28 months later: the coronavirus pandemic as an analogy for future sustainability challenges

John-Oliver Engler¹,² · Henrik von Wehrden²

Received: 21 November 2022 / Accepted: 14 June 2023 / Published online: 1 July 2023
© The Author(s) 2023

Abstract
We combine the concepts of ‘black elephants’ and wicked problems with Roy Bhaskar’s critical realist philosophy of science and frame the current state of the coronavirus pandemic as an analogy for impending sustainability challenges. We point out and illustrate that the interaction of different ontological levels of our world as it ‘is’ will likely remain a challenge in addressing the wicked problems of our time.

Keywords Black elephant · Critical realism · Pandemic · Predictable surprise · Risk · Sustainability

Wicked problems, black elephants and predictable surprises

We previously highlighted the ‘wicked problem’ characteristic of many current sustainability issues (Engler et al. 2021). Wickedness in this sense refers to problems where (1) time is essential, (2) creators and solvers of the problem are identical, (3) the future is irrationally discounted and (4) a central authority is weak or lacking (Rittel and Webber 1973; Levin et al. 2012). The pandemic and many sustainability challenges such as climate change certainly share these characteristics. There are, however, two closely related concepts that apply to situations like the current pandemic or climate change, and that shed light on possible trajectories for the future: predictable surprises and black elephants.

A ‘predictable surprise’ is ‘an event that leads an organization or nation to react with surprise, despite the fact that the information necessary to anticipate the event and its consequences was available’ (Watkins and Bazerman 2003; Bazerman 2006). The predictable-surprise concept originated from a business background, yet in other contexts such as ethics and politics, the same idea has also been referred to as “black elephant”, a term that combines Taleb’s (2007) idea of ‘black swans’ and the proverbial ‘elephant in the room’ (Möller and Wikman-Svahn 2011; Lin et al. 2021).

Thus, black elephants are high-impact negative events or chains of events that are not adequately addressed. A defining characteristic of predictable surprises/black elephants is that knowledge about them is available, at least for some people, but no proper action is taken to address them (Möller and Wikman-Svahn 2011).¹ Most sustainability issues that will become more pressing in the near future share these characteristics with the current coronavirus pandemic, which the WHO recently classified as nearing its end (WHO 2022).

Watkins and Bazerman (2003) have suggested that vulnerabilities toward predictable surprises have mainly three causes, which are psychological, organizational and political. Here, we take up this idea and add Roy Bhaskar’s notion of three knowledge domains to illustrate how it can help structure the types of problems we face in sustainability science.

¹ The term’s origins are unclear. Möller and Wikman-Svahn (2011) refer to an Internet blog entry that was apparently written in 2009 by someone named Gupta as their source of the concept, yet we could not open the blog as given in their reference list. A recent paper by Lin et al. (2021) refers to an NY Times piece (Stampeding Black Elephants, 11/23/2014) by T. L. Friedman, which is however obviously not the first mention of the concept.
The article proceeds as follows. "Critical realism: the real, the actual and the empirical" gives a brief introduction to Roy Bhaskar’s critical realism and illustrates how Bhaskar’s ontology/philosophy can be used to dissect the dynamics of the pandemic and how this interacts with the main ethical question of what we ought to do. "Solving global coordination problems" points out that the common denominator of the current pandemic and the sustainability challenges of past and present is that they are global coordination problems, which would benefit from installation of supranational institutions with effective legislative power. "The subjective, the objective, the normative, and the great ‘in-between’" illustrates this interaction using examples from the current pandemic and highlights the value of a transdisciplinary approach to crisis response and management. "Learnings for impending and future sustainability challenges from the analogy" concludes the article.

### Critical realism: the real, the actual and the empirical

Philip K. Dick (1985), in one of his short stories, had a character say “reality is that which, when you stop believing in it, doesn’t go away”. From the viewpoint of philosophy of science, what is ‘real’ is arguably contested at best. This problem reflects well in the concept of risk. Here, risk may refer to the probability of an unwanted event materializing (Hanson 2018). How negative the consequences of an unwanted event may be and how I assess its probability is practically subject to personal preferences (cf. Kahneman and Tversky 1979). Different people might have different perceptions on what is objectively the same risk. This is deeply relevant from the stance of philosophy of science because objective empirical perceptions are increasingly questioned, as philosophy of science moved beyond Positivism into a more critical perspective on Empiricism. Consequently, the relevance to recognize a subjective perspective is increasingly realized for instance by post-structuralism (e.g., Ryan 2005).

Roy Bhaskar’s critical realism establishes a pivotal link between the ontological objectivity and epistemological subjectivity, creating a possibility to recognize empirical

### Table 1 Overview on Bhaskar’s conception of real, actual and empirical (Bhaskar 2014) as applied to the current pandemic

| Ontological domain | Definition (general) | Example (pandemic) |
|--------------------|----------------------|--------------------|
| The real           | All mechanisms, activated or not and observable or not | All existing virus variants and all new variants, including those that might only emerge in the future |
| The actual         | Activated mechanisms not yet observed | New virus variants already circulating but not yet observed, e.g., a new variant before it is identified as such |
| The empirical      | Activated mechanisms that can be observed | Virus variants that have been circulating and observed long enough to come up with empirical statements such as “the risk of dying from this variant as a woman aged 35–49 is 0.2%” |

Critical realism also deals with the link between false facts and beliefs and their origin within suppressive dynamics (Bhaskar 2009 [1986]) such as neocolonialism, the patriarchate, and abusive economic structures and mechanisms. Globalization and other developments hide especially these suppressive structures, or actors consciously try to camouflage their suppressive actions. Therefore, realizing what mechanisms can be identified, albeit only indirectly, is an important contribution to a responsible research agenda. Taking empirically rooted decisions in a world of uncertainty is a contribution we claim critical realism can help

---

2 Bhaskar uses the term ‘mechanism’ to refer to ‘all the various levels and types of entities in the world with their various powers and tendencies’ Gorski (2013, p. 665).

© Springer
deliver toward research that aims to solve sustainability challenges.

Combined with these empirical notions is the question how we react to the dynamics of the pandemic from an ethical standpoint, which itself seems to be subject to change. This implies that the burden of disease (Vos et al. 2015) is also a moving target. For example, if the pandemic had struck in the 1980s, arguably there would have not been any alternative to just let the virus run its course, maybe with some masks and medical resources for some few privileged people. However, this is exactly the reality many countries of the Global South are facing today, and the reaction to the pandemic is dictated both by our context and our ethical premises. However, these ethical premises can range from utilitarianism that aims at assessing cost–benefit trade-offs (see, e.g., Driver 2022), social contract theory (Rawls 1985, 2001) that entails the protection of minorities, and reason-based thinking that can for instance counterbalance emotional stakes with directed actions. Lastly, ethical premises may also conflict with each other. For example, democracies, which are defined by the fact that majorities rule, increasingly follow the goal of protection of minorities, which may not always align with the preferences of the majority, in turn creating societal tensions (Koopmans and Orgad 2020), a problem complex that many countries currently try to address.

**Solving global coordination problems**

Global coordination problems are much harder to solve than national ones, because existing political authorities focus mainly on the latter, but not on the former. The nation state is still an important source of identity for most people, while political ideas such as the European Union are often criticized to remain abstract and hollow, arguably because nation states in fact often value their sovereignty higher than contributing to other issues international in scope that would require a tradeoff with national sovereignty (cf. Rendall 2022). In most contexts and for most people, it would not make much sense to refer to oneself as “Earth citizen”, because, as long as there is nobody anywhere else in the Universe, it seems like a trivial statement that we are on “spaceship Earth”, even if, in fact, this understanding could make all the difference (Boulding 1966; Daly 2005). WHO’s Smallpox Eradication Program eradicated smallpox from the map by 1980, the Montreal Protocol successfully banned hydrogenated hydrocarbons in 1989. Granted, the politico-economic playing field has changed compared to when those things were accomplished, but they still illustrate that successful global coordination is achievable, albeit a tough challenge.

The current pandemic so far has demonstrated the dominant role of the nation state. While there were global efforts to coordinate, and also supranational ones, for example in the European Union, practical responses to the pandemic situation were widely national. In his opening speech of the 2022 World Health Summit in Berlin, the WHO’s Director-General highlighted the lack of cooperation explicitly: “At exactly the moment when the world needed to come together to face this common threat as one, the COVID-19 pandemic has been characterized by a lack of cooperation and coordination.” (Ghebreyesus 2022, p. 2). In addition, the pandemic highlighted the vital role of individual citizens, because a substantial number questioned the threat of the virus overall (Brzezinski et al. 2021), and many were hesitant or refused to get vaccinated (Lazarus et al. 2022). While some nations fared better than others in terms of surplus death per year or hospitalization rates, already existent global disparities and suffering were increased by global, national and individual failures to respond as well as deliberate practices by the Global North that exacerbated matters in the Global South such as medical poaching (Thomas 2022) and unjust and inefficient vaccine distribution frameworks (Li et al. 2021). Recurring emergence of new virus variants and subtypes against which existing vaccinations may or may not work well (or anything in between) highlights that it would be wiser to put access to vaccination in the Global South higher on the agenda. Efforts to curtail climate change can be seen analogously. It would make sense to tackle the problem in a concerted global effort, but since no global authority can mandate any binding legislations, we are left with national authorities that have failed to prioritize GHG emission reduction over other political matters that always seem more pressing in the short run. Without better global coordination, many lives will continue to be lost due to SARS-CoV2, and humanity will keep struggling to meet the 1.5-degree (or any other) target concerning climate change.

**The subjective, the objective, the normative, and the great ‘in-between’**

In a much-debated article, Richard Tol argued that it was a categorical error to say that science demanded that we acted on climate change now, because science could only tell ‘what would happen if’ (Tol 2017, p. 433). While this reflects a rather narrow positivist understanding of science and the role of scientists in society, it is not an uncommon stance. For example, one of the leading researchers on coronaviruses, German virologist Christian Drosten, while being
on radio and TV almost nonstop throughout 2020 and 2021, repeatedly stressed that he was not the one to make political recommendations.\(^4\) This quest for objectivity highlights the problem that, in the real world, somebody still has to make decisions upon emerging knowledge, which presupposes some sort of normative stance on how to rank the different options to act. We, for one, would much rather have Christian Drosten make recommendations on how to politically tackle the SARS-CoV2 situation than leaving it solely to professional politicians who are often hesitant to take extreme or unpopular decisions, even if they were actually reasonable. Of course, scientists are advisors only and were never elected to take political decisions. Nevertheless, judging by the results of two surveys among British MPs about their understanding of basic statistics and probability conducted by the Royal Statistical Society in 2011 and 2022 (Masters 2022), politicians might simply lack the data literacy required to assess what needs to be done.\(^5\)

On the other hand, the role of affect, emotions and cognition biases seems to have been an underestimated factor in the pandemic. Emotions are not necessarily based on facts, but still they often play a large role in people’s decision-making (Engler et al. 2019). Take the problem of getting enough people vaccinated as an example. Public debate has often focused on anti-vaccinationist and die-hard opponents of “the mainstream” as explanatory factors (Jamieson 2021). However, most people that are hesitant to be vaccinated do not actually belong to these groups, but much rather feel diffusely skeptical about the risks of getting vaccinated, often raising doubt concerning the speed of development of vaccines, potential vaccination damage and distrust in clinical trials (Vulpe and Rughiniş 2021) and the pharmaceutical industry, understandably especially in Africa (Ackah et al. 2022), which has a long history of unethical clinical trials (see SOMO 2008). With earlier variants of the coronavirus, not getting vaccinated meant trading off a roughly 1.5–2.0\(^\%\) risk of dying from COVID-19 after infection against a 0.3\(^\%\) risk of serious adverse effects (e.g., anaphylaxis or thrombosis) and a 0.06\(^\%\) risk of death due to vaccination side effects and complications (Rosenblum et al. 2022). One way of looking at this is seeing this as a blatant example of risk illiteracy, so the solution could be to educate people to be more risk literate. In fact, most school curricula offer a large amount of arithmetic of certainty such as geometry, analysis and algebra, but little statistics or stochastics, which deal with randomness and uncertainty. Another perspective is that people might deliberately choose to ‘not know’ (Gigerenzer and Garcia-Retamero 2017), or to follow their feelings instead of their rational thinking (Zajonc 1980). While it becomes increasingly clear that the effects of social media on information spreading (Islam et al. 2020; Pennycook et al. 2020) including before elections (Bovet and Makse 2019) or human well-being (Allcott et al. 2020; Liu et al. 2021) are not necessarily positive, a transdisciplinary approach to policy within a crisis could help open up new avenues for communication and collaboration between citizens, governments, science and—in case of a pandemic—the medical industry (cf. Gralla et al. 2015).

### Learnings for impending and future sustainability challenges from the analogy

The combination of Bhaskar’s ontology of real, actual and empirical with three levels, objective, subjective and normative, can help structure the problem types we face in sustainability science. First, wicked problems are real in Bhaskar’s sense and, by definition, characterize complex systems. However, moving on to the actual, wicked problems such as climate change, pandemics or social media are essentially communication problems, since those who know something about the problem need to inform those who do not while keeping true to the matter including the fact that problems (e.g., viruses) and knowledge will evolve over time. Thus, on the empirical level, we have the interaction between science and society, broadly defined, including governments, citizens and stakeholders. What objectivity in science actually is and if it is attainable is an ongoing discussion, but for now we adopt the view that scientists should be faithful to facts\(^6\) (c.f. Reiss and Sprenger 2018). What the pandemic has shown is that, as actors in society that are still highly regarded in most countries (Rutjens et al. 2021), scientists need to take a clear normative stance when communicating their findings in an exchange with the public. Not only is this necessary to assist in political decision-making, if simply for the fact that politicians might lack the risk literacy necessary, it is also required when confronting those who prefer to distrust science and believe in ‘alternative facts’. The coronavirus pandemic has fleshed out that the simple dynamic of the virus has triggered a complex societal

---

\(^4\) For example, when asked directly about possible measures for upcoming fall in a radio interview for German public radio station Deutschlandfunk on September 2, 2021, Drosten replied “I just want to describe the situation first. [...] That's all I can tell you right now. I can't give you any policy recommendations here now or comment on or criticize any policy guidelines. I'm just describing the situation” Drosten (2021) To be fair, Drosten later increasingly abandoned this point of view.

\(^5\) The surveys of course cover British MPs only, but we do not see any good reason to assume systematic differences in statistical literacy between, say, British MPs, German members of the Bundestag or American Congress members and senators.

\(^6\) Naturally, this includes refraining from commenting on topics where they have no expertise.
dynamic including emergence (e.g., social movements) and moving targets (e.g., the different risks involved at different points in time). We need to learn to live with and adapt to the fact that the empirical, the actual and the real are different interacting domains of our world as it ‘is’ and that this will likely remain a challenge in the years and decades to come.

Author contributions JOE and HVW conceived the idea, wrote the paper and edited previous drafts for important intellectual content.

Funding Open Access funding enabled and organized by Projekt DEAL.

Data availability No data was used for the research described in the article.

Declarations

Conflict of interest The authors report that there are no competing interests to declare.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article’s Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

References

Ackah BBB, Woo M, Stullwood L, Fazal ZA, Okpani A, Ukah UV, Adu PA (2022) COVID-19 vaccine hesitancy in Africa: a scoping review. Global Health Res Policy 7(1):21
Alcott H, Braghiari L, Eichmeier S, Gentzkow M (2020) The welfare effects of social media. Am Econ Rev 110(3):629–676
Alléen S (2022) From unobservable to observable: scientific realism and the discovery of radium. J Gen Philos Sci 53(4):307–321
Bazerman MH (2006) Climate change as a predictable surprise. Clim Change 77:179–193
Bhaskar R (2009 [1986]) Scientific realism and human emancipation. Routledge, London
Bhaskar R (2014) The possibility of naturalism: a philosophical critique of the contemporary human sciences. Routledge, London
Boulding KE (1966) The economics of the coming spacearth. In: Jarrett H (ed) Environmental quality in a growing economy. Johns Hopkins University Press, Baltimore, pp 3–14
Bovet A, Makse HA (2019) Influence of fake news in Twitter during the 2016 US presidential election. Nat Commun 10(1):7
Brzezinski A, Kecht V, van Dijcke D, Wright AL (2021) Science skepticism reduced compliance with COVID-19 shelter-in-place policies in the United States. Nat Hum Behav 5(11):1519–1527
Daly HE (2005) Economics in a full world. Sci Am 293:3. https://doi.org/10.1038/scientificamerican0905-100
Dick PK (1985) I hope I shall arrive soon. Doubleday, New York City
Driver J (2022) The history of utilitarianism. In: Zalta EN, Nodelmann U (eds) The Stanford encyclopedia of philosophy
Drosten C (2021) „Mit dieser Impfquote können wir nicht in den Herbst gehen“: Virologe Christian Drosten zur Corona-Lage
Engler J-O, Abson DJ, von Wehrden H (2019) Navigating cognition biases in the search of sustainability. Ambio 48(6):605–618
Engler J-O, Abson DJ, von Wehrden H (2021) The coronavirus pandemic as an analogy for future sustainability challenges. Sustain Sci 16(1):317–319
Fleetwood S (2014) Bhaskar and critical realism. In: Adler P, Du Gay P, Morgan G, Reed M (eds) The Oxford handbook of sociology, social theory, and organization studies: contemporary currents. Oxford University Press, Oxford, pp 182–219
Ghebreyesus TA (2022) World Health Summit 2022 opening speech. Berlin
Gigerenzer G, Garcia-Retamero R (2017) Cassandra’s regret: the psychology of not wanting to know. Psychol Rev 124(2):179–196
Gorski PS (2013) What is critical realism? And why should you care? Contemp Sociol 42(5):658–670
Gralla F, Abson DJ, Möller AP, Lang DJ, Vilsmayer U, Sovacool BK, von Wehrden H (2015) Nuclear accidents call for transdisciplinary nuclear energy research. Sustain Sci 10(1):179–183
Hansson SO (2018) Risk. In: Zalta EN (ed) The Stanford encyclopedia of philosophy (fall 2018 edition)
Islam AKMN, Laato S, Talukder S, Sutinen E (2020) Misinformation sharing and social media fatigue during COVID-19: an affordability and cognitive load perspective. Technol Forecast Soc Change 159:120201
Jamieson KH (2021) How conspiracists exploited COVID-19 science. Nat Hum Behav 5(11):1464–1465
Kahenman D, Tversky A (1979) Prospect theory: an analysis of decision under risk. Econometrica 47(2):263–391
Koopmans R, Orgad L (2020) Majority-minority constellations: towards a group-differentiated approach. Berlin Social Science Center Discussion Paper
Lazarus JV, Wyka K, White TM, Picchio CA, Rabin K, Ratzan SC, Parsons Leigh J, Hu J, El-Mohandes A (2022) Revisiting COVID-19 vaccine hesitancy around the world using data from 23 countries in 2021. Nat Commun 13(1):3801
Levin K, Cashore B, Bernstein S, Auld G (2012) Overcoming the tragedy of super wicked problems: constraining our future selves to ameliorate global climate change. Policy Sci 45(2):123–152
Li Z, Lu J, Lv J (2021) The inefficient and unjust global distribution of COVID-19 vaccines: from a perspective of critical global justice. Inq J Med Care Organ Provis Financ 58:469580211060992
Lin YC, Mestav Sarica G, Chua TJ, Jenkins SF, Switzer AD, Woo G, Lallemand D (2021) Asia’s looming Black Elephant events. Commun Earth Environ 2(1):1–4. https://doi.org/10.1038/s43247-021-00283-8
Liu H, Liu W, Yoganathan V, Osburg V-S (2021) COVID-19 information overload and generation Z’s social media discontinuance intention during the pandemic lockdown. Technol Forecast Soc Change 166:120600
Masters A (2022) Behind the numbers: the RSS puts the statistical skills of MPs to the test, Royal Statistical Society, available at https://rss.org.uk/news-publication/news-publications/2022/general-news/behind-the-numbersrserp-puts-the-statistical.
Möller N, Wikman-Svahn P (2011) Black elephants and black swans of nuclear safety. Ethics Policy Environ 14(3):273–278
Pennycook G, McPhetres J, Zhang Y, Lu JG, Rand DG (2020) Fighting COVID-19 misinformation on social media: experimental evidence for a scalable accuracy nudge intervention. Psychol Sci 31(7):770–780
Powell WV, Padgett JF (2012) The emergence of organizations and markets. Princeton University Press, Princeton
