

Climate Change, Corporate Responses and Economic Growth*

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How will climate change, and personal, corporate, community, public sector and Governmental responses to it impact upon economic growth? Would more emphasis upon sustainability increase or depress economic growth? Much will depend upon creativity, innovation and entrepreneurship, the scale and timing of adjustment, and the economic implications of substitutes and lifestyle and other changes. In this article we will look particularly at corporate responses, the role of boards and some questions for directors to consider, and the relationship between boards, owners and other stakeholders, regulators and Governments.

On the first of June 2017 President Donald Trump announced the withdrawal of the United States from the Paris Agreement (2015) on climate change. His decision attracted widespread criticism and expressions of regret from political leaders around the world. The decision was taken to fulfil a campaign pledge aimed at protecting American jobs in particular sectors and locations, yet already across the country many more people are employed in renewable energy and solar power than in coal mining, one of the activities the Paris Accord was seeking to reduce. What can we learn from this? To combat environmental issues and climate change, should we put more faith in enterprise?

Whether international efforts to slow global warming succeed or fail, there are, and may continue to be, unprecedented opportunities for smart entrepreneurs. Many companies may have opportunities to redesign their products or rethink their services in the light of whatever changes occur. Some potential beneficiaries are easy to identify. For example, higher rainfall and rising sea levels create opportunities for flood protection offerings and manufacturers of pumps and drying equipment. Those who might gain from a worsening situation may be less obvious. If temperatures rise should clothing manufactures launch lighter weight garments? Should food and catering businesses change their recipes and menus? Companies vary in how they might and could respond to opportunity.

To reverse a phrase, one person's poison can be another's meat. A failure to reduce global warming will create opportunity for some alongside the problems it is likely to cause for many others. The potential beneficiaries of failure should not be regarded as vultures, but as welcome helpers for those coping with downsides and having to adjust to a deteriorating situation. For a period, many areas are likely to become worse before situations are stabilised. But what about turning the corner, reversing trends and positive opportunities to improve our prospects? Are there steps that businesses and entrepreneurs could take and markets could deliver to control and even reduce global warming? Could individuals, companies, communities and Governments take complementary action?

Market Responses and Government Action

Market responses are already occurring as directors and entrepreneurs address changing requirements, read the road ahead and speculate. In areas such as solar power, prices continue to fall as technology advances, volumes crank up, manufacturers move along learning curves and take up increases. More home owners and communities have the prospect of off-grid independence or earning income at certain times by feeding the electricity generated by their solar panels into a grid.

Future prospects are encouraging. Roofs represent a significant proportion of the footprint of many villages, towns and cities. From a sustainability perspective they can be used to collect rainwater and generate solar power. Could roads with an appropriate surface be used in the same way? The issue is often what laws and regulations will allow rather than what opportunities will be spotted

and addressed by entrepreneurs. Unless laws and regulations are flexible and regularly reviewed they can become an obstacle to progress rather than an enabler of it. If private and public governance arrangements are to cope with the scale of adjustment required a conscious effort may need to be made to introduce learning into the relationship between business, regulators, Governments and the various stakeholder groups and public they serve (Garratt, 2017).

In many arenas there is potential for public authorities, people and organisations that operate in different sectors, for example solar power manufacturers, builders, architects or planners, to collaborate. Some boards are reluctant to cooperate due to concerns over control, the protection of intellectual capital and the cost and potential distraction of concluding and managing collaborative arrangements in relation to the benefits. Governance arrangements that embrace networks of people and organisations who are working together to achieve common goals and encourage creative multi-actor collaborations can increase and enhance innovation (Torfing and Triantafillou, 2016).

Market Responses Versus Government Action

In many situations, creativity and further innovation is or may be required if affordable responses to climate change are to occur. Markets can be flexible and quick to respond where there are opportunities and a relative absence of constraints. They can harness the inputs and aggregate the independent decisions of a great many separate operators, which has advantages over political decision making through periodic elections and decisions by Governments and public bodies (Friedman, 1962). Ministers or officials can make the wrong call and only pursue one option which may fail, as opposed to many contending solutions emanating from a market. A practical need such as the requirement to adapt to climate change and the natural curiosity of restless entrepreneurs can be the combination that W Arthur Lewis identified as conducive to economic growth (Lewis, 1955).

In comparison with the dispersed and diverse responses that can emanate from markets and to which a great many people may have contributed, decisions taken by Government may take place behind closed doors and involve relatively few people who can become targets of lobbying. They may be influenced by vested interests or, in the case of politicians, a felt obligation to reward their supporters and financial backers. Consultation is often limited in order to preserve secrecy ahead of announcements. It is little wonder so many regulations and other Government measures are crude instruments that impose significant costs upon businesses and inhibit innovation (Crews, 2017). Corporate leaders devote attention to responding to Government diktats rather than being proactive.

Regulatory Issues and Concerns

In many jurisdictions a variety of laws and regulations have been introduced to protect the environment that is likely to be impacted by climate change. The supply of energy and water, and the utilities generally, tend to be relatively highly regulated with market players requiring a license to operate. Regulatory and legal controls can be blunt instruments as well as costly. If inflexible, they can inhibit innovation. In the environmental arena they may be difficult to develop, implement and monitor, can involve time and cost for all involved, and there is often a risk of unintended consequences (Mejia, 2009). If only periodically reviewed and updated, they can also lag behind technological developments, other innovation and the emergence of new business models. In addition, they may fail to address new possibilities.

Businesses in many countries could benefit from a review of the role regulatory and other public bodies should play and how one ensures they remain current and relevant, without unfairly reflecting vested interests. How should one protect, price and report the use of scarce natural capital? The Natural Capital Coalition (2015) was established to establish principles and suggest practices for addressing such a question. How could the pricing of harmful activity internalise social

costs (Coase, 1960)? Should activities be rated and scarce resources be priced in such a way as to ensure that necessary, important and high value-added uses have a priority? Would it be better to focus upon and devote more effort to incentives and other inducements to encourage desired changes of behaviour (Thaler and Sunstein, 2008)?

Mention has already been made of the scope that exists for collaboration across sectors. License conditions and regulations are sometimes sector specific. Addressing environmental and climate change issues may also require coordinated action across value chains to make them more sustainable, or separate arenas where there are interdependencies, such as between the environment, climate change and health. For example, both high levels of pollution and high temperatures can cause additional fatalities, particularly among vulnerable groups such as the elderly. As signals, price changes can be widely read and interpreted. They can span sectoral and other barriers

Boards need to consider how to integrate legal, regulatory and ethical issues and concerns, their accountability for environmental and related matters, whether to seek carbon neutral and other outcomes, and how to report their aims and achievements in such areas. What forms of environmental risk and impact assessment should be used? Should integrated sustainability reporting be adopted? Who should undertake these activities? How should a company monitor and react to the use of pricing or related subsidies and taxation to achieve environmental goals (Kreiser et al, 2015, Tybout, 1972)? How should directors and investors assess, rate, measure and verify what has been achieved?

Sustainability and Adjustment

A particular challenge for many directors is achieving a balance between change and continuity, and determining where, when and to what extent changes should be introduced or avoided. The term sustainability which is associated with climate change by those concerned about the environment suggests questions such as the sustainability of what, when and from whose perspective and at what cost? It is sometimes associated with continuity, but this may or may not be desirable. Many directors appear to instinctively assume that their role is to work for the continued existence of an entity and to explore new and better ways of enabling it to carry on the pursuit of its vision and mission. Few question whether a company's purpose is still valid or desirable, or whether it is time to call it a day and to either do something else or return capital to owners.

Rather than focus upon ensuring that existing activities and proposals for new ones are in line with a corporate vision and mission, should more directors consider their contemporary relevance and value in the face of a challenge such as climate change? When markets and priorities are uncertain, the life cycles of technologies are shortening, new options, channels and business models are emerging and strategic threats and opportunities are changing, should holding to a particular vision, mission and strategic direction give way to greater openness, flexibility and diversity of responses? Are some directors and boards acting as breaks upon adaptation, evolution and reinvention?

Innovation on the scale required to cope with climate change may well involve Schumpeter's (1942) "creative destruction" and invariably there will be winners and losers as changes occur. Activities that stop will drop out of the value of outputs produced, while the value of new activities will contribute to economic growth. In relation to how we currently value what is produced in a competitive market, might the benefits enjoyed by customers and the public be underestimated? As innovation and competition drive down prices and enable more to be produced for less, will some of the gains from them be hidden? Mobile devices now offer greater functionality at a lower price than the multiple products they replace. Could a switch from physical travel to electronic interaction in virtual worlds which might benefit the environment reduce economic growth?

Creativity, Innovation and Entrepreneurship

Pressure to conform and comply, norms and shared assumptions, and common approaches and understanding can drive out the diversity and challenge that can boost creativity when different types of people and organisations who are complementary but compatible are brought together (Bennis and Ward, 1997). If carrying on at present is thought to be unsustainable from the perspective of achieving environmental and climate change goals, incremental improvements to existing practices will probably not deliver the required level of change. If there is both a requirement and a desire to create new and better options and choices, companies should try to remove internal and external barriers to creativity, innovation and entrepreneurship and create an environment in which they can thrive (Coulson-Thomas, 1997, 2016b and 2017a-d).

Openness to new ideas and a constant willingness to explore opportunities to develop and improve, including when at the height of success and when stakeholders are content, can be essential for remaining relevant and staying at the cutting edge (Catmull and Wallace, 2014). In a business and corporate context innovation, progress and even survival can depend upon continual engagement with stakeholders, to assess their views and appetites for change and risk. It can also require the constant monitoring of developments and possibilities, the challenging of past assumptions and the regular questioning of cherished beliefs and practices (Coulson-Thomas, 2001).

People may need a degree of freedom if they are to challenge, question and be creative (Williams, 2016). Some might welcome the opportunity to experiment with new ways of operating and the space to develop and test their ideas. The author has set out ten essential freedoms for removing organisational constraints and liberating latent talent by allowing people to work, learn and collaborate in ways, and at times and places, and with the support that best allow individuals and teams to give of their best and be creative and productive (Coulson-Thomas, 1997). When conditions are right for the people and relationships involved they can flourish and be fruitful.

Throughout history significant breakthroughs in thinking have been caused by relative outsiders who have challenged complacent orthodoxy (Kuhn, 1962). Inspiring and successful directors are often more open to contributions from new sources and directions. They look beyond the “normal suspects” and welcome exposure to fresh ways of looking at situations, problems and opportunities. They are alert to new voices and are attracted to those who, like themselves, are curious and restless explorers. Openness, curiosity and non-conformity are associated with the creativity and entrepreneurship many organisations require to recognise and address opportunity (Duxbury, 2012). Future growth may well depend upon the aggregate and cumulative affect of such qualities.

Sustainable Business Growth

Many families and institutional investors have a longer perspective than dealers who monitor share price movements for short term positions and opportunities to exploit, or those who think in terms of particular ventures or projects. They prefer to carefully select, buy and hold shares for the longer term, and hence have more of an interest in sustainable business growth. In relation to climate change, the ability of most companies to have any influence over global trends is limited. Even in sectors that contribute significantly to environmental damage and/or global warming, a business may be one of many possible players. There may be variables over which a board has little or no control. From an investor perspective a key question is how profit and dividends across a portfolio during a period of adjustment will compare with those after a transition to more sustainable and possibly simpler lifestyles, communities and activities.

An aggregation of similar decisions by many companies and their customers and suppliers might

have a significant impact. In a field like solar power one can see the collective result of many entrepreneurs and companies responding to similar requirements and local, national and global opportunities. Some of them in certain jurisdictions have been motivated in part by incentives and public subsidies. The combined result of all this activity and supply chains achieving a critical mass is that innovation and the development of relevant technologies have occurred and renewable energy costs are falling. However, for many other companies and their boards, it is business as usual. Climate change and environmental debates can seem remote. Responses are more disparate and their consequences and trends are more difficult to discern. The consequences of insufficient private and public collective impact are apparent in mountains of rubbish, melting ice and retreating glaciers.

Are there strategies that can be adopted within market systems to achieve sustainable business and development goals and “green growth”, or are new approaches and very different models required? Are directors focused upon, and agreed about, what “sustainable” and “green” mean in relation to the activities for which they are responsible? Is their thinking, objective setting and corporate strategy influenced by the United Nations (2015) sustainable development goals? To what extent will transformational thinking and further innovation be required if business and political leaders are to cope with contemporary challenges and contribute to collective responses to them?

Do the lessons of history give us cause for hope or alarm? The historian Arnold Toynbee (1969) has pointed out that over the ages, including during his own lifetime, many generations have faced severe challenges. Progress has not always been linear and civilisations have come and gone, but people have displayed varying degrees of resilience. Today there is greater connectivity and the means of more rapid roll out of solutions that emerge. Some ancient wisdom may have been lost, but our initiatives and responses can draw upon a more developed scientific and technological base.

Breaking Free of Internal and External Constraints

If progress is to occur, is a shift of focus and change of priorities required? Is this possible to the extent of allowing us to satisfy the Brundland Report (1987) test of “meeting current needs without compromising the ability of future generations to meet their own needs”. At both corporate and national level leaders appear addicted to models and patterns of growth that seem to require ever more of the same. Do people feel so obliged to deliver growth, that simpler and more affordable and inclusive options are not considered? Consolidation or scaling back may not seem attractive options for executives looking for promotion and hoping further expansion will create opportunities for them to attain higher salaried positions. Some directors are simply content and/or complacent.

Some boards lack an incentive or the drive to change. They may feel their organisations do not have the capabilities and resources to enable the creativity and innovation required to develop more sustainable offerings and operations. They might worry about market and stakeholder responses and be reluctant to champion the more sustainable options and lifestyles that would create sufficient demand for the production of a new or changed offering to be viable. They may also be risk averse.

Corporate and Government objectives can differ. While Governments might champion more affordable housing for the poor, the first priority for many leading construction companies is to maximise the margins and returns on expensive apartments and homes for an urban elite in expensive locations. The provision of cheap, basic and mass produced pre-fabricated and modular homes for the rural poor, or those on the fringes of urban areas, may feature in the speeches of some politicians. However, it is less likely to appear in the plans of boards looking for high profits from exclusive and prestige developments. Where is fresh thinking to come from in sectors like construction? Is new blood required? Should there be an obligation upon companies to act for the public good (Moxey, 2017)? If so how might this be enforced?

Our Pre-occupation with Growth

If lower growth as currently measured were a possible consequence of effective action to address the challenge of climate change, whether to slow and/or reverse current trends or to better enable us to cope with them, how many politicians would be comfortable with this? Would Ministers be accused of complacency, rationalisation or deception if they attempted to play a climate change, environmental or sustainability card to explain and/or justify the beneficial implications of the scaling back of certain activities and lower growth rates? How would their speeches go down with those who have been displaced and who have lost their jobs?

Adjustment can be painful, but it may be necessary. Kerry Higgs (2014) has questioned our contemporary preoccupation with growth in the context of a finite planet. League tables are invariably computed on the basis of the volume of current activities. There is often intense competition to be “number one” or within a group of leading entities. Some organisations have programmes and teams whose purpose is to improve their league table positions. What new forms of league table might persuade companies to play different games? How might reward and recognition policies be used to encourage a redefinition of success? Could Governments use their honours systems to help achieve a change of priorities and behaviours among business leaders?

Should graphical representations of outputs and achievement be expected to point ever upwards, regardless of environmental and other consequences? When many of the current generation of business leaders were at business school, case discussions invariably focused on increasing rather than contracting output. For political leaders, a slackening of growth rates usually means fewer seats will be won at the next election. Are there alternative indicators such as quality of life and happiness indices that could re-frame public debates? Should one wait for a change of emphasis and priorities, or set out to be a catalyst in bringing them about?

Engaging With Stakeholders

The board of a listed company that is considering a change of direction and the adoption of a more sustainable business strategy may feel obliged to hold confidential consultations with significant shareholders, key customers and important suppliers and business partners to assess their viewpoints and perspectives on related issues ahead of a public announcement or drafting the narrative of an annual report. What is their view on the imperative for change? How supportive would they be of developments related to climate change and national and international goals and commitments? How sensitive would they be to disruption and price changes? Assessments could be made of the extent and depth of care and concern, the strength of certain relationships and what it would take to preserve them. Showing that one cares about the environment and climate change and sharing a passion for change may be acceptable and helpful (Hochschild, 1983, Cardon, 2008).

Shareholders usually seek a steady and hopefully increasing flow of dividend income. How many directors would be re-elected if they announced a costly and disruptive downsizing strategy of significantly scaling back corporate activities in order to reduce pressures on the environment? How many boards have active programmes to de-list in order to have greater freedom to pursue strategies that would make fewer demands upon scarce natural capital? Family businesses and innovative entrepreneurs who seek crowd sourcing support may have an advantage over listed companies in terms of freedom of action, but listed company directors with climate change concerns may still connect with those who are applying ethical investment criteria.

Many individual shareholders may be no better or worse than business leaders when it comes to being schizophrenic in their choices and mismatches between their thoughts, words and deeds. How

many ethical investors or supporters of green parties in western countries are aware of the true economic cost of meat in their diets and have stopped eating it in order to reduce the greenhouse gas emissions of cattle (Rowe, 2016)? Should the diets of vegetarians in countries such as India be championed as more environmentally responsible? Consumers may well be concerned about the environment and global warming, but when voting with their rupees and credit cards in the marketplace they may add to the pressures. Hence the value of making people aware of the environmental consequences of selecting different options (Coulson-Thomas, 2007 and 2013).

Many boards discuss environmental and climate change issues as potential problems rather than as an arena of opportunity. They worry about what additional regulatory requirements and costs might emerge and the implications of developments for their company's existing operations. Why do so many boards view shareholders as a constraint when many investors may accept the need for change? With the scientific knowledge, ingenuity and resources at our command should we be more positive and proactive? Should more directors and boards actively discuss environment and climate change issues with shareholders and seek their support for using corporate capabilities to identify and grasp opportunities to develop more innovative and sustainable responses and solutions?

Monitoring Developments and Identifying Opportunities

Too many boards are exclusively concerned with how external developments will effect them and their companies. They should also consider the potential impact of climate change and related developments upon their customers and other groups, and what if anything they could contribute to helping these other people and organisations to cope and respond (Coulson-Thomas, 2007). Directors need to read the road ahead and consider the impacts of current trends. How will they affect customers and corporate operations? What could or should be done in response, either to address issues or take advantage of windows of opportunity that emerge? Short-term actions may be needed while longer-term responses are determined and changes of strategy and/or policy agreed. In some cases, one may be able to make projections and develop alternative scenarios.

For many companies there are significant areas of uncertainty. How will Governments respond with new laws and regulations? How determined will they be to make changes and over what time-scales? How would extra taxes and price rises affect the profitability of different offerings? For how much longer can certain activities continue? What if the public mood changes? Maybe there will be more pressure and demand for more proactive and positive corporate responses. People may reconnect with nature and be more concerned and engaged with the external environment (Wilson, 1984). Are there risks from not reacting, whether to a corporate reputation or of losing an early mover advantage? Those who wait on the sidelines can sometimes miss the boat.

Boards may have views and can estimate or guess, but they can never be sure of how other parties will behave, whether discontinuous change or an acceleration of a trend might happen, or if a high profile incident will occur. A critical mass of interest, concern and/or desire for action might arise and result in a tipping point (Gladwell, 2000). Might customer priorities and public opinion suddenly change? Where an established business might be defensive, and seek to preserve and protect existing investments and perceived strengths, more entrepreneurial and flexible ones might actively look for alternatives. Are there latent feelings and requirements that could be tapped and substitutes that could be quickly activated or provided?

Changing Direction

Sometimes delay can compound the challenge of adjustment. So much momentum may build up behind current patterns of activity that easily and quickly stopping and/or changing direction may seem as problematic as steering a loaded oil tanker away from danger. If there is a possibility that it

could be too late, one's own contribution might be but a drop in the ocean, and markets reward those who carry on making hay while they can, business leaders have to be very committed to tell people to stop doing what they know and enjoy, and to drop current activities that support their families. In relation to the steadily accumulating impacts of climate change, some of which are less perceptible than others, determination, passion, persistence and tenacity may be needed to achieve a sudden or relatively quick change of direction (Baker, 1982, Cardon, 2008)

A combination of incentives and penalties may be required. However, even if certain initiatives worked or looked likely to reign back activity that contributes to global warming, how committed would a Government be to enforcement that might lower growth rates and a country's international ranking, while at the same time reducing the Government's own income for spending on high profile projects that may buy votes? Might some be tempted to follow President Trump and pull out of, or back from, Paris Agreement (2015) commitments? Are decisions that involve short-term penalties and which might prove unpopular with sections of the electorate likely to be postponed?

Where there are public policy options, policy makers should consult with those likely to be affected by changes and seek to work with them when considering how best to implement them (Agrawal, 2005). Scientific and technological breakthroughs are occurring. Consultation may reveal more of an appetite for positive, aligned and collective action than one might have expected based upon past experience. Have some policy makers and boards become too introverted and cautious? Where and when consultations occur, they can provide an opportunity for a board to put its point of view and assess the potential for collective and collaborative action.

Understanding the Need for Collective Action

People and organisations do not need to act alone, either in responding to external developments or in providing novel solutions to emerging challenges. They can co-create, collaborate and co-operate (Coulson-Thomas, 2014). There are new and relatively quick alternatives to listing and share issues that could be a way of raising the short and longer-term finance that is required. People who are creative and have been innovative, and who might make suitable collaborators, may be identifiable. For example, entries for the Golden Peacock Awards for Eco-Innovation from complementary organisations can be revealing of both concern and commitment to environmental action.

The need for collective action is clear. India and other countries need a strategy to meet their Paris Agreement (2015) on climate change commitments. There are various biodiversity, coastal ecosystem and food, energy and water security challenges to address, new carbon capture, replacement and trading arrangements to consider, and economic, educational, financial, scientific, social and technological adaptation and mitigation measures to put in place. Are directors and boards aware of these issues? Do they see them as an opportunity? Have they considered the areas in which they might make a contribution either alone or in collaboration with others?

How engaged are directors with environmental issues and climate change related debates? For example, are solutions such as carbon trading shifting responsibilities and creating new problems rather than offering solutions (Lohmann, 2006)? How many directors even know what was agreed in Paris, what obligations countries have signed up to and how their companies might be affected? In relation to expectations, how many directors feel their responsibilities are primarily to owners and those who buy from them and work for them rather than the public generally? Is participation in collective environment and climate change discussion and action, and a positive and responsible response, the social responsibility of business (Bowen, 1953)?

Preparing for Reassessment

Following President Trump's decision, some Governments may want to demonstrate their continuing commitment to action to address climate change. Ministers may have specific concerns about the rate at which natural capital is being plundered, species eliminated and greenhouse gasses emitted. They might also realise that while they may be held responsible for the welfare of their country's citizens, on their own Governments, especially those in democracies, are often relatively powerless to reverse certain trends and trajectories. Joint Government-business action may be required. Will companies respond to approaches, overtures and opportunities to play a part in collective and collaborative action? If they do, the challenge may be to ensure that corporate and political policies and strategies are aligned (Bleischwitz, 2004).

Government departments and companies may both need to rethink certain strategies and policies and their attitudes to cooperation as a consequence of how external developments are unfolding. Do they have the people and capabilities to make a contribution to dealing with environmental issues and climate change? Should boards be refreshed to include people with more awareness of related issues and options? Given America's intention to withdraw from the Paris Agreement (2015), the time could be ripe for both consultation with stakeholders to better understand their priorities and requirements and board consideration of how best to proceed.

Both corporate boards and public policy makers need balanced, informed and objective advice. There will be vested interests with positions to protect and there may well be lobbies for and against many of the policy proposals that emerge. Invariably there will be pressures to accommodate and compromise. Balance is important if one is to both address problems and capitalise upon opportunities as they arise. While his views may be controversial to some of those in favour of action to prevent climate change, Thomas (2017) points out that it also has advantages and that human activity is increasing biodiversity over much of the planet and speeding up evolution. The relocation of people and activities in response to climate change and to capitalise upon emerging opportunities represents a considerable public policy challenge and one that could spark conflicts.

Influencing Factors and Policy Options

Environment and climate change developments impact directly upon certain people and organisations, for example those concerned with secure and sustainable energy, water supply and waste disposal and management. Developments and how others respond can have wider implications, for example for those concerned with public health. They can also create new opportunities for discussion and cooperation, not just with Governments, but also at city, town and or village level. Some developments may have an impact upon all businesses. Water use in relation to its supply is already critical in many areas (Gleick, 2014). Some boards will be more aware than others about what is happening around them and how developments might affect them.

Many people are unwilling to pay a significantly higher price for an alternative that would cause less harm to the environment and/or might contribute less to climate change. In some areas further innovation may be required if significant change is to occur. There are grounds for optimism. The International Energy Agency (2017) believes systematic and coordinated financial and policy support of clean energy technologies to the limits of what innovation allows could reduce greenhouse gas emissions to levels consistent with the mid-point of Paris Agreement (2015) targets.

Concerned companies and Governments can exercise leverage through their own buying power. Much will depend upon the combination of carrots and sticks that are used. Are there industrial strategies and/or regulatory policies, with related incentives and penalties, that might encourage beneficial change and relevant innovation? How might vested interests respond? Could one work with the grain of human nature by appealing more to self-interest, for example to show how eliminating waste can reduce cost and its recycling can generate income, or by celebrating those

who have been successful with entrepreneurial responses to certain challenges as a result of viewing them as business opportunities and making money by helping others to adapt.

Companies like Governments may have policy options, such as bans and prohibitions, incentives and relative pricing, innovation or the adoption of a different way of operating or business model to avoid certain constraints. One could possibly shift priorities and develop new options such as recycling or reuse to prevent harmful and greenhouse gas emissions. One could consider co-locating or linking operations where the unwanted outputs of one process could be utilised by another, for example using biomass to generate energy. There are many areas in which creativity, innovation and entrepreneurship are occurring and in which there are further opportunities for both improvement and breakthroughs. Much progress could also be made by sharing, exploring digital options, learning from best practice and supporting existing initiatives.

Possible Future Scenarios

Not all activities, operations and entities will survive. Without renewal, regeneration and continuing relevance some of them will come to a natural end (McConnachie, 2017). New challenges are likely to arise. Inter-generational differences of experience and perspective may lead to conflict. Younger generations will be adversely affected by a failure to address environmental and climate change issues, yet in some countries they have much less economic leverage than their parents and grandparents, and they are sometimes less likely to vote. Could they be energised to form a stronger lobby? Might customers and other stakeholder communities disaggregate into groups with widely differing views of the way ahead? Are there options that might appeal to some of them?

Much of what happens tomorrow will depend upon the sensitivity of today's directors to shifting stakeholder concerns. Could values change? Will more people seek and gain the approval of their peers by adopting lifestyles and consumption habits that make fewer demands upon scarce natural capital? As automation, expert systems and 3D printing allow people to design and produce locally what they need, will the long championed transition from large bureaucratic organisations to more flexible and responsive networks of relationships be speeded up (Coulson-Thomas, 1992)? Will people think in terms of fulfilling activities rather than jobs? Involvement in many of the creative arts is more sustainable than the purchase of many manufactured and processed products (Coulson-Thomas, 2017e). Will we see a renaissance of local and community arts and craft activities?

How we use our time may change. Technological developments such as artificial intelligence, drones and robotics may reduce the requirement for many contemporary jobs (Ford, 2015). A new generation of social entrepreneurs may inspire and lead social enterprises and projects like Bridges of Sports, which aims to create a sustainable sports ecosystem across India. Unlike a polluting vehicle, arts and sporting activities can have positive externalities, as audiences and spectators as well as practitioners can participate. A whole community can follow and take pride in a local creative artist, sportsman, sportswoman or team. Simply watching and enjoying can be much less demanding of scarce resources than other forms of consumption and more uplifting.

New Economic and Market Models

Less of some things can result in more of others. As they reflect upon the implications of change, living a less hectic and stressful life and having more time for leisure activities and friends and families might appeal to more people. Living more slowly and simply can have its advantages (Honore, 2004). Less economic growth might result in very different allocations of waking and active time to the extent of enabling transition to an economic model that makes fewer demands upon finite natural resources. By choosing how they might wish to live, having the courage to embrace a different lifestyle and changing how they share and exchange what they have, individuals

when aggregated could reshape economies and markets.

More boards might conclude that a different business or market model could represent a more sustainable way of continuing to operate (Coulson-Thomas, 2016a)? The barter and sharing economies offer many opportunities for more people to benefit from what we already own or have (Sundarajan, 2016). Making more intensive use of existing possessions and capital helps to reduce the exploitation of scarce natural resources. Such exchanges and sharing could contribute to enabling lower growth to deliver a higher quality of life, as well as enabling more artistic, caring, creative, fulfilling, inclusive, independent and resilient communities (Coulson-Thomas, 2017e)?

Market and collaborative solutions are possible and could complement the responses and actions of Governments. Innovation could lead to the mass production of affordable housing and the wider availability of potable water and sanitation. Sustainable responses may require more imaginative, responsible, transformational and visionary leadership. Different strategies might be required. For green growth to be an affordable and practical possibility, fewer boards must compound the problems we collectively face and more of them must contribute to acceptable initiatives and desirable outcomes. How directors react to multiple challenges and the extent to which they are proactive and innovative when seizing related opportunities will determine our future quality of life.

Note

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References

Agrawal, Arun (2005), Environmentalism, *Current Anthropology*, Vol. 46 No. 2, pp 161-190

Bennis, Warren G. and Ward, Patricia (1997), *Organizing Genius: The Secrets of Creative Collaboration*, Reading, MA, Addison-Wesley

Bleischwitz, R. (2004), Governance of sustainable development: co-evolution of corporate and political strategies, *International Journal of Sustainable Development*, Vol. 7 No. 1, pp 27-43

Bowen, Howard (1953), *Social Responsibilities of the Businessman*, New York, NY, Harper & Row

[Brundland Report] World Commission on Environment and Development (1987), *Our Common Future*, Oxford, Oxford University Press

Cardon, Melissa S (2008), Is passion contagious? The nature and experience of entrepreneurial passion, *Academy of Management Review*, 34(3), pp 511–32

Catmull, Edwin E. “Ed” and Wallace, Amy (2014), *Creativity, Inc.: Overcoming the Unseen Forces That Stand in the Way of True Inspiration*, London, Bantam Press

Coase, R. H. (1960), The Problem of Social Cost, *Journal of Law and Economics*, 3 (October), pp 1-44

Coulson-Thomas, Colin (1992), *Transforming the Company, Bridging the Gap between Management Myth and Corporate Reality*, London, Kogan Page

Coulson-Thomas, Colin (1997), *The Future of the Organisation, Achieving Excellence through Business Transformation*, London, Kogan Page

Coulson-Thomas, Colin (2001), *Shaping Things to Come, Strategies for Creating Alternative Enterprises*, Dublin, Blackhall Publishing

Coulson-Thomas, Colin (2007), *Winning Companies; Winning People, Making it easy for average performers to adopt winning behaviours*, Peterborough, Policy Publications

Coulson-Thomas, Colin (2013), *Transforming Knowledge Management, A quicker and affordable route to high performance organisations*, Peterborough, Policy Publications

Coulson-Thomas, Colin (2014), Collaborative Capitalism and CSR, in J S Ahluwalia (Editor), *Strategy to Leverage CSR for Competitive Advantage*, New Delhi, IOD Publishing, 17th January, pp 61-74

Coulson-Thomas, Colin (2016a), Innovation, New Business Models and the Board, *Director Today*, Vol. II Issue IV, April, pp 7-11

Coulson-Thomas, Colin (2016b), Leadership, Innovation and Business Growth, *Management Services*, Vol. 60 No. 2, Summer, pp 36-43

Coulson-Thomas, Colin (2017a), Leadership for Creativity, Innovation and Entrepreneurship, *Effective Executive*, Vol. XX No. 2, June, pp 12-30

Coulson-Thomas, Colin (2017b), Climate Change Opportunity and Corporate Responses, in Ahluwalia J. S. (Editor), *Managing Environment & Climate Change: Transitioning to a Sustainable Economy*, Hyderabad, IOD Publishing, 7 July, pp 25-37

Coulson-Thomas, Colin (2017c), [Theme Paper for 19th World Congress on Environment Management] *Managing Environment and Climate Change: Transitioning to a Sustainable Economy*, [www.iodglobal.com \[http://www.iodglobal.com/images/wcem2017/theme-paper.pdf\]](http://www.iodglobal.com/images/wcem2017/theme-paper.pdf) 18th May

Coulson-Thomas, Colin (2017d/a), Stimulating Creativity, Enabling Innovation and Supporting Entrepreneurship, *Management Services*, Summer, pp 26-29

Coulson-Thomas, Colin (2017e/b), *The Case for the Creative Arts* [Position Paper No. 1/17], Peterborough, Adaptation

Crews, Clyde Wayne Jr (2017), *Ten Thousand Commandments, An Annual Snapshot of the Federal Regulatory State*, Washington, DC, Competitive Enterprise Institute

Duxbury, Tom (2012), Creativity: Linking Theory and Practice for Entrepreneurs, *Technology Innovation Management Review*, 2 (8), August, pp 10-15

Ford, Martin (2015), *Rise of the Robots, Technology and the Threat of a Jobless Future*, London, Oneworld Publications

Friedman, Milton (1962), *Capitalism and Freedom*, Chicago, ILL., University of Chicago Press

- Garratt, Bob (2017), *Stop The Rot: Reframing Governance for Directors and Politicians*, London, Routledge
- Gladwell, Malcolm (2000), *The Tipping Point, How Little Things Can Make a Big Difference*, Boston, MA., Little, Brown and Company
- Gleick, Peter H (2014), *The World's Water Volume 8: The Biennial Report on Fresh Water Resources*, Washington, DC, Island Press, January
- Higgs, Kerryn (2014), *Collision Course: Endless growth on a finite planet*, Cambridge, MA, MIT Press
- Hochschild, Airlie (1983), *The Managed Heart*, Berkeley, CA, University of California Press
- Honore, C (2004), *In Praise of Slow*, San Francisco, Harper
- International Energy Agency (2017), *Energy Technology Perspectives 2017*, Paris, International Energy Agency, June
- Kreiser, Larry, Andersen, Mikael Skou, Olsen, Birgitte Egelund, Speck, Stefan, Milne, Janet E, Ashiabor, Hope (2015), *Environmental Pricing: Studies in Policy Choices and Interactions*, Cheltenham, Edward Elgar
- Kuhn, Thomas S. (1962), *The Structure of Scientific Revolutions*, Chicago, IL, University of Chicago Press
- Lewis, W Arthur (1955), *The Theory of Economic Growth*, Homewood, Ill., Richard D. Irwin
- Lohmann, Larry (2006), *Carbon Trading: A Critical Conversation on Climate Change, Privatisation and Power* [Development Dialogue No. 48], New York, NY, The Dag Hammarskjold Centre
- McConnachie, James (2017), *Scale: The Universal Laws of Life and Death in Organisms, Cities and Companies*, London, Weidenfeld
- Natural Capital Coalition (2015), *Natural Capital Protocol Principles and Framework (Draft)*, London, Natural Capital Coalition, 23rd November
- Paris Agreement (2015) [Agreement adopted on 12 December 2015 at the twenty-first session of the Conference of the Parties to the United Nations Framework Convention on Climate Change], United Nations Treaty Collection, Chapter XXVII Environment, New York, NY, United Nations
- Mejia, Robin (2009), The challenge of environmental regulation in India, *Environmental Science & Technology*, Vol. 43 No. 23, pp 8714-8715
- Moxey, Paul (2017), The Public Good and Capitalism, *Director Today*, Vol. III Issue VII, pp 21-27
- Rowe, Mark (2016), The true cost of meat, *Geographical*, Vol. 88 No. 03, March, pp 36-43
- Schumpeter, Joseph A. (1942), *Capitalism, Socialism and Democracy*, New York, NY, Harper & Row
- Sundarajan, Arun (2016), *The Sharing Economy, The end of employment and the rise of crown-based capitalism*, Cambridge, MA., The MIT Press

Thaler, Richard H. and Sunstein, Cass R. (2008), *Nudge, Improving Decisions About Health, Wealth, and Happiness*, London and New Haven, CT, Yale University Press

Thomas, Chris D. (2017), *Inheritors of the Earth: How Nature is Thriving in an Age of Extinction*, London, Allen Lane

Torfinn, Jacob and Triantafyllou, Peter (Editors) (2016), *Enhancing Public Innovation by Transforming Public Governance*, Cambridge, Cambridge University Press

Toynbee, Arnold (1969), *Experiences*, London, Oxford University Press

Tybout, Richard A. (1972), Pricing Pollution and Other Negative Externalities, *The Bell Journal of Economics and Management Science*, Vol. 3, No. 1 (Spring), pp. 252-266

United Nations (2015), *Transforming our world: the 2030 Agenda for Sustainable Development* [Resolution adopted by the General Assembly on 25 September 2015], 70/1, New York, NY, UN General Assembly

Williams, Joanna (2016), *Academic Freedom in an Age of Conformity, Confronting the Fear of Knowledge*, London, Palgrave MacMillan UK

Wilson, Edward O (1984), *Biophilia*, Cambridge, MA, Harvard University Press

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