Environmental Sustainability and Climate Change:

Leading with Innovation^

Prof Colin Coulson-Thomas*

Globally, business and other human activities continue to pollute the environment and concentrations of C02 and other long-lived greenhouse gases continue to increase (UNEP, 2019). For many stakeholders of contemporary companies the number one longer-term issue, and an increasingly urgent one, is protecting the environment and climate change. In the UK the Financial Reporting Council has been consulting on proposed revisions to the UK Stewardship Code focused on how effective stewardship can deliver sustainable value for beneficiaries, the economy and society (FRC, 2019). Signatories are expected to take material environmental, social and governance (ESG) factors into account. Are they equipped to do this in a way that makes a material contribution to tackling environmental issues?

Globally are directors doing enough in relation to the environment and climate change? With many business leaders seemingly continuing along an unsustainable "business as usual" path of growth and development, discontent with elites is growing (Stern, 2019). Young people in various countries around the world who are worried about the consequences that will bite in their lifetimes have been called "the climate generation" or "generation change" for protests about the lack of commitment to transformative change (Maynard, 2019). The likely cost of delaying adequate responses in a range of inter-related areas is escalating (Stern, 2007; UNEP, 2019). At what future point might it be too late to take corrective action?

Global Nature of the Environment Crisis

Biodiversity is being lost at mass extinction rates (World Economic Forum, 2018). Flows of polluted air and water cross national boundaries and the consequences of global warming, reduced biodiversity and many degraded eco-systems do not recognise them. The interconnectedness of systems, history of our planet and the many millennia for which the consequences of current activities such as the burning of fossil fuels may last, suggest hundreds of thousands of future generations may already pay a price for our inaction (Crane, 2018). Lord Stern (2015) has asked: Why are we waiting? Are our priorities, board practices and governance arrangements, and the functional and departmental structures of our organisations acting as barriers to the rapid adoption of the mix of multidisciplinary actions needed to address the challenges we face and seize related opportunities?

Most, if not all, areas of corporate operation are either already or may soon be affected by climate change. Boards need to take responsibility. It cannot be delegated to one function when all functions are impacted and may need to contribute to an effective response. Because of the scale of both challenges and opportunities, increasingly collective action, collaborative leadership, creative strategies and more than incremental change are required. In areas and locations where urgent action is most needed, does lengthy discussion of the costs and benefits of cooperation, and debates about whether to take the initiative or wait, need to be replaced by a sense of urgency and the imperatives of crisis management?

Are many directors unaware of wider public concerns? If they are and/or share them, what is holding them back (Stern, 2015)? Are they overly cautious, uncertain of how to address a combination of inter-related issues, or afraid of the downside risks of taking the initiative while discounting the possible upside benefits of being a first mover? Are boards overlooking the human, social and environmental consequences of current approaches to business and economic growth and development (Raworth, 2017)? Do more boards need to adopt alternative approaches, or could they address certain undesirable consequences by redefining corporate purpose, excellence, quality, performance, productivity and success, for example in terms of reducing environmental and resource footprints and addressing climate change? Do directors and boards need to view more matters through an environmental or sustainability lens? For example, should they be questioning whether assets relating to damaging activities should be depreciated more quickly and their replacement accelerated?

Leadership, Culture and Innovation

In relation to leadership, in what areas is improvement or innovation required? Do governance arrangements or the practice of leadership need to change? Are new leadership styles and approaches required, or do the cultures and structures of organisations need to change? Is it just a question of urgency and priorities or are new skills required? Do we need to address the purpose of corporate leadership and how business value and social outcomes can be aligned (Ahluwalia, 2015; Kempster et al, 2019)? Whether addressing inter-related challenges relating to the environment, sustainability and climate change, or pursuing the many opportunities that accompany them, is more than the leadership of individual organisations needed? Are collective and collaborative responses and a more collaborative capitalism required to achieve sufficient impact (Ahluwalia, 2015; Coulson-Thomas, 2014c)?

This article will consider leadership from a board perspective and in relation to the challenges and opportunities that exist in a number of areas in which the United Nations Environment Programme (UNEP, 2019) has identified a need for action to address crises and achieve United Nations (2015) Sustainable Development Goals. It will also raise a series of questions for boards, business leaders and those who advise them to consider. Where significant changes of attitude, behaviour and conduct are required, the UK Financial Reporting Council has identified the importance of culture change (FRC, 2016). Is this the answer, or given the multiple impacts of various environmental challenges, the variety of organisations likely to be involved in effective responses and the diversity of cultures that exist within them and the different functions, communities and arenas impacted, is "culture" a distraction?

There are many factors other than culture that boards need to address in order to inspire and lead creativity, innovation and entrepreneurship in challenging and uncertain times (Coulson-Thomas, 2014d, e & h, 2015c, 2017 a & b, 2019a). It is questionable whether culture in the sense of deeply held attitudes, beliefs and values can and should be changed, and even if it were possible whether desired changes could be achieved in the timescales required for the changes of conduct, focus and/or priorities being sought to occur (Coulson-Thomas, 2015a & b). Boards should avoid unnecessary, general and distracting corporate programmes and focus on the reality rather than the illusion of innovation and progress (Erixon and Weigel, 2016).

Where changes of behaviour are required, these can be achieved by means other than culture change, for example by appropriate performance support (Coulson-Thomas, 2012a & b, 2013, 2014a, b, e & f, 2015a & b). If changes of attitude are required at leadership level, are these in relation to collaboration? Elsewhere, given the variety of people, organisations and situations involved, rather than culture change, might peer pressure and other factors cause changes to occur as, when and where action creates a momentum for further progress?

Environmental Governance for Global Challenges

The scale of environmental damage from emissions that pollute drinking water to the plastic found in the world's oceans, and the accelerating destruction of eco-systems, is alarming to many stakeholders. However, situations like the demise of Enron reveal board members not asking questions, challenging assumptions or being informed of waivers of policies and codes (Useem, 2003). How many directors request information on waivers of requirements relating to the environment? As already alluded to, younger people seem particularly concerned with business conduct, with one survey of millennials believing that impacts upon society and the environment should be a top priority (Verschoor, 2018). Millennials also prefer to work for companies they perceive as more socially responsible (McGlone, 2011). Apparent inaction may alienate this group upon whom the future of businesses may increasingly depend.

Directors should be alert to stakeholder concerns and their interests should be taken into account when board decisions are made. Environmental governance and they role they and boards can play in weighing contending factors and aligning the needs of society with successful and sustainable business requirements deserves a higher priority (Ahluwalia, 2015). Are new governance arrangements required in situations in which speed is of the essence, green growth solutions have to be quickly developed and scaled up, incremental change will not be sufficient and transformational leadership is needed (Coulson-Thomas, 2018a)? Where a mix of policies and actions are required that cross functional and organizational boundaries, how can their formulation and implementation be governed and differences of opinion between parties addressed, and who needs to be involved?

At a national level, policy instruments and governance may also need to be reviewed and a more systematic and comprehensive approach to both a top-down and bottom-up assessment of policy effectiveness adopted (UNEP, 2019). Is public governance transformation a key to greater innovation (Torfing and Triantafillou, 2016)? Increasingly, stakeholders may expect environmental and climate change issues to feature more prominently in corporate mission statements, priorities, objectives and strategies, and be reflected in business, excellence and operating models and risk management, investment and other practices. Boards require listening leaders who are aware of stakeholder concerns (Coulson-Thomas, 2014g).

Conflicts between generations and different family members have long been a feature of the governance and management of family businesses (Levinson, 1971). Might these be exacerbated by differing views on the possible and likely consequences of the exponentially increasing costs to future generations of slow and inadequate responses to the challenges of climate change? Debates in some boardrooms of family and other companies are prolonged by the difficulty of obtaining independent, objective and multi-disciplinary advice and

assessing the impact of a mix of environmental and other policies. Decision makers need appropriate support (Coulson-Thomas, 2018b). Evaluation can require expert opinion and a mixture of quantitative and qualitative approaches (UNEP, 2019).

UN Sustainable Development Goals (SDGs)

In the international arena, the United Nations (2015) SDGs represent a useful starting point for the discussion of collaborative action involving leaders of both private and public sector organisations, as they embrace both environmental challenges and requirements for social transformation. SDGs might be the key to formulating shared objectives, rebuilding trust and aligning business, regulatory and intervention strategies. Although both social and technical innovation may be needed to address SDGs, bottom-up and local approaches are occurring and encouraged by the UN Environment Programme (UNEP, 2019).

For some directors, accepting wider responsibilities and stepping up to the challenges of SDGs and climate change may require a change of perspective. For boards it may necessitate away days for fundamental reviews of assumptions and the role a company could play in the development of collective solutions. For educational institutions, it could mean more multidisciplinary programmes to explore individual, organisational and collaborative approaches to both tackling climate change and achieving SDGs (Jenkins and Stone, 2019).

A former President of Ireland has described the impacts of climate change as fundamentally unfair (Robinson, 2018). Some people are affected much more than others through no fault of their own and some of those who are least influential are at greatest risk. Lord Stern (2019) believes that the pursuit of a zero-carbon economy will generate strong and inclusive growth that can result in a more acceptable climate and assist the delivery of SDGs. Are sector strategies required? For progress towards their achievement to be better monitored, do SDGs need to be grouped and a more concise and quantitative set of targets agreed (UNEP, 2019)?

Accepting wider and collective responsibilities may require a review of corporate investment models and decision making practices. Are social and environmental impacts as well as other financial costs recognised? Are boards ensuring that they are being fairly and responsibly accounted for (Gray et al, 2010)? Are wider, downstream, upstream and 'true' costs being overlooked (Rowe, 2016)? There may be externalities to assess and internalise, whether the costs of natural and man-made disasters or the benefits of eco-innovation. There may be specific impacts on particular projects to consider (Infrastructure Australia, 2018). Are potential environmental liabilities tracked and is action taken to reduce them? Are business strategies aligned with environmental and other dimensions of SDGs? Could current processes be used to achieve this or are new mechanisms required (Lawrence et al, 1998)?

Do we need strategies for alternative enterprises (Coulson-Thomas, 2001; Cole, 2016)? Should boards look beyond strategy and at redefining corporate purpose (Basu, 1999)? Reviews of corporate purpose and business models in the light of wider social, environmental and other considerations and the interests of a broader range of stakeholders over a longer time horizon could involve a shift of emphasis from materialistic growth and its quantitative indicators to experiential, sustainable and more inclusive growth, the quality of life and issues such as food security. Are boards ready for this? Are they using applications of decision and

performance support to increase awareness and help employees, customers, supply chain partners and others to understand the consequences of different options and make more sustainable choices (Coulson-Thomas, 2012a & b, 2013)?

Climate Resilient Smart Cities and Innovative Solutions

The rapid urbanisation that has occurred in many parts of the global and the associated sprawl, congestion, waste and pollution that has resulted mean that the transformation of cities and conurbations has become the key to improving the quality of life for large numbers of people. The development of climate resilient and water-sensitive smart cities represents a prime arena for public-private collaboration in the development of new models of sustainable urbanisation and collective action to improve air quality, transportation and working and living environments. Infrastructure Australia (2018) has produced an assessment framework for initiatives and projects to be included in the country's infrastructure priority list which provides guidance on the treatment of climate change risks in the appraisal of projects, for example the impact of increasing heat on a mass transit project. Are companies and their strategies contributing enough to improved air and water quality, pollution and waste reduction, climate mitigation and sustainable urbanization in relation to what is required (Newman, 2006; James et al, 2015)? Might peer pressure from public and private organisations coming together encourage collective agreement (UNEP, 2019)?

There are many opportunities for innovation in fields as varied as electric and driverless vehicles and geo-engineering, and for companies to contribute to national strategies to meet voluntary obligations under the Paris Agreement (2015). Should companies as well as architects and planners be more proactive in using satellite and other technologies and data on environmental trends to influence the design and construction of the built, operating and living environment (Jackson, 2018)? Would this help them and communities to better cope with the impact of global warming? A variety of technical and potential solutions are available (Hawken, 2017). Increasingly, boards need to understand the particular challenges of coping with innovation related to disruptive technologies (Yu and Hang, 2010).

Could boards become more demanding clients and catalysts of change? In relation to the built environment, and particularly cities and the mega-cities emerging in different parts of the world, are the approaches adopted by planners and developers too incremental and overly focused upon adaptation and mitigation of the impacts of climate change, rather than the more imaginative design and creation of new approaches to urban living and new models of cities (Dobraszczyk, 2019)? An equivalent question could be asked about patterns of living and sustainable land management in rural areas and whether there are alternatives to the current use of this finite resource and the present urban-rural divide (UNEP, 2019).

Sustainable Energy Supply Options

Smart meters and their hoped for impact are a feature of some smart cities. For both urban and rural areas, greater energy efficiency and a more sustainable supply of affordable and eco-sensitive energy that reduces emissions contributing to global warming could help to both improve the quality of life and tackle climate change. For countries, sustainable and affordable energy can be a security issue (Farah, 2015). For companies, the transition to clean

energy, more efficient devices, energy diversification and continuing innovation should result in greater security of supply and greater cost-effectiveness. They also create additional opportunities for existing and new players to participate in the energy sector. Is there scope for more experience sharing across cities and greater involvement in international alliances?

Power generation with fossil fuels is a major contributor to global warming. Progress in energy efficiency and transition to low-carbon energy sources is continuing, but it is still not sufficient to achieve Paris Agreement (2015) targets (UNEP, 2019). While the major sources of CO_2 and other greenhouse gas emissions may be known and potential solutions identified (Hawken, 2017), do more companies need to understand obstacles and barriers to adoption and implementation and find ways of overcoming them, either by individual or collective action? For example, there are availability, perception, cost and infrastructure issues that those seeking to produce and market electric vehicles need to address (Bennett et al, 2016).

Should boards pay more attention to life-time costs when decisions are taken? For example, do clean energy transition strategies embrace the disposal and/or recycling of solar panels? The decommissioning of nuclear power stations and the cost of treating and storing nuclear waste illustrate the consequences of turning a blind eye to future costs that are difficult to estimate. Ignoring them can impose an unwelcome burden on future generations, as is the case with the disposal of thousands of offshore oil and gas platforms (Rowe, 2019). Are more eco-sensitive and cost-effective sustainable energy and power infrastructure options and solutions available? Could more be done to encourage energy efficiency and diversification?

Pollution Prevention and Waste Management

Environmental pollution is a major source of danger to human health and that of the planet, while the disposal and discharge of waste also has a negative impact on eco-systems and our health (UNEP, 2019). 90% of the world's population lives with polluted air (World Economic Forum, 2018). In city and urban areas the challenges of pollution, sanitation and sewerage and solid waste disposal are particularly acute. Integrated and more sustainable sanitation, sewerage and solid waste management solutions are sought. Households in some European cities are able to deposit waste in smart bins that can monitor waste levels and optimise collection arrangements (Shearman, 2019). Coping with hazardous and e-waste, mitigating noise, vibration and air pollution, recycling and generating energy from waste also represent significant areas of opportunity. How will boards respond?

Are enough directors in their executive suite offices focused on the flows of sewage beneath their buildings and mountains of accumulating waste? In relation to India, perhaps nothing better illustrates the gulf that can exist between the rhetoric of expressions of concern and the reality of what happens on the ground than the flows of raw sewage and industrial effluents into the waters of the Ganges and the enigma and paradox of the most sacred being among the most polluted (Sen, 2019). Once again, integrated solutions are required. In addition to environmental benefits these could help to restore trust and build the better brand reputation that is associated with higher than average financial performance (Dowling, 2006).

Given the extent to which the world's oceans offer opportunities ranging from inshore fish farming to offshore deep ocean mining, should more boards be looking out to sea, rather than

being in a metaphorical sense 'at sea'? Fish already provide over 3 billion people with over 20% of their dietary protein and a higher proportion in some areas of food insecurity (UNEP, 2019). Reducing the flow of oil, chemical, plastic and other pollutants into rivers and the oceans can both improve the quality of life and open up new leisure opportunities for urban and coastal communities. It can also represent a cause that engages stakeholders. Early adoption of environmentally friendly activities and offerings by some can exert a social influence upon others to follow their lead (Axsen et al, 2013).

Water Crisis Management

Water represents another arena of opportunity. Fresh and usable water supplies in relation to growing demand are a serious problem in various parts of the world (Gleick, 2007 & 2014). Many fresh water eco-systems are degrading. Water has been particularly significant for the history and development of India and surrounding countries (Amrith, 2018). The Puranas advise conduct to prevent atmospheric and water pollution (Renugadevi, 2012). The various impacts of climate change, whether upon meltwater flows into rivers or monsoons, also have consequences for large numbers of people, many of whom are in coastal areas and vulnerable to cyclones and storm surges. Imaginative, affordable and urgent mitigation is required.

The per-capita availability of fresh water is decreasing with population growth and this also mobilizes and amplifies risks to human health and the environment caused by human activity (UNEP, 2019). In many areas there is a growing shortage of water and much of what exists is polluted. This is a problem that is being exacerbated by climate change. It is particularly acute in urban areas such as Bengaluru, while in rural areas it is driving some farmers to suicide. Competitive struggles to obtain and control supplies of oil have led to greed, rivalry and conflict (Auzanneau, 2018). How much more likely is it that wars over access to water will occur? It can be considered a human right (Gleick, 2007). Will measures be taken to achieve better governance of the world's available water (Cooley et al, 2013)? Will more businesses actively contribute to tackling aspects of the water management crisis before it is too late to prevent the spilling of blood as well as effluents?

There are opportunities for individuals and organizations and the agricultural, industrial and domestic sectors to use water more efficiently by reducing waste and increasing recycling and reuse. Sustainable development can be a source of competitive advantage (Pop et al, 2018). Are companies undertaking sustainability and opportunity audits? Government, regulatory and collaborative action involving the industrial, construction and other sectors could be the key to increasing water supply by interlinking rivers, replenishing water tables, desalinating sea water and improving fresh water eco-systems. Who or what could be the catalyst to bring together potential public and private sector collaborators? How might corporate and political strategies be better aligned (Bleischwitz, 2004)? Is more public-public collaboration and are more public-public partnerships also required (Hall et al, 2009)?

Green Growth and Market Solutions

There are many opportunities for green growth and market solutions to the challenges overviewed above. Are pricing and trading options that have been advocated acceptable in relation to carbon and pollutants that are regarded as intrinsically undesirable (Coase, 1960;

Tybout, 1972; Hahn, 1984)? Lord Stern (2019) believes the policies required to unlock a new, sustainable and inclusive model of growth can be identified and the finance and technology required to make a rapid start is available. Will green banking and further innovation fill any remaining gaps? Again, what is holding us back from more imaginative and determined action (Stern, 2015)? Within boards, is there the will and leadership to respond to growing public concerns with both corporate and collaborative action at local, national and international level? Might fiscal incentives and statutory intervention help? Within markets, could alternatives to compulsion facilitate, prompt and support desired changes of behaviour (Thaler and Sunstein, 2008; Coulson-Thomas, 2012a & b, 2013)?

Embracing uncertainty has been described as the essence of leadership (Clampitt and DeKoch, 2015). Environment and climate change related uncertainties are multifaceted, inter-related and widely shared. More multi and transdisciplinary approaches are required (Howarth and Monasterolo, 2016). Individuals, large and small companies, the Government, regulators and a variety of public bodies all have their part to play. How their efforts and multi-disciplinary contributions are coordinated at local, national and international levels can be the key to success, but how many companies can contribute the programme management and other leadership skills required? In one survey undertaken for the UN Global Compact, almost all CEOs of global companies felt that sustainability should be considered when thinking about corporate strategy and operations (Perrott, 2014). What about actions?

Boards can be critical in recognizing concerns, initiating debates and engaging stakeholders. They can provide leadership by prioritizing and main-streaming environmental, sustainability and climate change concerns and by adopting and implementing green growth business models, strategies and policies. Boards could try to better understand the exercise of local leadership and how to bring about change in the cities in which their companies operate (Hochadel, 2017). Companies could aspire to leadership within sectors such as green banking, insurance, energy, design, construction, education and infrastructure. How many will do so? How many directors and boards will take the initiatives required? How can environment protection be embedded into corporate strategy and their DNA?

In relation to achieving aspects of certain SDGs, further innovation is needed (UNEP, 2019). The developments required to more confidently address such environmental issues and climate change will not occur simply because boards wish for them. Sustained innovation by larger companies can occur, but it can be a challenge for directors and senior management in view of the need to carefully balance different requirements and run existing businesses as well as create new ones (Pisano, 2019). What should the role of directors and boards be in kick-starting action to develop, test and scale up alternative approaches and models (Coulson-Thomas, 2001)? How could they better engage with scientific expertise and innovators? How can MSMEs, entrepreneurs and regulators help in developing green market solutions? In some areas, is it already too late for start-up entrepreneurial businesses to achieve the scale needed for a global impact? How can MSMEs and large companies work together to address this conundrum (Coulson-Thomas, 2019b)?

Collaborative Responses

Appropriate collaboration can be effective. That between individuals can extend the environmental benefits of the sharing economy (Sundarajan, 2016). International action has been successful in tackling problems caused by ozone-depleting substances and certain chemicals, but in many areas more needs to be done (UNEP, 2019). Governments, utilities and infrastructure providers can have an important role to play in coping with the macro effects of lots of individual decisions, for example in providing incentives for the recharging of electrical vehicle batteries to occur at times that can be accommodated by available power supplies. Will they be able to work together? Will any public intervention be flexible, thought through and affordable to those affected? Will boards inspire the creativity, enable the innovation and support the entrepreneurship that is required (Coulson-Thomas, 2017a & b)?

Consistency and the avoidance of conflicting priorities, policies and interests are important. New business models can impact upon sustainability, but when innovation and changes are considered other considerations may impact upon environmental benefits (Schaltegger et al, 2012). For certain companies there may be a paradox in that corporate processes designed to ensure that activities and conduct are responsible and ethical might actually inhibit innovation that would benefit the environment (Baucus, 2008). Do some boards need to devote more effort to ensuring that environmental and other objectives are aligned, resulting initiatives are not in conflict and reward and promotion policies do not encourage different behaviours?

Boards must ensure companies have access to the creative, scientific and entrepreneurial skills needed to participate in networks of relationships and collective action. They should make things happen (Harvey-Jones, 1988). Obstacles to progress, including psychological barriers that limit climate change mitigation and adaptation, must be identified and intended steps taken (Gifford, 2011). This is especially true of more creative solutions (Catmull and Wallace, 2014). Sometimes so many barriers may be found that companies might face a challenge in determining which to address first (Berkeley et al, 2018). Tackling sufficient of a combination of them to achieve progress may require a flexible programme plan that coordinates the contributions of a number of departments, working parties and projects.

Recognition of the social responsibility of business leaders is not a new concept (Bowen, 1953; Hoffman, 2007). Contemporary socially responsible business leadership may require more collaborative capitalism (Coulson-Thomas, 2014c). In relation to the environment, bold and collaborative corporate leadership has been called for by the President of India's Institute of Directors (Ahluwalia, 2015). Collaboration can be crucial for extending the circular economy. In addition to social impact, organisations that act responsibly may find it easier to attract and retain the people they require to refresh their human capital and implement their environment and other strategies. Other things being equal, graduates are more likely to want to join companies that are environmentally conscious (Hanson-Rasmussen et al, 2014). Companies that focus upon sustainability also have a lower staff turnover (Pop et al, 2018).

There may be multiple pathways to achieving the required environmental improvements within SDGs and the use of different model-based scenarios may help in their identification (UNEP, 2019). Will boards commit the effort required to develop them? Evidence suggests that there may be more synergies than trade-offs, which raises the prospect of a virtuous spiral of increasing financial, lifestyle and other benefits for those that make the effort (Stern,

2019, UNEP, 2019). The exercise of environmental leadership may be with the grain of ESG investor and other stakeholder opinions. It may simultaneously achieve multiple objectives. It might rebuild reputation, trust and inter-generational rapport, ensure a more sustainable, inclusive, fulfilling and healthier future for mankind, and benefit damaged eco-systems.

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Further Information

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*Author

Prof. (Dr) Colin Coulson-Thomas, President of the Institute of Management Services, has helped directors in over 40 countries to improve director, board and corporate performance. He leads the International Governance Initiative of the Order of St Lazarus, is Director-General, IOD India, UK and Europe, chair of United Learning's Risk and Audit Committee, Chancellor and a Professorial Fellow at the School for the Creative Arts, Honorary Professor at the Aston India Foundation for Applied Research, a Distinguished Professor and President, Council of International Advisors at the Sri Sharada Institute of Indian Management-Research, Visiting Professor of Direction and Leadership at Lincoln International Business School, and a member of the advisory board of the Aravind Foundation and ACCA's Governance, Risk and Performance Global Forum.

An experienced chairman of award winning companies and vision holder of successful transformation programmes, Colin is the author of over 60 books and reports. He has held public appointments at local, regional and national level and professorial appointments in Europe, North and South America, Africa, the Middle East, India and China. He was educated at the London School of Economics, London Business School, UNISA and the Universities of Aston, Chicago and Southern California. He is a fellow of seven chartered bodies and obtained first place prizes in the final exams of three professions. He obtained the CSR Lifetime Achievement Award at the 2018 CSR Leadership Summit. Details of his most recent books and reports can be found on: http://www.policypublications.com/

Abstract

Public and stakeholder concern over the environment and climate change and the global nature of related challenges and opportunities have implications for many directors and boards. They raise a variety of issues that boards should address, including the adequacy of governance arrangements, contribution to the UN's Sustainable Development Goals and the nature of the leadership required to align business and social priorities, objectives and outcomes and the nature, scale and timing of required responses. In regard to climate resilient smart cities, sustainable energy supply choices, pollution prevention, waste and water management, green growth and market solutions, there is scope for collective as well as corporate action and for creative strategies, innovation and entrepreneurship. Boards need to reassess corporate capabilities to participate in collaborative responses. The exercise of environmental leadership might rebuild reputation, trust and inter-generational rapport, ensure a more sustainable, inclusive, fulfilling and healthier future for mankind, and benefit damaged eco-systems.