

Values Based and/or Responsible Leadership for Addressing Climate Change[^]

Prof Colin Coulson-Thomas*

Corporate boards are responsible for providing strategic direction. This can involve formulating and/or agreeing and periodically reviewing corporate vision, mission or purpose, goals, objectives, policies and priorities, and ensuring that capabilities and strategies required for their achievement are in place. Over time as situations, circumstances and contexts change boards need to ensure they are still current and ideally aligned. A combination of these elements and whether they are appropriate and aligned can have a significant influence upon the impact and consequences of corporate operations and activities.

Some directors and boards may be more interested in some of the areas for which they are responsible than others and, whether or not they are inter-related, their relative significance can vary. There are those who attach particular importance to corporate values. It has been suggested that leadership should be values based and the case has been put for building a values-driven organisation (Barrett, 2006; Kraemer, 2011). When boards are subjected to a variety of influences, not least the aspirations and requirements of customers, investors and other stakeholders, what influence do statements of values have on critical board decisions? The behaviour and conduct of directors and boards may yield some clues as to their priorities.

How significant and influential are attempts of boards to agree, articulate, communicate and share particular corporate values in the context of the challenges and existential threats facing contemporary boards? While many companies have statements of values, the existence of laws, regulations and critiques of business and capitalism suggest a gulf or disconnect between the rhetoric of values and the reality of corporate conduct and what really determines what is decided and done. There may also be a diversity of values across an organisation and within its board. Leadership has been defined as the process of influencing the activities of an organisational or organised group towards goal achievement or both goal setting and achievement (Stogdill, 1950; Rauch and Behling, 1984). This article considers the board leadership required to address the impact of human activity upon the environment and global warming which threatens a shared goal of survival (Coulson-Thomas, 2022a; UNEP, 2022).

Value or Values-based and Responsible Leadership

A focus on the value, benefit or worth created by a board raises the question of value for what and for whom, while the significance of an emphasis on values may depend upon what and whose values are adopted and practised by whom, commitment to them and the extent to which they are shared and considered 'core values'. Value and values may be inter-dependent and influence each other. For example, if a common set of values is shared, might teams experience greater alignment and benefit from higher productivity (Barrett, 2006)? Various forms of value-based leadership such as authentic, ethical and servant leadership have been

explored and opportunities for further investigation relating to the role of leadership identified (Chang et al, 2021). What do the impacts of human activity upon the environment and eco-systems tell us about our collective values, principles and priorities? How often do values feature in questions directors should ask when considering corporate responses?

An absence of value based leadership may result in corruption and other abuses (Hendrikz and Engelbrecht, 2019). However, whether value or principle-based leaders with a moral compass can be selected and/or developed may depend upon the extent to which it can be assessed (Hendrikz and Engelbrecht, 2019). Can it also be learned by leaders to influence team performance, especially in the case of directors who are reluctant to recognise their own need for development (Coulson-Thomas, 2007, Lin et al, 2022). Much could depend upon the values that influence leader behaviour and whether these are related to prevailing corporate values and organisational culture. Can these be identified and developed so that they are also related to customer needs, the concerns of ESG investors and sustainable development requirements (Backstrom et al, 2018)?

Within a board and corporate organisation should particular individuals be custodians of core principles and values or a conscience or moral compass, or should these and standards of conduct and ethical behaviour be a collective responsibility? Should a company secretary act as a corporate conscience? Even when agreed, shared and supported, values still have to be applied in a particular situation and context. To some they may appear general and abstract and/or different values may be thought to be in conflict and certain values regarded as more important than others. There may be disagreement as to how, where and when they might and should relate to priorities, goals and objectives, and in the case of global warming and climate change a common and shared goal of survival (Coulson-Thomas, 2022a).

Responsible Corporate Leadership

Whether or not corporate leadership is claimed or suggested to be principled and value or values based, is it more important that it should be responsible and sustainable in relation to the social, environmental and other consequences, impacts and implications of board decisions and corporate activities and operations, and in the best long-term interests of a company and its stakeholders, including the environment, eco-systems and future generations (Moody-Stuart, 2014; Coulson-Thomas, 2019 & 2021a; Saks, 2023)? In relation to the environment and climate change, organisational resilience as well as responsible leadership is required (Piroti and Venzin, 2017). The requirement for responsible leadership extends to the management of major initiatives and projects, including those related to the environment, climate change and sustainability (Amato et al, 2018).

In an uncertain and volatile era in which boards face multiple challenges, the exercise of responsible leadership in the search for continuing relevance, resilience and sustainability is far from easy (Badaracco, 2013; Moody-Stuart, 2014; Piroti and Venzin, 2017). The 13th United Nations Environment Programme (UNEP) Emissions Gap Report 2022 issued a stark warning ahead of the COP 27 meeting in Sharm al-Sheikh, Egypt. It concluded that the carbon cutting plans of Governments since COP 26 have been “woefully inadequate” and that

there is “no credible pathway” to keeping global temperature rises below 1.5°C (UNEP, 2022). Regardless of the values of their leaders, their collective commitments and many of their individual commitments do not appear responsible in the face of potential catastrophe.

The question of whether a corporation as a legal entity can have values, a conscience and moral compass as opposed to its officers, employees and others who act in its name has been asked (Goodpaster and Matthews, 1982). In relation to corporate conduct and transgressions, might legal actions relating to responsibility be easier to pursue than those relating to values? As legal entities companies as well as their directors can and may be held responsible. Fossil fuel suppliers and companies that have been major emitters of greenhouse gases since we have become aware of their consequences may face loss and damage claims. As awareness grows of the negative consequences of corporate activities, responsibility for them may become harder to avoid. Directors need to confront legal as well as environmental realities.

Questioning Board Leadership

The damaging impact of human activity upon the environment has been relentless (Tucker, 2019; UNEP, 2019; IPCC, 2022a). Coral reefs that have built up over millennia now seem destined for extinction unless we can quickly reduce and reverse carbon dioxide emissions (Roberts, 2019). The biological impact of human induced climate change on biodiversity, eco-systems and natural resources amplifies the observed negative consequences for our collective futures (Dasgupta, 2021; Hannah, 2022). Is further degradation inevitable? One consequence of the Covid-19 pandemic was that for a period the air that many people breathed was less harmful. Some mentioned hearing bird song, the absence of which alerted Rachel Carson (1962) to the impact of pesticides on wildlife. Others noticed distant hills or mountains that had been long hidden by the fog of pollution. Could changes of our lifestyles, and business practices, and responses to the consequences of our collective behaviours, alter our relationship with nature and lead to sustainable and climate resilient economic growth?

Time is not on our side. Recent business practices and contemporary lifestyles have damaged the environment, reduced biodiversity and destabilised ecosystems (UNEP, 2019; Dasgupta, 2021; Hannah, 2022). They also contribute to global warming and climate change, the impacts of which are widespread, rapid and intensifying. More needs to be done and quickly to adapt, mitigate and address our vulnerabilities (IPCC, 2021 & 2022a & b). Is a return to previous business models, patterns of work, hectic lifestyles and headlong growth desirable and/or advisable? Given growing stakeholder awareness of the need for action, do business leaders have an unprecedented opportunity in challenging times to contribute to the building of a ‘new normal’ that embraces social and environmental aspirations and considerations as well as economic and financial ones (Coulson-Thomas, 2020 & 2022a & b)?

What questions should directors ask about the leadership they should provide, climate change, governance, pollution control, water and waste management, and energy security? Is more responsible leadership required and are changes of purpose, priorities and direction needed? Will these be sustained or will boards be distracted by pressing events, diverted by crises and frustrated by vested interests in the status-quo? Might they revert to previous

practices that damage the environment, reduce biodiversity and contribute to climate change, or will they commit, work towards and support an environment friendly, responsible and sustainable future and operations and lifestyles that are in harmony with the natural world (Coulson-Thomas, 2021a & 2022a)? Given the collective effort needed to change direction and address existential threats, can future growth be greener, low carbon and more inclusive?

Responsible Board Leadership for Sustainability

Different aspects of contemporary corporate activities, conduct and operations vary in the degree to which they are resilient and sustainable. They also differ in the extent to which certain stakeholders, and in some cases many people, might wish them to be sustained. Reaction against operations that damage the environment, reduce biodiversity, consume scarce natural capital and/or contribute to global warming appears to be growing, especially among younger people concerned about their future (Maynard, 2019; Sengupta, 2019). However, steps taken need to be genuine and significant. Greenwashing should be avoided. For example, with so many leading brands undertaking them, environmental sustainability initiatives *per se* may not engage customers unless they relate to them (Salnikova et al, 2022).

While economic growth, urbanization and population growth can impact negatively on environmental sustainability in the long run, responsible industrial value-added and capital formation may improve it (Tucker, 2019; Yang and Khan, 2022). Unless certain changes of corporate and community purpose, practice and priorities occur, is 'climate resilient green growth' possible and sustainable (Mayer, 2018; Coulson-Thomas, 2021d)? How do stakeholders feel about its achievement? Is there an opportunity to secure new alliances and wider support? Should public policy promote a sustainable lifestyle, ecological awareness, clean technological innovations and efficient production and consumption measures (Yang and Khan, 2022)? What strategies are required to build a climate resilient green economy?

How should 'resilience' and 'green growth' be defined? Can they and sustainable business be achieved by market-based strategies and what form should these take? Alternatively, is Government and regulatory intervention required and in what areas? What strategies are required for conservation, ecological balance and the sustainable use of natural resources? How should they be formulated? Are they achievable, or are too many people essentially selfish and greedy? Are ESG investors too few in number and unable to prevent damaging externalities being ignored? How might we live in greater harmony with nature as advocated in Indian philosophy (Baindur, 2015)? What can we learn from ancient wisdom and the practices of past generations (Coulson-Thomas, 2019 & 2022a)? How do we move our environmental strategies from compliance with dated and inadequate requirements to creative solutions to current challenges and more responsible business practices and models?

Responsible Innovation-based Strategies

If widely implemented, organizational creativity and responsible innovation may help a company to address economic, environmental and social sustainability challenges and contribute to its sustainability performance (Souto, 2021). Could responsible innovation, problem solving and optimism be the keys to 'saving the planet' (Butfield et al, 2021)? What

changes of strategy are required to conserve rather than destroy, achieve an ecological balance and use natural resources more responsibly and sustainably? Is a more holistic and integrated approach needed to build a sustainable organisation (Perrott, 2014; Coulson-Thomas, 2022b)? Are there steps that could be taken to rescue, revive, restore and/or recreate aspects of the environment and biodiversity that have been lost? How might they be funded and implemented? Where is innovation and creative entrepreneurship most required? Must we move in a different direction? Are the changes needed sufficiently radical and urgent to require transformational leadership, rather than incremental improvement? What form should this take and how should it be exercised and by whom, when and where?

More boards may now acknowledge responsibilities to a wider range of stakeholders. Will enough of them incorporate environmental and social as well as economic considerations into their business development strategies, to achieve more responsible, inclusive and sustainable growth? Might engaging multiple stakeholders, behaving responsibly and addressing issues such as climate change and inequality be a route to good financial performance (Polman and Winston, 2021)? What integration strategy could be used for economic, social and environmental development that is conducive to reducing carbon footprints and achieving net zero ambitions? Are there additional steps and interventions that might speed up the transition to a lower carbon future and achievement of UN (2015) sustainable development goals (SDGs)? What changes to board and leadership policies, practices and priorities are needed to achieve the corporate, collective and collaborative action that is required to achieve SDGs? How could these be captured, expressed and shared as a roadmap for attaining them?

Combating Climate Change

The scientific evidence for the multiple negative impacts of climate change is overwhelming (IPCC, 2021 & 2022a & c). How are we planning to mitigate them (IPCC, 2022b)? What technological developments would most help us to combat them? Are there applications and innovative solutions for dealing with the challenges of climate change and a zero carbon future? What is needed to adopt them and embrace related opportunities? How might the digital infrastructure across a company's own operations, customer eco-system and value chain enable decarbonisation and support corporate and collective adaptation and mitigation? In what ways should companies respond to climate risk? How are climate resilient technologies being used to manage climate uncertainty risks? What can be learned from experience of dealing with physical hazards such as fires and floods and their socio-economic impacts? Are there lessons from COP 26 in Glasgow that companies should consider (Coulson-Thomas, 2021b & c)? What can and should they do to bridge the gap between the commitments of participating countries and other parties and what is actually needed?

Managing climate change risks across global supply chains and their resilience is a collective priority in view of the vulnerabilities of activities and people dependent upon them (Ghadge et al, 2020). Are the uncertainties and risks of climate change understood within companies and across their networks of relationships? Are they effectively managed? How is this manifest in terms of action, intention and aspiration? Do boards sometimes just focus upon certain aspects of environmental changes and assume there will be time to adjust? Given the

multiple consequences that climate change can have, are large areas of the world in danger of becoming uninhabitable (Wallace-Wells, 2019)? What steps are being taken to increase corporate resilience to climate and other challenges, including extreme weather events and food, water and energy security? Are there particular practices, technologies and changes of approach, or different business and/or operating models that would increase resilience? What is being done to help customers and other stakeholders to become more resilient?

In Africa, which is especially vulnerable to climate change, factors such as a partial view, authoritarian and intolerant ideologies, gender and proficiency in a particular language can hinder understanding of it (Gonzalez and Sanchez, 2022). Where living standards are below those elsewhere, boards may feel under greater pressure to expand production in order to speed up and increase hoped for improvements. Will they succumb and boost output despite environmental concerns, or will they act to reduce the impact of an unsustainable increase of economic activity upon global warming and climate change? What steps might and should boards take to increase corporate contributions to the achievement of voluntary national Paris Agreement (2015) obligations? Are there approaches in particular areas such as energy and/or waste management that could contribute more to tackling climate change? Should board decision-making criteria be reviewed? For example, how might waste disposal decisions take account of full life-cycle and long-term costs of collection, handling, storage and decay?

Monitoring External Trends and Developments

Issue monitoring and management processes can track climate and other environmental risks and trends, assess their impacts on corporate operations, customers, suppliers and other stakeholders, and determine the responses that are required at local, business unit and corporate levels. Are directors tracking variations in the rate of change itself, rather than just assuming that identified trends will continue (Dorling, 2020)? Are the possibility of major weather events such as fires and floods and physical hazards taken into account? As well as their wide ranging indirect affects, extreme weather events can impact directly on injury, disability and death (Ahmed et al, 2021). Are crisis management, emergency and disaster recovery plans in place? Have these been recently tested? Do boards consider the socio-economic consequences of climate change and events upon the people of organisations, value chains and the communities and societies in which they operate?

Combating climate change creates opportunities for directors and boards (Coulson-Thomas, 2021b). How should they set about monitoring, evaluating and pursuing them? Do boards track innovations, developments, opportunities and possibilities relating to climate change adaptation and mitigation? Could more be done to stimulate creativity, encourage innovation and support entrepreneurship (Coulson-Thomas, 2017)? What solutions to climate change, achieving SDGs and other challenges are being explored? Are alternative business and operating models being considered? Are customers, suppliers and other stakeholders being consulted? How likely is it that the adaptation, mitigation and development options being assessed and measures in the pipeline will enable the required transition to a low carbon economy? What additional steps, interventions and/or collaborations are required?

Incremental improvements may not enable sufficient change while windows of opportunity still exist to tackle existential challenges. Innovation can play a key role in relation to sustainability and coping with climate change (Savastano et al, 2022). Are boards assessing or even aware of breakthroughs and various developments that could help them to address climate change (Hawken, 2017)? Is the adaptation and innovation required to survive it still seen as an arena of opportunity? How could innovations be more quickly adopted? What changes to current corporate governance arrangements are required to simultaneously handle multiple ambiguities and issues and deliver responses that achieve climate security and UN (2015) SDGs? How might and should stakeholders be engaged to secure the support required for agreeing and adopting the changes needed? What has to happen for innovation and applications that pursue SDGs to become a shared priority and strategic imperative?

Environmental Governance for Economic Growth and Financing

The UN advises national Governments to periodically review their policies and governance arrangements relating to the environment and ensure they adopt a comprehensive and systematic approach (UNEP, 2019). Democratic environment governance practices appear to foster transformations towards sustainability (Pickering et al, 2022). What environmental governance arrangements would best facilitate the development and scaling up of green growth solutions? From a corporate perspective, what factors would most help or hinder the achievement of an environmentally sustainable future? How do they compare with those emanating from ‘helps’ and ‘hinders’ analyses relating to other corporate objectives? What corporate activities and initiatives would directors like to see more or less of, and what is missing? How might customers, investors and other stakeholders respond to these questions? Are they engaged, consulted or involved over changes of governance, purpose, objectives, strategies and policies concerned with environmental sustainability?

Are there particular approaches, strategies or business and/or excellence models that are more or less environmentally friendly than others? Which of them need to be changed, dropped or replaced? Are their internal and external environmental impacts and/or consequences assessed, tracked and reported to senior management? What market solutions for strategic, operational and environmental challenges and associated opportunities are being explored and or adopted, and what is the experience to date? Might a slowdown in economic and population growth reduce the possible severity of some social and environmental issues (Dorling, 2020)? Are more sustainable development alternatives investigated and adopted? As and when they and innovations and breakthroughs occur, are solutions developed to environmental and green growth issues? What, if any, environmental governance and/or management changes are needed to enable faster adaptation, mitigation, transition and transformation? What needs to occur to make them happen?

How likely is it that the environmental governance changes required to achieve sustainable ‘green growth’ will occur and how should it be financed? Will Government and regulatory intervention be required to achieve this outcome, and if so, what form should it take? To what extent can the market be relied upon to provide solutions for strategic, operational and environmental challenges? Do we already know what needs to be done in terms of policies

and business development models and might the required finance and technology already be largely available for action now (Stern, 2019)? What impacts are green funds for specific environmental, social and governance (ESG) issues and investment criteria having? What needs to change in terms of market measures, incentives, collaboration and/or signals for sustainable 'green growth' to be delivered? Do corporate reward and bonus policies encourage responsible or irresponsible conduct (Treanor, 2020)? How might, could or should necessary changes be justified, initiated, funded and introduced?

Stakeholder Concerns and Contributions

Economic growth has drawbacks as well as advantages, especially if environmental and climate change impacts are taken into account (Meadows et al, 1972; UNEP, 2019; Coulson-Thomas, 2020; Dasgputa, 2021). During periods of lockdown or disruption, or in the aftermath of extreme weather events, how many stakeholders reassess what is important to them, their priorities and trade-offs they have made, such as between quantity of consumer goods and the quality of life? Can more sometimes be less? For example, how many people can our planet support and are there limits to growth (Meadows et al, 1972; Tucker, 2019)? Do we need a social transformation or revolution in behaviour to reduce birth rates in many parts of the world, or are some environmentally beneficial trends already occurring (Tucker, 2019; Dorling, 2020)? Is a first principles rethink and re-evaluation required of the purpose and priorities of companies and how and for whose benefit they are governed (Handy, 2002; Mayer, 2018)? How might this be undertaken? Who should be involved?

What sacrifices and/or contributions might different categories of stakeholder be prepared to make to enable more sustainable and 'green growth' to occur? Have likely supporters and opponents of such a goal been identified? Are ways of encouraging the former, countering the latter and better engaging stakeholders being explored? How might necessary changes be funded? Directors should be listening leaders who monitor and respond to stakeholder concerns (Coulson-Thomas, 2014). What proportion of customers might pay a premium for greener and more sustainably produced offerings? Might Environmental, Social and Governance (ESG) investors provide the finance that could be required? Would there be an appetite and market demand for further mutual funds that meet specific ESG criteria?

Particular attention should be paid to international discussion and developments relating to continuing existential threats, including climate change, commitments that Governments and others make, and the reactions and responses of key stakeholders to them. For example, what steps should directors and boards take to review the implications of COP 26, and also Nationally Determined Contributions towards tackling climate change, for them, their companies and those for whom they are responsible (Coulson-Thomas, 2021b & c, UN Climate Change, 2021)? How might activity, progress, obstacles and slippages best be monitored and their consequences and next steps periodically reviewed?

Responsible Water Management

Where do water availability, management and conservation feature on board agendas and among corporate objectives? In recent years, fresh, potable and usable water supplies have

fallen short of rising demand (Gleick, 2014 & 2018). Continuing water loss adds to sustainability pressures and new approaches to strategic water loss management and related performance indicators are required (Bozkurt et al, 2022). How aware are directors of the potable water crisis and other water challenges, issues and shortages within the communities, cities and societies in which the companies on whose boards they sit operate? What are the challenges and opportunities for universal and equitable access to safe drinking water? Are board members aware and apprised of corporate water consumption in relation to local supply and the pressures and external costs caused by corporate operations? How integrated are the processes being used for the management and conservation of water resources? What perverse incentives are too often causing water to be over used?

Are boards providing leadership and direction to corporate and collective efforts to achieve more integrated and responsible management and conservation of water resources? How will challenges such as local, regional or national potable water crises impact upon corporate aspirations, objectives, strategies and plans? Are certain cities and patterns and locations of urban living and industrial activity viable longer-term at an acceptable financial and environmental cost (Wallace-Wells, 2019)? What architectural, planning and conceptual changes need to occur if we are to create viable future cities (Dobraszczyk, 2019)? What needs to be done to better harvest, store, treat and transport rain water and improve ground water management? How might this be funded and achieved? Where is improvement most required? How might excessive, unnecessary and undesirable water use and contamination be prevented? What combination of appeals, directives, laws, regulations, incentives and pricing or other market mechanisms might best achieve SDGs, specific water protection and/or conservation objectives, and the more equitable and responsible use of water?

Human civilizations have been shaped by our relationship with the natural world and the availability of its resources (Dartnell, 2019; Tucker, 2019). What further steps are needed to improve water use efficiency in the agricultural, industrial and domestic sectors? Are entities and activities which are the biggest net users of water paying a fair share of the costs of supplying it? Should they also bear some liability for external costs being imposed upon others as a result of any consequential water shortages? What market mechanisms and/or forms of public intervention might redress the balance between costs and benefits, supply and demand, and ‘winners’ and ‘losers’? How many boards know the extent to which corporate operations are net positive or negative in terms of factors such as water usage and pollution? What should they do to achieve a positive balance and obtain greater water security?

Usable Water Access and Distribution

Taking a longer-term strategic view and externalities into account, what could be done to increase access to a secure and renewable supply of usable water and encourage the more equitable, responsible and sustainable use and allocation of supply? Might some corporate activities be no longer sustainable when the interests of a wider range of stakeholders are taken into account? Are boards considering what could happen as wells and affordable water supplies dry up (Rowe, 2019)? Should certain activities be scaled back, changed or relocated closer to water sources? What could and should be done to increase water supplies, whether

through the interlinking of rivers, desalination of sea water, replenishment of water tables or recycling and reuse? How might each of these and reducing levels of water loss be funded? What additional supplies of water could result and when are these likely to be available?

How should available supplies of water be fairly distributed between competing agricultural, industrial and domestic demands? Authoritative criteria and a framework may be required to allocate them between these contending requirements for an increasingly scarce resource (Sohrabi et al, 2022). At what level should critical decisions about access and quotas be taken? What more could be done to capture heavy rain falls? Access to safe and clean water and safe and hygienic sanitation has been recognised by the UN General Assembly (2010) as a basic human right. What are the opportunities and challenges for providing universal and equitable access to safe drinking water? What needs to change for directors to acknowledge their responsibilities in relation to water access and use? Are stakeholder water requirements and utilization understood? Could helping and supporting them become a differentiator and a business opportunity? Is collective action required?

Energy Security and Sustainability

Energy generation is a significant contributor to global warming. In some locations the burning of fossil fuels to generate electricity has increased because total energy demand has increased more quickly than fossil fuel generated production can be replaced by renewables. Should the first priority of responsible directors be to reduce energy consumption, energy wastage and the use of fossil fuels? Is the extravagant consumption of energy by many societies and communities an unnecessary indulgence and example of conspicuous consumption (Veblen, 1899)? Even if off-peak energy at cheaper prices is available, must so many cities be lit up like Christmas Trees at night? While recognising security issues, would turning external lights off during quiet and traffic free periods in residential areas allow more people to see the stars and encourage them to benefit from deeper and undisturbed sleep?

What needs to be done to encourage more responsible demand for energy and ensure this is met with a sustainable supply? Recent progress in the transition to renewable energy sources has fallen below what is needed to meet Paris Agreement (2015) goals (UNEP, 2019). What further steps are required to replace fossil fuels with renewable energy sources? How might boards simultaneously address multiple environmental issues, for example by using circular economy principles? Could agricultural, food and other waste be used to generate electricity? Are there specific public interventions or market-based incentives that might speed up this process of reuse? What is the current status of the roadmap for India's ambitions for additional energy generation and the achievement of its target of 500GW of renewable energy by 2030? What can and should directors and boards do to help to bring them about?

The Russian invasion of Ukraine has increased pressure on energy supply and prices that were already impacted by post-pandemic economic recovery demand (IEA, 2021). What energy security policies are companies adopting and/or contributing to and what cost-effective sustainable energy options are they considering? How ambitious are corporate, community, city and national strategies? Is sustainable energy for all a realistic goal? What

more needs to be done to better exploit renewable energy sources? How might collaboration and further International Solar Alliance developments help? What strategies for the wider and sustainable use of 'waste to energy' technologies should be explored and/or adopted?

Private and Public Sector Responses

More resilient and sustainable supplies of energy may depend upon accelerated innovation (Drahos, 2021). Will this emerge from commercial companies or public utilities? How should public-private collaboration to achieve it be encouraged? What is needed for the faster roll out and scaling up of beneficial developments? How effective are corporate and public body energy risk management, saving and security objectives, strategies, policies and plans? Are customers, supply chain partners and other stakeholders involved in their formulation? When were they last reviewed by the board? How energy resilient are supply chains and operating and business models? What back-up, disaster and recovery arrangements are in place to cope with an interruption of supply? How quickly can replacement energy provision become available? Are sustainable and green energy options feasible, practical and cost-effective?

Disruptive technologies within the renewable energy sector could have a wider social impact in enabling more sustainable development (Schuelke-Leech, 2018). Is the sector sufficiently resilient to cope with changing weather patterns? For example, extreme weather events such as droughts and high temperatures can increase power outages in the energy sector (Golub et al, 2022). These can affect many areas of an economy to compound their direct impacts upon human health and well-being. What storage or back up arrangements could be put in place to cope with the reduced efficacy of solar panels on cloudy days, or if overall cloud-cover increased for longer periods? Within energy majors there are different approaches to climate-linked compensation incentives (Ritz, 2022). What are the most effective ways of encouraging and rewarding energy renewable, resilience and security initiatives? How might publically funded incentives support beneficial transitions?

How effective have Government, state and local initiatives to encourage the greater use of renewable energy been? How will the end-of-life costs of reducing fossil fuel production be addressed (Rowe, 2019)? What calls should directors make if companies that have the choice opt not to purchase energy from a renewable source because fossil fuel generated electricity is cheaper and/or has been restarted as an alternative to importing Russian oil? Will continuing innovation and a trend towards lower renewable energy costs be sufficient to encourage more companies and other enterprises and public organisations to purchase their energy from renewable sources? Are additional Government measures and market incentives required? What renewable energy initiatives are underway, and how are companies responding to them? Might changes increase their take up and impact?

Pollution Prevention and Waste Management

Preventing pollution for a sustainable future can involve a wide range of projects and a variety of process techniques and tools (Raj et al, 2022). The need for action is pressing. Environmental pollution and the discharge of waste are a threat to human health and the planet's ecosystems (UNEP, 2019). The treatment of the River Ganges illustrates the damage

that human activity can do to an ecosystem that is of special importance to large numbers of people (Sen, 2019). What steps could and should directors, legislators, enforcement agencies and regulators take to reduce the production and discharge of harmful pollutants and the generation of waste? How might public-private collaboration improve the handling of waste generated by large and dense populations of people and/or the regeneration of heavily industrialised areas for alternative use? The responsible enlargement of cities may limit the adverse effects of urbanization on environmental sustainability (Yang and Khan, 2022).

The data on solid waste around the world is alarming (World Bank, 2018). What could and should be done to improve the management, recycling and/or reuse of waste and the recovery of 'rare earths'? How might current and future practices also contribute to addressing climate change? Could circular economy principles be more generally adopted? For example, would the greater beneficial use of waste-to-energy technologies encourage their more widespread adoption (Baxter and Srisaeng, 2022)? How can companies be made accountable for the negative externalities resulting from their activities and operations? Could pricing be used to cover social costs (Coase, 1960; Tybout, 1972)? How sustainable are the various environmental initiatives being pursued? At what point might diminishing returns set in?

Innovation and commitment are required to cope with the global challenge of dealing with waste (Rowe, 2020). What questions should directors ask to avoid the irresponsible handling and/or disposal of hazardous waste? How should hazardous and e-waste be responsibly managed, transported and ultimately dealt with? How might its recycling be improved? Is closer surveillance and monitoring required? Should stricter penalties be enforced or incentives introduced (Thaler and Sunstein, 2008)? What needs to be done to prevent the export of waste to developing countries where regulations relating to its disposal are less strict and its incineration might represent a public health threat to local populations?

Plastic and Ocean Pollution

Legislative action to control plastic and other pollution is needed, but can on occasion take many years to agree, enact and implement (Liu et al, 2022). What could be done to speed up the process and stay current? How might avoidance of the application of laws and regulations as a result of the payment of bribes to officials be avoided? Given its negative and long-lasting impact upon the environment, should all boards be taking steps to firstly reduce and then eliminate the single use of plastic? What strategies, measures and options are there for achieving this? By what means can people be weaned off their use of plastic? How might stakeholder support for this be best obtained? Who should be held accountable and in what ways for the harm caused by plastic and other waste and the cost of its collection and containment? Should reparations be paid by their sources to cover the cost of cleaning up plastic and other waste and the restoration of habitats and environmental damage?

The oceans cover over 70% of the world's surface and contain some 97% of the world's water. Even remote areas are affected by plastic pollution and microplastics are entering marine and human food chains. How focused are directors upon pollution generated by entities for which they are responsible and the impact of effluents and waste resulting from

human activities upon marine habitats (Roberts, 2019)? Marine biologists should be in great demand in view of the opportunities in arenas as diverse as new sources of food and carbon capture. What can be done to better protect the oceans and save them from oil, chemical and plastic pollutants, help them and marine life to recover, and explore the known and potential opportunities of the world's last great frontier? What new measures and corporate, collective and international commitments are required? Could action to improve marine and other environments be a potential business, engagement and/or innovation opportunity?

The Circular Economy and Collaborative Action

Should participating in the circular economy be a higher priority for more boards? Is this an arena in which rhetoric needs to be matched by reality? Externalities should be taken into account in current activities, investment decisions and in relation to circular economy claims and proposals, for example, in relation to the rebound or negative environmental effects of asset sharing. For example, prior to greater utilisation of boats that are shared, is account taken of their greater emissions and those from increased air and vehicle travel to where they are moored (Warmington-Lundstrom and Laurenti, 2020)? Are some directors more interested in appearing to be doing something, rather than understanding what is actually happening? How can boards ensure that all relevant externalities are taken into account?

More developed recycling and reprocessing infrastructure is urgently needed (WRAP, 2019). Opportunities to export plastic and other rubbish diminish as more countries refuse to import it. Greater priority should be given to waste reduction, prevention, reuse, recycling, recovery and composting and its responsible disposal and dumping. Does the policy and regulatory framework support the development of the circular economy (Maitre, 2018)? The perspective of Government can impact the implementation of the circular economy in supply chains, as it can be promoted through laws, policies, risk reduction via taxes and strict governance arrangements (Govindan and Hasanagic, 2018). However, critiques of the circular economy suggest that some applications of certain suggested approaches may require careful thought and might not always be beneficial (Corvellec et al, 2022). Collaboration and coordination may be required to ensure that putting too many eggs in too few baskets is avoided and a diversified portfolio of initiatives is pursued. How might a board best ensure this occurs?

What pollution control and sustainable environmental initiatives are underway and/or planned internationally, nationally and locally? What are the impacts of these initiatives likely to be and how might these be improved? Do they and other public measures influence relevant board discussions? Should directors be concerned about possible costs of penalties, reparations and clean-ups? Are corporate decisions mainly based upon internal and financial considerations? To what extent are externalities and environmental factors taken into account? How might corporate actions be made more environmentally responsible and better aligned with SDGs? What can be learned from best practice case studies about the effective implementation of energy efficiency, eco-innovation and environment management?

Addressing Environmental Challenges and Opportunities

Human activity remains a threat to our future and that of natural eco-systems (Tucker, 2019; UNEP, 2019 & 2022; IPCC, 2022a). Collective adaptation, mitigation and conservation effort is required to prevent mass extinctions (Dasgupta, 2021, Hannah, 2022). If urgent, decisive and systematic action in relation to environmental challenges and opportunities is required, an obvious question is “why are we waiting” (Stern, 2015)? The current situation may provide the possibility of pursuing multiple objectives simultaneously. Contemporary challenges could represent a once in a lifetime opportunity for thoughtful and responsible directors and boards to re-boot enterprise, re-purpose companies and re-engage with stakeholders and the communities and societies in which businesses operate (Coulson-Thomas, 2021a-d & 2022a & b). Can businesses thrive in a politicised world (Zammit-Lucia, 2022)? How does the interaction of information and communication affect building and sharing understanding of climate change challenges and opportunities (Graminius, 2022).

Younger generations are particularly concerned about climate change (Maynard, 2019). Its direct and indirect impacts can represent a severe threat to children and adolescent mental health (Clemens et al, 2022). Supporting collective and joined-up responses to environmental issues and existential challenges such as climate change, and working to ensure a more resilient, sustainable and inclusive future, could make young people more aware of the role that caring capitalism could play in their lives. Ensuring that this happens requires board oversight and direction, as the challenges and opportunities involved are inter-dependent and they also impact on many or most areas of corporate operation. More directors need to be ambassadors, educators and champions and show their commitment to a common purpose and collective interest in responding to shared existential threats. The social media many of their potential successors relate to can contribute to increasing environmental sustainability awareness (Mohammed and Dominic, 2021). It can be used to engage, inspire and enlist.

The perspective of directors should embrace the totality of organisations, their value chains and their networks of relationships with stakeholders, and both immediate issues and longer-term aspirations and considerations. What needs to be done cannot easily be delegated to a single department, business unit or function. Nor can environmental issues and challenges such as climate change be resolved by individual organisations acting alone and without the involvement of Governments and relevant public bodies. Boards should ensure that the silo-like functional structures that still exist in some organisations, and the perspectives of the professionals and specialists that accompany them, do not prevent the holistic thinking, connections and collaborations required for effective action and progress (Capra, 2002).

Making a Difference and Achieving Impact

More action to address global warming and climate change is needed while there is still time (UNEP, 2022). Expediency and short-term considerations can triumph over principles and longer-term collective interests and environmental concerns. While at COP 27 some Governments seem prepared to phase out all fossil fuels and incur the costs of supporting resistance to an illegal, unjustified and brutal invasion others were not. Could cities, businesses and citizens rather than Governments lead the battle against climate change (Bloomberg and Pope, 2017)? Within many countries and sectors there are also significant

differences in the degree to which companies and their boards could be regarded as either value-driven or responsible, as evidenced by their behaviours.

It has been suggested that values-based leadership may build trust and increase commitment (Barrett, 2006). Behavioural responses to environmental and eco-system concerns that are irresponsible can have the opposite affect and lead to protest and boycotts and increase the risk of legal action. In contrast, business leadership behaviour in pursuit of a laudable purpose such as the widely shared goal of collective survival that is also perceived as responsible can garner support and lead to reputational and other benefits (Mayer, 2018; Kempster et al, 2019; Coulson-Thomas, 2022a; Saks, 2023). Rather than play down or conceal contributions to global warming, boards should encourage their identification and initiatives to reduce them. Understanding the drivers and root causes of whatever appears irresponsible or proves to be harmful, may enable them be addressed.

While values per se have not explicitly featured in most of the questions this article suggests directors may now need to consider, responsible board leadership has an important role to play in ensuring that future business models, economic growth and proposed changes and developments are environment friendly and sustainable. It could be a driver of pro-environmental behaviour (Afsar et al, 2020; Coulson-Thomas, 2021a). Collectively and with complementary collaborators, directors need the will and drive to question, think and initiate and/or support responsible, inclusive and sustainable activities for protecting and enhancing or restoring the environment, adapting to and mitigating climate change, and undertaking transition and transformation journeys to beneficial lifestyles, operations and outcomes for humankind and the natural world that allow us to live in harmony with it.

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* Prof (Dr) Colin Coulson-Thomas, President of the Institute of Management Services, Director-General, IOD India, UK and Europe and leader of the International Governance Initiative of the Order of St Lazarus, is an experienced chairman of award winning companies and vision holder of successful transformation programmes. He has helped directors in over 40 countries to improve director, board and corporate performance, authored over 60 books and reports and held public appointments at local, regional and national level and professorial roles in Europe, North and South America, Africa, the Middle East, India and China. He is currently *inter alia* Honorary Professor at the Aston India Centre for Applied Research, a

Distinguished Professor and President of the Council of International Advisors at the Sri Sharada Institute of Indian Management-Research, and a Visiting Professor of Direction and Leadership at Lincoln International Business School. Details of his recent books and reports can be found on: <http://www.policypublications.com/>

Abstract

The leadership required to address the impact of human activity upon the environment and global warming raises questions for directors to consider about differing approaches to responsible corporate leadership for sustainability, innovation, combating climate change, issue monitoring, environmental governance, stakeholder relations, energy security, water and waste management, tackling pollution, collaboration and the circular economy. While values *per se* do not explicitly feature in most of the questions suggested, responsible board leadership should ensure future business models and economic growth are more environment friendly and sustainable. When confronted with existential threats and addressing common environmental challenges, private and public sector responses suggest significant variation in the degree to which different companies, boards and Governments are either value-driven or responsible, as evidenced by their behaviours. Irresponsible responses can lead to protest and boycotts and increase the risk of legal action. In contrast, business leadership behaviour in pursuit of a laudable purpose such as the widely shared goal of collective survival that is also perceived as responsible can garner support and lead to reputational and other benefits.

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