

# National disaster risk assessments in Europe. How comparable are they and why?

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## Abstract

In the late 2000s, a process started that was designed to approximate the national disaster risk assessments in the European Union. Member states are currently obliged to prepare their assessments every three years. The European Commission will summarize the results, which should not only lead to a better overview of common risks but also direct future joint activities and investments. To date, two rounds of this new practice have been implemented and summarised. The present study investigates how and why this largely informal integrative practice was born, how it is facilitated, and how successful it has been vis-à-vis the expectations, especially achieving a relative comparability of the national risk assessments.

## KEYWORDS

creeping competence, European Union, informal governance, ISO 31000, national approaches, risk assessment, risk management

## INTRODUCTION

Risk assessment (RA) in the field of disaster risk management (DRM) assumed greater importance in the European Union (EU) in 2009 when it was decided that the European Commission (EC) should facilitate an approximation of *national* risk assessments (NRAs) and collate the results, focusing on common European risks. This, in turn, would guide the EU-level DRM, especially in terms of prioritizing joint investments and activities. A certain approximation of concepts and methodologies was presupposed in order to

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produce comparable NRA results. To date, this practice has been conducted twice, and the third round is expected to result in updated NRAs by the end of 2020. The third EC overview will then be produced in 2021.

The question that inevitably arises with regard to the above is why member states would voluntarily transfer any mandate for supranational coordination in this particular field. Is this a rare exception, or does it point to what is termed “creeping competence” in enhancing supranationality? If so, what does it entail?

This article analyzes this relatively recent development within European DRM. It begins by identifying the regulative decisions and guidelines that instigated and legitimated the new practice. The majority of the article is then devoted to evaluating the quality and comparability of those NRAs that have been completed. Lastly, some potential explanations are given for this integrative development, whereby the EC has increased its formal and informal role in a field that basically belongs to the member states' sovereignty. As the article shows, these explanations are not unambiguous.

## REGULATION AND FACILITATION

The idea of approximating NRAs most likely arose during the routine policymaking process in the context of the much wider issue of European DRM in the Civil Protection Unit of the EC DG Environment (now under DG Echo). Obviously, if the EC was not entirely sure what the disaster-related challenges of the member states entailed, it was logical to ask them to prepare documents to that effect.

EC units do not work on an ad hoc basis, however. Consequently, issues such as the approximation of NRAs for better DRM—a goal which seems highly beneficial for member states as well—still takes time and effort, and always requires some kind of regulatory backing and practical facilitation.

### Regulation with sensitivity

The EC Communication on a *Community approach on the prevention of natural and man-made disasters* from February 2009 is usually seen as the regulatory starting point for a more coordinated European NRA approach. A Communication is a policy document with no mandatory authority and which has no legal effect. The NRAs were discussed under the subheading “Developing guidelines on hazard/risk mapping” and were condensed into less than half a page. The main message was that the diversity of methodological approaches toward nationally produced risk information had reduced the comparability of information and made it difficult for information to be consolidated at the European level. As a result, there was no overall picture of the risks that the EU was facing (EC, 2009, item 3.1.3).

In November 2009, the Council of the European Union acknowledged in its Conclusions that “hazard and risk identification and analysis, impact analysis, RAs and matrices, scenario development, risk management measures, and regular reviews” are major components of the Community disaster prevention policies. The Conclusions also called on the EC to develop guidelines before the end of 2010 to facilitate NRAs, thereby ensuring better comparability between member states. A cross-sectoral overview of the major “natural and man-made risks that the EU may face” needed to be prepared before the end of 2012 (Council of the European Union, 2009, Art. 28, 30).

The first EC (2014) overview was finally published, with a compilation of the results of around two-thirds of the member states. It is possible that the delays and initial

experiences in collecting the incomplete sample of NRAs had led to the current practice based on a binding Council Decision as a part of the Union Civil Protection Mechanism (UCPM). The member states were now *obliged* to “develop risk assessments at the national or appropriate subnational level and make available to the Commission a summary of the relevant elements thereof by 22 December 2015 and every three years thereafter” (European Parliament/Council of the European Union, 2013, Art. 6/a). However, making it mandatory to prepare the NRAs for the EC, thus revealing some country-related vulnerabilities, is of course a balancing act between the powers of the member states and the EU. It is therefore duly mentioned that the obligation only concerns “sharing non-sensitive information, namely information whose disclosure would not be contrary to the essential interests of Member States' security” (Preamble/8 and Art. 6 introduction).

In March 2019, a new version of the abovementioned Decision was issued. Only a few amendments were made in respect to the current subject area (European Parliament/Council of the European Union, 2019, Art 6). The main change concerned the shift from mere RA to an emphasis on prevention and preparedness, as well as a stronger focus on cross-border risks. The Decision obliges the member states to submit their subsequent editions to the EC by the end of 2020, “and every three years thereafter and whenever there are important changes”.

## Facilitation with guidelines and overviews

The EC's task was to achieve at least some level of comparability with regard to the NRAs in order to prepare better-coordinated policy initiatives. There are five relevant documents to consider in this respect.

The *first guidelines* (EC, 2010a) comprise a 42-page document on improving the use of good practices and international standards across the EU, and serve to further the gradual development of coherent and consistent RA methodology and terminology. The nonbinding guidelines certainly provide very useful background information, along with the necessary definitions, establishing the expected scope and presenting available techniques for NRAs.

The *first overview* of the NRAs (EC, 2014) is an 86-page document, based on only 18 NRAs. In the body text, the document is concerned for the most part with identified hazards rather than any deeper methodological comparability of NRAs. Consequently, of all the 25 hazards identified in the NRAs, a list of the 12 most addressed is duly overviewed, representing the priority list of hazards that the EU should focus on. The Annexes, however, contain some comparative methodological tables from the NRAs.

After the second round, the subsequent *second overview* (EC, 2017) is a 112-page document. The 2013 Council Decision had apparently paid off, as the overview included contributions from all 28 member states and three (of the six) additional UCPM participant countries. Like the 2014 overview, it organizes its body text according to the hazards, although it discusses the generic picture more extensively, including such issues as key trends, interdependencies, and cascading effects. In its overview of hazards, the so-called new hazards (e.g., the migrant crisis, antimicrobial resistance, space weather) are also apparent, reflecting the new themes in the NRAs. Again, the Annexes are highly useful, providing comparative methodological tables. The gaps in the tables show that quite a few countries had not provided sufficient material to conduct a full analysis.

The *second guidelines* (EC, 2019a) were published after the second round and hence were not used in preparing the latest NRAs. The guidelines consist of a non-binding 26-page document, which takes the form of a template of questions to which

the member state is supposed to formulate its answers. The document then provides rather detailed guidance as to what should be considered under each question. Compared to the 2010 guidelines (EC, 2010a), the scope is broader than mere RA, following the abovementioned 2019 Council Decision. Thus, the next NRAs should also include a risk management capability assessment as well as a description of priority prevention and preparedness measures, especially when it comes to key risks with cross-border impacts, and risks with a low probability but high impact.

Simultaneously with the second guidelines, the EC/DG Joint Research Centre (JRC) released *recommendations* (EC, 2019b), which cannot be regarded as official guidelines, but rather as JRC scientific support for the DG Echo and member states. They still serve as an indicator of the challenges identified by the EC in the 2017 overview. The 162-page (!) recommendations attest to the fact that more effort has to be invested in the quality and comparability of NRAs.

## ISO 31000 as a baseline standard

The EC did not have to start from scratch when preparing its guidelines. Risks, in general, are widely researched from multiple perspectives (for a review, see Kuipers et al., 2018). RA proper, in turn, is a well-established multidisciplinary academic field informed by numerous peer-reviewed journals and textbooks (e.g., Aven, 2015; Coleman, 2011; Ostrom & Wilhelmsen, 2012; Pritchard, 2015; Yoe, 2012). Furthermore, efforts have been made to systematize RA in terms of standards. The most prominent of the relevant standards is the International Organization of Standardization (ISO) 31000 Risk Management standard. The first edition was approved in 2009 (ISO, 2009a, 2009b; ISO/IEC, 2009) and was recently updated (ISO, 2018; ISO/IEC, 2019). ISO 31000 is professed to be applicable to organizations of “all types and sizes,” and hence also to NRAs. Within the risk management community, ISO 31000 has been both welcomed (Lalonde & Boiral, 2012; Purdy, 2010) and criticized (Aven, 2011, 2016; Aven & Ylönen, 2019; Leich, 2010). Moreover, the so-called risk *governance* school concerns RA, or risk *management* as a whole, as a too limited approach. It claims that today's systemic, interdependent and complex risks need a much more horizontal and multilevel governance approach (Ansell & Baur, 2018; Galaz et al., 2017; Renn, 2008, 2006; Schweizer & Renn, 2019).

Nevertheless, the ISO 31000 standard's obvious achievement is the approximation of the terminology and general understanding of the risk management process among practitioners. The EC had already approved ISO 31000 as a basis for NRAs in its first guidelines (EC, 2010a), and continued to enforce the standard in the subsequent EC/JRC recommendations (2019b), like many other international organizations (Organisation for Economic Co-operation and Development, 2018; UNDRR/UNISDR, 2017). While ISO 31000 is no longer referred to in the latest official EC (2019a) guidelines, in practice the document continues to follow the same ISO-based lines as before.

## EVALUATION OF THE NRAs

Has the effort to approximate European NRAs been successful? We address this question by systematically evaluating the available results against the aforementioned EC documents as well as the original goals and objectives, paying specific attention to the comparability of the NRAs.

## Data and comparative indicators

While the latest EC overview (2017) makes full use of the 28 + 3 NRAs, for outsiders only a handful can be found in public sources, especially in their English editions. We have identified eight of these. Some were published/updated after the 2014–2015 editions that were used in the EC's (2017) latest overview. We pay particular attention to the latest available editions, listed in Table 1. Due to the data limitations (our sample is 8/31 or 26%), our analysis necessarily draws only a rough and perhaps somewhat biased picture of state of the art. By the same token, it is plausible that the published NRAs represent the better than average in terms of quality.

For our comparative evaluation, we have chosen three basic indicators:

1. *how the concept of “risk” is defined?*
2. *how the task of “risk assessment” is understood?*
3. *what type of methodology is used?*

The EC overviews (2014, 2019a), as well as its nonbinding guidelines (2010a, 2019a, 2019b), provide a natural reference point for our evaluation. As the 2010 guidelines directing the latest round are literally based on ISO 31000, this international standard can also be used as an authoritative nonbinding reference point. Furthermore, to gather more hands-on information, we have also interviewed some practitioners both from the participating countries and the EC who have been involved with the processes discussed here.<sup>1</sup>

To enhance the comparability of our findings, we have formalized our evaluation, with slight adaptations, on the four-score weighted scale proposed by ISO in a related field (ISO/IEC, 2014, 5.3), as indicated in Table 2.

What this means is that we understand the three basic indicators above, and their subcategories, as organizational process capability goals that have more or less been achieved compared to the guidelines and standards presented above and detailed below. Our evaluation of the NRAs is, of course, *subjective*.

## Definition of risk

### Clear risk definition

An effective RA includes a clear-cut definition of what constitutes a “risk.” The most simplistic definition is that “Risk = likelihood × consequences.” The concepts of “probability” and “impact” are often used instead if one wants to emphasize measurability. A somewhat more complicated risk definition should take into account the functional relationship of these two variables, namely that the value of one variable varies with changes in the values of a second variable. Following the EC (2010a, p. 16) guidelines, this is the case, for instance, when the consequences of a hazard are also a function of the preventive and preparatory measures to reduce the risk. In this case, one often uses the terms “probability” ( $p$ ), “vulnerability” ( $V$ ), and “exposure” ( $E$ ) to express this function ( $f$ ). The result is a nonlinear curve, which is expressed as “Risk =  $f(p \times E \times V)$ .” While the latest edition of the guidelines (EC, 2019a) does not include any formal risk definition, the JRC recommendations (EC, 2019b, p. 27) adopt the definition “ $H \times E \times V = R$ .” The left-hand symbols for H(azard), E(xposure), and V(ulnerability) are collectively defined as underlying risk drivers and capacities, whereas R(isk) is defined as the potential for future losses.

**TABLE 1** NRAs evaluated in the current article

Country	Latest edition		Older version(s)		Comments
	Year	Reference	Year	Reference	
DK	2017	DEMA (2017)	2013	DEMA (2013)	-
FI	2019	Mol (2019)	2015	Mol (2016)	2019 edition focuses on the trend of likelihood and impact, without updating the 2015 edition
IT	2018	PCM (2018)	2015	PCM (2015)	2015 version cannot be found, only mentioned in the 2018 version
NL	2016	NIPHE (2016)		Not available	NRA conducted yearly, updating the risk profile with new scenarios
NO	2019	DSB (2019a)	2014	DSB (2014)	Several scenario-specific RAs have been published between 2014 and 2019, combined into an NRA. Name of 2019 version was changed to "Analysis of crisis scenarios"
PL	2015	RCP (2015)		Not available	-
SE	2015	MSB (2016)	2012	MSB (2013)	2016 version shifts the focus toward capability assessment
UK	2017	Cabinet Office (2017)	2015	Cabinet Office (2015)	The National Risk Assessment, which the national risk register is based on, is not publicly available (classified Government version)

**TABLE 2** Evaluation scale

Evaluation	Description (% of goals)
Not achieved (NA)	Goals not achieved (15%)
Partly achieved (PA)	Goals partly achieved (+35%)
Largely achieved (LA)	Goals largely achieved (+35%)
Fully achieved (FA)	Goals fully achieved (+15%)

## All-hazard approach

The EC (2010a, 2019a, 2019b) guidelines expect the NRAs to be based on the all-hazard approach, as opposed to merely focusing on certain types of hazards, such as terrorism or natural disasters. This approach is formalized in the EC (2010b, Action 2) *Internal Security Strategy*, where the task of the European-level RA was literally defined as “covering in principle all-natural and man-made disasters.” In more detailed definitions, one usually differentiates between nonmalicious and malicious man-made hazards, and technological hazards are often understood as a separate risk category.

## Including complex/multirisks

Risks might be regarded as unrelated phenomena, as individual risks. However, in the RA literature (e.g., Aven & Zio, 2014; Carpignano et al., 2009; Gallina et al., 2016), as well as in the EC (2010a, 2019a, 2019b) guidelines, encouragement is also given to consider so-called complex and multirisks. Many disaster risks are naturally multirisks, like extreme weather, for example, may trigger technological and social risks. Complex multirisks are, however, difficult to estimate based on the historical data because such data does not provide much evidence for anticipating the thousands of potential coincidences, dependencies, and interdependencies. Consequently, to identify the possible multirisk chains, one may have to use rather complicated modeling and simulations (e.g., Komendantova et al., 2014; Mun, 2006; Schmidt et al., 2011), or add well-structured “what if” scenarios or similar qualitative techniques (Card et al., 2012; Han & Weng, 2011).

## Including cross-border risks

The EC (2010a, pp. 32–34) guidelines have a section on cross-border risks. While they do not actually demand the same from NRAs, they “encourage” the development of cross-border RAs, “in particular on floods.” In contrast, the 2019 guidelines (EC, 2019a) emphasize cross-border risks in particular, asking member states to focus on the ‘key’ cross-border risks. While the latter guidelines were not in place before the last round, one could still expect the NRAs to touch upon the cross-border dimensions of risks.

## Multilevel consequences

The EC (2010a, p. 17) guidelines differentiate between the human, economic and environmental, and political/social consequences or impact: “In risk identification and risk analysis, all three categories of impacts should always be considered when

assessing the impact of any analyzed event, hazard, or risk, including for risk scenarios and multi-risk assessments.” This is repeated in the 2019 edition, with specific emphasis on risks that “have significant adverse human, economic, environmental and political/social impacts (including security)” (EC, 2019a, p. C 428/15).

How does our sample of NRAs measure up in terms of the above-described perspectives? Table 3 summarizes our findings in accordance with the evaluation scale presented in Table 2.

As Table 3 shows, the results are mixed. Most countries include a short description of the risk concept, but some do not discuss it at all. In general, the countries score quite well on including multi- and cascading risks, and multilevel risk impacts, but there are some shortcomings when it comes to taking an all-hazard approach. Some countries tend to direct the focus of the assessments toward well-known natural hazards, such as earthquakes and hurricanes, with limited focus on emerging and new threats. Nevertheless, the majority of countries manage to capture a wide range of hazards that could possibly affect vital functions in society. For instance, Denmark defines a broad range of incident types, stating that “an incident means a delimited sequence of events that has significant and immediate negative consequences for society [...]” (DEMA, 2017, p. 6), not excluding any hazard or threat when identifying risks. Sweden defines four risk categories: natural hazards, major accidents, disruption to technical infrastructure and supply systems, and antagonistic incidents (MSB, 2016, p. 11). Most countries also highlight the cross-border and global nature of risk. However, this is often included only indirectly, while comprehensive cross-border RAs are lacking.

## Understanding RA

Even a cursory glance at the RA literature reveals that the vocabulary is rather confusing (cf. Renn, 2006, Annexes A–B, pp. 86–156). The EC (2010a) guidelines rely on ISO 31000 for a clear, comparable reference point. However, while the 2019 guidelines edition (EC, 2019a) does not mention ISO, it largely follows the previous edition in its RA guidance. The JRC recommendations (EC, 2019b), instead, are literally based on the ISO 31000 guidelines. Hence, we should expect the member states to follow the recommended standard to some extent.

**TABLE 3** Definition of risk

Country	Edition	Clear risk definition	Considering all-hazard risks	Considering multi- and cascading risks	Considering cross-border risks	Considering multilevel risk impacts
DK	2017	LA	LA	PA	PA	LA
FI	2019	NA	LA	LA	PA	LA
IT	2018	PA	NA	PA	PA	PA
NL	2016	LA	LA	LA	PA	LA
NO	2019	PA	LA	LA	PA	LA
PL	2015	PA	PA	LA	PA	LA
SE	2016	PA	LA	LA	LA	LA
UK	2017	PA	LA	LA	PA	LA



According to this standard, the umbrella concept is *risk management*. This refers to all of the coordinated activities illustrated in Figure 1.

Thus, RA is a part of this broader process. Before any organization, in our case a member state embarks on preparing an RA, several parameters must be in place. The ISO standard speaks about *the scope, context, and criteria* (ISO, 2018), while others may use such expressions as defining the risk environment (Pritchard, 2015, pp. 26–33). The JRC recommendations (EC, 2019b, pp. 17, 18) define the specific context for NRAs (albeit not available before the latest NRA round) as follows: what should be protected; which hazards the country is exposed to; which impacts should be considered; a time window for the assessed risks; the classification of likelihood and impact levels; quality levels in terms of uncertainty acceptance; a protocol for the use of expert opinion; and risk criteria for evaluating the risks to be treated.

During the whole risk management process, one is expected to engage in a *communication and consultation* process with the stakeholders to ensure that all of the risks and specific interests, priorities, knowledge, and expertise will be taken into account. In our case, it would include the relevant national and local authorities, but the private sector (e.g., infrastructure operators), civil society (relevant NGOs such as the Red Cross), and academia (research institutions) should also be consulted. This information is supposed to be found in the NRAs.

*Risk identification* is the initial process of recognizing and recording risks. It comprises a mapping exercise, leading to a preliminary long list of risks and their possible combinations. It should include risks whereby the source(s) can be controlled by an organization, as well as those that cannot be controlled.

*Risk analysis* is about determining the *level* of risk in particular, at least by making a likelihood analysis and consequence analysis and then combining these two variables into a risk. In this phase of NRA, one usually deals with several risks pinpointed in the risk identification phase. One then assesses individual risks one by one before finally putting them in a comparable perspective, for instance, in a risk matrix, in order to gauge the relative risk levels.

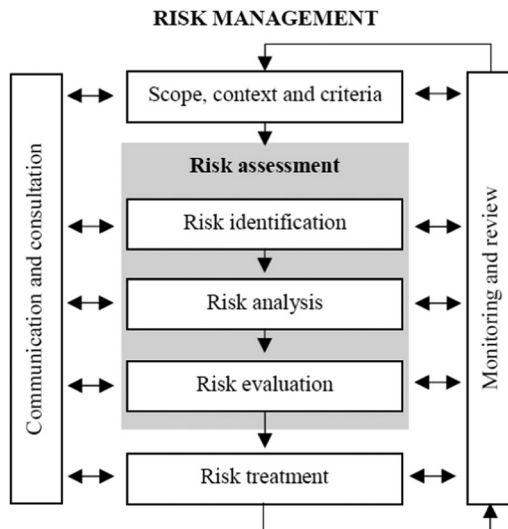


FIGURE 1 ISO 31000 risk management process

*Risk evaluation*, as the last phase of RA proper, is the process of comparing the results of the risk analysis with the risk criteria to determine whether the risk is tolerable or not (i.e., whether it needs to be “sent on” for *risk treatment*). In the EC’s first guidelines (2010a), valid for the most recent round, it was expected that risk evaluation would be included in the NRAs.

The ISO 31000 framework also presupposes that risk management is not a one-time exercise, but rather an iterative process that should be constantly *monitored and reviewed*. The indicator in our case concerns whether the current NRA has taken into account the possible changes in the risk environment and changed or added something to the current edition compared to the previous one(s). We only have a rough estimation of this as we do not always have access to previous NRA editions (even if they may exist).

Table 4 presents our estimations of how well the NRAs follow the indicator-based scheme above.

All eight countries have a rather good understanding of the basic elements of RA. In particular, “monitoring and reviewing” receive high scores, indicating that all or most countries continuously update their assessments. Some countries fail to define and set the scope for the assessment in detail, with inadequate explanations of how the different scenarios are identified and why they are included. However, most of the countries define the scope and set the context in a systematic and comprehensive manner, also presenting the criteria for the assessment. For instance, the Netherlands explains how a scenario is obtained, presents the requirements of a scenario (in terms of likelihood and consequences), and indicates the time horizon for the incident scenarios. All countries include satisfactory risk identification and analysis. However, there seems to be a trend among the Nordic countries (Sweden, Finland, and Denmark) of prioritizing comprehensive capability assessments rather than, or in addition to, risk analysis; this feature was indeed duly added to the latest EC (2019a) guidelines.

At the lower end, risk evaluation stands out as being the weaker (or missing) component. Only one country included a formalized risk evaluation, using risk acceptance levels. Indeed, the latest EC guidelines (2019a, p. C 428/15), published after the last round, reacted by stating that risk evaluation would no longer be required in the NRAs due to its “political nature.” The Swedish NRA summary provides some indication of what this means: “MSB deems it very difficult, if not impossible, to

**TABLE 4** Understanding risk assessment

Country	Edition	Setting the scope, context, and criteria	Communication and consultation	Risk identification	Risk analysis	Risk evaluation	Monitoring and reviewing
DK	2017	LA	LA	LA	PA	NA	LA
FI	2019	PA	LA	LA	PA	NA	PA
IT	2018	PA	PA	PA	LA	PA	LA
NL	2016	LA	LA	LA	LA	PA	LA
NO	2019	LA	PA	LA	LA	NA	LA
PL	2015	LA	PA	LA	LA	LA	LA
SE	2016	PA	LA	PA/LA	PA	NA	LA
UK	2017	PA/LA	LA	LA	LA	PA	LA

determine thresholds for acceptable levels of risk. Furthermore, measures should not be prioritized based on a risk evaluation, but should instead be prioritized based on vulnerabilities and deficiencies in capabilities identified in the scenario analyses. Consequently, the Swedish assessment does not include a risk evaluation" (MSB, 2016, p. 10). Nor does the Norwegian NRA, albeit for a different reason: "The last two steps of the risk management process—risk evaluation and risk treatment—are not included [... in the NRA]. Herein the responsibility lies with the individual ministries, which must also make a more detailed analysis of risks and vulnerability within their own area of responsibility" (DSB, 2019b, p. 8).

## Methodology of the NRAs

Presumably, the biggest challenge for the NRAs is methodological. To evaluate this issue, we have chosen to focus on five indicators that we see as being the most appropriate given the methodological guidelines proposed by the EC (2010a, 2019a, 2019b), as well as the more general RA literature.

### Input type

ISO 31000 (ISO/IEC, 2009, 2019) discusses several RA methodologies in some detail, always stating certain basic input elements, be they basic societal data, historical loss data, expert evaluation, and so forth. There is one input methodology that feeds through the whole RA process, namely well-developed scenarios in NRAs. The EC guidelines (EC, 2010a, pp. 13, 21, 22) and JRC (Poljanšek et al., 2017, pp. 13, 47) ostensibly recommend using scenarios to examine complex and untypical developments in particular.

### Reliability

Intuitively, one should demand some kind of reliability from an RA, no matter which type of methodology (quantitative, semiquantitative, or qualitative) one uses. The simplest characteristic of reliability is that the same information can be obtained repeatedly, irrespective of who gathers the information or designs the process. While in qualitative analysis the data is not strictly repeatable and measurable, such attributes as a reflection on one's own perspectives, representativeness of the findings in relation to the phenomena, consistency, or auditability can be demanded (Golafshani, 2003; Mayring, 2004).

### Validity

While the study may be reliable, it does not mean that its methodology is valid (Creswell & Miller, 2000; Noble & Smith, 2015; Whittemore et al., 2001). In our context, validity is best understood to the extent that the methodology assesses the right elements of the issue one wants to assess. In the RA literature (e.g., Pritchard, 2015; Yoe, 2012), the message is that the methodology should be chosen depending on the task at hand. This may require the use of separate methodologies or combinations thereof for each RA *phase* (see Figure 1), as expressed in the ISO standard's attached

technical document (ISO/IEC, 2009, 2019). Furthermore, the JRC recommendations (EC, 2019b, p. 30) make the point that each *type* of hazard also requires its specific RA methodology.

## Uncertainty

However, the criteria of reliability and validity are problematic when the uncertainties are extensive (Aven, 2016, p. 3; cf. Bellavita, 2006; Gundel, 2005; Veenema & Woolsey, 2012). Strictly speaking, the distinction between risk and uncertainty is that risks based on historical loss data and known vulnerabilities can be described as strictly probabilistic outcome distributions, whereas uncertainty cannot (Andersen, et al., 2014, pp. 37, 38; Pritchard, 2015, p. 7). It is therefore important for it to be clearly expressed whether it is a question of a probabilistic risk or whether it is about a nonprobabilistic uncertainty or a combination of some sort, and how this ambiguity is assessed. For the latter alternative, there are plenty of semiquantitative and qualitative methodologies available for different types of expert assessments (e.g. ISO/IEC, 2019) that may be deemed reliable and/or valid, with a certain level of uncertainty of output (Aven, 2016; Klink & Renn, 2002; Mastrandrea et al., 2010).

## Output type

In the generic RA literature, as well as in the EC guidelines (2010a, 2019a, 2019b) and ISO 31000, one usually differentiates between quantitative, semiquantitative, and qualitative methodologies. While ISO 31000 does not directly recommend using any particular methodology, one of the main criteria for a methodology is whether it can provide quantitative output. The EC seems to lean toward quantitative methodologies, at least when it comes to the consequence/impact side of the risk: "Impact analysis should rely as much as possible on empirical evidence and experience from past disaster data or established quantitative models of impact" (EC, 2010a, p. 18). The JRC recommendations (EC, 2019b, p. 20) emphasize more strictly that the results of the NRA "should be quantified and presented in a way that is useful to the stakeholders."

Table 5 presents a summary that draws on our evaluation of the NRA methodologies following the above indicators.

All eight countries included historical data as well as expert evaluation to a large extent in their assessments. A good example is a Norwegian assessment, which used different types of data sources, depending on the scenario. For instance, when analyzing a natural hazard, technical and scientific methods were applied, integrating quantitative (historical) data to estimate probabilities. At the same time, methods closer to social science were used to analyze other types of scenarios, such as malicious attacks, integrating knowledge from experts to estimate both the likelihood and the consequences of certain scenarios. However, there were some weaknesses among the NRAs when it comes to how the data was collected, systematized, and processed, duly affecting reliability. With respect to validity and uncertainty, only one country used tailored quantitative RA methodologies for each natural hazard. Most countries included some uncertainty assessment, but this was only qualitative in general. Yet those who did better than most used a systematic, transparent, and well-considered uncertainty assessment methodology (e.g., DSB, 2019b, pp. 19, 20; NIPHE, 2016, p. 13), whereas others were content with a rather intuitive assessment. A common approach was to present the RA results on some kind of semiquantitative

**TABLE 5** Methodology of the NRAs

Country	Edition	Combined evaluation for risk identification, risk analysis, and risk evaluation					Output type
		Input type	Reliability	Validity	Uncertainty	Output type	
DK	2017	Research and discussion with experts and responsible authorities + historical data	PA	PA	PA	PA	Qualitative, verbal description
FI	2019	Amalgamation of the different actors' individual risk assessments	PA	NA	NA	NA	Qualitative, verbal description
IT	2018	Historical data and expert opinions	LA	LA	LA	LA	Quantitative
NL	2016	Historical cases, indices, practical experience, expert knowledge	LA	LA	LA	LA	Semiquantitative
NO	2019	Expert judgements and historical data	LA	PA	LA	LA	Semiquantitative
PL	2015	Historical data on the basis of fragmentary reports	LA	PA	NA	NA	Semiquantitative
SE	2016	Historical data, expert opinions	PA/LA	PA	PA	PA	Qualitative, verbal description
UK	2017	(Semi) quantitative historical data, expert opinions	PA	NA <sup>a</sup>	NA <sup>a</sup>	NA <sup>a</sup>	Semiquantitative

Abbreviation: NRA, national risk assessment.

<sup>a</sup>We do not have access to the NRA as such, only the national risk register, on the basis of which it is difficult to assess the methodology in detail.

scale (such as low, medium, high). A few countries only included a discussion on the occurrence and impact of the scenarios, while only one country presented purely quantitative results.

## WHAT EXPLAINS THE UNFINISHED EUROPEANIZATION OF NRAs?

While the approximation effort with regard to the NRAs has been based on rather minimal regulation at the European Union level, the EC has nevertheless acquired certain responsibilities beyond its original powers in the respective policy area. It has been able to gather a great deal of useful information through the practice discussed above and to influence the national NRA practices to some extent. This development has taken place in a field that, in principle, is not subject to supranational policies.

### The weakness of the EC mandate?

Despite the achievements, the original main goal, namely the comparability of NRAs, has not been entirely successful thus far. Based on our evaluation above, as well as on the EC's (2014, 2017) own overviews, and confirmed by our small-scale personal interviews, the quality level, in general, is too uneven and the methodological choices too diverse to enable a scientifically sound comparison between countries. The EC (2010a) guidelines as such, had they been followed, would have resulted in a more comparable overview as they are based on the ISO 31000 standard. However, at least one of our interviewees, responsible for preparing a member state's NRA, remarked that ISO 31000 is designed for organizations and is therefore unsuitable for NRAs, duly flagging up some basic differences with regard to what should constitute a national-level RA.

One could simply argue that the existing regulation, in spite of its vagueness, explains the successes of the current integration effort, and the weakness of the EC mandate, in turn, the shortcomings.

### Or creeping competence of the EC?

Yet it is interesting to consider this process from a wider European integration perspective. The above-described development is indeed not untypical in the European Union. It follows the tendency of what has been labeled "creeping competence" (Pollack, 1994, 2000; Princen, 2016; Princen & Rhinard, 2006) or "informal governance" (Christiansen et al., 2004; cf. Kleine, 2014) in the European integration literature. The current study thus confirms the previous empirical observations in such fields, inter alia, as the environment, regional development, research and technological development (Pollack, 1994), critical infrastructure protection (Pursiainen, 2009), energy (Maltby, 2013), civil security (Kirchner et al., 2015), Common Foreign and Security Policy (Bergmann, 2019; Riddervold, 2016; Riddervold & Rosén, 2016), and health policy (Greer & Löblová, 2017).

### A functionalist need?

In terms of traditional integration theories, the slowly but surely developing integrative practice described above can firstly be seen as an application of the

traditional *functionalist* approach (Haas, 1958), or its revised *neofunctionalist* version (Haas, 1964, 1990; Schmitter, 2005). States are voluntarily assigning some expert-level duties, control, and authority to a supranational power in the name of their functionalist needs. In our case, these needs are related to the EU-level coordination of DRM, including investments, operative support, training, R&D, and so forth in conditions where many risks have a cross-border dimension.

This development can also be seen as a spillover from closely related fields, within the preconditions of growing risk interdependencies. If technical agenda-setting power is regarded as included in the (neo)functionalist toolbox (Greer & Löblová, 2017; Princen, 2016, p. 361; Princen & Rhinard, 2006), its inherent logic necessarily enhances supranational elements in the governance of the EU member states.

## The rational state?

Yet the *intergovernmentalist* logic (Moravcsik, 1993, 1994; Moravcsik & Nicolaïdis, 1999; Rosamond, 2000, pp. 130–156) could also be defended to some extent, pointing to the fact that this development is best explained by relying on the assumption of rational states behaving according to their self-interest. In our case, one could argue that member states are just working in a win-win setting with the EU but are still well aware of their sovereignty. This logic has, however, often been seen as incapable of capturing the real dynamics in European policies in such “hybrid” areas as ours (e.g., Kirchner et al., 2015).

Yet, reflecting the intergovernmentalist logic, one could also point out the difference between high politics and the *low-politics process* (Princen & Rhinard, 2006). The technical character of the current issue area might indeed explain the relatively smooth implementation of the NRA approximation, as far as it does not penetrate high-politics interests. Some case studies following the same logic have also suggested that while the EC may influence emerging integrative developments when the process is in its infancy, the member states are likely to increase their influence when the process is institutionalized (De la Porte, 2011). One should then expect a phase during which member states redefine the original task or their ownership of the approximated NRA process. Indeed, some signs of this were identified above.

## Multilevel governance in the context of asymmetry of information?

Furthermore, the current case could also be regarded as an example of European *multilevel governance* (Tömmel & Verdun, 2009) or a hybrid governance system, where nearly all policy areas are covered by the EU, either through formal competences or, as in our case, through coordination and facilitation. Our case could then be explained by the claim that the structure of governance is supposed to reflect the efficient production of the public good (European DRM) and/or that governance should at least mirror the patterns of the community (the EU) where it takes place (Schakel et al., 2015).

Some studies have considered *bargaining theories*, with varied results (Riddervold, 2016), while others have proposed semi-official *policy networks* (Christiansen et al., 2004) to explain the increasing informal supranational power. It is, however, difficult to find evidence to that effect for our case. More relevant, perhaps, is the *principal-agent theory* (De la Porte, 2011; Pollack, 2003). The governments (principal) delegate their power to the EC (agent) due to an asymmetry of information, with the latter being able to obtain a better overview of European-level risks.

## Positivist or postpositivist explanation?

As none of the above grand or middle-range theories as such can be dismissed as irrelevant, in the era of “analytic eclecticism” in international studies (Haas & Haas, 2002; Sil & Katzenstein, 2010) one is inclined to open the door to combining some theoretical perspectives. In essence, this eclecticism is already at the core of neo-functionalism (Schmitter, 2005). One example of this kind of amalgam is Boin et al.'s (2013) effort to explain the institutionalization of the European level of crisis management from a more general perspective. They consider three “dimensions” in their descriptive explanation, including the regulatory outputs (the more the better), network configurations within a sector (the tighter the better), and level of legitimacy (the higher the better).

The above is also applicable to our case, where we can find a combination of bottom-up and top-down elements, working imperfectly and gradually, but still creating a kind of “creeping competence” logic of integration in our particular field. Yet no conclusive lessons can be drawn from our exercise in terms of how to explain such phenomena. Should we look at this from a social science perspective, it seems that both positivist and constructivist logic apply.

From a positivist perspective, the functional integrative pressure would be the independent factor. The dependent variable, that which we aim to explain, would be the more or less approximated NRAs. The EC, and its interactions with the member states' civil protection authorities, would then be the intervening variable. The intervening variable would in this case explain the outcome, because it would not have happened without it, at least in such a manner and at this time.

From a postpositivist perspective, it is more about the constantly revolving agent-structure interaction. Initiated by the EC, or perhaps by some persuasive individuals within this particular bureaucracy, the discussion ultimately turned from national risks toward common or similar risks incurred by the member states. The previous structure of nationally defined risks was therefore challenged. The initial reports from the EC made sense to the higher-level decision-makers. The agency of both the EC and the member states' civil protection authorities, their activity or inactivity, professionalism or nonprofessionalism, had to re-orientate to this new demand. The negotiated agreements and conflicts, in the absence of a ready-made supranational governance system, then produced a temporarily agreed-upon but variously understood new structure in this particular field.

## CONCLUSIONS

The current study has focused on national disaster RA in Europe, an area where the member states still have sovereignty, but where the EU/EC has gradually assumed more tasks and power with regard to its guidelines, agenda-setting, deadlines, and overviews. The regulation, agreed by all member states, is not excessive, but with its obligation to produce NRAs every three years, it is still rather effective.

It has then become the task of the EC to facilitate the comparability and quality of the NRAs, albeit without any enforcement mechanism. The EC has become increasingly sophisticated and ambitious over time, with the whole process probably serving as a learning process in itself. While its guidelines and subsequent overviews are not binding upon the member states, the level of normative pressure is implicitly increased, expressing some dissatisfaction as to the quality of some of the NRAs and their general comparability.



The above discussion indicates that this development has not been without challenges. While the current practice has led to a quantitative and qualitative gradual enhancement of the knowledge needed to assess disaster risks in Europe and in individual countries, it has resulted in mixed results as to the quality and comparability of the NRAs. The latest EC (2019a) guidelines, with an approach based on a questionnaire, are designed to enhance the comparability of the NRAs in the future. At the same time, some difficult issues, such as the role of ISO 31000 or risk evaluation, are circumvented to avoid controversy. While this might foster cooperation, it does not resolve the underlying methodological disagreements and enhance the comparability of NRAs.

Based on our short discussion on the mechanisms of integration, we concluded that there are several theoretical approaches that provide partial explanations of our case. The best candidate, however, might be *neofunctionalism*, which would capture most of the elements that we see in our case. One can pinpoint two relevant inter-related features of this logic. First, it is argued that integration is not to be seen as a conflict-free and automatic deepening or spill-over process. Second, a mere functionalist integration will fall short if political leaders (as well as citizens) do not become interested in partially shifting their loyalties, expectations, and political activities beyond existing national bodies to the interstate and perhaps supranational level.

Whether or not this deepening integration will be the future of NRAs is more important in this context than the triennial practice itself, or even DRM in more generic terms. If disaster risks become more Europeanized, it means that policymakers and citizens alike will share European rather than mere national risk scenarios and will also demand more European-level solutions. The converse, naturally, is that the member states will mainly define their risks on a national basis, and try to find national solutions, respectively. The latter may effectively serve to undermine the larger European project in the future, particularly during major crises and disasters.

## ENDNOTE

<sup>1</sup>(a) *In-depth interview* of one of the key European Commission officials in this field (on September 28, 2018); (b) *in-depth interview* of a person responsible for the NRA process in a member state (January 21, 2019); (c) an *email exchange* with a person responsible for another member state's NRA process (January 10, 2020); and (d) a *workshop* discussing the processes related to NRA with the participation of practitioners that have taken part in the processes (February 27, 2020). The minutes of the above are in possession of the authors.

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