Addressing the biodiversity crisis via leadership

– An interdisciplinary review, concept development & research agenda

Abstract submitted to the Corporate Responsibility Research Conference 2023, sub-theme 8: Management and the Anthropocene or sub-themes 14-15 open call.

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Abstract

In order to address biodiversity decline, international reports recommend transformative change to reform global economic systems, shifting the prevailing paradigm of economic growth and overconsumption to penalise actions that deteriorate biodiversity and to reward sustainability. Yet, little is known on how can leadership enable such transformative change. In this conceptual paper, we engage in developing the concept of biodiversity-respectful leadership. In our conceptual development, we build on an interdisciplinary perspective. Our main contribution is in proposing and outlining the need for and the contents of a potential new leadership framework that addresses the biodiversity crisis, termed 'biodiversity-respectful leadership'. To this end, our paper offers disciplinary reviews of prior research on biodiversity from the perspectives of institutions, business and consumers. Thereafter, we move toward a review of leadership research, before developing a multi-level biodiversity-respectful leadership framework. In closing, we highlight challenges in such development, while offering an agenda guiding future research.

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1. Introduction

The future of humanity is threatened by accelerating decline of biodiversity, which refers to the variability of life in all its manifestations (Chivian & Bernstein, 2008). Just as one symptom of the crisis, it has been estimated that up to a million species risk extinction within the next decades (IPBES, 2021). However, the intertwined combination of biodiversity decline and climate change is not only an ecological disaster but, at heart, it is a crisis of humanity (Amel etl al., 2017). The "pervasive human-driven decline of life on Earth" (Diaz et al., 2019) is caused by, e.g. changes in land and sea use, unsustainable direct exploitation of species, climate change, pollution and invasive alien species. Put bluntly, our current way of life is destroying the natural ecosystems on which the wellbeing and mutual survival of all species depend. The COVID-19 pandemic offered a taste of the future if immediate action to remediate the situation is not taken (IPBES, 2020, Schmeller et al., 2020). While the international biodiversity targets (Aichi) were not met (UN 2020), new targets were set at the 15th Conference of Parties to the UN Convention on Biological Diversity (COP15) in Montreal (UN/2022).

Several important international reports on the reduction of biodiversity and its critical implications to the future of humanity have been published during the last few years. First, IPBES (The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) published a thorough global assessment on biodiversity which reviewed 15,000+ scientific publications on the state, causes and implications of biodiversity decline and actions needed to change course (IPBES 2019). Next, the IPBES pandemics report evaluated the links between pandemic risk and reduced biodiversity since the COVID-19 pandemic began (IPBES 2021). Further, the joint report by IPCC (Intergovernmental Panel on Climate Change) and IPBES emphasized that halting biodiversity decline and climate change are mutually supportive goals (Pörtner et al., 2021). Dasgupta's review (2021), in turn, outlined the economics of biodiversity. Finally, the IPBES value report stated the many values of nature and their determination (IPBES, 2022). The next large international report on biodiversity decline, the IPBES Invasive alien species assessment, will be published in September 2023. Combined, these reports recommend actions for transformative change to reform global economic systems, shifting the prevailing paradigm of economic growth and overconsumption to penalise actions that deteriorate biodiversity and to reward sustainability (Maes et al. 2013; Dasgupta, 2021). Systemic transformation calls for leadership at multiple levels from businesses to institutions to individual consumers (Bulkeley et al. 2020; Díaz et al. 2019; IPBES 2019; Maes et al. 2013).

Nevertheless, prior research has left unaddressed the connections between leadership and the transformative change required to address the biodiversity crisis. While it is recognized that leadership is needed to implement major change (Kotter, 1996), it has not been explicitly addressed in the transformation to reverse the biodiversity decline. On the one hand, this is a leadership failure, as classic leadership theorizing has not addressed questions beyond the organisational realm; thus, the suitability of leadership theory to address socio-ecological challenges is debated. On the other hand, research on responsible leadership and the emerging multidisciplinary field of sustainable leadership fail to address nature let alone biodiversity. Essentially, an integrative, interdisciplinary perspective toward leadership that accounts for biodiversity is needed.

In this conceptual paper, in order to start addressing this theoretical and practical gap in understanding, we engage in developing the concept of biodiversity-respectful leadership. To this end, the objective of this paper is to develop a conceptual appreciation of biodiversity-respectful leadership. To this end, the research question guiding our inquiry is: 'What kind of a leadership approach is needed to address, and potentially solve, the biodiversity crisis?' In our conceptual development, we build on an interdisciplinary perspective. Our main contribution is in proposing and outlining the need for and the contents of a potential new leadership approach that addresses the biodiversity crisis. This approach is termed 'biodiversity-respectful leadership'.

Our paper proceeds as follows. To begin with, we start by making sense of and defining the concept of biodiversity. Thereafter, we offer disciplinary reviews of prior research on biodiversity from the

perspectives of institutions, business and consumers. In so doing, in our conceptual development, we cover institutional, organizational and individual levels of analysis, while building on the disciplines of biology, marketing, business, management and corporate responsibility, political sciences and sustainability science. In a third section, we move toward a review of leadership research, before developing a multi-level biodiversity-respectful leadership framework. In our final section, we highlight challenges in such development while offering an agenda guiding future research.

2. Biodiversity

Biodiversity as a concept was introduced to the world at the national science forum organized in the United States in 1986. The book *BioDiversity* (Wilson 1988), published as a result of the meeting, can be considered as one of the first international biodiversity reports. The authors of the book had already published views on, for example, the interface between biodiversity and the economy. The forum and the book based on it were ahead of their time, as economists and philosophers, for example, took part in the discussions alongside natural scientists. They were all united by their concern for the state of biodiversity, which was rapidly deteriorating. The core message of the book was priceless: biodiversity decline threatens our future.

Biodiversity refers to the variability of life in all its different manifestations (Chivian & Bernstein, 2008). It is one of the basic characteristics of the planet Earth. Life started to evolve approximately four billion years ago, and the diversity of the natural world that now surrounds us is result of this continuum. The evolution of life has also been shaped by five global mass extinctions caused by, for example, severe changes in climate conditions of the planet.

Biodiversity can be studied at several overlapping levels (Gaston & Spicer, 1988). Genetic diversity refers, for example, to the variability of genetic traits between organisms within or among species. Species diversity, on the other hand, refers to the variability of organisms examined at the level of species. At the third level we find ecological diversity, which means the variability of, for example, the communities formed by different species living in the same area and the ecosystems they form together with the non-living nature.

In the mainstream academic literature and policy, biodiversity has become defined both as a biological concept and a broader framework for action. Most importantly, the Convention on Biological Diversity (CBD) has anchored the discussion and conceptual development of the biological definition of the concept to the variability at the three above mentioned levels of biological organization: genes, species, and ecosystems. Similarly, the CBD has set the stage for three spheres of action related to biodiversity: conservation, sustainable use, and fair distribution of costs and benefits. Most research and policy have adopted these principles; three levels of biological organization and three spheres of action.

Despite the exceptionally strong message of international biodiversity reports, the state of nature continues to deteriorate all over the world. The use of land and resources, and the impacts from human activity continue to affect and simplify natural and human-made ecosystems worldwide. Nature conservation efforts do not meet the necessary levels globally, and the use of nature is not sustainable but negatively affects the diversity at all levels of biological organization. Neither are the costs and benefits distributed fairly. The prevailing approach has not been able to fulfil its promise.

3. Review of prior research on biodiversity across the business and social sciences

In this section, we focus on reviewing prior knowledge on biodiversity at the levels of global and national governance, business practice and consumers. In so doing, we address three levels of analysis via which the biodiversity crisis can be addressed.

3.1 Biodiversity and governance

During the last three decades, biodiversity has gradually emerged from one single concept within wider environmental policy into its own policy field, which is dealt with both as an independent topic of biodiversity policy and together with other broad environmental issues, such as climate change (Smith et al. 2022). Similarly, in environmental social sciences, biodiversity governance has gradually gained stronger foothold (Petersson & Stoett 2022). The functionality and acceptability of national and international biodiversity policy tools have been studied chiefly from the viewpoints of distribution of rights, benefits and burdens related to the use and conservation of nature, and it can be argued that biodiversity has been a political topic from the very beginning (Escobar 1998). One important field of research has been forest policy because while forests are economically, culturally and otherwise socially vital environments, the negative effects of forest management on biodiversity are also significant (Blattert et al. 2022; Mönkkönen 2022). Agriculture and food production, social scientific research related to biodiversity is another important yet perhaps less studied topic (Glamann et al. 2017; Kuhmonen & Siltaoja 2022).

In recent years, biodiversity has gained new weight as an independent object of governance, its discourses and research internationally. This coincides with growing international awareness of the dwindling state of nature, and particularly due to the European Union's policy efforts. While efforts until the 2020s can be critiqued for lacking sufficient ambition, some development in this respect has occurred. To this end, in 2021, the European Commission published the European Biodiversity Strategy 2030, which is part of the European Green Development Program. The strategy raised high the goals of halting biodiversity decline, also challenging other regions of the world to act more effectively in halting the shrinking of biodiversity. The EU's goals also served as examples at the UN's COP15 meeting, organized in Montreal in December of 2022. Such developments have reinforced the shift of biodiversity as a topic from a wider environmental protection entity towards *biodiversity policy* as a concept in the mainstream of politics and public debate of the 2020s.

One central problem in attending to the global biodiversity crisis during the last decades has been that the parties of the international convention on biological diversity neither have binding obligations to achieve the targets nor systematic monitoring to verify the success or failure. Solutions to these challenges were sought at the COP15 meeting, during which the parties found a consensus on the importance of halting biodiversity decline (CBD 2022). The ambitious goal is to achieve this by 2030 with the help of multiple interconnected targets.

A critical view conducted by Finland's National Nature Panel concluded that the agreed international targets would appear to be sufficient for halting biodiversity decline (Ketola et al. 2022). According to the panel's report, reversing the trend now depends on decision-makers in different parts of the world making sufficient decisions that ensure the implementation of the necessary measures. This requires, for example, taking biodiversity and climate effects into account in all policy measures, increasing the sustainability of the use of natural resources, increasing biodiversity awareness, expanding the current network of protected areas and restoring weakened ecosystems. The task is extremely challenging, but not impossible.

Taking as an example the Finnish setting, the concept of biodiversity entered properly into the Finnish politics in the mid-1990s after the signature (1992) and ratification (1994) of the Convention on Biological Diversity (CBD). The CBD and the looming Finnish membership of the European Union (member from 1995) forced the Finnish government to include biodiversity into its laws and strategies (CBD.int s.a.; YM 1994, 8; YM 1995, 15–18). The first environmental program of the forestry sector drafted by both the Ministry of Environment and the Ministry of Agriculture and Forestry (MMM & YM 1994) was the first major strategy with biodiversity implications. It was complemented with new forestry practice recommendations that also included recommendations on biodiversity (Metsäkeskus Tapio 1994). On a more comprehensive scale, the report *Protecting the Finnish Forest Biodiversity* (YM 1994) and, most importantly, *the Biodiversity Working Group's report on the Tasks and Responsibilities in the National Implementation of the Convention on Biological Diversity* (YM 1995) led to the drafting of the first national action plan on biodiversity for the period of 1997–2005 (YM 1997). *The Forest Act* (1996), *Nature Conservation Act* (1996), the completely new *Act on the Financing of Sustainable Forestry* (1997) and other subsequent laws and revisions shaped the legal framework on the protection of biodiversity.

Since then, the concept of biodiversity has been included in numerous programs, strategies, funding instruments and action plans. However, according to the latest Impact Assessment of the Implementation of *National Strategy and Action plan for the Conservation and Sustainable use of Biodiversity in Finland (2012–2020)* (Auvinen et al. 2020), the actions taken have thus far not been able to halt biodiversity decline. A process to prepare a new National Biodiversity Strategy and an action plan toward 2030 is underway, though delayed. In addition to national objectives, the new strategy will account for the objectives of the UN Convention on Biological Diversity and the new EU Biodiversity Strategy.

In summary, goals have been set and strategies have been drawn up, but biodiversity continues its downward trend no matter what the have political measures been. What is causing this? According to recent studies, there are many reasons. Although Finland is considered a kind of "model student of the EU", which usually rushes to fulfill the set goals ahead of time (Koskimaa, Rapeli, Hiedanpää 2021), the strong politicization of the concept of biodiversity and its connection to the national forest policy have made the prevention of biodiversity decline a challenge both at national and EU levels. As regards the broader scale, biodiversity research in the social sciences is only in its "infancy" (Tan et al. 2023: 2756). It is necessary to create a variety of future images and visions, to develop political guidelines and new tools that protect biodiversity, and to test their feasibility and acceptability. We must also remember to ask what kind of world view and perception of ourselves as humans has led us to a situation where the destruction of nature is progressing at a shocking pace.

3.2 Biodiversity and business

Businesses are critical actors for halting biodiversity decline, due to the significant impact of business activity, across sectors, on the natural environment (Addison et al., 2020). In recent years, the discussion on the need for taking biodiversity into account in business practices has increased, though current research endeavours on business and biodiversity and business practices remain scant, as a recent review of the field posits (Teerikangas et al., 2023).

By reviewing the extant academic literature, across economic and business sciences, on the connection between biodiversity and business, we reveal that research on the connection has focused around five main themes. To begin with, quantitative survey-based or qualitative interview-based studies have been conducted, across countries, on companies' appetite in addressing biodiversity crisis in their operations. These studies, overall, paint a bleak picture of companies' actual deeds toward preserving biodiversity. Despite the prevalence of environmental management and CSR strategies in companies, biodiversity has been omitted from these (Wagner, 2022; Boiral et al., 2018). While there exist some initiatives to respecting biodiversity in business practice, current theorizing about sustainability management does not yet offer efficient conceptual tools for understanding relationship between business decision-making and biodiversity decline (Winn and Pogutz, 2013). Appreciating biodiversity in business practice induces changes to the ways the business-natural environment relationship is perceived. Overall, companies appear to be lacking agency toward tackling the biodiversity crisis. Moreover, their motivation to act appears to stem from external constraints, such as legislation or standards (Boiral et al., 2018; Smith et al., 2018). All the while, more pressure from regulation and markets is called for (Grigg, 2005; Moreira, 2019). There are promising signs of change, though, as regards early-movers have been identified (Hassan et al., 2022). Moreover, large companies as well as those that purchase or produce raw materials are further ahead than others as regards protecting biodiversity (Wagner, 2022; Quarshie et al., 2019).

Yet, as regards defining biodiversity, authors are sceptical as to the ability to ever fully grasp what biodiversity entails (Kassar & Lasserre, 2004; Farnsworth et al., 2015). The difficulty of defining biodiversity leads to the difficulty of measuring and reporting on its changes, whether considered negative or positive (Sobkowiak, 2023). If its measurement is difficult, if impossible, this means that its management is equally impossible. Equal difficulty has been assessed on the ground vis-à-vis a lack of a shared understanding of biodiversity as hampering efforts to address the matter (Quarshie et al., 2019).

Paradoxically, in current business practice, approaches to biodiversity have largely focused on reporting-based indicators and tools (Addison et al. 2020). Taking a critical stance, agency appears to be offered to numbers, instead of people as actors. Sustainability reporting is one of the key tools for sustainability management in business. Its most commonly used reporting framework, Global Reporting Initiative (GRI 2023) has included biodiversity aspects since early 2000's. Despite the sustainability reporting guidelines covering biodiversity issues since decades, the research on biodiversity reporting is scarce or embryonic (Roberts et al., 2021). In their 2021 paper, Roberts et al. reviewed the literature on biodiversity and species extension accounting finding 40 articles published in 2013-2020. Whereas, in 2022, Blanco-Zaitegi's et al. found 63 publications focusing on biodiversity accounting from 1996-2020 with 39 directly focusing on biodiversity reporting. Both studies found the year 2018 to be a peak year of biodiversity reporting analysis. Blanco-Zaitegi et al. (2022) further highlight the increase in biodiversity reporting from 2010 onwards.

Based on biodiversity accounting, Blanco-Zaitegi et al. (2022) identified five clusters in previous studies: sustainability, biodiversity reporting, corporate environmental management, environmental protection, and emancipatory accounting. Regarding biodiversity reporting research, they raised four aspects. First, corporate reporting often focuses on specific, iconic species. Second, the anthropocentric view dominates the reporting, where the biodiversity should be protected for human benefit. Third, a non-anthropocentric view is rare. Fourth, companies' main motivation in biodiversity reporting is to improve legitimacy. In this regards, Blanco-Zaitegi et al. (2022) noticed that there are typical sustainability reporting problems in the biodiversity reporting, including positive, selective reporting and even green-washing.

However, reporting and indicator-based business practice for halting biodiversity remains limited, and the academics have suggested the need for more profound changes in business practices, decision making and business models. However, there is still unclarity and debate on the best practices for biodiversity management in business and what it should include. Panwar et al. (2022) suggest that any biodiversity protection strategy in business should follow three basic principles: 1) aim to mitigate the primary driver of biodiversity decline caused by the company 2) reporting separately on four different biodiversity protection strategies (restoration, conservation, reparation, compensation) 3) be based on such understanding of biodiversity protection strategies that is created interdisciplinary between conservation biologists and corporate sustainability scholars. We argue, however, that halting biodiversity decline requires also more fundamental changes in our business models and economic systems, referring the redesigning and reorganizing the basic premises guiding their structures and decision making. As part of this discussion, for example such concepts as circular economy (to minimize material and land use) (Ruokamo et al. 2023), degrowth (to suggest sustainable degrowth and a fundamental shift in societal values) (Moranta et al. 2022) and regenerative business (to propose that business should enhance the health of social-ecological systems in a co-evolutionary process) (Hahn & Tampe, 2021).

As regards measuring a company's impact on biodiversity, research is nascent, yet amenable to critique. Quantified information for environmental impacts is crucial for organizations to recognize impactful actions and to measure possible reductions (reference?). To assess the environmental impacts of e.g., products, services, or processes along their various life cycle stages, a standardized method referred to as life cycle assessment (LCA) has been developed. Although LCA offers an array of different environmental impacts that enjoys scientific consent among scientists — such as global warming potential — a comprehensive and commonly accepted method quantifying human impacts on biodiversity has yet to be developed (Crenna et al., 2020; Winter, 2017). This lack can be explained by the complexity of capturing the full range of impacts that adversely affect biodiversity and complexity of the manner in which to measure all these impacts (Crenna et al. 2020). Multiple approaches to assess biodiversity in LCA has been published in recent years and many methods are currently under development (Lammerant et al. 2021; winter et al. 2017). A vast majority of the biodiversity impact assessments focus on the pressure from land use and management. Other biodiversity loss drivers — such as the role of pollution, invasive species, and overexploitation — remain less often considered. Other weaknesses and differences in published methods are found in terms of the metrics applied, biodiversity levels coverage (genes, species, ecosystems), conservation perspectives, taxa considered, impact pathways, and geographical coverage (Crenna et al. 2020; Asselin et al. 2020; Lammerant et al. 2021; Verones et al. 2022). Crenna et al. (2020) emphasizes that existing metrics are poor at capturing the complexities of

biodiversity. On the other hand, methods are constantly developed and improved e.g. by Vrasdonk et al. 2019; Maier et al. 2019; Asselin et al. 2020; Verones et al. 2022.

This development is necessary as a fully comprehensive LCA biodiversity impact method is especially needed now that a growing number of businesses is committing to ambitious biodiversity targets and are in need of a tool to measure its footprint on biodiversity in a credible way (Lammerant et al. 2021). They argue that once companies' impacts on biodiversity can be measured comprehensively, companies can start to develop strategies to integrate biodiversity into their core operations, thereby reducing their overall biodiversity impacts.

Finally, we observe that biodiversity is conserved in collaboration with different stakeholders, be it academia, NGOs or local community actors. This means that biodiversity protection is collaborative in its essence. Yet, as the bulk of prior research has either assessed companies' approaches toward biodiversity, or focused on biodiversity reporting or measurement, less attention has been paid to the role of executives, board members or individual managers as active change agents (Quarshie et al., 2019). In this regard, Sharma & Nguan (1999) found managers' risk propensity to affect their willingness to address biodiversity, while Panwar et al. (2022) observed that decision-makers in companies appear to not bear biodiversity on their attention span.

3.3. Biodiversity and consumption

The root causes of biodiversity decline - habitat destruction, unsustainable use of wild species, climate change, pollution and littering of natural habitats, and the spread of invasive alien species to new areas with human activities are closely linked to unsustainable production and consumption practices (Amel et al., 2017; Dasgupta, 2021; Díaz et al., 2019; IPBES, 2019; 2020; UNEP, 2022). Overconsumption, overuse of natural resources, and harmful production practices pose a serious threat to biodiversity, affecting the future of humanity and the planet (Amel et al., 2017; Dasgupta, 2021; Díaz et al., 2019; IPBES, 2019; 2020; UNEP, 2022).

While the role of consumers with respect to biodiversity is scantly studied so far, research on sustainable consumption has examined the conditions, requirements, and obstacles that foster or hinder the negative effects of consumption on the environment. In a large multinational study on environmental issues as drivers for food choice consumers tended to consider preservation of biodiversity as one dimension of sustainable food choices, the other dimensions being respect for life, saving natural resources, saving energy, reducing industrial pollution and using minimal packaking (Guine et al., 2021). From an individual perspective, research has largely focused on individual choices, motivations, behaviors, values, and attitudes (Connolly & Prothero, 2003; de Burgh-Woodman & King, 2013). Consumers' values and attitudes are linked to their understanding, knowledge, emotions, and actions (Mandal, 2011). If consumers' values and attitudes do not align against, for example, consuming meat that burdens nature, it is difficult to achieve permanent changes in consumption (de Boer & Aiking, 2021a). Consumers' personal values and value hierarchies determine the consumption choices they make in their own lives (Danner & Thørgersen, 2022; Gatti et al., 2022). At times, consumers are forced to make trade-offs between animal rights, biodiversity, or climate when making consumption choices. Studies have shown that different environmental attitudes may support each other. Climate and nature-friendly attitudes can work in parallel and guide consumers towards environmentally positive choices and leadership (de Boer & Aiking, 2021a; 2021b).

Studies describe the environmentally friendly consumer as an individual whose consumption decisions are largely influenced by emotions and habits (Gatti et al., 2022; Lange & Coremans, 2020; Moss et al., 2017), rather than knowledge about the environmental effects of products. Consumers are often motivated to engage in environmentally respectful actions based on their positive experiences, emotions, and values (Danner & Thørgersen, 2022; Grajal et al., 2017; Stoll-Kleeman & Schmidt, 2017). However, information regarding environmental harm caused by products seems to increase consumers' intentions to consume in an environmentally friendly manner but does not necessarily lead to long-term commitment to action (Lange & Coremans, 2020). Consumers do not always have the patience to explore information at the time of choice when habit and availability guide their behavior. Information that guides environmentally friendly consumption should be provided in an inspiring and emotionally engaging way, and should also encourage action

(Moss et al., 2017). Nevertheless, information is still important in decision-making situations because without measured information of the products' footprints, it is not possible to make environmentally respectful choices (Crenna et al., 2019; Notarnicola et al., 2017).

Studies have shown that individuals who experience and observe nature in their daily lives or who feel a sense of connection to animals are more likely to act in favor of biodiversity conservation (Moss et al., 2017; Prévot et al., 2018). In addition, cognitive dissonance, the conflicting feeling produced by the contradiction between values and actions, influenced consumers' willingness to change their consumption habits (Gatti et al., 2022).

Studies on biodiversity and consumption highlight various practices that individuals can adopt, lead, and act on in favor of biodiversity conservation in line with their values. Such practices include reducing consumption levels (Haswell, 2021), following a plant-based diet (Machovina et al., 2015; Selinske et al., 2020), avoiding foods that contribute to habitat destruction (Brisman & South, 2020; Chaves et al., 2021; Doughty et al., 2020; Lange & Coremans, 2020), favoring organic produce (Danner & Thørgersen, 2022; de Boer & Aiking, 2021a; 2021b; Meyer-Höfer et al., 2015), and practicing natural gardening (Dahl & Emontspool, 2021).

Today's culture is based on anthropocentric values and an endless growth economic system of consumer culture, which can be interpreted as the root causes of biodiversity decline (Haswell, 2021; Mandal, 2011; Turnhout et al., 2013). Individual actions and values are inseparably linked to shared values and beliefs about a good life and desirable lifestyle. Markets are also linked to the symbols and values of consumer culture and thus to the actions of communities and individuals. From a societal perspective, sustainable consumption has been approached from the perspectives of markets, culture, communities, ideologies, and morality (Boström & Klintman 2019; Cielemęcka & Daigle 2019; Connolly & Prothero 2008; Dolan, 2002; Giesler & Veresiu 2014; Holt, 2012). The lives of consumers and individuals are intertwined with a larger socio-cultural environment, a network of communities, social norms, customs, and habits that guide and set boundaries for individual actions and choices.

Research on biodiversity and consumption highlights the symbolic and social significance of local communities in protecting biodiversity (Prevót et al., 2018). Communities can support biodiversity and support community's identity based on locality: in traditional plant varieties and seasonal foods, and in shared local culture. Consumers and producers can work together to preserve ecosystem diversity through alternative food networks. Consumers can prefer plant varieties suitable for local natural conditions, preserve local food culture, and thus support sustainable production methods. The community also acts as a local, experiential knowledge bank for local environmental conditions, soil, and natural regeneration capacity. Understanding local nature and farming conditions is shared community knowledge (Foti et al., 2019).

Societally oriented macro-level studies highlight the limitations of an individualistic perspective. Emphasizing individual choices shifts the focus away from essential drivers of change, such as organizations, infrastructure, governance, power structures, and practices that shape individuals' opportunities for action (Shove, 2010). Theoretical considerations question the ability of the prevailing economic system to produce biodiversity-friendly consumption (Haswell, 2021; Mandal, 2011; Otero et al., 2020). Studies criticize the prevailing consumption culture based on overconsumption (Brisman & South, 2020; Haswell, 2021), the prevailing way of conceptualizing nature as measurable ecosystem services (Turnhout et al., 2013), and the inability to break away from the imperative of economic growth - growing resource use and deterioration of nature (Otero et al., 2020). Economic growth is linked to growing (natural) resource use, trade, and consumption, which in turn accelerate climate change, increase land use, and spread invasive species. In this current system an individual's opportunities to influence and lead the change is limited.

4. Toward a biodiversity respectful leadership framework

Summarizing the above interdisciplinary review of biodiversity research, taking a critical stance, we observe present research, across the studied research streams laments the lack of action toward addressing the biodiversity crisis. This is the case as regards consumers in marketing research, as regards business and companies in management and responsible business research, as well as regards the role of national and international governance mechanisms across social science

research. All the while, all the studied research streams appear to place the blame on others – be it the consumer, the firm or forms of governance and regulation. In summary, the studied streams have scantly addressed how active forms of individual, organizational or trans/national sustainability agency (Teerikangas et al., 2021) could accelerate biodiversity protection. This leads us to argue for the need for the concept of biodiversity-respectful leadership. In this section, we will proceed to explaining how our concept of biodiversity-respectful leadership builds on and differs from prior leadership theorizing.

4.1. Leadership theory

We begin our review with a critique of traditional leadership theory. To begin with, traditional leadership theorizing has focused on organizations as closed systems, thereby not addressing questions beyond the organisational realm, be it stakeholders, societal demands or environmental questions, including climate change or biodiversity. Moreover, traditional leadership theorizing has focused on business as usual, thereby assuming profit maximization for shareholders as the primary responsibility of business leaders. This assumption becomes amenable to critique at a time where business activity is among the main drivers of biodiversity decline. Solutions to address the biodiversity crisis need to adopt views of leadership that consider alternatives to the traditional business model of profit maximization. Third, traditional leadership theorizing assumes leadership to be enacted by individuals in managerial and/or decision-making roles/positions (i.e. business executives and societal decision-makers). Thus, the focus has largely been on the study of individuals in managerial positions, their attributes, and their relationship with their followers, i.e. why they have become leaders and how they exercise their leadership. To conclude, this brief review points to the fact that traditional leadership theories might, in fact, be part of the problem that is causing the biodiversity crisis.

Notwithstanding, more recent leadership theorizing offers promising insights to address the biodiversity crisis. In light of corporate scandals at the end of the 1990s, value-based leadership theories emerged, including authentic leadership, servant leadership, ethical and transformational leadership. While each has roots and theoretical origins going from the 1980s to the Greek philosophers, it was at the turn of the 20th/21st centuries that these concepts gained popularity in leadership research and practice. Paralleling the rise of corporate responsibility and influenced by stakeholder theory, the notion of responsible leadership emerged (Mark & Plees, 2006). All the while, paralleling the rising significance of sustainable development and the United Nation's Sustainable Development Goals, the notions of sustainable or sustainability leadership gained ground. In contrast to the responsible leadership literature that largely focuses on business, the sustainable leadership literature is multidisciplinary, including education and health, while bearing less connection to business (Gerard et al., 2017). Responsible and sustainable leadership theories are both drawing from the previously developed notions of authentic, servant, ethical and transformational leadership.

Taking a critical stance, all the above-reviewed leadership theories lack an in-depth appreciation of the natural environment. For one, classic leadership theorizing does not address the natural environment as it is solely focused on the profit maximization of business. For another, the natural environment is implicit in responsible leadership theory, while mentioned in sustainable leadership theorizing via contemporary crises such as climate change. Third, the more recent concepts of environmental leadership (Portugal et al. 1994; Boiral et al. 2009) and green transformational leadership (Chen & Chang 2013; Robertson 2018) offer rays of hope, though not detailed in their appreciation of the concept of environment. Environmental leadership emphasizes environmental values in all functions of the organization compared to other leadership styles, where environmental values are considered a separate part of the operations. Both environmental leadership and green transformational leadership rely on transformational behaviour when leading towards more environmentally friendly business operations, i.e. the manager's ability to influence individuals and mobilize organizations to achieve long-term environmental goals (Egri & Herman 2000; Boiral et al., 2009; Crossman 2011), while guided by environmental values.

To the best of our knowledge, though, none of these streams of leadership theorizing explicitly addresses biodiversity or the biodiversity crisis. In a broader perspective, leadership research has scantly connected with natural sciences (Panwar et al., 2020), as the two fields of science are rather

far apart (Porter, 2006; Winn and Pogutz, 2013). Yet, the present times of ecological crisis call for an end to this state of affairs. This leads us to argue for the need for the concept and conceptualization of biodiversity-respectful leadership.

4.2 Conceptualizing biodiversity-respectful leadership

In what follows, we move onto building tentative elements of a biodiversity-respectful leadership framework. Our review of extant leadership theorizing brings to the fore the need for an integrative, interdisciplinary perspective on leadership to address the biodiversity crisis.

A first defining principle of biodiversity respectful leadership is recognition and respect for all forms of life, be it bacteria, plants, animals, sceneries or human beings. This represents a departure from prior leadership theorizing, which is human-centric in its essence, while building on the assumptions in economic theory that the natural environment offers a resource for business. In contrast, we build on prior reflections and theorizing on nature as well as the subjectively shaped and historically evolving relationship between humans and nature. We are inspired by ecological realism (Ruuska et al., 2021) as well as multi-species perspective to sustainability (Ruprecht et al., 2020), both of which consider that the wellbeing of all species needs to be considered. In so doing, we shift away from a dualistic ontology that e.g. separates humans from nature toward a relational ontology (Locke & Muenster, 2015).

In respecting all forms of life, biodiversity-respectful leadership favours economic systems and business models that enable such an approach. This contrasts with the profit-maximization motive of traditional leadership theories, while moving beyond the triple-bottom-line as recommended by responsible leadership theory.

Moving on, both responsible and sustainable leadership theories adopt and call for multi-level theorizing on leadership to include individual, organizational and societal levels of analysis (Miska & Mendenhall, 2018). Even though individual, organizational, and societal levels can be conceptually separated, in practice, they are intertwined (Archer, 1988). Despite these calls, critical reviews of these literatures posit the dearth of research actually adopting multi-level perspectives (ibidem). Building on these theories, we posit that biodiversity respectful leadership bears a multi-level character. In other words, it is enacted simultaneously at individual, organizational and societal levels of analysis.

What is more, contrary to traditional leadership theorizing that views leadership as amenable only to those individuals in formal positions of power, responsible and sustainable leadership theories consider, instead, that leadership can be enacted by anyone. This idea bears potential in our conceptualization of biodiversity respectful leadership, as it essentially enables arguing that biodiversity-respectful leadership can be enacted in two ways. For one, it can be enacted by individuals in formal positions of power, be it company or NGO managers, civil service managers, politicians, or presidents. Present research on forms of company response, national or transnational biodiversity governance shows such elements of leadership to be largely missing. This leadership can be termed top-down leadership, representing the formal hierarchical element involved.

For another, biodiversity-respectful leadership can be enacted by any individual who lacks a formal power position. A formal power position vis-à-vis the biodiversity crisis can be found lacking in one's personal or professional life. As regards the former, we all act daily as consumers and citizens. As regards the latter, this refers to those in employee roles in work life. While research has studied consumers' attitudes and behaviours toward biodiversity protection, it remains largely silent as regards the role of employees or citizens in addressing the biodiversity crisis. Such leadership can be termed bottom-up or emergent leadership, representing the lack of formal hierarchy.

Consequently, a conceptualization of formal and informal leaders operating in private vs. professional roles offers the opportunity of appreciating the essentially dualistic/hybrid nature of biodiversity respectful leadership. Indeed, even though an individual is in a formal role in one's professional life, one nevertheless always remains in an informal role in one's private life. This leads us to argue that biodiversity-respectful leadership is required from all individuals, in all walks of life, regardless of one's formal position power. Therefore, we call for all individuals, in private and professional roles, to step up, awaken to, develop and start enacting biodiversity-respectful

leadership. This means taking responsibility for one's actions and recognizing the extent of one's impact on others and the planet. All the while, our conceptualization of biodiversity-respectful leadership is a call for leaders in formal power positions to take stance toward addressing the biodiversity crisis, while also developing this leadership in their private roles. In other words, there is no escaping the responsibility for our planet's wellbeing, be it one's private or professional life.

5. Discussion

Our conceptual development answers calls for interdisciplinary perspectives and research on biodiversity (Winn & Pogutz, 2013). Our main contribution is in proposing and outlining the need for and the contents of a potential new leadership approach that addresses the biodiversity crisis. This approach is termed 'biodiversity-respectful leadership'. In this section, we start by outlining challenges and limitations to this approach, before closing with future research directions.

Overall, an attempt to define or consider biodiversity respectful leadership is not without challenges, some of which we detail below. This is why, instead of seeking perfection, we hope that our developed concept inspires researchers and practitioners toward further developing such a framework and/or practicing it themselves.

5.1. Challenges and limitations

Our argument has been that if the biodiversity crisis is going to be resolved, then questions of leadership need to be raised. Put bluntly, we argue that unless leadership toward the biodiversity crisis is adopted, there is little hope for the required transformative change toward a biodiversity-respectful society to occur. Yet, this is a tall order, as solving the biodiversity crisis not only calls for leadership, but further from everyone, and timing-wise either 'right way' or at least 'as soon as possible'. This points to the mission impossible element that conceptualizing the biodiversity crisis via leadership entails. This is the first challenge that we raise.

Taking a closer look, questions of leadership and its development come closer to personal growth. Developing one's leadership calls for recognizing one's agency and one's potential for growth. Biographies and the history of humankind is replete with stories of individuals, at times called heroes, who have undertaken such a journey. In other words, this calls for taking responsibility for one's life and one's life path. This is another tall order. Were this easy, such personal growth would take place more than it to date has taken place in the history of mankind. This is the second challenge that we raise.

A historical review of philosophical and social science research on agency (Emirbayer & Mische, 1998) posits that for long, society has not been interested in (really) developing the agency of its citizens, as this might lead to dire consequences, including revolutions or anarchy. Notwithstanding, any attempt to call for individual level leadership development requires recognizing the role of surrounding local and societal structures (such as values, education, legislation) (Giddens, 1984) or an individual's internal psychological structures (Stones, 2005) toward dis/abling such agency. Moreover, taking responsibility for leadership at the individual level calls for the ability to bypass the limits of such structures, something that is also termed systems intelligence, i.e. the ability to act intelligently amid the systems that one is surrounded by (Hämäläinen & Saarinen, 2004). This is the third challenge that we raise.

Further, there are conceptual challenges. The concepts of biodiversity, nature and leadership, are all historically loaded, subjectively constructed differently over time, inherently messy and multifaceted concepts, thereby inamenable to perfect definitions. Indeed, any attempt at defining any of them leads to part of the phenomenon escaping. This leads to accepting the ontological and epistemological challenge that defining and developing the concept of biodiversity respectful leadership entails. It possibly opens doors toward maintaining ontological-epistemological diversity, when developing the concept. In so doing, a conceptualization of biodiversity respectful leadership might not lead to a normative outcome, but an array of different scenarios, depending on the assumptions adopted. This is the fourth challenge that we raise.

A further onto-epistemological challenge relates to defining what biodiversity-respectful entails. Given the impending difficulty of detailing all forms of life and diversity that constitute biodiversity, what is then the essence of being biodiversity-respectful? Can certain core principles be identified that relate to being nature-respectful in contrast to the present human-centric worldview? This is the fifth challenge that we raise.

While our intellectual pursuit in this paper has focused on arguing the need for addressing the biodiversity crisis via leadership, it deserves recognition that the biodiversity crisis is presently addressed by leaders simultaneously with other ecological, social and economic crises. In other words, this leads to questioning the etymological need for the concept of biodiversity respectful leadership. What leadership concept would represent the simultaneous ecological crises of climate and pollution (Rockström, 2015)? Taking a further stance, what leadership concept would address the socio-economic challenges, crises and transformations needed to build a more sustainable world? Unless the concept of biodiversity enables addressing all of the above, potentially, a next step would be developing a leadership that envelops the above challenges in one, e.g. planetary leadership. This is the sixth challenge that we raise.

5.2. Future research agenda

Building on the reviews in the previous sections, we identify numerous fascinating avenues for future research. In light of the seriousness of the biodiversity crisis, the scant amount of research on biodiversity across business and social sciences deserves attention. Most papers are published in ecological economics or sustainable science and responsible business journals. For example, mainstream marketing and management journals remain silent about the biodiversity crisis. Our findings are a call for more research, across the social sciences on how to address biodiversity decline as well as dedicated individual, organizational, and societal action.

Zooming into the concept of biodiversity, how does a closer focus on this concept enable re-visiting current leadership theorizing? Further, how does a more thorough philosophical and historical appreciation of nature and the natural environment enable further developing the biodiversity-respectful leadership framework? What forms does it take, depending on the ontological and epistemological positioning and the perspective on nature and the human-nature relationship adopted?

The predominant focus of research as regards biodiversity, business and consumption has been on generating more precise knowledge, assuming that this knowledge will result in a desired reorganization of social and natural dynamics. However, this kind of reasoning builds on and perpetuates a conceptual separation of humans from nature. Within this understanding, ecosystems and biodiversity have been studied as if humans were not integral parts of them. How does this conceptual separation influence the study of business and consumption vis-à-vis biodiversity, neglecting the integral role of humans within them?

Looking at the concept of biodiversity-respectful leadership at different levels of analysis, the following questions can be raised. How do national and transnational forms of governance exhibit leadership characteristics, or lack thereof? As an example, the numerous biodiversity conventions highlight global efforts, yet a continuous failure to actually embed biodiversity protection into daily practice. If the present state of biodiversity respectful leadership and individual, organizational and societal levels of analysis appears to be faltering, then how can this state of affairs be changed? What are the means of awakening individuals and organizations toward biodiversity-respectful leadership? Further, how can such leadership be developed by individuals, in daily practice, or via formal education programs?

Further, what is the role of companies and public sector organizations in addressing the biodiversity crisis? There is need for holistic approaches and an understanding of how biodiversity conservation affects organizational management, corporate strategy, business models and supply chains. Present efforts in research and practice tend to focus on efforts to measure biodiversity, which arguably can be considered immeasurable. Hence, the question of whether to continue efforts at measuring the immeasurable, this essentially reflecting an incremental change in the business status quo, or shifting via transformative change toward a biodiversity-respectful society. In this light, an overview of the meta-approaches to addressing biodiversity in business, be it via circular economy,

regenerative organizing, or nature-positive business, is in need. As the reduction of biodiversity is largely a land-use issue, we urge researchers to focus on industries with direct link to the primary production. Examples of such industries are agriculture and related food sector, and forestry and related forest industries, energy, as well as food consumption and waste.

As regards biodiversity practices and reporting in companies, global studies on large business samples would give the general understanding on the level of biodiversity strategies, practices and reporting. It would answer the research question how commonly is biodiversity addressed in companies in various business sectors and geographical locations. In this endeavor, corporate reports need to be supplemented with other data sources, be it interviews, observations.

In terms of biodiversity measurement, there are differences in BD assessment methods which leads to a risk that BD related information is not comparable and easily interpreted. Therefore, aligning various method and units would be important (Align 2022). At the moment, there are limitations in drivers of biodiversity decline, e.g. invasive alien species, micro plastics in oceans and direct exploitation (Crenna et al. 2020). More research will be needed to include missing drivers to have more holistic assessments. The current methods are also mainly focusing on terrestrial BD where more development would be needed for marine and freshwater BD despite some late advancements (Verones et al. 2022). One of the major limitations of existing methods is that due to lack of data some changes in product life cycles cannot be captured in assessments. To have more specific and exact methods more data on BD impacts of various human actions will be needed in various geographical contexts. This can be very time consuming and costly and therefore new data collection methods such environmental-DNA (Winther Pedersen et al. 2015) should be considered.

Overconsumption presents a significant challenge to both sustainability and individual wellbeing. It would be essential to understand the barriers associated with transitioning consumption towards sustainability from individual, corporate and societal perspectives. To foster biodiversity friendly/respectful behavior, it is important to reflect upon and to critically examine the issue of overconsumption, striving to cultivate the courage and integrity necessary to pursue a more sustainable and purposeful way of life. What obstacles exist in reducing consumption and changing consumer habits and practices at the individual, corporate and societal levels? How does an individual connect to consumption structures at a systemic level? What is the corporate response? This leads to asking, how does biodiversity-respectful leadership differ, whether an individual bears a formal position of power or not? How can consumers, employees and citizens develop and enact biodiversity-respectful leadership?

In closing, our paper is a call for action. All players, from the UN, to governments, firms, NGOs, local players, as well as individual consumer citizens, across the globe need to take leadership toward tackling the biodiversity crisis. This is the personal growth opportunity of our times.

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