Introduction to Regulation of Risk

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Argüello et al.

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1 Understanding Risk

Risk is a complex topic intersected by law, policy, and politics, making it an interesting and important subject of study. We currently live in a time that is fraught with risks such as climate change, political upheavals, security, armed conflict, liability. Risk is also the subject of considerable discussion and action, which further adds to its relevance as a topic of research. Humankind has experienced discrete risks, including earthquakes, epidemics, famines and floods, since time immemorial. Discrete risks[[1]](#footnote-1) are usually understood in objective terms as features of reality that are not dependent on “subjective and social factors”[[2]](#footnote-2) and are externally imposed on humans.[[3]](#footnote-3) Within this approach, risk is not only related to harm, but it is also conceived as a calculation mechanism, i.e., to understand the extent of undesirable events.[[4]](#footnote-4) Risk is then defined in probabilistic terms, i.e., “probability of a particular event (or hazard) occurring and the consequent severity of the impact of that event.”[[5]](#footnote-5) Traces of the probabilistic definition of risk is found in legal scholarship as well, where risk may be conceptualised as “the possibility of harm or loss associated with an activity, or the likelihood of an incident happening that may result in danger to life, property or the environment, or may lead to commercial disputes and litigation.”[[6]](#footnote-6) The translation of risk into probabilities makes it possible to assess its potential harm and manage it, for example, through insurance and quality standards.

While risk has traditionally been externally imposed and, in broad terms, quite predictable, modernity radically changed “the way of dealing with hazards and insecurities.”[[7]](#footnote-7) Sociologists characterise the change introduced by scientific and technological progress as the dawn of the “risk society.”[[8]](#footnote-8) Unknown to pre-industrial societies, modernity introduced a risk that looms over humans as an omnipresent threat and permeates social life. To name a few, humans are exposed to a myriad of risks due to our dependence on fossil fuels, production of dangerous chemicals, pesticide use, intensified resource exploitation, carriage of dangerous goods; trade of weapons; testing of mass destruction weapons, development of autonomous and intelligent systems, biotechnology, high-speed transport systems, and the advancement of technologies for making large-scale interventions in the climate system. In modern societies, risk is no longer externally imposed but is “morally cognisable.”[[9]](#footnote-9) As Oberdiek points out, humans, rather than the external world, are imposing risk because we are, usually, the creators of risk, and we own the responsibility to take active action to prevent to the extent possible the negative consequences of such scientific and technological development.[[10]](#footnote-10) Giddens also makes a similar point by referring to the risk society in terms of “manufactured risks”[[11]](#footnote-11) resulting from human, technological and scientific endeavours. In the words of Beck, the semantics of risk have changed in modern societies due to the “present thematisation of future threats that are often a product of the successes of civilisation.”[[12]](#footnote-12) The risk society is not fundamentally more dangerous per se, but societies are more aware of possible future scenarios and, therefore, more prone to action.[[13]](#footnote-13) In these scenarios, notions of prevention and safety are prevalent.

When risk cannot be anticipated, the legal system may not be able to prevent and compensate for harm. Eventually, the legal system may fail to deliver legal certainty. For this reason, novel regulatory alternatives have been proposed, including, for example, adaptive management and inclusive governance. In the fields of environmental law, financial markets, administrative law, social welfare, and medical law, adaptive management has been suggested as an alternative to deal with modern risks.[[14]](#footnote-14) Such management refers to “learning by doing”[[15]](#footnote-15) and acknowledges that social and natural systems constantly change. Taking into consideration this state of constant change, the legal system is called to provide the tools to periodically evaluate legislative objectives and establish flexible mechanisms for adjustment in light of changing circumstances, including, for example, new scientific knowledge. Inclusive governance requires a broader set of required actions both from governmental and non-governmental actors. Arguably, the assessment and management of risk require the participation of multiple stakeholders, including scientists, policymakers, legislators, industry representatives, and civil society organisations.[[16]](#footnote-16) More involvement of non-governmental stakeholders has been linked to behavioural change and added legitimacy to regulatory processes because:

including … many actors in defining the problem space and exploring the solution space has been proven to be a reliable and valid method to cope with complex and contested policy options … Inclusive governance is based on the assumption that affected and interested parties have something to contribute to the governance process and that mutual communication and exchange of ideas, assessments and evaluations improve the final decisions.[[17]](#footnote-17)

The risk society also has implications for the justification of regulatory intervention. Decision-makers are more prone to use the language of risk to frame State interventions as legitimate. This implies that areas regulated in the “name of risk have been expanding significantly, most particularly through the 1990s.”[[18]](#footnote-18) Additionally, since modern risks are usually transboundary, Beck points out the steady transition to a “cosmopolitan imperative” where international and regional cooperation is paramount for the regulation risk.[[19]](#footnote-19) The increased awareness of transboundary risk may explain international law’s “expansion and differentiation”.[[20]](#footnote-20) Expansion relates to the regulation of areas previously unnoticed by the States, while differentiation refers to the continuous sophistication and enactment of detailed rules.[[21]](#footnote-21) The subjects of this book, i.e., trade, transport, and the environment, are good examples of this cosmopolitan imperative.

In risk societies, risk acceptability and risk tolerance are highly controversial issues.[[22]](#footnote-22) As previously explained, the risk society calls for the involvement of multiple stakeholders. However, reaching a consensus is not an easy task in a regulatory framework where multiple actors influence decision-making processes. Even if not directly involved in decision making, societal actors are increasingly interested in receiving information on risks they are exposed to. In legal terms, this interest has been translated, for example, into disclosure obligations in product safety law, and procedures of informed consent within the medical field.[[23]](#footnote-23) Science has also been an important source to justify the existence of risk and regulatory action. Still, expert knowledge is met with increased scepticism.[[24]](#footnote-24) Anti-vaxxers and climate change deniers are good examples of the contested perceived value of scientific knowledge. It brings to the fore questions about the privileged position of science to address complex matters and prevent risks.[[25]](#footnote-25) These examples also show that informing the public about broad scientific consensus is not enough to shape the risk perception in societal actors.[[26]](#footnote-26)

Modern risk intensifies the debates about the role and function of the welfare State. Due to the complexity and ubiquitous nature of contemporary risk, it appears that States are failing to prevent, assess and manage the risks of, for example, climate change, biodiversity loss, or data security. It is debatable also whether security and prevention justify giving more extensive powers to the regulatory State. The covid 19 pandemic evinced profound disagreements about the legitimacy of State interventions across the globe.[[27]](#footnote-27) Overall, if regulatory intervention is deemed insufficient or overly intrusive, distrust in governments and political institutions may ensue.[[28]](#footnote-28) Used as a justification for regulation, risk may be categorised as paternalistic and perceived as a tool to curtail individual freedoms.[[29]](#footnote-29)

The transition into a risk society has also implications for risk as an object of regulation and risk as a justification for regulatory intervention. As an object of regulation, modern risks (e.g., climate change, pollution, biodiversity loss, cyberattacks) are not easily framed as probability questions. They are usually delocalised and are non-compensable through monetary valuations and insurance schemes.[[30]](#footnote-30) In fact, these risks generally have transboundary effects, are cross-sectoral (i.e., factors taking place in several fields are intertwined, such as trade, environment, transport, and health) and causal relationships are stochastic.[[31]](#footnote-31) Therefore, traditional legal concepts, such as causality, foreseeability, and negligence, lose their significance in the risk society.[[32]](#footnote-32)

2 Risk, Catastrophe and Uncertainty

The dawn of the risk society is not synonymous with a fatalistic or catastrophic outlook of the future.[[33]](#footnote-33) Therefore, it is essential to distinguish between modern risk, catastrophe, and uncertainty. Risk is always abstract. Once it materialises, the consequences could be considered a catastrophe,[[34]](#footnote-34) which Posner defines as an event with “a very low probability of materialising but that if it does materialise will produce a harm so great and sudden as to seem discontinuous with the flow of events that preceded it.”[[35]](#footnote-35) Catastrophic risks are also referred to as “low-occurrence, high-impact risks” and evidence shows that these risks receive more attention in risk governance.[[36]](#footnote-36) Complex risks require careful consideration of how resources are allocated while being aware that a particular policy may reduce risk while at the same time creating new hazards and other novel risks.[[37]](#footnote-37) For example, in geoengineering research, international law is a co-creator of risk and not a passive recipient of scientific and policy developments. Catastrophic risks include both externally imposed risks and morally cognisable risks, including volcanic explosions, tsunamis, nuclear waste leakage, chemical pollution, massive biodiversity loss, bioterrorism, poor geoengineering deployment, and the most recent example, the covid-19 pandemic. War and the ruling of tyrants have also been categorised as catastrophic risks.[[38]](#footnote-38) The Russian invasion of Ukraine that started on 24 February 2022 is a painful reminder of the devastating consequences of war, ranging from millions of internally displaced persons to numerous others who have already fled the country to find refuge in neighbouring States. Ukraine’s economy and health system have also been severely affected and since Russia is a major exporter of oil and natural gas, the global economy has not been immune to the war.[[39]](#footnote-39) Once a catastrophic risk materialises, mitigation is not only costly, but the consequences may not always be contained, and the damage may be irreversible. For instance, unilateral sanctions that are used to combat the threat to peace or acts of aggression have other far-reaching consequences for trade, finance, transport, and the society at large.

Finally, when the future becomes unmeasurable, we leave the realm of risk and enter the field of uncertainty. While risk, to some extent, is predicted and measured, uncertainty relates to unknown future scenarios that cannot be assessed or predicted.[[40]](#footnote-40) The management of uncertainty is not based on statistical calculations but rather on expectations, “professional judgment, ordinary foresight, rule of thumb”,[[41]](#footnote-41) or “multivalent degrees of belief.”[[42]](#footnote-42) Notably, According to the 9/11 Commission, the terrorist attacks that occurred on 9/11 in New York were not prevented due to “failures of imagination.”[[43]](#footnote-43) Arguably, policy and decision-makers alike adopt rules and make decisions while facing uncertainty and need to be able to contemplate multiple future scenarios.[[44]](#footnote-44) The contributors to this book reflect on future and diverse regulatory frameworks while dealing with numerous uncertain futures in trade, transport, and the environment.

3 Reflecting on the Regulation of Risk: A Diverse and Developing Agenda

While legal systems traditionally contend to provide legal certainty, i.e., stability and predictability *vis-à-vis* rights and obligations,[[45]](#footnote-45) risk may be seen as a potential threat to legal certainty due to its relation to danger, harm, or peril.[[46]](#footnote-46) In this case, risk is connected to harm[[47]](#footnote-47) which becomes the object of legal regulation.[[48]](#footnote-48) The role of the law is then to prevent, mitigate and eventually compensate for the negative consequences of risk. However, risk itself cannot be repaired because of its abstract nature,[[49]](#footnote-49) nor can it be absolutely prevented without jeopardising human progress. The acceptance or tolerance of specific risks in the name of human progress reveals its multidimensional nature. It entails that risk-taking is a worthwhile endeavour due to perceived or expected benefits.[[50]](#footnote-50) Overall, risk may be assessed, managed, and minimised using legal instruments that afford legal, economic, and technical measures. As Black explains, it is nothing novel for the legal system to regulate risk to protect human health, guarantee transport safety, secure well-functioning markets, or protect the environment.[[51]](#footnote-51)

Risk however is not only the object of regulation but also used as a basis for regualtion. In other words it can also be perceived as a fundamental tool for decision making that *justifies* a regulatory action.[[52]](#footnote-52) Regulatory intervention in such a case is then justified in the name of risk prevention, for example, to guarantee safety, health, or a clean environment.[[53]](#footnote-53) Defining and assessing the boundaries of legitimate regulatory intervention have attracted much scholarly interest.[[54]](#footnote-54) It has been contended that certain risks should be managed by the individual and not by the State. Some typical examples include dietary choices, or personal financial stability. In principle, one could argue that an individual should have the freedom to decide what to eat. In contrast, others could contend that regulatory intervention is needed considering the exponential rise of diseases such as diabetes.[[55]](#footnote-55) States may nudge individuals into healthier dietary choices by imposing, for instance, taxes on sugary products. Individuals may also be expected to manage their own financial independence, for example, through savings, and investments, while regulatory intervention may be justified to prevent financial risks, for example, through pensions.[[56]](#footnote-56) Much has been debated about the type of risks that should be collectively or individually managed in connection to the welfare State’s role, individual freedom and paternalism.[[57]](#footnote-57) Giddens, for example, characterises the welfare State as a collective risk manager. However, the boundaries between individual and collective risks are far from settled.

Connected with the discussion of risk is the management and regulation of risk to anticipate, prevent, control and mitigate future adverse consequences, potential harm, and loss. Different techniques and regulatory approaches may be employed to counter or manage risk. The following section provides a brief overview of selected regulatory alternatives:

3.1 Risk-Based Regulation

As risk became pervasive and morally cognisable in human societies, regulatory responses also proliferated and led to a perceived regulatory crisis in many industrialised States during the 1980s and 1990s.[[58]](#footnote-58) Over-regulation and high costs characterised this crisis.[[59]](#footnote-59) In this context, risk-based regulation emerged as a benchmark of good and cost-effective regulatory practices[[60]](#footnote-60) that comprised of establishing priorities for regulatory action.[[61]](#footnote-61) It includes a process for risk identification, scoring (e.g., from low, medium, high, or catastrophic risk),[[62]](#footnote-62) assessment, monitoring, and evaluation. In these processes, economic (e.g., ecosystem services valuations, cost-benefit analysis) and scientific techniques (e.g., risk assessment) justify a chosen regulatory decision.[[63]](#footnote-63) An illustration of a process could be found in international environmental law, where environmental impact assessments (eia s) have become a central tool for the identification of national and transboundary environmental risks. eia s provide relevant information to decision-makers and promote public scrutiny.[[64]](#footnote-64)

Risk-based regulation is increasingly popular across multiple jurisdictions and has been widely adopted in areas such as environment, food safety, transport, consumer law, and finance.[[65]](#footnote-65) However, it is also subject to several criticisms and challenges. First, it is not entirely clear how regulators prioritize, score, and assess risks. Although risk-based regulation is considered to promote efficient and consistent regulation, some empirical evidence points to the contrary. For example, in the field of food safety, Borraz et al. found substantial differences among four European Union (EU) member states applying risk-based inspections. According to these authors, risk-based approaches may have negligible impacts on “enforcement practices without more reflection on the assumptions, conceits, and institutional contexts that shape how risk is understood and used by regulators from country to country.”[[66]](#footnote-66) Baldwin and Black explain the challenges regulators face in defining risk and prioritizing those that need regulatory attention. They found three main factors influencing the definition and scoring of risk, i.e., theory and ideology, available operational resources and “political, communicative or reputational factors, stemming from their need to maintain their reputation and legitimacy.”[[67]](#footnote-67) Rothstein et al. also point out differences in implementing risk-based approaches in several sectors, including “finance, health and safety and environmental regulation.”[[68]](#footnote-68) However, these authors do find evidence of improved environmental quality achieved thanks to risk-based regulation.[[69]](#footnote-69)

Second, risk-based regulation relies heavily on reliable information, which is not always available.[[70]](#footnote-70) Gathering data may be costly and time-consuming, while the data may not necessarily be reliable in uncertain scenarios. Finally, the most substantial criticism against risk-based regulation is the perceived hyper-legalization of internal procedures. It appears that organisations are more concerned about preventing reputational risks and may be distracted from the actual management of societal risks.[[71]](#footnote-71) In the following sub-sections, we briefly overview two holistic frameworks developed to overcome some of the perceived limitations of risk-based regulation.

3.2 International Risk Governance Council

The International Risk Governance Council (irgc) was founded in the early 2000s in Geneva to support stakeholders, such as governments, civil society organisations and industries, in their efforts to *govern* risk.[[72]](#footnote-72) Professor Ortwin Renn is the prominent leader of this project with a holistic perspective to respond to the risk society. While risk-based regulation intends to identify the most “important” risks and “fix” them, traditional risk assessment, management and communication may not be sufficient. Especially in a regulatory environment based on hierarchical governmental structures and where the focus is exclusively on public or private regulators.[[73]](#footnote-73) Renn et al. focus instead on governance that we understand as legal and policy frameworks encompassing a wide range of stakeholders (both public, private and other civil society organisations), norms and processes involved in decision making at national, regional and international levels. Governance implies a dialogue between these stakeholders and, therefore, means a “nonhierarchically organised structure encompassing state and non-state actors bringing about collectively binding policies without superior authority.”[[74]](#footnote-74)

irgc focuses mainly on what the Organisation for Economic Co-operation and Development (oecd) initially labelled as systemic risks,[[75]](#footnote-75) distinctive to the risk society. Systemic risks are cross-sectoral and cannot be understood, framed or managed from a silo perspective. Climate change, biodiversity loss, artificial intelligence and autonomous transport vehicles, to name a few, are examples of systemic risks whose causes and consequences are routed in large scale technological, societal and political processes. These risks are characterised by,

high complexity, transboundary effects, stochastic relationships, and nonlinear cause–effect patterns with tipping points and often associated with less public attention than they deserve. Systemic risks range from natural hazards, environmental threats, and financial crisis to cybersecurity. Due to their special features, systemic risks are overextending established risk management and creating new, unsolved challenges for policy making in risk governance. Their negative effects are often pervasive, impacting fields beyond the obvious primary areas of harm.[[76]](#footnote-76)

The irgc then offers a generic four-stage process, i.e., pre-assessment, appraisal, characterisation and evaluation, and management, coupled with cross-cutting aspects common to all stages. The framework can then be tailored to the specific risk considering the societal, political and economic context.[[77]](#footnote-77) In the pre-assessment stage, the relevant stakeholders are identified, and the problem, including its scope, is framed together with early warning signals of known risks.[[78]](#footnote-78) The appraisal stage relates to two related matters, i.e., risk assessment (hazard identification, risk characterisation and exposure and vulnerability), and a concern assessment to grasp the social perception of risks, the concerns and potential impacts.[[79]](#footnote-79) In the characterisation and evaluation stage, both risk evaluation (e.g., risk tolerability and acceptability) and knowledge characterisation are conducted (e.g., risk profile, risk scoring and risk reduction alternatives).[[80]](#footnote-80) In the final management stage, decision-making and implementation take place. Apart from monitoring and control, the implementation phase requires giving feedback to the stakeholders to revise or improve future management decisions.[[81]](#footnote-81) The proposed irgc stages include cross-cutting aspects that refer to open and transparent communication, stakeholder engagement and accounting for the context where risk is being governed.[[82]](#footnote-82) Concerning systemic risk, the irgc proposed seven steps to meet this governance challenge. We summarize these steps in the following graphic

Figure i.1 Here

Arguably, the irgc can be seen as a practical tool that embodies adaptive governance, which is by no means extraneous to the legal system.[[83]](#footnote-83) The latter emphasises a learning by doing approach and intends to evaluate over time which management policies and instruments are more or less successful in achieving a determined goal.

3.3 Good Regulatory Intervention Design

Professors Julia Black and Robert Baldwin developed the Good Regulatory Intervention Design (grid) to give regulatory visibility to low-impact risks. Black and Baldwin noticed that risk-based regulation primarily focuses on low-occurrence, high-impact risks, which are then prioritised in the regulatory agenda to prevent the materialisation of severe harmful consequences. However, high-occurrence low-impact risks may go unnoticed, yet if their impacts are cumulative and the harm considerable, these risks then transform into high impact risks.[[84]](#footnote-84) A case in point is littering, which has been pointed out as an important marine and land pollution source.[[85]](#footnote-85) There is also the possibility that risks once considered tolerable become unacceptable by local communities.[[86]](#footnote-86) This case could occur, for example, after the establishment of waste treatments plants. Even if the regulator considers these plants tolerable, increasing odours may trigger social resistance.[[87]](#footnote-87) The grid framework considers two main factors, the nature of low-impact risk (for example, whether those risks are stable or dynamic, systemic or non-systemic, or whether they tend to accumulate) and the nature of the regulatee (i.e. the willingness and capacity to comply).[[88]](#footnote-88) This timely framework challenges the perceived assumption that low-impact risk should not be prioritised and explains why such risks deserve much more attention.

4 Consideration of Risk in This Collection

The contributors of this book provide a comprehensive insight into risk in the areas of transport, trade and environment. Risk management can take the form of insurance; dispute settlement; sanctions; export control; interaction between industry standards and prescriptive rules; deepening of regime interaction; adaptive and ecosystem-based regulatory approach; smart contracts; and the adaptation of traditional legal categories to meet, for instance, technological changes. The contributions in the book do not use a common approach or method simply because there is no single comprehensive risk framework that could adequately accommodate the various issues addressed in this collection. However, all the chapters remain true to the core theme of risk and engage with question(s such as: How is risk conceived in areas of transport, trade and environment in light of contemporary developments and concerns such as technology deployment, climate change, political upheaval, evolving geopolitics, and the covid-19 pandemic? How does the law in the areas of transport, trade and environment translate risk into rights and obligations? What legal tools, such as dispute settlement mechanisms, contractual frameworks, and governance structures, are available to effectively manage the changing landscape of risk?

The book covers both public and private law issues that concern risk and does not restrict the scope to studies that are region or jurisdiction specific; in fact, the legal framework considered includes national, regional and international legal orders. Overall, this book highlights the importance of dialogue and collaborative decision-making on risk issues between policymakers, judicial or quasi-judicial actors, industry stakeholders and scientists.

Altamimi in “The UN Arms Trade Treaty (att): A Multilateral Trade and Security Treaty Not Regulated by International Trade Law?” considers the relationship between the att (which is substantively and procedurally a trade and security regulating treaty) and international trade law. He argues that the above-mentioned relationship remains unclear, particularly as the att alludes neither to the World Trade Organization (wto) law, nor to the core obligations of international trade law. The lack of clarity of the relationship between the two regimes has the potential to cause jurisdictional and enforcement issues. Altamimi contends that att regime should be reformed, international trade law rules and principles be added to the att treaty, and the wto best legal practices for effective enforcement be utilized.

Argüello and Johansson in “Ice Management Research and the Arctic Marine Environment” discuss geoengineering research governance with particular emphasis on the Arctic Ocean and novel ice management techniques, i.e., Arctic marine cloud brightening, flooding-refreezing and Arctic Ocean albedo enhancement. According to the authors, there is no comprehensive legal regulation of geoengineering research and while governance before deployment is fundamental, governance before research is just as crucial. In this context, they argue for a constructive and morally cognisable understanding of risk where law plays a decisive role in the legal imaginary of geoengineering. By focusing on geoengineering research, i.e., an activity prior to deployment, it becomes evident how risk governance is not exclusively concerned about managing existing risks but rather about shaping the future.

Basu Bal, Rajput and Chen in “Divide and Conquer or Unite to Trade: Trade Facilitation Along the China-Europe Railway Corridors” highlight that global value chains are subservient to networks that underpin the exchange of goods, money and information. They submit that the resilience of these networks is increasingly being tested through conflicts, geopolitics, and legal barriers. They focus on the trade facilitation reforms along a railway network, namely the Chongqing-Duisburg link, to examine the legal and regulatory fragmentation which poses a risk for utilization and/or furthering of physical and digital infrastructures. The authors of the chapter take a forward-looking perspective to consider what may be done to develop a regional agenda for harmonized trade facilitation in China-Europe railway corridors and proposes a tripartite approach to manage fragmentation.

In “The Meaning of “Accident” under the Montreal Convention in Light of cjeu Jurisprudence,” Bokareva critically discusses how “accident” under the Montreal Convention has been construed by the Court of Justice of the European Union (cjeu) and other common law courts in the UK, US, Australia and Canada. The author adopts an internal perspective about risk in a multilevel regulatory environment. She warns about the risk of creating legal conflicts at the international and European Union (EU) level. In particular, Bokareva qualifies the cjeu’s approach to treaty interpretation as disconcerting. Legal uniformity and certainty are at risk by not considering judgments on similar issues of other highest courts in State Parties to the Montreal Convention.

Chuah in “Admissibility of Air and Marine Accident Investigation Records in Arbitration and Litigation” examines air and marine casualty investigation reports and their changing function in relation to risk. Investigation reports have traditionally been used to identify the contributing causes of an accident, recognize additional risks and learn from previous mistakes. In essence, the rationale for transport investigations is forward-looking to prevent accidents in the future. Arguably, casualty investigation reports are fundamental for an adaptive risk governance perspective. However, the author notices a growing tendency to use these reports in judicial and arbitral proceedings to prove liability or fault. This tendency reflects a traditional understanding of risk that aims to find linear causal relations. Yet, Chuah considers that litigation expediency should not sacrifice the conventional rationale for transport investigations.

Dackö in “When Economic Sanctions Lead to Conflict of Laws and Real Risks for Businesses” deals with “decoupling”, a term commonly used to explain the effects of different trade and security policy measures leading to the ripping apart of international value chains and the insulating of trade into regional hubs. The author draws out that economic sanctions imposed by one country often target another country, which in turn will try to block the effects of such sanctions, sometimes by legal measures, resulting in a clear legal clash – a conflict of laws. Businesses are then often left to make difficult choices, having to discontinue trade and thereby face economic and legal consequences. “Risks posed by the covid-19 pandemic regarding the carriage of goods and passengers by sea – considerations on seafarers’ rights and health protection” presents that the seafarers bore the heaviest brunt during the covid-19 pandemic. Contractual issues arose from delays, which for example, threatened the fulfilment of contracts, and payment to seafarers. Border closures and governmental restrictions prevented seafarers from disembarking vessels to repatriate after their contract ended or changing crews to continue and maintain the global supply chain. The inability to disembark jeopardized the health and safety of the seafarers. Fernández in this chapter discusses the government’s measures and their effects on the maritime and shipping industry, including solutions and consequences.

International shipping is subject to many different rules and regulations, which together frames the market conditions of the industry. Framing a coherent – or level – playing field for an industry that by nature is truly international, is not an easy task. Often, there are chances of overlapping legislation promulgated by two competing organizations that generate the risk of conflict or regulatory overkill. Through the contribution “International Shipping Who Levels the Playing Field?”, Eftestøl and Yliheljo considers the role of the main regulator of international shipping, namely the International Maritime Organization (imo), and that of the EU which exercises its competence on certain shipping matters, to demonstrate the interplay between the two organizations as regards ghg emissions from international shipping. In the recent past, imo has faced regulatory competition from the EU which has itself tried to solve regulatory gaps by preparing regional solutions to identified regulatory needs. The authors enquire whether a Brussels Effect on the rules and regulations in this area can be observed.

Flodén and Woxenius in “Risk in Transporting Dangerous Goods via RoRo and RoPax Shipping” investigate how prescriptive regulations for dangerous goods, especially the imdg Code, the Baltic Agreement and adr, affect transport operations and the overall risk of RoRo and RoPax shipping in Northern Europe. This investigation is important as roll-on, roll-off (RoRo) and roll-on-passenger (RoPax) shipping serves intra-regional trade and travel, handles a wide mix of goods, of which approximately 4% are dangerous and pose risks of destruction of marine and coastal habitats and particularly the loss of health, life and property for passengers and crew. Flodén and Woxenius highlight that to manage maritime transport restrictions for dangerous goods, transport planners can delay, reroute or transform consignments; however, stiff competition and a lack of knowledge may cause consignors to misdeclare and/or send undeclared dangerous goods, nonetheless. Thus, for safety precautions and risk management to succeed in supply chains, the appropriate declaration of substances is imperative.

In “Scrubber Technology – Bad News for the Marine Environment” Hassellöv looks at the risks associated with exhaust gas cleaning systems, also known as scrubbers. These are being introduced on increasing numbers on ships as a way to enable the continued use of heavy fuel oils while still complying with tightened rules on Sulphur emissions. However, while the scrubbers significantly reduce the emissions of Sulphur and also other pollutions to the air, all but very few scrubber systems generate extensive emissions of heavily acidified wash water to the sea which also includes pollutants such as polycyclic aromatic hydrocarbons (pah) and heavy metals. Not only does this seem like a clear example of transforming one type of pollution into another in contravention of unclos. A narrow focus on reduction of emissions of Sulphur oxides to the atmosphere has resulted in potentially devastating consequences for the marine environment being overlooked, thereby showing the severe risks associated with introducing technical solutions without a proper assessment of their overall environmental impacts.

The use of unmanned maritime vehicles and the potential of autonomous transport raise interesting questions of maritime law as to what happens should such property be subject to maritime casualties. “Autonomous Wrecks” by Kern discusses key issues or problems that arise because of the special characteristics of unmanned maritime vehicles and autonomous transport in wreck removal situations can be handled under the Nairobi International Convention on the Removal of Wrecks (wrc).

In his chapter “High Seas Marine Protected Areas – Impact on Shipping and the imo” Krabbe examines the draft text on marine protected areas (mpa s) on the high seas in the new treaty on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (bbnj). With a growing demand for area-based protection measures in high sea areas it becomes important to ask what trade-offs such measures may give rise to in areas where shipping has traditionally tended to use the shortest and most direct routes, irrespective of the ecological values affected. Routing measures may be valuable instruments for protecting vulnerable ecosystems but typically result in longer shipping routes. This calls for evaluating the impacts of such measures, in particular on fuel-consumption and voyage times. Not only because it enables a more well-informed discussion on the costs to industry, but also because the measures can imply trade-offs with other environmental objectives such as reduced co2 emissions. Neglecting this entails a risk of making decisions that are counterproductive from a wider environmental perspective.

In “Shipping and the Ecosystem Approach” Langlet looks at how the need for management that considers specific environmental needs and vulnerabilities on local and regional scales can be combined with the international regulation of shipping. Inclusive and adaptive forms of governance pose a risk to the values protected by internationally harmonized regulation, i.e. the expediency and efficiency of shipping as a global mode of transport. On the other hand, the harmonized nature of marine environmental regulation risks undermining the pursuit of effective protection and management of vital environmental and health objectives at a local scale. Langlet inquires to what extent and how the regulation of the environmental effects of shipping can allow for regional and local conditions to be considered and enable relevant management responses to be put in place to address local needs, while also recognizing the importance of international shipping for the pursuit of other societal objectives.

“Autonomous Shipping: Some Reflections on Navigational Rights and Rescue at Sea” by Leopardi examines key rules and principles related to the topic of his contribution. The examination encompasses law of the sea, the International Convention for the Safety of Life at Sea, the International Convention for Maritime Search and Rescue and the International Convention on Salvage. Leopardi submits that autonomous and unmanned ships are in a predominately similar position as other ships when it comes to navigational rights. However, he contends that autonomous and unmanned ships are in some respects outside the scope of international maritime rescue law. Therefore, legislators need to re-examine the efficacy of the risk mitigation aspects of maritime rescue law to address the emerging shortcoming.

Liu in “Maritime and Aviation Law: A Relational Retrospect and Prospect on Unmanned Ships and Aircraft” presents a relational comparative analysis of respective laws focusing on unmanned ships and unmanned aircraft. She indicates that the technological advancements and increasing demands are shaping the trend towards a new era in maritime transportation, but a regulatory framework is yet to materialize. For instance, a legal definition of unmanned ships is lacking. Liu recommended that lawmakers in the maritime sphere be inspired from aviation and emulate the icao endorsed operation-centric and risk-based regulatory approach for unmanned aircraft systems. Further, imo can conduct a full risk assessment of autonomous ships and their operations in different environments to reach a risk-based categorization scheme and apply commensurate regulatory measures.

From a property law perspective, Martinson assesses the definition of ships as implemented in Swedish law in “Some Perils of Turning Small Ships into Big Boats: On the Relevance of Addressing the Real Issues in Law”. One may think that property law is concerned with things or objects, but in this contribution, the author eloquently argues how this legal branch deals with conflicts of interest among people. The legal definitions of objects, such as ships, necessarily make some inclusions and some exclusions. In this case, such legal definitions create risks that may, for example, negatively affect the identification of several interests. In legal proceedings, definitions could mask the real conflicts of interest or hide the characteristics that the parties typically have. While legal definitions are important, Martinson makes a crucial remark that “vessels do not have to be seen as objects only. The conflicts of interest can be about enterprises, projects, and also human beings.”

In “the International Regulatory Framework of mass Disruption” Mejia engages in a regulatory scoping exercise about maritime autonomous surface ships o (mass) and their place in current and future regulatory frameworks. The development of autonomous marine technologies is a typical example of the risk society posing challenges to the legal system. As an object of regulation, mass raises questions about whether existing legal structures are suitable to regulate this disruptive technology. Mejia reflects on the unintended risks that mass may be accompanied by, including it-related failures, cyberattacks and legal fragmentation. This chapter challenges the reader to frame mass beyond a purely technocratic perspective but rather in a broader social context of the region where the acceptability of the technology poses its own challenges.

Mukherjee in “Salvage Agreement and Contract Salvage: Risk Dynamics in Salvage Law” delves into the question of risk as it pertains to salvage services from the opposite perspectives of the shipowner and the salvor. The chapter rests on the submission that the lof-type salvage agreement is not a contract. The author observes that the lof-type agreement is rapidly declining and being increasingly replaced by expressly stated salvage remuneration typical of contracts proper, which is not dependent on the vagaries of arbitral awards, and which reduces the salvor’s financial risk considerably.

Naidoo through “(Smart) Contractual Networks in the Carriage of Goods by Sea” explores how smart transactional technologies may be embedded in business networks (“smart contractual networks”). Drawn from socio-legal contractual scholarship, the concept of “contractual networks” situates and views the bilateral contract as contractually networked to a series of other connected relationships and contracts in the network. To reflect on conceptual and normative issues pertaining to smart contractual networks Naidoo asks whether smart contracts alter the understanding of contractual networks, or will contractual networks be shaped by technologies that underpin their operation, e.g., contractual networks that will develop around blockchain?

Rajput in “Restricting International Trade through Export Control Laws: National Security in Perspective” deliberates on the current geo-political dynamic characterized by the rise of China on the world stage and the imposition of export restrictions as a strategy to address matters of national security. As the US-China trade war continuously unfolds and manifests in novel ways, this chapter considers the export control framework that is put in place by China for control/consolidation of the rare earths sector through People’s Republic of China Export Control Law (ecl) and the proposed Administrative Regulation on Rare Earths (are) in context of the security exception under General Agreement of Tariffs and Trade Article xxi. The rare earths are widely deployed in defense, automotive, electronics, renewable energy industries and the prognosis made by Rajput is that China may potentially utilise the ecl and the are framework to restrict export of rare earths to the US as tit-for-tat national security claims in view of their deteriorating relationship. Overall, the discussion in this chapter highlights the risk for wto as an organization and for value chains that depend on rare earths.

While the shipping industry is largely risk averse, the ‘greening’ of shipping requires large investments in new technologies that are often associated with significant uncertainties. In “Legal Tools for Overcoming Perceived Risks in Green Shipping” Rebelo finds that to overcome barriers associated with uncertainty surrounding technology selection and optimal solutions shipowners must be incentivised through access to capital and clear guidance on choice of measures. Against this backdrop she inquires how green finance frameworks can help de-risk low-carbon shipping technologies by providing clarity and legal certainty on technology selection and criteria.

“Third Party Direct Rights of Action against Insurers under UK Law and International Maritime Liability Conventions” by Thomas confronts the question – “To what extent should third parties enjoy direct rights of action against liability insurers”? This may be characterised as a question of public policy and the position may vary significantly in different jurisdictions which leads to legal uncertainty. In many jurisdictions, third parties continue to occupy a difficult position and the UK is one of them. The position has been marginally qualified by statutory developments, most recently the Third Parties (Rights against Insurers) Act 2010, but such third-party rights as are recognised by the statute continue to be very limited. This chapter compares English law with the insurance regime in emergent international maritime liability conventions where third-party direct rights of action are coupled with mandatory insurance and much more openly entertained. The chapter highlights the way in which third party rights are established on a much different platform with insurers perceived as directly responsible for compensating third parties.

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figure i.1 irgc and the Governance of Systemic Risks

Note: The authors made this graphic, but the content of the graphic comes entirely from International Risk Governance Council (irgc), *Guidelines for the Governance of Systemic Risks* (irgc 2018).

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47. The meaning of the term ‘regulation’ is often made controversial. For the purpose of this book, the term is to be understood as ‘the intentional use of authority to affect behaviour of a different party according to set standards, involving instruments of information-gathering and behaviour modification’. See Robert Baldwin, Martin Cave and Martin Lodge, ‘Introduction: Regulation – the Field and the Developing Agenda’ in Robert Baldwin, Martin Cave and Martin Lodge (eds), *The Oxford Handbook of Regulation* (oup 2010) 12. [↑](#footnote-ref-47)
48. Black (n 18). [↑](#footnote-ref-48)
49. Note that due to the abstract nature of risk, Ewald argues that risk “knows nothing of the binary divisions of classical juridical thought – permitted and prohibited, legal and illegal. All it knows is the endless chain of discrete quantities.” Ewald (n 30) 221. [↑](#footnote-ref-49)
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55. “a large proportion of illnesses are related both to lifestyle practises … It doesn’t make any sense to suppose that liability in these circumstances can remain wholly with the collectivity, whether this be government or an insurance company. Giddens (n 3) 9. [↑](#footnote-ref-55)
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61. Baldwin, Cave and Lodge, *Understanding Regulation: Theory, Strategy, and Practice* (n 5) 281. [↑](#footnote-ref-61)
62. “There is, however, considerable variation across regimes and jurisdictions in the approaches that are taken to risk scoring. Some systems are highly quantitative and some are heavily qualitative”. Ibid 282. [↑](#footnote-ref-62)
63. Hutter, ‘A Risk Regulation Perspective on Regulatory Excellence’ (n 43) 104. [↑](#footnote-ref-63)
64. Alan Boyle and Catherine Redgwell, *Birnie, Boyle, & Redgwell’s International Law and the Environment* (4 edn, oup 2021) 184. [↑](#footnote-ref-64)
65. Julia Black and Robert Baldwin, ‘When Risk-based Regulation Aims Low: Approaches and Challenges’ (2012) 6 Regulation & Governance 2. Emilia Mišćenić and Aurélien Raccah (eds), *Legal Risks in EU Law: Interdisciplinary Studies on Legal Risk Management and Better Regulation in Europe* (Springer 2016). S.O. Johnsen and others, ‘Risk-based Regulation and Certification of Autonomous Transport Systems’ (Safety and Reliability – Safe Societies in a Changing World 2018). [↑](#footnote-ref-65)
66. Borraz and others (n 60) 289. [↑](#footnote-ref-66)
67. Baldwin and Black (n 60) 566. [↑](#footnote-ref-67)
68. Henry Rothstein and others, ‘The Risks of Risk-based Regulation: Insights from the Environmental Policy Domain’ (2006). 31 Environment International 1056 at 1063. [↑](#footnote-ref-68)
69. Ibid. [↑](#footnote-ref-69)
70. Hutter, ‘A Risk Regulation Perspective on Regulatory Excellence’ (n 43) 104. [↑](#footnote-ref-70)
71. Michael Power, ‘The Nature of Risk: The Risk Management of Everything ‘ (2004) 12 Balance Sheet 19 at 25. [↑](#footnote-ref-71)
72. Ortwin Renn, *White Paper on Risk Governance: Towards and Integrative Approach* (The International Risk Governance Council 2005). Ortwin Renn, Andreas Klinke and Marjolein van Asselt, ‘Coping with Complexity, Uncertainty and Ambiguity in Risk Governance: A Synthesis’ (2011) 40 Ambio 231. Renn and others (n 16). Lucas, Renn and Jaeger (n 31). [↑](#footnote-ref-72)
73. Renn, Klinke and van Asselt (n 72) 231–232. [↑](#footnote-ref-73)
74. Ibid [↑](#footnote-ref-74)
75. Organization for Economic Co-operation and Development (oecd), *Emerging Systemic Risks in the 21st Century: An Agenda for Action* (oecd Publications 2003). [↑](#footnote-ref-75)
76. Renn, ‘The Systemic Risk Perspective: Social Perception of Uncertainty and Tipping Points’ (n 15) 15. [↑](#footnote-ref-76)
77. International Risk Governance Council (irgc), *Introduction to the IRGC Risk Governance Framework, revised version* (epfl International Risk Governance Center 2017). [↑](#footnote-ref-77)
78. Ibid 11–12. [↑](#footnote-ref-78)
79. Ibid 13–16. [↑](#footnote-ref-79)
80. Ibid 17–21. [↑](#footnote-ref-80)
81. Ibid 23–26. [↑](#footnote-ref-81)
82. Ibid 27–32. [↑](#footnote-ref-82)
83. This framework has been applied for example to Arctic shipping regulation. Floris Goerlandt and Ronald Pelot, ‘An Exploratory Application of the International Risk Governance Council’s Risk Governance Framework to Shipping Risks in the Canadian Arctic ‘ in Aldo Chirco and others (eds), *Governance of Arctic Shipping: Rethinking Risk, Human Impacts and Regulation* (Springer 2020) [↑](#footnote-ref-83)
84. Black and Baldwin, ‘When Risk-based Regulation Aims Low: Approaches and Challenges’ (n 65) 6–8. [↑](#footnote-ref-84)
85. Aleke Stöfen-O’Brien, *The International and European Legal Regime Regulating Marine Litter in the EU* (Nomos 2015). [↑](#footnote-ref-85)
86. “Secondly, a regulator’s giving a risk a low priority may be contested by consumers, local residents, politicians, ngo s, and industry. The result may be that the regulator loses public and political support. An example in the environmental sector is noise and odours.” Black and Baldwin, ‘When Risk-based Regulation Aims Low: Approaches and Challenges’ (n 65) 7. [↑](#footnote-ref-86)
87. Ibid 9. [↑](#footnote-ref-87)
88. Julia Black and Robert Baldwin, ‘When Risk-based Regulation Aims Low: A Strategic Framework’ (2012) 6 Regulation & Governance 131. Robert Baldwin, Julia Black and Gerard O’Leary, ‘Risk Regulation and Transnationality: Institutional Accountability as a Driver of Innovation’ (2014) 3 Transnational Environmental Law 373. [↑](#footnote-ref-88)