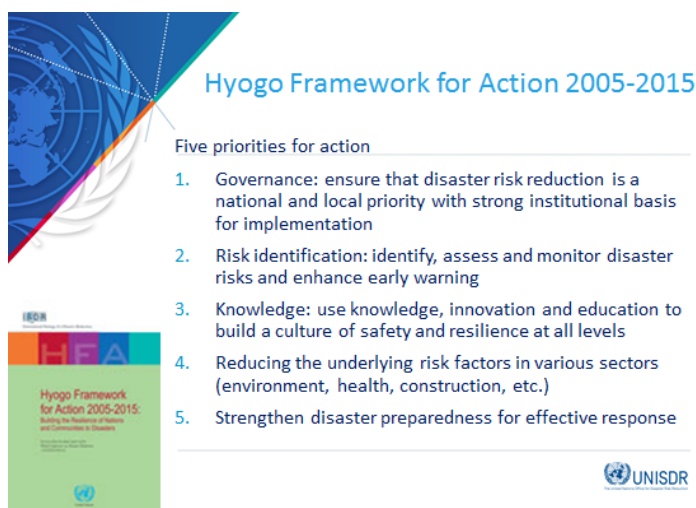


Figure 2: Priorities for Action, Hyogo Framework for Action 2005-2015 (UN, 2005)

- The Sendai Framework **“aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors.”** Its goal is to **“Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience.”**

The Sendai Framework sets four priorities for action to be implemented at national & local levels and at global & regional levels, namely (Figure 3):

1. Understanding disaster risk.
2. Strengthening disaster risk governance to manage disaster risk.
3. Investing in disaster risk reduction for resilience.
4. Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction.



Figure 3: Priorities for Action, Sendai Framework for Disaster Risk Reduction 2015-2030 (UN, 2015)

As the Hyogo Framework, the Sendai Framework also established **risk “knowledge” and risk governance as main priorities.**

**IRGC Risk Governance Framework**

- In 2005, the IRGC published a white paper titled **“Risk governance: Towards integrative approach”** recommending a comprehensive framework. The framework highlights two main interrelated spheres: i) the assessment sphere for knowledge generation, including pre-assessment, risk appraisal and risk characterisation; and ii) the management sphere for decisions and implementation of actions, including risk evaluation, risk management and risk management strategy. Communication is at the heart of the process. It is a central task in risk governance (**Figure 4**).

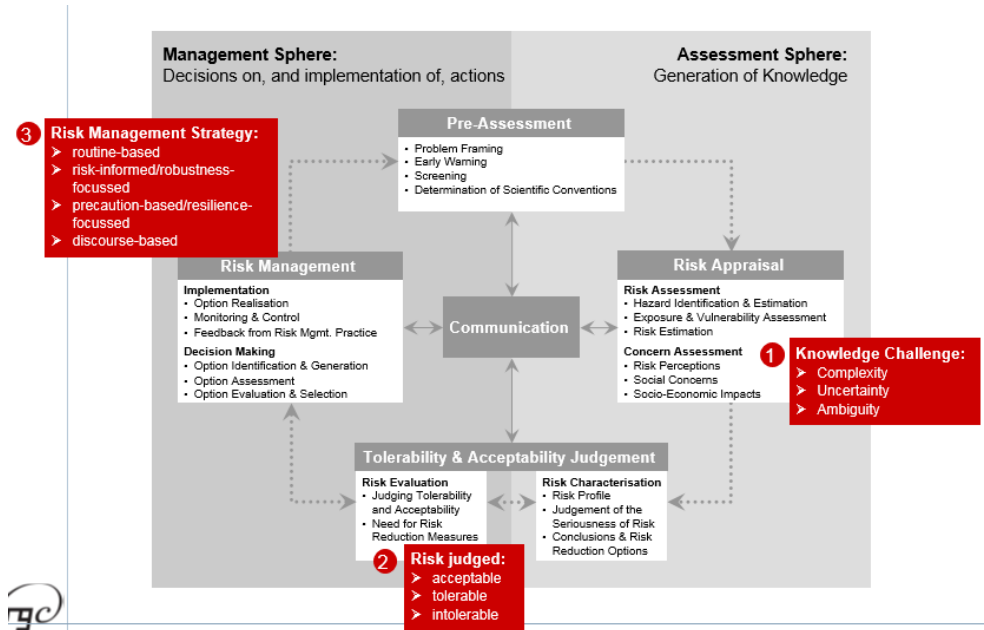


Figure 4: The original representation of the IRGC risk governance framework (IRGC, 2005)

- In 2008, a simplified visual representation of IRGC risk governance was produced (**Figure 5**) highlighting the interrelation between **understanding risk and deciding about risk** (in the same way as recognised by the Sendai Framework in 2015).

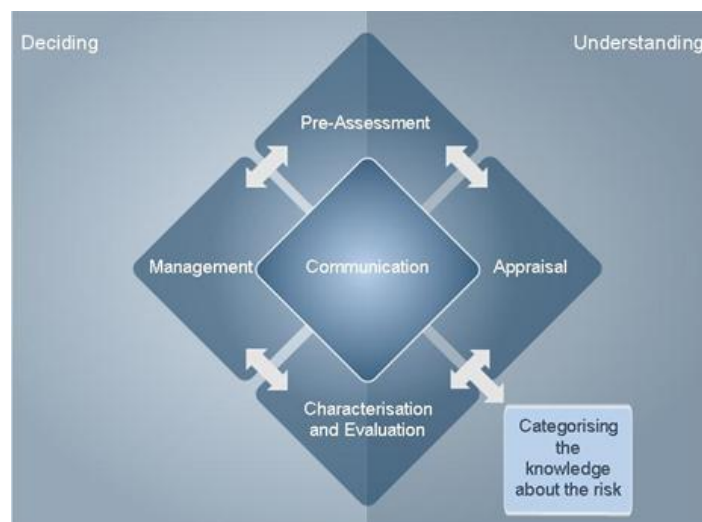


Figure 5: A simplified representation of the IRGC risk governance framework (IRGC, 2012)

*The importance of context (IRGC 2012)*

IRGC emphasises the importance of considering the context in which risk governance takes place, for assessing, managing and communicating risk: *“Alongside the conventional elements of risk assessment, risk management, and risk communication, the IRGC framework stresses the broader social, institutional, political and economic contexts that must be taken into account in risk-related decision-making.”*

Among other elements, it is important to recognise the *“organisational capacity, which refers to the capability of key actors in the risk governance process to fulfil their roles and the political cultures or the governmental and regulatory ‘styles.’ Also important is the risk culture, which impacts on the level of risk tolerance (or risk aversion), and the degree of trust in the institutions responsible for risk governance.”*

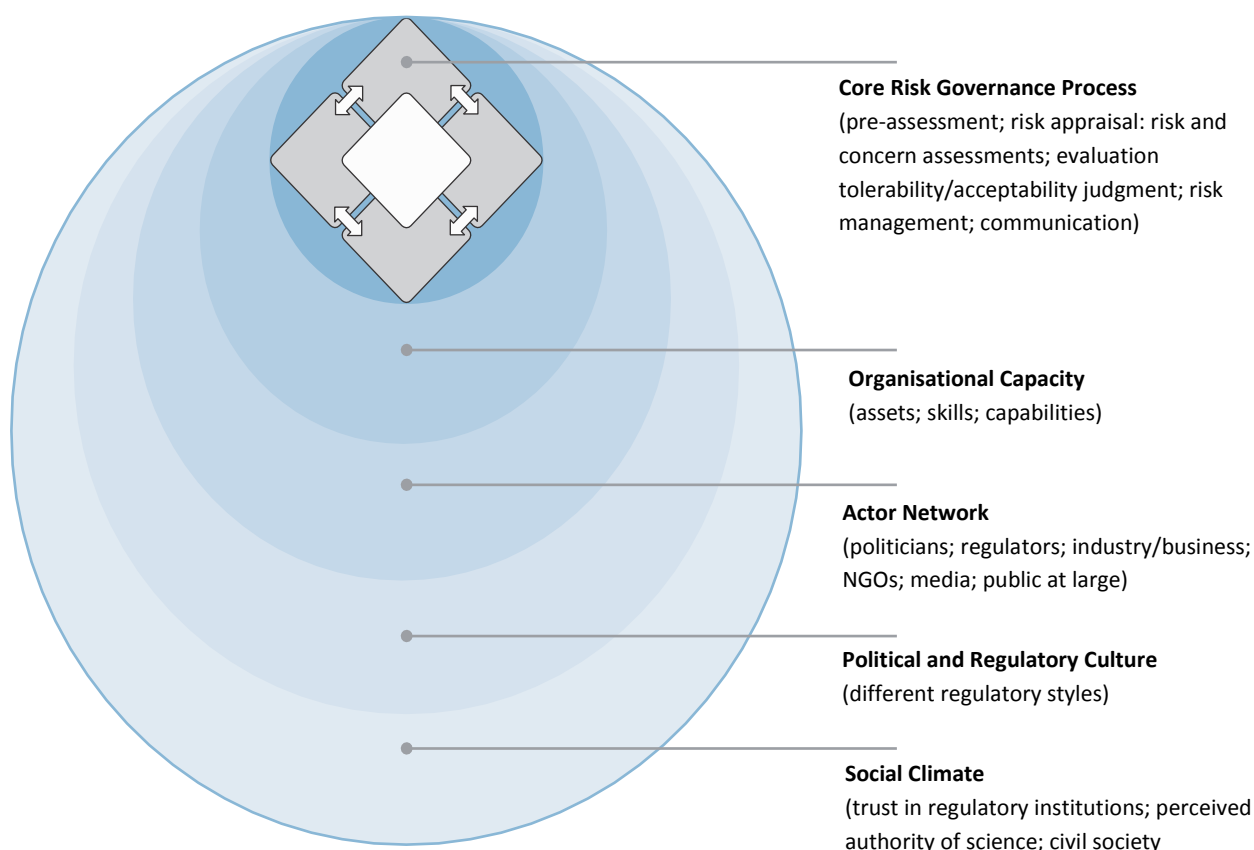


Figure 6: Risk governance in context (IRGC, 2012)

Many governance deficits originate from the lack of an appropriate **legal or regulatory framework**. Sometimes there is no appropriate structure or process. Alternatively, some regulatory structures overlap and compete with others, creating conflicts which complicate how risks are handled.

**International Standard Organization, ISO 31000**

- In 2009, the International Organization for Standardization (ISO) and its Technical Committee (TC) 262 released a set of principles, a framework and a process for managing risk. **ISO 31000:2009 Risk management - Principles and guidelines.**
- ISO is currently undertaking a revision of ISO 31000: 2009. The present analysis is based on a draft of the forthcoming revision, dated 2016-04-7, entitled: **Risk management – Framework and Process - Guidelines (ISO/CD 31000).** Although this version is not final, we consider it in the present study.
- ISO/CD 31000 provides principles and guidelines to organisations on managing risk. **Figure 7** summarises the relationship between principles, framework and process. **Figure 8** illustrates the framework components in more detail.
- ISO defines risk assessment components (identification, analysis and evaluation) necessary to undertake risk treatment, monitoring and review. Communication and consultation are permanent elements to allow the achievement of the different process components.
- Like in the Sendai Framework and IRGC Framework, ISO 31000 highlights the interrelation between risk “knowledge” (risk assessment and treatment) and “governance” (leadership and commitment). Hence, more than conceptual differences, these frameworks present differences in terminology used.

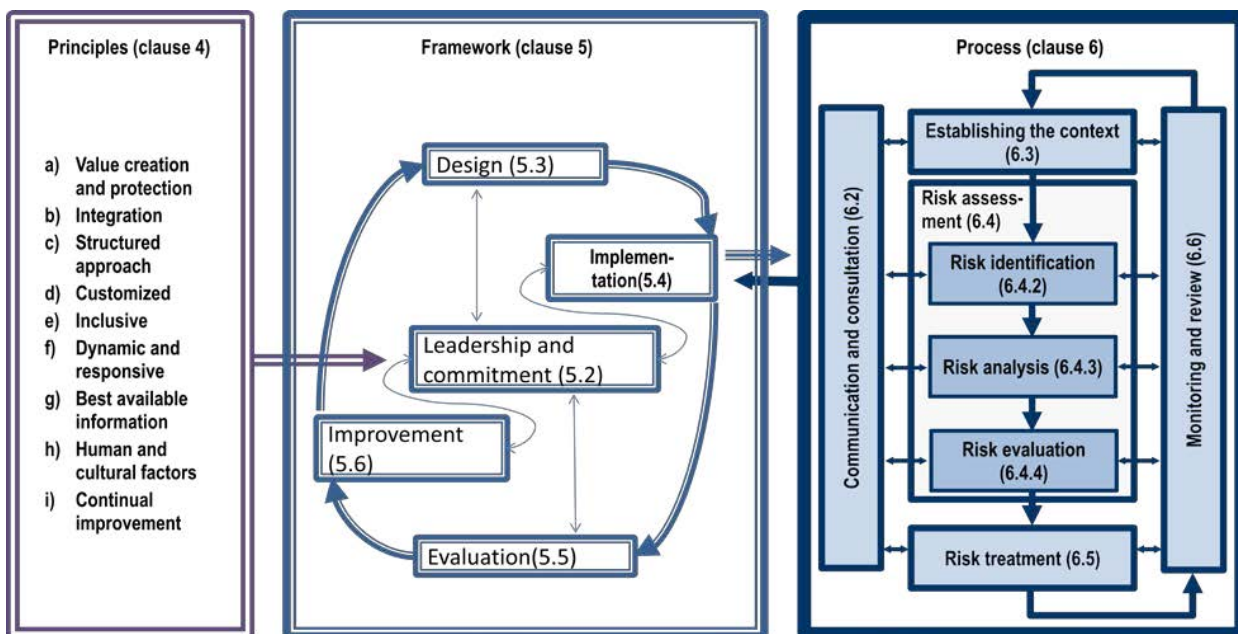


Figure 7: Relationship between the principles, framework and process (ISO/CD 31000, 2016)



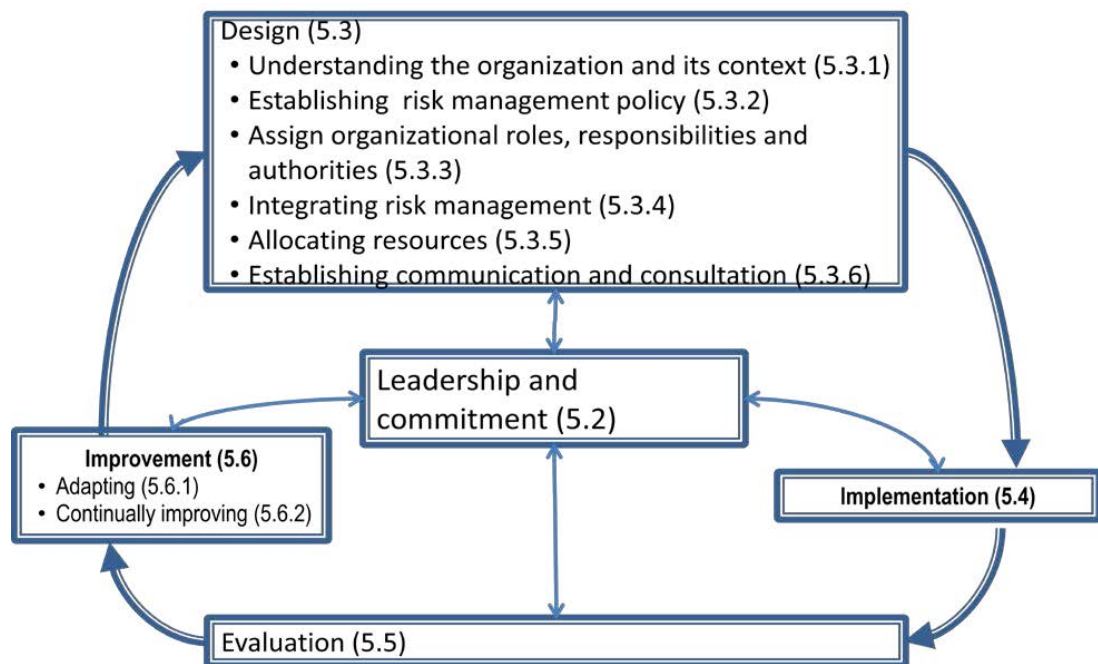


Figure 8: Relationship between the components of the framework (ISO/CD 31000, 2016)

## Other organisations

- Table 1 summarises information from other organisations. For example, UNECE considers ISO 31000:2009 to elaborate more in detail about **Risk management in regulatory systems: towards a better management of risk (2012)**. “This publication is an attempt to induce and help implement change in the structure of regulatory systems and frameworks. It presents tools and models in response to the problems faced by various entities in implementing risk management tools within regulatory systems...”
- In 2014, the OECD through its Council at Ministerial Level agreed on: **Recommendation on the Governance of Critical Risks**. “The recommendation proposes a fundamental shift in risk governance towards a whole of society effort. It proposes actions that governments can take at all levels of government, in collaboration with the private sector and with each other, to better assess, prevent, respond to and recover from the effects of extreme events, as well as take measures to build resilience to rebound from unanticipated events.”

The overarching recommendation is “that Members establish and promote a comprehensive, **all-hazards and transboundary approach to country risk governance** to serve as the foundation for enhancing national resilience and responsiveness.”

- At the country level, the **Netherlands’s National Security Strategy, 2007** and **National Risk Assessment with a National Security Profile, 2016**, and the **UK National Risk Register of Civil Emergencies, 2015** and **National Risk Assessment, 2016** also consider whole-of-government and all-hazard approach, having risk assessment as initial stages to policy initiatives or application, see Table 1.

### 2.3 Complementarity

- As we can see in the summary of frameworks and analyses presented above, **a substantive convergence or complementarity exist among the frameworks studied** in this brief analysis.
- For example, the framework for disaster risk reduction shown in Figure 1 -which was the basis of the Hyogo Framework for Action 2005-2015 (Figure 2) and the **Sendai Framework** 2015-2030 (Figure 3), proposes risk identification or understanding disaster risk (in the case of the Sendai Framework) as a priority to reach political commitment or strengthen risk governance.
- The **IRCG Risk Governance Framework** is like a magnification of the DRR framework in relation to risk assessment and risk management giving detailed steps and having communication in a central role (Figure 4). It also strongly recommends that the overall context (social, institutional, political and economic) is considered for risk-related decision-making and to enable both a comprehensive understanding of the risk, and the implementation of effective risk management (Figures 4 and 6).
- **ISO** sets the definitions clarifying that risk assessment is composed of risk identification, risk analysis and risk evaluation prior to risk treatment, monitoring and review having communication and consultation as cross-cutting tasks. ISO also links this process to leadership and commitments. In other words, to decision-making.
- **UNECE's** Risk management proposal complements the frame with principles and **risk management process** with the following main functions: establishing the context, risk identification, risk analysis and evaluation, implementing risk treatment strategies, and contingency planning and crisis management.
- Recently, as part of the implementation of the Sendai Framework, the inter-governmental group in charge of updating DRR terminology agreed with the definition of **Disaster risk management** as “the application of disaster risk reduction policies, processes and actions to prevent new risk, reduce existing disaster risk and manage residual risk contributing to the strengthening of resilience” (see other definitions in table 1 under Sendai Framework).
- The **OECD** makes clear recommendations to its Members to shift risk governance towards a whole of society effort that reflects the elements of the frameworks studied here.
- In conclusion:
  - The studied frameworks have risk “assessment” and risk governance as main elements of the framework (Sendai Framework) or set a framework to organise governance of risk (IRGC, OECD) in a broader context. The frameworks show complementary approaches from risk assessment or understanding disaster risk to disaster risk management and strengthening risk governance.
  - ISO and UNECE define a detailed terminology for risk assessment and risk treatment or risk management. The UNISDR terminology on DRR 2009 recognises ISO’s risk assessment definitions and components, it complements DRR terms and definitions, being reviewed by the open-ended intergovernmental expert working to be submitted to the UN General Assembly by the end of 2016.

## 2.4 Divergences and some recommendations

The more we study existing frameworks on risk governance, the more we can see the convergence of these frameworks, either in their principles, scope or objectives and key elements. The divergences are mainly related to the nature or genesis, the terminology used and their audience to which they were conceived, namely:

- **Regarding the nature and audience (application)**, the IRGC Risk Governance Framework is the result of a substantive research and collaboration, primarily among academics and other social scientists. It is motivated by the desire to enable societies to benefit from changes and opportunities (in particular, those that come with advances in science and technology) while minimising the negative consequences of the associated risks.

The Sendai Framework for Disaster Risk Reduction was negotiated through an inter-governmental process, and its implementation is a responsibility of the UN Member States.

UNECE recommendations for Risk Management in Regulatory Framework and ISO principles, framework, process and definitions are products of expert debates. Most of the experts involved in the debates represent their governments. The results are intended to be used by their members, European countries or ISO country members.

Finally, OECD recommendations were adopted by a Council at Ministerial level, and the Netherland and the UK documents are national strategies or policies.

**Even though the nature of the frameworks varies, the ultimate audience is society and governments.**

Other frameworks that are not included in this analysis have been developed for specific sectors or for the industry.

- **Overall terminology** and global notions are similar, but specific terms are often defined in different manners. An effort could be made by adopting definitions that result from an inter-governmental process, such as the open-ended intergovernmental expert working group on indicators and terminology related to disaster risk reduction, which work will be finalised in December 2016; and complement with ISO terminology considering that they have a membership of 163 national standards bodies and experts to share knowledge and define consensus-based standards, terms and definitions in a large variety of sectors.
- **Ownership matters.** For effective implementation, it is important that risk managers, or those responsible for the management of risk, go through a process of appropriation. The outcome of such a process is "ownership", which enables accountability. For example, the IRGC framework, developed primarily by academics, is better recognised in academia than by governments. Governments can be "inspired" by it, or refer to it, but they need to develop their own framework to be implemented as their policy practice. Vice-versa, academics may also consider institutional frameworks such as those recommended by the OECD or governments with a deliberate policy focus, which is sometimes necessary to obtain policy buy-in.

### 3. Synthesis of the comparative analysis of existing frameworks

**Table 1** summarises the main features of the studied frameworks as a basis for a comparative analysis. It puts in evidence the framework genesis or author, scope or aim, highlights main priorities or elements as well as audience or field of application.

The frameworks could be grouped as follows:

- Generic principles, guidelines and methods: IRGC, ISO
- Applied principles recommended to governments and governmental organisations: OECD, UNECE
- Intergovernmental framework: UNISDR
- National institutionalised frameworks: The UK and NL governments

Framework	Author and role	Scope/Aim	Priorities or Elements	Audience/application
<p><b>IRGC Risk Governance Framework (White Paper No. 1 2005; brief introduction 2012)</b></p> <p>(IRGC is an independent foundation. Its activities are now organised by the EPFL International Risk Governance Center)</p>	<p>International Risk Governance Council (IRGC), EPFL.</p> <p><b>IRGC is a non-profit and independent organisation</b> whose purpose is to improve the understanding and management of emerging systemic risk that may have significant impacts on human health and safety, the environment, the economy and society at large. IRGC’s work includes developing concepts of risk governance.</p>	<p><b>“Improvements in risk governance</b> are essential to taking optimal risk-related decisions and to maximising public trust in risk management processes, structures and decisions.”</p> <p><b>What Is Risk Governance?</b> Risk accompanies change and is often connected to potential benefits and opportunities. Better risk governance implies enabling societies to benefit from change while minimising the negative consequences of the associated risks. The governance of global, systemic risks requires cohesion between countries and the inclusion within the process of government, industry, academia and civil society.</p> <p>Governance refers to the actions, processes, traditions and institutions by which authority is exercised, and</p>	<p>The framework comprises 5 elements:</p> <p><b>Risk Pre-Assessment</b> – early warning and “framing” the risk in order to provide a structured definition of the problem, of how it is framed by different stakeholders, and of how it may best be handled.</p> <p><b>Risk Appraisal</b> – combining a scientific risk assessment with a systematic concern assessment to provide the knowledge base for subsequent decisions.</p> <p><b>Characterisation</b> of knowledge about the risk as simple, complex, uncertain or ambiguous</p> <p><b>and Evaluation</b> – ...to evaluate the risk as acceptable, tolerable or intolerable, and to guide further risk management decisions.</p> <p><b>Risk Management</b> – the actions and remedies needed to avoid, reduce transfer or retain the risk.</p>	<p>Public policy, governmental and non-governmental organisations, large industry.</p> <p>To enable societies to benefit from opportunities while minimising the negative consequences of the associated risks.</p>

Framework	Author and role	Scope/Aim	Priorities or Elements	Audience/application
		<p>decisions are taken and implemented. Risk governance applies the principles of good governance to the identification, assessment, management and communication of risks.</p>	<p><b>Risk Communication</b> – how stakeholders and civil society understand the risk and participate in the risk governance process.</p>	
<p><b>Sendai Framework for Disaster Risk Reduction: 2015-2030</b>  (through intergovernmental process)</p>	<p>Based on intergovernmental negotiations facilitated by the UNISDR, the Sendai Framework for Disaster Risk Reduction was agreed at the Third UN World Conference on Disaster Risk Reduction held in Sendai, Japan in March 2015 and endorsed by the <b>United Nations, General Assembly</b> in June 2015.</p>	<p><b>Goal:</b> <i>“Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience.”</i></p> <p><b>Scope:</b> <i>“Apply to Risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters, caused by natural or man-made hazards as well as related environmental, technological and biological hazards and risks.</i>  <i>It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors.”</i></p>	<p><b>Priorities</b></p> <ol style="list-style-type: none"> <li>1. <b>Understanding disaster risk;</b></li> <li>2. <b>Strengthening disaster risk governance to manage disaster risk;</b></li> <li>3. Investing in disaster risk reduction for resilience;</li> <li>4. Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction.</li> </ol> <p><b>Key definitions</b> (Intergovernmental process till Dec. 2016)</p> <p><b>Disaster risk governance</b> The system of institutions, mechanisms, policy and legal frameworks and other arrangements to guide, coordinate and oversee disaster risk reduction and related areas of policy.</p> <p><b>Disaster risk management</b> Disaster risk management is the application of disaster risk reduction policies, processes and actions to prevent new risk, reduce existing disaster risk and manage residual risk contributing to the strengthening of resilience.</p>	<p>World-wide by Member States of the United Nations.</p> <p>National, regional and local governments</p>

Framework	Author and role	Scope/Aim	Priorities or Elements	Audience/application
		<p><i>Key definitions:</i></p>	<p><b>Disaster risk reduction</b>                      Disaster risk reduction is the policy objective aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contributes to strengthening resilience.</p>	
<p><b>Risk Management in Regulatory Framework: towards a better management of risks, UNECE, 2012.</b></p>	<p>Staff of the UN Economic Commission for Europe (UNECE) based on work carried out under the auspices of the UNECE Working Party on Regulatory Cooperation and Standardisation Polices.</p> <p>Contribution of the authors in an attempt to induce and help implement change in the structure of regulatory systems and frameworks.</p>	<p><b>Risk effect of uncertainty on objectives:</b>                      i) financial,                      ii) health and safety,                      iii) environmental.</p> <p>Evaluation of risks.</p> <p>Risk ranking matrix: probability - impact:</p>	<p><b>The main functions of the Risk management process are:</b></p> <ul style="list-style-type: none"> <li>• Establishing the context</li> <li>• Risk identification</li> <li>• Risk analysis and evaluation</li> <li>• Choosing and implementing risk treatment strategies</li> <li>• Contingency planning and crisis management</li> </ul> <p><b>Risk management in regulatory systems. Regulation as a risk mitigation tool:</b></p> <ul style="list-style-type: none"> <li>• Horizontal legislation,</li> <li>• Sectors specific regulations</li> <li>• Organisation’s internal procedures</li> </ul>	<p>All stakeholders working in a single regulatory system willing to help solve most of the risk management-related problems.</p> <p>Possible audience includes:                      Policymakers,                      Legislators,                      Business,                      Standardisation bodies,                      Conformity assessment bodies and market surveillance authorities.</p>
<p><b>ISO 31000: 2009 Risk management - Principles and guidelines</b></p> <p><b>ISO/CD 31000, 2016 Risk management- Framework and Process - Guidelines</b></p>	<p><b>ISO is an independent, non-governmental international organisation</b> with a membership of 163 national standards bodies. Through its members, it brings together experts to share knowledge and develop voluntary, <b>consensus-based</b>, market relevant International Standards that support innovation and provide solutions to global challenges.</p> <p>Developed by ISO TC 262</p>	<p>ISO 31000:2009 - Risk management – Principles and guidelines</p> <p><b>Risks</b> affecting organisations can have consequences in terms of economic performance and professional reputation, as well as environmental, safety and societal outcomes. Therefore, <b>managing risk effectively helps organisations to perform well in an environment full of uncertainty.</b></p>	<p>ISO/CD 31000 (2016)                      Components (same as in ISO 31000:2009, but description of principles and framework have been updated):</p> <ul style="list-style-type: none"> <li>• Principles</li> <li>• Framework</li> <li>• Process.</li> </ul> <p>These components may already exist in full or in part within the systems of governance and management of the organisation. However, they may need to be adapted or improved so that the management of risk is consistent and effective.</p>	<p>Up to 40 countries have adopted ISO 31000 as their national risk management standard, under the label "TS ISO 31000".</p> <p>ISO 31000 is suitable for any type of organisation, including the private sector and small and medium enterprises.</p>

Framework	Author and role	Scope/Aim	Priorities or Elements	Audience/application
<p>(which is considered in this table)</p> <p>International Organization for Standardization (ISO)</p>	<p>ISO international technical committee (TC) 262 comprised 60 experts from different sectors (industry, health &amp; safety, quality management, banking &amp; finance, etc.), representing 30 countries.</p> <p>Revision ISO/CD 31000 (in process)</p>	<p>ISO/CD 31000 - Risk management - Framework – Guidelines (2016)</p> <p><b>Scope:</b> ISO 31000 provides principles and guidelines to organisations on managing risk.</p> <p>It can be used by any organisation to help to set and achieved its objectives. It provides a common approach to managing risk and is not specific to any industry or sector. It can be used to manage any type of risk.</p> <p>ISO 31000 can be used throughout the life of the organisation and applied to any activity, including decision-making at all levels.</p> <p><b>Key definitions</b></p> <p><b>Risk:</b> effect of uncertainty on objectives.</p> <p><b>Risk management:</b> coordinated activities to direct and control an organisation with regard to risk.</p> <p><b>Risk management framework:</b> set of components that provide the foundations and organisational arrangements for designing, implementing, monitoring, reviewing and continually improving risk management throughout the organisation.</p> <p><b>Risk management policy:</b></p>	<p><b>Principles</b> The principles provide the basis for the management of risk. The principles communicate the value and 279 explain the intention and purpose of risk management. If these principles are taken into account, then 280 an organisation is more likely to manage risk successfully and meet its objectives.</p> <ol style="list-style-type: none"> <li>a) value creation and protection</li> <li>b) Integration</li> <li>c) Structural approach</li> <li>d) Customized</li> <li>e) Inclusive</li> <li>f) Dynamic and responsive</li> <li>g) Best available information</li> <li>h) Human and cultural factors</li> <li>i) Continual improvement</li> </ol> <p><b>Framework</b> The framework encompasses the organisational arrangements for designing, implementing, monitoring, reviewing and continually improving risk management. It offers a structure for using the risk management process as a basis for decision-making and accountability at all levels of the organisation. Figure 3 illustrates the relationship between the components of the framework, namely:</p> <ul style="list-style-type: none"> <li>• Leadership and commitment</li> <li>• Design</li> <li>• Implementation</li> <li>• Evaluation</li> <li>• Improvement.</li> </ul>	

Framework	Author and role	Scope/Aim	Priorities or Elements	Audience/application
		<p>statement of the overall intentions and direction of an organisation related to risk management.</p> <p><b>Risk management process:</b> systematic application of management policies, procedures and practices to the activities of communicating, consulting, establishing the context, and identifying, analysing, evaluating, treating, monitoring and reviewing risk.</p> <p><b>Risk assessment:</b> overall process of risk identification, risk analysis and risk evaluation.</p> <p><b>Risk identification:</b> process of finding, recognising and describing risks.</p>	<p><b>Process</b></p> <ul style="list-style-type: none"> <li>• Establishing the context</li> <li>• Risk assessment               <ul style="list-style-type: none"> <li>○ Risk identification</li> <li>○ Risk analysis</li> <li>○ Risk evaluation</li> </ul> </li> <li>• Risk treatment</li> </ul> <p>Across the process:</p> <ul style="list-style-type: none"> <li>• Communication &amp; consultation</li> <li>• Monitoring &amp; review</li> </ul>	
<p><b>OECD</b> Recommendation on the Governance of Critical Risks, May 2014</p>	<p>Meeting of the Organisation for Economic Co-operation and Development (OECD) Council at Ministerial Level, Paris, 6-7 May 2014.</p> <p>The mission of the Organization for Economic Co-operation and Development (OECD is <b>to promote policies</b> that will improve the economic and social well-being of people around the world.</p> <p>The OECD provides a forum in which governments can work together to share experiences and</p>	<p>RECOGNISING that <b>effective risk governance</b> is a means of maintaining or achieving national competitive advantage against a backdrop of numerous geopolitical, environmental, societal and economic uncertainties as it represents an opportunity to invest in safer and better lives for the future;</p> <p>RECOGNISING that <b>critical risks</b> may develop quickly and through unforeseen pathways to spread across borders, resulting in adverse impacts of national significance, disrupting vital infrastructure sectors,</p>	<p>RECOMMENDS that:</p> <ul style="list-style-type: none"> <li>• <b>Members establish and promote a comprehensive, all-hazards and transboundary approach to country risk governance</b> to serve as the foundation for enhancing national resilience and responsiveness.</li> <li>• <b>Members build preparedness through foresight analysis, risk assessments and financing frameworks</b>, to better anticipate complex and wide-ranging impacts.</li> <li>• <b>Members raise awareness of critical risks</b> to mobilise households, businesses and</li> </ul>	<p>Central governments in OECD's 35 Member and other countries</p>



Framework	Author and role	Scope/Aim	Priorities or Elements	Audience/application
	<p>seek solutions to common problems.</p> <p>OECD has 35 Member countries. Some developing and emerging countries are invited to participate in OECD activities.</p> <p>The European Commission takes part in the work of the OECD, but it does not have right to vote and does not officially take part in the adoption of legal instruments submitted to the Council for adoption.</p>	<p>degrading key environmental assets, negatively impacting public finances and eroding public trust in government;</p> <p>NOTING that the OECD plays a <b>leading role in helping countries to share good practices in governance across the risk management policy cycle</b>, and that this work has been welcomed by international forums, such as the G20 Finance Ministers and Central Bank Governors;</p> <p>NOTING that the OECD identified an <b>Agenda for Action for emerging risks in the 21st century</b> in the early 2000s, that the report 'Future Global Shocks' took this Agenda for Action a step further by focusing on the policy challenges to contend with unlikely or unforeseeable disruptive events of high magnitude, and that since 2011 the High-Level Risk Forum of the Public Governance Committee has provided a platform for government officials, private sector risk managers, think tanks and civil society to exchange policy practices and raise awareness; ...</p>	<p>international stakeholders and foster investment in risk prevention and mitigation.</p> <ul style="list-style-type: none"> <li>• <b>Members develop adaptive capacity in crisis management</b> by coordinating resources across government, its agencies and broader networks to support timely decision-making, communication and emergency responses.</li> <li>• <b>Members demonstrate transparency and accountability in risk-related decision making</b> by incorporating good governance practices and continuously learning from experience and science.</li> </ul>	
<p>NL: <b>The Netherlands' National Security Strategy, 2007</b></p>	<p>In 2007, a National Security Strategy<sup>1</sup> was established (MIKR 2007a).</p>	<p>The approach consists of a <b>methodology based on scenarios</b>, which are graded in terms of impact and likelihood according to a unified scoring method.</p>	<p>The Dutch NRA/NSP considers risk, scenarios, likelihood, and impacts:</p> <p><b>Stage 1: analysis of threat and assessment of risks</b></p>	<p>The government of The Netherlands at all levels</p>

Framework	Author and role	Scope/Aim	Priorities or Elements	Audience/application
<p>and the <b>National Risk Assessment</b>.</p>	<p>Central to this strategy is an <b>integrated, whole-of-government, and all-hazard approach to Dutch national security, also encompassing societal security.</b></p>	<p>The method enables to position and evaluates different kinds of future threats, hazards, and risks in mutual relation to each other.</p> <p>The results of the analysis are applied to perform a capability analysis, define adequate policy measures, and determine priorities regarding the allocation of resources for the prevention of, preparation for, and response to disasters.</p> <p>Analysis is performed using a methodology called the National Risk Assessment (NRA).</p> <p>The strategy does intend not only to identify capacity gaps and define measures regarding individual threats and risks, but also to enhance capability planning and policy considering the overall national security.</p> <p>Although governments, civil services, and private parties already fulfil an active role in strengthening safety and security, the all-hazard approach fosters cooperation between all organisations that are responsible: national government, local authorities, civil society, and the business community.</p>	<ul style="list-style-type: none"> <li>• Strategic foresight: known and new or upcoming threats and risks are identified from scientific, technological, and governmental long-term foresight studies.</li> <li>• Short-term analyses, and current developments.</li> <li>• Further developed in a ‘thematic in-depth study’ including scenarios up to five years.</li> </ul> <p><b>Risk Assessment → National Risk Assessment (NRA)</b></p> <p>The risk assessment methodology (MIKR 2009) is suitable for an all-hazard approach, which implies that scenarios of very different kind of risks, threats, and hazards are described and rated in an unambiguous manner, so that they are rendered comparable.</p> <ul style="list-style-type: none"> <li>• Scenario building</li> <li>• The Network of Analysis for National Security</li> <li>• The risk assessment                         <ul style="list-style-type: none"> <li>○ Impact</li> <li>○ Likelihood</li> <li>○ The risk diagram</li> <li>○ Uncertainty, sensitivity and robustness analyses</li> </ul> </li> </ul> <p><b>Stage 2: capabilities analysis</b></p> <p>The capability analysis is the second stage of the National Security Strategy, which is aimed at improving Dutch national security and strengthening societies’ resilience.</p> <p><b>Stage 3: policy initiatives</b></p> <p>Identify how and where is Dutch national security to be reinforced.</p>	

Framework	Author and role	Scope/Aim	Priorities or Elements	Audience/application
<p>2016 The government decided to replace the current annual National Risk Assessment with a <b>National Security Profile (NSP)</b> to be released every four years, with the first edition in autumn 2016.</p>	<p>The NSP is a comprehensive analysis of the most salient risks and threats to national security, based on an <b>'all-hazards' approach</b>, but also contains an overview of relevant technological and social trends and developments that are likely to affect the country's risk profile in the foreseeable future.</p>	<p>The benefits of this new approach are that it maintains the momentum already achieved through the 6 editions of the NRA since 2007, by:</p> <ul style="list-style-type: none"> <li>• Providing strategic early warning of future developments in the risk profile of the country, to help the government decide on its priorities</li> <li>• Re-engaging the interest of policy-makers and of citizens, so embedding a risk management culture more firmly in the body politic;</li> <li>• Capitalising on the very extensive work done, through partnership with stakeholders in the public, private and academic sectors, to assess the current risk picture in the Netherlands</li> </ul>	<p>The Council of Ministers decides whether national safety and security should be improved by reinforcement of capabilities and, if so, through which measures.</p> <p>Risk Analysis:</p> <ul style="list-style-type: none"> <li>• Scope</li> <li>• Hazard identification</li> <li>• Impact analysis</li> <li>• Likelihood and plausibility analysis</li> <li>• Risk evaluation, monitoring and re-evaluation.</li> </ul>	<p>The government of The Netherlands at all levels and main sectors.</p>
<p>UK: <b>National Risk Register of Civil Emergencies</b>, 2015 edition</p>	<p>UK Cabinet Office  Purpose</p>	<p><b>Risk Summaries</b> Natural hazards</p> <ul style="list-style-type: none"> <li>• Human diseases</li> <li>• Flooding</li> </ul>	<p><b>The main types of civil emergency</b> <b>What is a civil emergency?</b> The Civil Contingencies Act 2004 (the Act) describes an emergency as:</p>	<p>The National Risk Register (NRR) is a public resource for individuals and organisations</p>

Framework	Author and role	Scope/Aim	Priorities or Elements	Audience/application
	<p>The UK National Risk Register of Civil Emergencies (NRR) is the unclassified version of the National Risk Assessment (NRA), a classified assessment of the risks of civil emergencies facing the UK over the next five years.</p>	<ul style="list-style-type: none"> <li>• Poor air quality events</li> <li>• Volcanic hazards</li> <li>• Severe space weather</li> <li>• Severe weather</li> <li>• Severe wildfires</li> <li>• Animal diseases</li> </ul> <p>Major accidents</p> <ul style="list-style-type: none"> <li>• Major industrial accidents</li> <li>• Widespread electricity failure</li> <li>• Major transport accidents</li> <li>• Disruptive industrial action</li> <li>• Widespread public disorder</li> </ul> <p>An introduction to terrorist and other malicious attacks</p> <ul style="list-style-type: none"> <li>• Terrorist attacks on crowded places</li> <li>• Terrorist attacks on infrastructure</li> <li>• Terrorist attacks on transport systems</li> <li>• Unconventional terrorist attacks</li> <li>• Cybersecurity</li> </ul>	<ul style="list-style-type: none"> <li>• an event or situation which threatens serious damage to human welfare in a place in the United Kingdom</li> <li>• an event or situation which threatens serious damage to the environment of a place in the United Kingdom</li> <li>• war, or terrorism, which threatens serious damage to the security of the UK.</li> </ul> <p><b>What is a risk of civil emergency?</b> Every two years the UK Government produces a classified assessment of the risks of civil emergencies facing people in the UK – this is the National Risk Assessment (NRA). In both the NRA and NRR, how serious the risk of an emergency is depends both on the <b>likelihood</b> of it happening over the next five years and on the <b>consequences</b> or <b>impacts</b> that people will feel if it does. When identifying risks for the NRA and NRR, a ‘<b>reasonable worst case</b>’ is chosen which represents a challenging manifestation of the scenario after highly implausible scenarios are excluded.</p> <p><b>The NRR risk matrices</b> Provides graphic information on: i) Risks of terrorist and other malicious attacks considering overall relative impact score versus relative plausibility of occurring in the next five years. ii) Other risks considering overall relative impact score versus relative likelihood of occurring in the next five years. These figures are updated within each edition of the NRR to ensure that changes to the assessment of risks in terms of impact, plausibility and likelihood are correctly</p>	<p>wishing to be better prepared for emergencies.</p>

Framework	Author and role	Scope/Aim	Priorities or Elements	Audience/application
<p>UK (2016): <b>National Risk Assessment (NRA)</b></p>	<p>UK Cabinet Office – Civil Contingencies Secretariat (part of the National Security Secretariat)</p>	<p>The National Risk Assessment (NRA) is a comprehensive all-hazard assessment of the most significant emergencies (malicious and non-malicious) the United Kingdom could face over the next five years. It is updated every two years (including publication of an unclassified National Risk Register) and has been running for more than 10 years. It combines both fields of Civil Protection and Critical Infrastructure Protection.</p>	<p>captured. The assessment of risks is continuous, and thus the positioning of risks within the NRR risk matrices remains fluid and subject to change.</p> <p>There are three stages to the assessment:</p> <ul style="list-style-type: none"> <li>• the identification of risks</li> <li>• assessment of their likelihood and potential impacts, and</li> <li>• comparison/prioritisation of the risks.</li> </ul> <p>All three stages involve consultation with subject matter experts including independent academics and government scientists.</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>- to assist in the identification and prioritisation of risks for the development of capabilities at a national and local level</li> <li>- to enable reasonable quantitative and qualitative estimates to be made of the breadth and scale of likely consequences that need to be planned for</li> <li>- to facilitate risk communication to those planning for emergencies, in public, private and community and volunteer sectors</li> <li>- to provide the evidence base for investment and resource allocation decisions mitigate or prepare for consequences or risks</li> </ul>	<p>NRA is used for planning for emergencies at a Government level, and to provide guidance to local emergency planners and responders on the kinds of risks which they may need to assess and plan for in their local area.</p>

## 4. Conclusions

The **main innovations or aspects of each instrument, which are particularly interesting for effective risk management** are summarised as follows.

### IRGC

- Pre-assessment to frame the issue considered, before engaging in risk assessment.
- Opinion and concern assessment matter as much as factual risk assessment.
- Characterisation of risk knowledge as simple, complex, uncertain or ambiguous, to determine the type of stakeholder engagement and management strategies that would be relevant.
- Evaluation as a specific phase in the process, where decision-makers use their own judgment, based on the knowledge gathered in the risk assessment
- Focuses on global or systemic risks.

### ISO

- Risk as the effect of uncertainty on objectives. An effect can be negative, positive or both.
- Applicability to a large variety of sectors or organisations.

### Sendai

- Goal is to “prevent new and reduce existing disaster risk”.
- Priorities of action at global and regional levels, and at national and local levels:  
1. Understanding disaster risk; 2. Strengthening disaster risk governance to manage disaster risk; 3. Investing in disaster risk reduction for resilience; 4. Enhancing disaster preparedness.
- Sets international cooperation and global partnership for implementation, including means for implementation and a monitoring/review system.
- The document recognises ISO definition and components of risk assessment.

### OECD

- Recommends that governments establish and promote a comprehensive, all-hazards and transboundary approach to country risk governance.
- Focus on foresight, risk assessment, adaptive approaches, crisis management, transparency and accountability.

### UNECE

- Establishes as a principle that risk management should be included in regulatory systems, in order to reach regulatory goals.
- Proposes regulation as a risk mitigation tool.

### UK NRA

- Draws on expertise from a wide range of departments and agencies, resulting in an integrated approach to the National Risk Assessment.
- Enables risk prioritisation.

### NL NRA/NSP

- Integrated, whole-of-government, and all-hazard approaches.
- The approach consists of a methodology based on scenarios, which are graded in terms of impact and likelihood according to a unified scoring method.

### Similarities, complementarity and differences

- All studied frameworks are concerned with **increasing risks, their causes and consequences**.
- All studied frameworks have a **holistic, all hazards or integrative approach to risk, and set links to development, governance or risk governance**.
  - The Sendai Framework has risk “assessment” and risk governance as main elements. IRGC and OECD establish a framework or propose recommendations to organise governance of risk.
  - **Terminology** and global notions are similar, but specific terms and definitions can differ. ISO followed by UNECE have defined a specific terminology for Risk assessment, Risk treatment and Risk management. The open-ended intergovernmental expert working group on indicators and terminology related to DRR will finalise the update of DRR terminology by the end of 2016 to be presented to the UN General Assembly. It is recommended to use agreed DRR terms and definitions, complemented by ISO as appropriate.
- The **divergences** are somehow related to the nature or genesis, the terminology used and their audience to which the frameworks have been conceived.
- **The frameworks could be grouped as follows:**
  - Generic principles, guidelines and methods: IRGC, ISO.
  - Applied principles to governmental organisations: OECD, UNECE.
  - Intergovernmental framework: UNISDR.
  - National institutionalised frameworks: The UK and NL governments.
- **Ownership** is key for effective implementation. It is important that those responsible for the management of risk go through a process of appropriation. The outcome of such a process is "ownership", which enables accountability.
- This implies that for example, the IRGC framework, developed primarily by academics, is better recognised in academia than by governments. Governments can be "inspired" by it, or make reference to it, but like the UK and NL, they need to develop their own framework based on an intergovernmental process, for which the OECD or the UNISDR make recommendations.
- Finally, it has been beneficial to have several frameworks designed from different angles, purpose and nature. Nevertheless, more dialogue and collaborative work are needed to recognise each other's frameworks, further improve their own or common tools to support implementation, and contribute to their specific audience.

## Appendix

### Comparison of selected terms in IRGC and ISO 31000 / Guide 73

	IRGC White Paper Nr 1, 2005, page 77	ISO/CD 31000 <a href="http://www.iso.org/obp">www.iso.org/obp</a>	UNISDR ( <a href="http://www.unisdr.org">www.unisdr.org</a> ) Intergovernmental group, 2016
Risk	An uncertain consequence of an event or an activity with respect to something that humans value. Note: Such consequences can be positive or negative, depending on the values that people associate with them.	Effect of uncertainty on objectives. Note: An effect can be positive (sometimes expressed as opportunities), negatives (sometimes expressed as threats) or both.	<b>Disaster Risk</b> The potential loss of life, injury, destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.
Context	(p. 12) Besides the generic elements of risk assessment, risk management and risk communication, the IRGC framework gives equal importance to contextual aspects, which either are directly integrated in a model risk process, or otherwise form the basic conditions for making any risk-related decision.	(design) Before starting the design of the framework for managing risk, the organisation should evaluate and understand its external and internal context.	
Risk management	Creation and evaluation of options for initiating or changing human activities or structures with the objective of increasing the net benefit to human society and preventing harm to humans and what they value; implementation of chosen options; monitoring of their effectiveness.	Coordinated activities to direct and control an organisation with regard to risk.	<b>Disaster Risk Management</b> Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses.
Framework	Risk governance framework (p.11): An integrated analytic framework for risk governance which provides guidance for the development of comprehensive assessment and management strategies to cope with risks, in particular at the global level.	Risk management framework: Set of components that provide the foundations and organisations arrangements for designing, implementing, monitoring, reviewing and continually improving risk management throughout the organisation. Is intended to assist the organisation to integrate risk management into all its activities	
Risk assessment	Task of identifying and exploring, preferably in quantified terms, the types, intensities and likelihood of the (normally undesired) consequences related to a risk. Comprises hazard identification and estimation, exposure and vulnerability assessment, and risk estimation.	Overall process of risk identification, risk analysis and risk evaluation	A quantitative approach to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of exposure and vulnerability that together could harm people, property, services, livelihoods and the environment on which they depend.
Risk identification		Process of finding, recognizing and describing risks	



Risk (characterisation and) evaluation	Evaluation: Process of determining the value-based components of making a judgement on risk. (p. 14) Risk characterisation and evaluation, aims at judging a risk's acceptability and/or tolerability. While risk characterisation compiles scientific evidence based on the results from the risk appraisal phase, risk evaluation assesses broader value-based issues that also influence the judgement.	Evaluation: Process of comparing the results of risk analysis with risk criteria to determine whether the risk and/or its magnitude is acceptable or tolerable.	
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