



Code Red for Humanity: The Role of Business Ethics as We Transgress Planetary Thresholds

Heidi Rapp Nilsen¹

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Abstract

The urgency of the ecological crisis, described as a ‘code red for humanity’, is also a call to the business ethics community to work even harder for a safe space for humanity. This commentary suggests two specific domains of engagement, with the aim of having more impact in mitigating the ecological crisis: (1) the empirical fact of non-negotiable biophysical thresholds to convey the status and severity of the crisis, and (2) the need for strong laws and regulations—and compliance with these—to guide the aggregated economic activity away from further transgressing biophysical thresholds. Traditionally, business ethics focusses on why and how business can contribute beyond compliance with laws and regulations. By engaging more explicitly with the other two domains, our business ethics community can contribute to distinguish between which are value discussions and which are not, and to the necessity and legitimacy of laws and regulations. This text is a proposal on how we can use business ethics, hence the form of a commentary.

Keywords Compliance · Beyond compliance · Interdisciplinarity · Systems thinking · Planetary boundaries · Teaching business ethics · Research in business ethics

Introduction

UN Secretary General António Guterres warned that the report from the International Panel on Climate Change, issued in August 2021 (IPCC, 2021), is a ‘code red for humanity’ (UN, 2021). People around the world are now experiencing the consequences of climate change in form of record high temperatures and a resulting sharp rise in extreme weather, massive wildfires and droughts, and declining biodiversity (IPCC, 2021). Moreover, 21.5 million people are displaced by climate change-related disasters every year, and deaths due to weather-related disasters have increased fivefold in the past 50 years (UNHCR, 2021). However, the ecological crisis is broader and more serious, as climate change is only one of six defined planetary thresholds already exceeded through human activities (Persson

et al., 2022; Steffen et al., 2015; Wang-Erlandsson et al., 2022).

This commentary suggests how the business ethics community can contribute more in order to mitigate this ecological crisis. Other discussions of values and approaches related to the ecological crisis include, for instance, choosing the wellbeing of the current generation or just the next 5–10 years into the future. In contrast, this commentary takes a stand that ‘code red for humanity’ is a call to stop transgressing planetary thresholds, now.

The business ethics community has provided excellent scientific contributions based on different philosophical and ethical approaches that focus on why we should mitigate the ecological crisis. Moreover, it is argued that researchers have a responsibility to contribute to the mitigation of this crisis, also in line with ethical guidelines for research (Nilsen, 2020a; The Norwegian National Research Ethics Committees, Chapter 13, 2022). This commentary does not add to these arguments but rather suggests ways to have more impact on decision-makers and the business community in mitigating the ecological crisis.

I suggest two specific domains requiring engagement from researchers whose knowledge and competences are within the sphere of business ethics. The first is the

✉ Heidi Rapp Nilsen
heidi.r.nilsen@ntnu.no
https://www.ntnu.edu

¹ Department of Industrial Economics and Technology Management, NTNU - Norwegian University of Science and Technology, Trondheim, Norway

domain of biophysical realities and the notion that these are not contingent on human values and ethical theories. Too many people, including leading politicians, act as if they still do not know that biophysical thresholds exist, except perhaps for climate change. Transgressing other planetary thresholds also triggers irreversible and self-reinforcing dynamics with pervasive implications for the future wellbeing and even the survival of humanity on Earth (Barnard et al., 2021; Steffen et al., 2018).

The traditional role of our research community is studying why and how business can contribute beyond compliance with laws and regulations. However, in order to contribute ‘beyond compliance’, I argue we also need to address laws, regulations, and compliance. This is the second domain this commentary calls for engagement with.

Businesses wanting to contribute to mitigating the ecological crisis have few laws to comply with. The state of the ecological crisis is an urgent call for global agreements and national laws and regulations, which today are either non-existent, too lax or not enforced (Hogan & Idowu, 2021; Matz-Lück & Christiansen, 2020; Sjøfjell, 2021). Our business ethics community can argue to strengthen this situation by raising the quality of agreements regarding ethical issues like fairness and power, and by calling for compliance, such as meeting the goals of the Paris Agreement. Indeed, “Getting on track to achieve 2030 targets will require an enormous acceleration in effort” (Climate Action Tracker, 2022, p. 2). At the time the Paris Agreement was adopted in 2015, policymakers were already aware that the levels of emissions cuts proposed in our national targets were insufficient to limit global warming to 1.5 °C and thus agreed to update those targets by 2020. The compliance review will take place by 2024, but national pledges as of October 2022 point to a 2.8 °C temperature rise by the end of the century, which will be a global catastrophe (Climate Action Tracker, 2022; Ibrahim et al., 2021; UNEP, 2022). Thus, national pledges must increase to achieve the Paris Agreement’s goals, and national policies must be implemented to ensure that these pledges are met, also to regulate the aggregated pressure on climate change from business.

We can continue to work within our traditional sphere of business ethics, suggesting why and how businesses can contribute beyond compliance with laws and regulations. However, the detrimental urgency of the situation requires that we contribute to the recognition of other domains. My concern is that because we often fail in being explicit about the two more non-traditional domains, decision-makers typically point to our normative contributions within our traditional sphere, thereby excusing themselves from the responsibilities of passing laws and regulations in line with non-negotiable thresholds. My suggestion is to engage

more actively with these domains and with the connection between them.

In particular, our engagement must be evident in our research, teaching, training and outreach. Our ambition must be to increase our impact by facing the profound challenges in transforming our systems of planning, collaboration and governance, keeping in mind that “The actions or inactions of individual leaders in government, communities and businesses in this decade will be remembered darkly, or hopefully kindly” (Barnard et al., 2021, p. 22).

The First Domain: Planetary Biophysical Thresholds

The framework of the planetary boundaries defines a safe operating space for humanity based on biophysical processes that regulate the stability of the Earth system (Rockström et al., 2009; Steffen et al., 2015). The framework seeks to define planetary boundaries and provide stopping points with a buffer before thresholds of these boundaries are exceeded. Where the stopping points should be is based on attitudes towards risk and hence is a discussion of values that we can contribute to.

What is not a discussion of values is the existence of biophysical thresholds: Which thresholds have we exceeded and which are we approaching? As scholars outside the sphere of natural sciences, we need knowledge of planetary biophysical thresholds as a starting point or reference for our contributions related to the ecological crisis, such as that articulated by Whiteman et al., (2013, p. 327): “We call for more systemic research that measures the impact of companies on boundary processes that are at, or possibly beyond, three threshold points—climate change, the global nitrogen cycle, and rate of biodiversity loss—and closing in on others”. This citation is from a paper written almost ten years ago. In 2015, a fourth threshold, land use change, was documented to be exceeded (Steffen et al., 2015), and in 2022, two more were added to this list: chemical pollution and freshwater change (Wang-Erlandsson et al., 2022). Chemical pollution is in the category of novel entities; this category refers to entities that are ‘novel’ in a geological sense (Persson et al., 2022).

In summary, the situation is that nine planetary boundaries have been defined so far, and the thresholds of six of these boundaries have already been transgressed. The transgression of the boundaries deteriorates functioning of the Earth system, increases the risk of regional regime shifts and predisposes transgression of the two core boundaries, climate change and biosphere integrity, previously termed ‘biodiversity loss’ (Steffen et al., 2015). The persistent and substantial transgression of either of the two core boundaries can push the Earth system towards an irreversible state

shift (Steffen et al., 2018; Wang-Erlandsson et al., 2022). Moreover, as stated by Barnard et al., (2021, p. 3), “Critical thresholds (tipping points) may be unknown before they are breached and, once breached, the consequences may be irreversible”.

To mitigate the ecological crisis, the severity of the situation must be conveyed in research, teaching, training and outreach. For this, we need to acquire and demonstrate climate science literacy, or ecological literacy, through interdisciplinary work with the natural sciences (Ergene et al., 2021, p. 1327). We need to know which are discussions of values and which are not (Bansal & Song, 2017), and we can engage in both discussions. Engaging with the planetary boundaries is the first domain, in terms of being the foundation for humanity on Earth.

The Second Domain: Laws and Regulations

Business ethics has traditionally focussed on motivations, incentives and moral obligations that take firms and actors beyond what is required by law (Norman, 2011; Porter & Kramer, 2006). In other words, business ethics has traditionally focussed on what firms can or should do *beyond compliance* with laws and regulations. As of today, there are few laws and regulations to comply with for businesses that do not want to contribute to breaching the planetary thresholds.

The contributions business has made to mitigate the ecological crisis have been approached and described under a long range of concepts, such as ‘corporate social responsibility’, ‘corporate environmentalism’ and ‘circular economics’ (Banerjee, 2002; Bocken et al., 2016; Hahn & Ince, 2016). Most of these are presented and applied under the still prevalent and dominant regime of capitalism. Many have argued that the capitalist system itself is the root cause of the ecological crisis, first and foremost with its instrumental view of nature framed in a mechanistic world view and utilitarianism. Often, this critique is followed by suggestions of alternative ontologies or alternative ethical theories. Specific suggestions are typically ecofeminism, ecocentrism and an organic worldview (Allen et al., 2019; Capra & Jakobsen, 2017; Phillips, 2019; Prothero & McDonagh, 2021), to name just a few recent and prominent contributions. Alternative ethical approaches are, by and large, any ethical approach other than utilitarianism, such as virtue ethics, and other emerging ethics, such as biosphere-based stewardship (Dyck & Manchanda, 2021; Folke et al., 2016).

The critique against utilitarianism, specifically as executed in mainstream economics, is well documented with regard to encroaching ecological thresholds. Main shortcomings are lack of limits on the instrumental use of natural resources; only relative restrictions through prices, which are too low; and technological innovations that are being

developed too slowly (Loureiro & Loomis, 2017; Nilsen, 2020b). Moreover, the neoclassical economic definition of sustainability, called ‘weak sustainability’, does not ensure ecological sustainability but allows trade-offs with other human interests (Janeiro & Patel, 2015; Nilsen, 2010).

Still, we cannot rule out that utilitarianism in economics can be implemented within planetary thresholds. Even though most existing business models still contribute to overconsumption, there is a growing number of sustainable business models and business model transitions towards sustainability, where sharing economy and repair services are two practical examples (Bocken et al., 2016; Hahn & Ince, 2016; Nilsen et al., 2022). However, regulations are needed so that the aggregated economic activity, even within a degrowth economy, can stay within planetary thresholds.

This line of reasoning—that we need regulations—also applies to other ontological or ethical approaches. Even within the frames of the non-consequential ethics of care, we need regulations, as care ethics may give priority to relationships rather than to global aggregated ecological consequences.

I use this possibility to call for a sense of modesty regarding what can realistically be expected when it comes to staying within ecological thresholds even if a majority of all firms were to act within an organic worldview (Capra & Jakobsen, 2017) or ecofeminist capitalism (Phillips, 2019). Furthermore, it is not realistic to think that alternative ontologies and ethics can achieve the necessary transformation soon enough in a business world still dominated by mainstream economics and utilitarianism. There is a risk that business ethical contributions are seen as hypothetical discussions of values detached from the urgency of the situation.

The planetary thresholds are challenged from both sides of the still predominantly linear economic value chain within which businesses operate, on the input side by excessive extraction of raw materials and, on the output side, through production of waste and pollution from human activities (Nilsen, 2020b). As Capra and Jakobsen (2017) asserted, “The question is how to develop an economy that strengthens nature’s inherent ability to sustain life. In other words, the economy must adapt to ecological limits and principles” (p. 833). Achieving this economic paradigm demands much more than single corporations’ choices—be they based on ontological, ethical, financial or other considerations. Having already transgressed six out of nine defined biophysical thresholds, it is time for governance through laws and regulations laid down by national, regional and international institutions (Barnard et al., 2021; Thorseth & Schuppert, 2018). In line with the call from Heikkurinen and Mäkinen (2018), the democratic public sphere of society must be called upon to draft and enforce fair institutional conditions under which the activities of the private sphere can take

place so that economic actors can advance their ends within planetary thresholds. This challenge pertains to practical policy globally, regionally and nationally (Climate Action Tracker, 2022; Walker et al., 2009).

Can we contribute more to a common goal of strong laws and regulations for public sector, business and people, and compliance with these regulations? There is no agreed upon way of materialising an ontological or ethical approach into a scientifically incontestable operational principle of how to stay within planetary thresholds (Janeiro & Patel, 2015). However, arguments supporting such a common goal from our community's different ontological and ethical positions increase the possibility of reaching and supporting more people in businesses and in policies. Furthermore, as laws and agreements build on ethical foundations, can we contribute more to what *is* a strong or stronger agreement to mitigate the ecological crisis (Dooley et al., 2021)? For instance, by providing input to the creation of laws and agreements, by questioning power relations in today's capitalistic system: "Who gets to set the rules? What values should they reflect? What's fair?" (Kehoe, 2016).

The Paris Agreement, as with many other treaties, relies on voluntary contributions; thus, it leaves room to exert social pressure, including academic arguments for compliance, as well as for accordance with international norms for good behaviours (Bang et al., 2016; Chayes & Chayes, 1995; Ibrahim et al., 2021; Tingley & Tomz, 2021). The second domain that I propose our business ethics community can take a bigger part in is arguing for (King & Pucker, 2021) and contributing to new and better laws and regulations (Dooley et al., 2021), as well as for fulfilment of agreements already in place.

Business Ethics' Comfort Zone

Why and how we live within the planetary thresholds, view the world and nature and organise ourselves and our industries are necessary discussions within our traditional business ethics boundaries. I suggest that research, teaching, training and outreach in business ethics within our confined boundaries contemplate the relevance of the domain of planetary biophysical thresholds and the domain of laws and regulations, and consider whether and how to engage. Should the type of research questions explored be revised? Should we include scholars with competence within ecological sciences, law or systems thinking? Will this contribute to mitigating the ecological crisis?

Business ethics engaging and interacting with these two domains can be characterised as a systems approach to science (Meadows, 2009) and, more specifically, social-ecological systems thinking (SES). SES is a research approach for understanding cross-scale dynamics of social

practices and ecosystems. This approach sees humans as part of, as well as being able to shape, the ecosystems that they depend on (Ahlström et al., 2020; Liu et al., 2007). Although systems thinking can be viewed as contradictory to the traditional reductionist methodology, more often, the two are seen as complementary (Nilsen & Nilsen, 2018). What we do know is that systems thinking demands interdisciplinarity (Meadows, 2009). Furthermore, crossing traditional disciplinary lines is increasingly emphasised as a necessary mode of knowledge production, particularly in the field of sustainability research and in education for sustainability (Brundiers et al., 2021; Callard et al., 2015; Ergene et al., 2021; Van der Velden et al., 2023; Verhulst et al., 2023). I argue that 'code red for humanity' is a call to turn every stone, including stepping out of our scientific comfort zone more often.

Summary

Convey the Severity of the Ecological Status

The evidence of climate change is undeniable: rising sea levels, unprecedented flooding, widespread drought, increasingly intense wildfires, record-breaking heat, gargantuan hurricanes and other extreme weather events. Moreover, climate change is only one of six planetary thresholds that have been exceeded. The business ethics community can contribute to conveying the severity of the ecological crisis and the non-negotiability of biophysical thresholds. For this, the business ethics community needs to acquire climate- or eco-literacy.

The Need for Better Laws, and Compliance

Even if a majority of all firms were to act within, for instance, an organic worldview, there is no guarantee that the aggregated pressure on nature will be within planetary thresholds. If we change today's dominant form of capitalism to, for instance, ecofeminist capitalism (Bertella, 2019; Crittenden, 2000), we still need defined limits regarding the use and pollution of nature due to the aggregated character of the problem. It seems very unlikely that alternative ethics and ontologies can solve this crisis now, without new or better laws, regulations and agreements.

Using the words of John Elkington, in his recall of the 'triple bottom line' which he founded: "Indeed, *none* of these sustainability frameworks will be enough, as long as they lack the suitable pace and scale—the necessary radical intent—needed to stop us all overshooting our planetary boundaries" (Elkington, 2018). To help ensure that the

aggregated global pressure from businesses is within planetary thresholds, we need limits through hard and soft laws, and compliance with them. As of now, we are far from being on track to meet the Paris Agreement goals and are heading towards a climate disaster. The business ethics community can and should contribute more to new and better laws and agreements, and compliance, by arguing from our differing ethical positions and approaches.

Expand Business Ethics Boundaries

Within scientific communities, researchers have traditionally worked to contribute to a strong and solid discipline and have argued for the importance of their own confined scientific field. When we were within a safe distance from all planetary thresholds, there was still time to discuss what kind of worldviews and ethical theories could keep us from transgressing the safe space for humanity. Through these discussions and contributions in research, teaching, training and outreach, which we still engage in today, we argue and nurture our different visions, theories, and dreams about which values societies and business should build on (Allen et al., 2019; Capra & Jakobsen, 2017; Prothero & McDonagh, 2021). These contributions may have prevented the situation from being even worse than it is today. Nevertheless, I argue that ‘code red for humanity’ means that we must consider our traditional business ethics boundaries in relation to the increasing urgency of this crisis. My suggestion is that we contemplate the relevance of and actively engage with the planetary biophysical thresholds as well as with relevant laws, regulations and compliance—also through interdisciplinarity, systems thinking and SES. As Barnard et al. say (2021, p.22), “everything we know and love is at stake”.

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Declarations

Conflict of interest I hereby confirm that there are no potential conflicts of interest regarding the content and publication of this paper.

Research Involving Human Participants and/or Animals Not relevant.

Informed Consent Not relevant.

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References

- Ahlström, H., Williams, A., & Vildåsen, S. S. (2020). Enhancing systems thinking in corporate sustainability through a transdisciplinary research process. *Journal of Cleaner Production Article*. <https://doi.org/10.1016/j.jclepro.2020.120691>
- Allen, S., Cunliffe, A. L., & Easterby-Smith, M. (2019). Understanding sustainability through the lens of ecocentric radical-reflexivity: Implications for management education. *Journal of Business Ethics*, 154, 781–795.
- Banerjee, S. B. (2002). Corporate environmentalism: The construct and its measurement. *Journal of Business Research*, 55(3), 177–191.
- Bang, G., Hovi, J., & Skodvin, T. (2016). The Paris agreement: Short-term and long-term effectiveness. *Politics and Governance*, 4(3), 209–218.
- Bansal, P., & Song, H. C. (2017). Similar but not the same: Differentiating corporate sustainability from corporate responsibility. *Academy of Management Annals*, 11(1), 105–149.
- Barnard, P., Moomaw, W. R., Fioramonti, L., Laurance, W. F., Mahmoud, M. I., O’Sullivan, J., Rapley, C. G., Rees, W. E., Rhodes, C. J., Ripple, W. J., Semiletov, I. P., Talberth, J., Tucker, C., Wysham, D., & Ziervogel, G. (2021). World scientists’ warnings into action, local to global. *Science Progress*, 104(4), 00368504211056290.
- Bertella, G. (2019). Adding an ethical and spiritual dimension to sustainable business models. *Journal of Sustainability Research*, 1(2), 1–18.
- Bocken, N. M. P., de Pauw, I., Bakker, C., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308–332.
- Brundiens, K., Barth, M., Cebrián, G., Cohen, M., Diaz, L., Doucette-Remington, S., Harré, N., Jarchow, M., Losch, K., Michel, J., Zint, M., Mochizuki, Y., Rieckmann, M., Parnell, R., & Walker, P. (2021). Key competencies in sustainability in higher education: Towards an agreed-upon reference framework. *Sustainability Science*, 16(1), 13–29. <https://doi.org/10.1007/s11625-020-00838-2>

- Callard, F., Fitzgerald, D., & Woods, A. (2015). Interdisciplinarity collaboration in action: Tracking the signal, tracing the noise. *Palgrave Communications*, 1, 15019. <https://doi.org/10.1057/palco mms.2015.19>
- Capra, F., & Jakobsen, O. D. (2017). A conceptual framework for ecological economics based on systemic principles of life. *International Journal of Social Economics*, 44(6), 831–844.
- Chayes, A., & Chayes, A. H. (1995). *The new sovereignty*. Harvard University Press.
- Climate Action Tracker. (2022). State of Climate Action 2022. Downloaded October 2022 from, <https://climateactiontracker.org/publications/state-of-climate-action-2022/>
- Crittenden, C. (2000). Ecofeminism meets business: A comparison of ecofeminist, corporate, and free market ideologies. *Journal of Business Ethics*, 24(1), 51–63.
- Dooley, K., Holz, C., Kartha, S., Klinsky, S., Roberts, J. T., Shue, H., Winkler, H., Athanasiou, T., Caney, S., Cripps, E., Dubash, N. K., Hall, G., Harris, P. G., Lahn, B., Moellendorf, D., Müller, B., Sagar, A., & Singer, P. (2021). Ethical choices behind quantifications of fair contributions under the Paris Agreement. *Nature Climate Change*, 11, 300–305.
- Dyck, B., & Manchanda, R. V. (2021). Sustainable marketing based on virtue ethics: Addressing socio-ecological challenges facing humankind. *AMS Review*, 11, 115–132.
- Elkington, J. (2018). 25 years ago i coined the phrase “triple bottom line.” Here’s why it’s time to rethink it. Harvard Business Review. <https://hbr.org/2018/06/25-years-ago-i-coined-the-phrase-triple-bottom-line-heres-why-im-giving-up-on-it>
- Ergene, S., Banerjee, S. B., & Hoffman, A. J. (2021). (Un)sustainability and organization studies: Toward a radical engagement. *Organization Studies*, 42, 1319–1335.
- Folke, C., Biggs, R., Norström, A. V., Reyers, B., & Rockström, J. (2016). Socioecological resilience and biosphere-based sustainability science. *Ecology and Society*, 21(3), 41.
- Hahn, R., & Ince, I. (2016). Constituents and characteristics of hybrid businesses: A qualitative, empirical framework. *Journal of Small Business Management*, 54(1), 33–52.
- Heikkurinen, P., & Mäkinen, J. (2018). Synthesising corporate responsibility on organisational and societal levels of analysis: An integrative perspective. *Journal of Business Ethics*, 149, 589–607.
- Hogan, E., & Idowu, S. O. (2021). The drive towards global sustainability in the second millennium: An indispensable task for the survival of planet Earth. In S. O. Idowu (Ed.), *Current global practices of corporate social responsibility. CSR, sustainability, ethics and governance* (pp. 865–879). Springer.
- Ibrahim, I. A., Maljean-Dubois, S., & Owley, J. (2021). The Paris Agreement compliance mechanism: Beyond COP 26. *Wake Forest Law Review*, 11, 147–160.
- IPCC (2021). Summary for policymakers. In V. Masson-Delmotte, P. Zhai, A. Pirani, S. L. Connors, C. Pean, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekci, R. Yu and B. Zhou (eds.), *Climate change 2021: The physical science basis. Contribution of Working Group I to the sixth assessment report of the intergovernmental panel on climate change*. Cambridge University
- Janeiro, L., & Patel, M. K. (2015). Choosing sustainable technologies. Implications of the underlying sustainability paradigm in the decision-making process. *Journal of Cleaner Production*, 105, 438–446.
- Kehoe, J. (2016). Can capitalism be redeemed? Harvard Business Review 94, 23. <https://hbr.org/2016/07/can-capitalism-be-redeemed>
- King, A. and Pucker, K. (2021). The dangerous allure of win-win strategies. Stanford Social Innovation Review, Winter Issue, 35–39.
- Liu, J., Dietz, T., Carpenter, S. R., Alberti, M., Folke, C., Moran, E., Pell, A. C., Deadman, P., Kratz, T., Lubchenco, J., Ostrom, E., Ouyang, Z., Provencher, W., Redman, C. L., Schneider, S. H., & Taylor, W. W. (2007). Complexity of coupled human and natural systems. *Science*, 317, 1513–1516.
- Loureiro, M. L., & Loomis, J. (2017). How sensitive are environmental valuations to economic downturns? *Ecological Economics*, 140, 235–240.
- Matz-Lück, N., & Christiansen, L. (2020). UNGA as the anchor: Global environmental conferencing. *Environmental Policy and Law*, 50(6), 519–530.
- Meadows, D. H. (2009). Thinking in systems. A primer. Edited by D. Wright, Earthscan, London.
- Nilsen, H. R. and Nilsen, T. (2018). License to pollute: Stakeholders’ suggestions for environmental improvements on drilling waste in the Barents Sea. *Barents Studies: At the Economic, Social and Political Margins* 5(1), 58–81. <http://www.barentsinfo.org/barentsstudies/English/Issues/2018-vol5-1>
- Nilsen, H. R., Goodwin, D., Poncet, M., Smith, H., Thorseth, M. and Koop, S. (2022). Ethical challenges and societal expectation of the circular economy. A white paper. Ultimate, Water Smart Industrial Symbiosis, Deliverable 4.1. <http://api.kwrwater.nl/uploads/2021/09/ULTIMATE-D.4.1.-Ethical-Drivers-Societal-Expectations-for-the-Circular-Economy-A-white-paper.pdf>
- Nilsen, H. R. (2010). The joint discourse ‘Reflexive Sustainable Development’ – From weak towards strong sustainable development. *Ecological Economics*, 69(3), 495–501. <https://doi.org/10.1016/j.ecolecon.2009.11.001>
- Nilsen, H. R. (2020a). Staying within planetary boundaries as a premise for sustainability on the responsibility to address counteracting sustainable development goals, Nordic. *Journal of Applied Ethics*, 14(1), 29–44. <https://doi.org/10.5324/eip.v14i1.2863>
- Nilsen, H. R. (2020b). The hierarchy of resource use for a sustainable circular economy. *International Journal of Social Economics*, 47, 27–40. <https://doi.org/10.1108/IJSE-02-2019-0103/full/html>
- Norman, W. (2011). Business ethics as self-regulation: Why principles that ground regulations should be used to ground beyond-compliance norms as well. *Journal of Business Ethics*, 102(1), 43–57.
- Persson, L., Almroth, B. M. C., Collins, C. D., Cornell, S., de Wit, C. A., Diamond, M. L., Fantke, F., Hassellöv, M., MacLeod, M., Ryberg, M. W., Jørgensen, P. S., Villarrubia-Gómez, P., Wang, Z., & Hauschild, M. Z. (2022). Outside the safe operating space of the planetary boundary for novel entities. *Environmental Science & Technology*, 56(3), 1510–1521.
- Phillips, M. (2019). Daring to care: Challenging corporate environmentalism. *Journal of Business Ethics*, 156, 1151–1164.
- Porter, M. E., & Kramer, M. R. (2006). Strategy and society: The link between competitive advantage and corporate social responsibility. *Harvard Business Review*, 84(12), 1–16.
- Prothero, A., & McDonagh, P. (2021). Is sustainable marketing based on virtue ethics the answer to addressing socio-ecological challenges facing humankind? *AMS Review*, 11, 134–139.
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., III., Lambin, E., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H., Nykvist, B., De Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., ... Foley, J. (2009). Planetary boundaries: Exploring the safe operating space for humanity. *Ecology and Society*, 14(2), 32.
- Sjåfjell, B. (2021). Reforming EU company law to secure the future of European business. *European Company and Financial Law Review*, 18(2), 190–217.
- Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., Biggs, R., Carpenter, S. R., deVries, W., deWit, C. A., Folke, C., Gerten, D., Heinke, J., Mace, G. M., Persson, L. M., Ramanathan, V., Reyers, B., & Sörlin, S. (2015). Planetary

- boundaries: Guiding human development on a changing planet. *Science*, 347(6223), 11.
- Steffen, W., Rockström, J., Richardson, K., Lenton, T. M., Folke, C., Liverman, D., Summerhayes, C. P., Barnosky, A. D., Cornell, S. E., Crucifix, M., Donges, J. F., Fetzer, I., Lade, S. J., Scheffer, M., Winkelmann, R., & Schnellhuber, H. J. (2018). Trajectories of the earth system in the anthropocene. *Proceedings of the National Academy of Sciences*, 115, 8252–8259. <https://doi.org/10.1073/pnas.1810141115>
- The Norwegian National Research Ethics Committees. (2022). General Guidelines, updated in 2019. Downloaded October 2022. <https://www.forskningsetikk.no/en/guidelines/general-guidelines/>
- Thorseth, M., & Schuppert, F. (2018). Governance towards a green future. In M. Düwell, G. Bos, & N. van Steenberg (Eds.), *Towards the ethics of a green future. The theory and practice of human rights for future people Chapter 19*. Routledge.
- Tingley, D., & Tomz, M. (2021). The effects of naming and shaming on public support for compliance with international agreements: An experimental analysis of the Paris Agreement. *International Organization*, 76(2), 445–468.
- UN (2021). Secretary-General's statement on the IPCC Working Group 1 Report on the Physical Science Basis of the Sixth Assessment. Downloaded October 2022. <https://www.un.org/sg/en/content/dsg/statement/2022-03-02/deputy-secretary-generals-remarks-the-opening-of-the-high-level-segment-of-the-resumed-fifth-session-of-the-united-nations-environment-assembly-delivered>
- UNEP (2022). Emissions gap report 2022. Downloaded October 2022. <https://www.unep.org/resources/emissions-gap-report-2022>
- UNHCR (2021). Displaced on the frontlines of the climate emergency. Downloaded October 2022. <https://storymaps.arcgis.com/stories/065d18218b654c798ae9f360a626d903>
- Van der Velden, M., Russell, R., & Sjøfjell, B. (2023). Interdisciplinarity for sustainable business. In B. Sjøfjell, M. Van der Velden, & R. Russell (Eds.), *Interdisciplinary research for sustainable business, strategies for sustainability, Chapter 1*. Springer Nature Switzerland.
- Verhulst, E., Nilsen, H. R. and Sortland, B. (forthcoming, 2023). Engaging and empowering students to contribute to sustainable development through developing interdisciplinary teamwork skills', forthcoming. In T. Walker, K. Tarabieh, S. Goubran and G. Machnik-Kekesi (eds.), *Sustainable practices in higher education*, Palgrave-Macmillan.
- Walker, B., Barrett, S., Polasky, S., Galaz, V., Folke, C., Engstrom, G., Ackerman, F., Arrow, K., Carpenter, S., Chopra, K., Daily, G., Ehrlich, P., Hughes, T., Kautsky, N., Levin, S., Mäler, K.-G., Shogren, J., Vincent, J., Xepapadeas, T., & De Zeeuw, A. (2009). Looming global-scale failures and missing institutions. *Science*, 325, 1345–1346.
- Wang-Erlandsson, L., Tobian, A., van der Ent, R. J., Fetzer, I., te Wierik, S., Porkka, M., Staal, A., Jaramillo, F., Dahlmann, H., Singh, C., Greve, P., Gerten, D., Keys, P. W., Gleeson, T., Cornell, S. E., Steffen, W., Bai, X., & Rockström, J. (2022). A planetary boundary for green water. *Nature Reviews Earth & Environment*. <https://doi.org/10.1038/s43017-022-00287-8>
- Whiteman, G., Walker, B., & Perego, P. (2013). Planetary boundaries: Ecological foundations for corporate sustainability. *Journal of Management Studies*, 50(2), 307–336.

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