The origins of 'risk' as an idea and the future of risk regulation

Weimer, M.

DOI
10.1017/err.2016.1
Publication date
2017
Document Version
Final published version
Published in
European Journal of Risk Regulation

The Origins of "Risk" as an Idea and the Future of Risk Regulation

Maria WEIMER*

I. Introduction

This inaugural issue is a wonderful example of the coming of age not only of the *European Journal of Risk Regulation*, but also of EU risk regulation as an academic discipline. A "new kid in town" only six years ago,[1] this journal (and the work published in it) has ever since been crossing borders; between traditional sub-disciplines of EU law (e.g. EU internal market, administrative or constitutional law) on the one hand, and between law and other disciplines, on the other. I find the fact that the *EJRR* is now moving to Cambridge University Press, the world's oldest publishing house, highly symbolic of the Journal's dynamics: to enable new innovative research while relying on solid foundations of established disciplinary knowledge.

Looking back at the development of the *EJRR* for me also means reflecting upon my own scholarly journey. How did I become a scholar of risk regulation and what keeps me going in further developing this field? Many stories of inspiring people and places could be told in response. However, instead I would like to focus on the story of an idea that has drawn me into this field and that, in my view, remains crucial for its further development. In this short essay to inaugurate the "rebirth" of *EJRR* I would like to contemplate the idea of risk. What are the meaning and origins of the notion of risk? In what way do ideas about what risk means shape its regulation? I will present the idea of risk as an interplay between two different understandings – two sides of the same coin, so to speak – namely, between the "bright" and the "dark" side of risk. Ultimately, the tensions between these two understandings remain highly visible in contemporary risk regulation in Europe and beyond. I will argue that an open discussion of these tensions presents an important opportunity for the further development of legal and regulatory approaches to risk.

II. The two sides of risk

Risk as a notion has become ubiquitous. It has left the domain previously reserved to technical and scientific experts long ago, and today is framing not only the regulatory, but also the societal debate about technology and beyond.[2] Since at least the publication of Ulrich Beck's "Risk Society"[3] the notion of risk has been associated not only with

* University of Amsterdam; email: M.Weimer@uva.nl.

[1] When the *EJRR* was established.

[2] Think about the discussion on human rights risks and corporate social responsibility.

[3] U Beck, *Risikogesellschaft* (Frankfurt am Main: Suhrkamp 1986).

European Journal of Risk Regulation, 8 (2017), pp. 10–17
doi:10.1017/err.2016.1

highly specialised technical areas, but also with broader societal questions about the "way of life" in late modernity.[4] According to Beck, risk can now be perceived as a social phenomenon of late industrialisation assuming the role wealth has played in class societies. Whereas class societies are dominated by scarcity and the distribution of wealth ("goods"), the "risk society" is dominated by concerns about safety and the distribution of risks ("bads").[5] As a consequence, the regulation of risk in modern risk societies provokes distributive conflicts over the socio-economic implications of technological progress.

This, of course, is only one side of the risk story. The risk discourse[6] is as complex and multifaceted as other inter- and transdisciplinary discourses of our time, which deal with terms and concepts that are in some way perceived to fundamentally reflect current changes of paradigms or of *zeitgeist* across modern western societies (such as for instance the terms "globalisation," "governance" or "digitalisation"). The meaning of the term risk, therefore, can be explored from different perspectives and will vary accordingly. Jenny Steele warns us, "Whenever it is argued that a problem may be resolved by adoption of 'a risk perspective', readers should therefore be wary. It is quite likely that the writer of such a statement is (at best) drawing a veil over the full range of possibilities that such a perspective might imply."[7]

Not wanting to disguise the fact that other perspectives on risk exist or that other aspects of it might be considered equally important, I will nevertheless concentrate on one theme that is highly relevant for the discussion about adequate legal and regulatory approaches to risk. This theme arises from the dialectic between two different understandings of the meaning of risk, which I refer to as the "bright" and the "dark" side of risk.

1. The bright side of risk

At its "bright" side, risk appears as an achievement of modernity; an empowering technique that allows for rational decision-making even in the face of an uncertain future. The American economist Peter Bernstein describes the mastery of risk as the idea that "defines the boundary between modern times and the past".[8] Other authors also refer to the idea of risk and its emergence in contemporary language and thinking in order to mark a significant change, which western societies underwent in their transformation from traditional to modern societies. In a society where life is no longer lived as fate, individual freedom and freedom of choice allow people to take decisions about their lives "against the gods".[9] Or, as sociologist David Garland said, "In an important sense,

[4] See D Garland, "The Rise of Risk" in RV Ericson and A Doyle (eds), *Risk and Morality* (Toronto: University of Toronto Press) who describes the emergence of risk scholars as opposed to risk professionals.

[5] Beck, note 3 supra, 25: "In der fortgeschrittenen Moderne geht die gesellschaftliche Produktion von Reichtum systematisch einher mit der gesellschaftlichen Produktion von Risiken. Entsprechend werden die Verteilungsprobleme und –Konflikte der Mangelgesellschaft überlagert durch die Probleme und Konflikte, die aus der Produktion, Definition und Verteilung wissenschaftlich-technisch produzierter Risiken entstehen."

[6] See overview in P Strydom, *Risk, Environment and Society* (Philadelphia: Open University Press) 11 *et sqq*.

[7] J Steele, *Risks and Legal Theory* (Oxford: Hart 2004) 6.

[8] PL Bernstein, *Against the Gods: the Remarkable Story of Risk* (New York: John Wiley and Sons 1996) 1.

[9] Bernstein supra note 8.

risk is the necessary accompaniment of freedom and choice. Where there are no choices to be made there are no risks to run."[10] This means that individual decisions and choices matter and can lead to different consequences. Most crucially, this notion of risk means that despite not knowing the future, one can base decisions about it on rational grounds. Risk "puts the future at the service of the present".[11]

2. The dark side of risk

What then is the dark side of risk? If on the bright side, risk is an achievement of modernity, does its dark side announce the passage to a new stage? This, as you might have anticipated, takes us back to Beck's risk society. Beck argues that there is a fundamental change that modern industrialised societies underwent at the end of the 20th century, which made them enter a new, "reflexive" stage of modernity. This change is due to the fact that growing industrialisation and technological progress have resulted in new risks and that these contemporary risks are not truly controllable or fully measurable.[12] In reflexive modernity, the very notion of risk changes. It is no longer a decision-making technique to control the future, but a new modern hazard stemming from the human employment of new technologies. The turn from traditional to modern society and the achievements of rationalisation – increased control over nature, increased safety of life, progress, and more individual choice – seem at the advent of the risk society to show unintended negative side effects, which, ironically enough, defy any control. Increased safety brought about by technological innovations comes at the cost of increased uncertainty, therefore making apparent the fragility of modern living.

Related ideas can be found in the work of the British sociologist, Anthony Giddens. Giddens begins by distinguishing "risk" from "hazard" or "danger". Hazards and dangers are seen as given, or they simply come from a world that one takes for granted. Hazards are typical for traditional societies, in which there is no notion of risk. "The idea of risk is bound up with the aspiration to control and particularly with the idea of controlling the future."[13] Furthermore, "The idea of 'risk society' might suggest a world which has become more hazardous, but this is not necessarily so. Rather, it is a society increasingly preoccupied with the future (and also with safety), which generates the notion of risk".[14]

Similarly to Beck, Giddens also observes a major transition within industrialised societies in the second half of the 20th century, which is marked by the passage from "external" to what he calls "manufactured risks":

> "Manufactured risk is risk created by the very progression of human development, especially by the progression of science and technology. Manufactured risk refers to new risk environments for which history provides us with very little previous experience.

[10] Garland, supra note 4, 68. Risk, therefore, is also strongly related to courage, since courage is necessary to make choices. See, for instance, Opinion of the Economic and Social Committee on the "Use of the precautionary principle" (2000/C268/04), OJ 2000 C 268/6, point 2.1, where it is stated, "Risk does not equate with fear, but with courage."

[11] Bernstein, supra note 8, 1.

[12] See the account on Beck in Steele, supra note 7, 47 *et sqq*.

[13] A Giddens, "Risk and Responsibility" (1999) 62 *Modern Law Review* 1, 3.

[14] Giddens, supra note 13, 3.

> We often don't really know what the risks are, let alone how to calculate them accurately in terms of probability tables."[15]

Hence, both Beck's "risk" and Giddens' "manufactured risk" are referring to a new understanding of risk as a modern technological hazard. For both authors these newer[16] risks or hazards are man-made, catastrophic in their potentially global impact, and less amenable to control and probability calculation. Beck expresses this clearly when he states:

> "By risks I mean above all radioactivity, which completely evades human perceptive abilities, but also toxins and pollutants in the air, the water and foodstuffs, together with the accompanying short- and long-term effects on plants, animals and people. They induce *systematic* and often *irreversible* harm, generally remain invisible, are based on causal *interpretations*, and thus initially only exist in terms of the (scientific or anti-scientific) *knowledge* about them. They can thus be changed, magnified, dramatized or minimized within knowledge, and to that extent they are particularly open to social definition and construction."[17] (Italics from original.)

An understanding of risk as new technological and potentially uncontrollable hazard represents the "dark" side of risk. To borrow from Bernstein's metaphoric language, if the idea of risk as technique enabled people to take rational decisions about their future and to rebel "against the Gods", then risk as late modern technological hazard could be seen as what they have brought upon us as their vengeance. This, of course, is a polemic remark, which does not intend to hint at some sort of transcendental explanation for the occurrence of technological hazards. Rather, it is to point out that the two understandings of risk presented here cannot be thought of separately from one another; they are related.[18] More importantly, the tensions between them are perpetuated in current discussions about risk regulation in general, and EU risk regulation in particular.

III. Risk techniques and the challenge of late modern technological risks – from control to contestation

For legal and regulatory approaches to risk a crucial question is how to claim rationality for decisions taken in the face of limited knowledge about the future and what precisely constitutes the "risk technique" that enables decision-makers to do that? Moreover, bearing in mind the emergence of new technological risks, is this technique still viable to assess such risks under the conditions of uncertainty and ignorance?

To answer the first question, it is useful to briefly refer to the origins of risk as a decision technique, which lie in mathematics and its further application in statistics.[19]

---

[15] Giddens, supra note 13, 4.

[16] For a criticism of Beck's account on the novelty of risks in late modernity see Garland, supra note 4, 75–76.

[17] Beck, supra note 3, 23.

[18] One could also describe this relationship as one of a continuum. Rationalisation and the extension of human knowledge have also led to new dangers and anxieties. Niklas Luhmann in *Soziologie des Risikos* (Berlin: Walter de Gruyter 1991) 37–38 notes on this subject: "Je mehr man weiss, desto mehr weiss man, was man nicht weiss, und desto eher bildet sich ein Risikobewusstsein aus." And, "Die moderne Risikogesellschaft ist also nicht nur rein Resultat der Wahrnehmung von Folgen technischer Realisationen. Sie ist schon im Ausbau der Forschungsmöglichkeiten und des Wissens selbst angelegt."

[19] See P Bernstein, *Against the Gods; I. Hacking, The Emergence of Probability* (London: Cambridge University Press 1975); ibid, *The Taming of Chance* (New York: Cambridge University Press 1990).

The idea of risk was in fact born with the discovery of probability theory, which became the basis for statistical theories. First studies of probability occurred in the context of games of chance as early as in the 16th and 17th centuries and were focused on the comprehension of chance occurrences in random events.[20] It was discovered that random events become predictable when observed over a long enough period of time and that the occurrences of chance follow certain patterns or laws. Understanding these laws and the nature of chance allowed knowing what to expect, based on frequencies.[21] Later, the use of probability theory was extended beyond the scope of random events; up until today it is largely applied in statistic calculations in the areas such as insurance, economic prognosis etc., in which non-random events, such as human action (e.g. frequencies of car accidents), which occur regularly and on a large scale, are treated on the same basis as games of chance. Here, *regularity of and social experience* with certain events allow for the calculation of probabilities. Studies of probability and their use in statistics also constitute the basis for the decision-making used in contemporary management and regulation. In economic decision theory quantitative calculation methods, together with cost-benefit analysis methods,[22] are used to assess the consequences of economic decisions of market participants, and, thus, to enable them to decide rationally under conditions of incomplete knowledge. In public environmental or health regulation, a similar numerical approach to decision-making is embodied in the so-called *Quantitative Risk Assessment* (hereinafter QRA). Here the well-established definition of risk is that it is a function of two variables – the probability of an impact and its magnitude; it is a condition under which it is possible both to define a comprehensive set of all possible outcomes and to resolve a discrete set of probabilities (or a density function) across this array of outcomes.[23] As a consequence, when QRA is applied, potential hazards are identified in terms of potential undesired outcomes and ranked according to the size or level of risk.[24] Further, probabilities are attached to these potential outcomes. This technique allows, in theory, for the full characterisation and ordering of the different options for regulatory action under appraisal. It follows that QRA was originally developed for relatively well-structured mechanical problems, in which the technical processes and parameters are well defined, and the reliability of separate components is either testable or amenable to statistical evidence.[25]

At this point, we encounter one of the major problems of applying QRA to the assessment of modern technological risks such as, for instance, biotechnology or

[20] See A. Hájek, "A Philosopher's Guide to Probability" in G. Bammer and M. Smithson (eds), *Uncertainty and Risk: Multidisciplinary Perspectives* (Routledge 2008) 92.

[21] See Steele, supra note 7, 21–22.

[22] See DA Kysar, "It might have been: risk, precaution and opportunity costs" (2006) 22(1) *Journal of Land Use and Environmental Law* 1.

[23] See A Stirling, *On Science and Precaution in the Management of Technological Risk: Volume I – A Synthesis Report of Case Studies* (Sevilla: Institute for Prospective Technological Studies 1999) 16; also Brian Wynne, "Uncertainty and Environmental Learning" (1992) 2 *Global Environmental Change* 111–127.

[24] The chosen unit of measurement is expressed either in terms of human mortality (fatalities to be expected per, for instance, million individuals in any given year), or by estimating the probability of a single individual dying in any given period of time as a result of the hazard. See Steele, supra note 7, 164 and Stirling, supra note 23, 9.

[25] Wynne, supra note 23, 113; on the origin of risk assessment as governed by risk professionals see Piet Strydom, *Risk, Environment and Society* (Buckingham, Philadelphia: Open University Press 2002).

nanotechnology: they are much less amenable to statistical calculation based on probability theory. To quote Steele,

> "… the truth is that a quantification of the hazards posed by a new technology such as genetic modification of crops, or of low probability-high intensity risks such as those stemming from disposal of nuclear waste, requires a wholly different method. Past experience is no guide. Thus the figures for these risks must be constructed and understood very differently from the experience-based figures for other risks. In this context, QRA methods become highly misleading."[26]

Similarly, social studies of science and technology[27] have long revealed various shortcomings of probabilistic heuristics used in risk appraisal. Their criticism shows, firstly, the reductionism[28] of QRA practices. Technological risk is characterised as including a diversity of possible impacts. In the case of biotechnology, for example, the regulatory debate usually encompasses a wide range of possible effects such as the environment, human health, agricultural practice, economics, social impacts and questions of fundamental ethics.[29] A criticism that only a minority of these types of effects can meaningfully be characterised and ranked by one single unit of measurement – this typically being a human mortality or morbidity metric – because many of the impacts are irreducibly qualitative in nature and cannot be addressed in numerical terms. Thus, in order to apply QRA, the full diversity of technological risk has to artificially be reduced, with the consequence that many classes of effects will typically be excluded from consideration.[30]

Another problem is that QRA is deemed to be an unreliable basis for regulatory appraisal in this area because it is not attuned to situations of "uncertainty" or "ignorance", which are typical for modern technological risks. Uncertainty is described as a "condition under which there is confidence in the completeness of the defined set of outcomes, but where there is acknowledged to exist no valid theoretical or empirical basis for the assigning of probabilities to these outcomes."[31] The term ignorance, furthermore, "applies in circumstances where there not only exists no basis for the assigning of probabilities (as under uncertainty), but where the definition of a complete set of outcomes is also problematic."[32] The latter condition entails the possibility of surprise, because "we don't know what we don't know".[33] The applications of bio- and nanotechnologies, for example, are typically surrounded by scientific uncertainty, if not ignorance. This is so not only because experience and, hence, collective knowledge about possible long-term effects and their "odds" is not available, but also because the occurrence of risks is dependent on circumstantial factors such as the natural

[26] Steele, supra note 7, 165–166.

[27] Stirling, supra note 23; also Wynne, supra note 23; MBA van Asselt and E Vos,"The Precautionary Principle and the Uncertainty Paradox" (2006) 9(4) *Journal of Risk Research* 313.

[28] See Wynne, supra note 23, 113.

[29] See Stirling, supra note 23, 9.

[30] See also A Stirling and P van Zwanenberg, "Risk and Precaution in the US and Europe" in H Somsen, T Etty, J Scott and L Krämer (eds), *Yearbook of European Environmental Law* (Oxford: Oxford University Press 2004) Vol. 3, 47.

[31] Stirling, supra note 23, 17.

[32] Ibid.

[33] Wynne, supra note 23, 114.

environment and human behaviour. As a consequence, probabilistic techniques, as used traditionally in QRA, fall short with regard to uncertain technological risks.[34] To cite Steele one more time:

> "At the extreme, the whole nature of what can be understood by 'risk' changes. Rather than being a question of what *number* of outcomes of a specified kind will occur, the question becomes one of imagining what the outcomes might be. There is a new question of whether or not a risk *exists*, and so the very first stage – of specifying the possible bad outcomes whose probabilities needs to be addressed – becomes highly significant, and politically highly charged."[35] (Italics from the original)

IV. Conclusion

How should law and regulation address such tensions in the assessment of technological risks? A first crucial step is to openly acknowledge the two sides of risk described above. A pretence at regulatory control and scientific certainty where both are questionable can do more harm than good, because it will ultimately undermine trust in regulation. Several case studies of EU risk regulation show that while regulatory science plays a crucial role in democratic decision-making on risk, its potential to legitimate such decision-making is limited.[36] The uncertainty and ignorance often surrounding new technologies indeed opens up space for politicisation and the exercise of wide regulatory discretion, which is a challenge for law (e.g. legal certainty, rights protection and for democratic legitimation), as can be seen in the controversy surrounding the application of the precautionary principle in EU regulation.[37] Legal practice and scholarship have to address this challenge not by retreating to out-dated doctrinal constructions, but by developing new concepts of uncertainty tolerant law.[38]

So far, the EU's search for the "right" model of risk regulation has been accompanied by an inner struggle, and many contradictions both in legal norms and regulatory practices.[39] Perhaps the biggest paradox is that despite the widespread acknowledgement

[34] On the notion of uncertain risks, see van Asselt and Vos, supra note 27.

[35] Steele, supra note 7, 166.

[36] See Maria Weimer, "Risk Regulation and Deliberation in EU Administrative Governance – GMO Regulation and its Reform" (2015) 21 *European Law Journal* 622; Maria Weimer and Anniek de Ruijter (eds) *Regulating Risks in the European Union – the Co-production between Expert and Executive Power* (Hart forthcoming); Sheila Jasanoff, *The Fifth Branch: Science Advisers as Policymakers* (Harvard University Press 1990). See also T-13/99 *Pfizer v Commission* ECLI:EU:T:2002:209.

[37] Maria Weimer, "Applying Precaution in EU Authorisation of Genetically Modified Products – Challenges and Suggestions for Reform" (2010) 16 *European Law Journal* 624; Joakim Zander, *The Application of the Precautionary Principle in Practice: Comparative Dimensions* (Cambridge University Press 2010).

[38] Such work is underway, see e.g. the contributions in Maria Weimer and Luisa Marin (eds) Special Issue on Regulating New and Emerging Technologies, (2016) 7(3) *European Journal of Risk Regulation* 469–532; or the rich scholarship on courts in risk regulation, e.g. Sidney Shapiro, Elizabeth Fisher and Wendy Wagner, "The Enlightenment of Administrative Law: Looking Inside the Agency for Legitimacy" (2012) 47 *Wake Forest Law Review* 463; Joanne Scott and Susan Sturm, "Courts as Catalysts: Rethinking the Judicial Role in New Governance" (2007) 13(3) *Columbia Journal of European Law* 565; Alberto Alemanno, "The Shaping of European Risk Regulation by Community Courts", *The Jean Monnet Working Papers*, n. 18/2008.

[39] See MBA van Asselt and E Vos, "Wrestling with Uncertain Risks: EU Regulation of GMOs and the Uncertainty Paradox" (2008) 11 *Journal of Risk Research* 281; Maria Lee, "Beyond Safety? The Broadening Scope of Risk Regulation" (2009) 62 *Current Legal Problems* 242; Milhail Kritikos, "Traditional Risk Analysis and Releases of GMOs into the European Union: Space for Non-Scientific Factors?" (2009) *European Law Review* 405.

of the limitations of regulatory science as the basis for public decision-making, EU decision-makers continue to justify regulatory decisions on risk and technology almost exclusively in scientific terms,[40] thereby falling victim to the critique of reductionism as articulated above. This is not the place to unpack this paradox.[41] Instead, this short reflection on the origins of risk aims to show that we need to recognise the transformation in the nature of technological risks in the 21st century; we also need to re-think the models of regulatory decision-making addressing such risks. Uncertainty and ignorance seem almost intractable challenges, whereas evidence-based regulation[42] fits much more neatly into traditional legal and regulatory thinking. Yet politicisation and contestation of new technologies and their regulation will not go away. Instead of wishful thinking, let us focus on the opportunity which this entails: to go beyond narrowly-construed notions of risk and safety, embracing a broader discussion about the societal purpose of technological innovations as well as their contribution to public good.[43] Future risk regulation scholarship in this journal should contribute to re-thinking law and regulation along these lines.

[40] It is undisputed here that scientific expertise is a crucial part of risk regulation. However, the uncertain nature of many late-modern technological risks necessarily changes the role of science in regulation.

[41] See, for further discussion, Maria Weimer and Gaia Pisani, "Expertise as Justification – The contested legitimation of the EU 'risk administration'" in Weimer and de Ruijter, supra note 36.

[42] For a critical appraisal see the contributions in the Special Issue on the Better Regulation Package – How Much Better is Regulation? (2015) 6(3) *European Journal of Risk Regulation* 344–381.

[43] A pioneering example is this respect is the regulatory framework for the authorisation of GMOs in Norway, see Apolline Roger, "In the public interest? Comparative Analysis of Norway and EU GMO Regulations" (2015) 24(3) *Review of European, Comparative & International Environmental Law* 264–277.