AI, Executive and Board Leadership, and our Collective Future^

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There are certain tasks that Artificial Intelligence (AI) or the intelligence of machines or software can perform much more quickly than humans and other species. As Artificial General Intelligence (AGI) is introduced, the advantage the technology has and its ability to learn will be much increased. AI and AGI have the potential to replace and/or enhance humans in the performance of some tasks. As they can complement human intelligence their use can also extend what we are able to confront and do. This article looks at the implications of AI, particularly for executive managers and directors, and executive and board leadership, and issues its adoption raises. They, and associated risks and possibilities, raise many questions for directors and boards. Applications of AI are expected to affect many aspects of our contemporary lives and lifestyles. The extent to which they help us to address certain challenges and existential threats may have a significant influence upon our collective future.

The Rise of AI

The growing scale and strategic impacts of emerging AI, the nature of the alternatives and possibilities it can and/or might in future enable, the growth of multiple areas of concern among different stakeholder groups, and accumulating ethical and legal issues and resource requirements at a time when there are existential threats to address, suggest AI represents a governance challenge for boards as well as a management one for executive leaders. AI cannot and should not just be left to executives and executive leaders. It can enable new business models and may influence or determine many aspects of our individual and collective futures, including the nature of work and how, where, with whom and with what technological support it is undertaken (West, 2018; Merisotis, 2020; Kissinger et al, 2021).

AI is rapidly evolving. Its applications affect the experiences of customers of Amazon and Google worldwide and users of other services without them necessarily being aware of it (Saraswati, 2023). IA and AGI are also the source of multiple dilemmas and difficult choices. Legislators and regulators with many other claims upon their time and largesse struggle to keep pace with developments, requirements and concerns (Suleyman and Bhaskar, 2023). Directors and boards of companies need to be involved. Boards are ultimately responsible for applications of AI and other technologies. They should understand ethical, legal, reputational and other risks and ensure these are addressed (Blackman, 2023). In an era of limited and degrading natural capital, there are also opportunity costs and alternative uses and priorities to consider. Strategic direction and policies relating to the use of AI are required.

Executive and Board Perspectives

While the perspectives of executive leaders and board members should not be incompatible, they may still differ, reflecting their roles and responsibilities and the expectations and priorities of those to whom they report and/or feel accountable. Executive leadership may be more focused on customer-related issues and matters relating to the performance of areas they manage (Vaid et al, 2023). They and directors might also be expected to be concerned for the welfare of those they lead. However, directors and boards could be more interested in achieving a balance between the interests of a wider range of stakeholders and matters important to them, overall corporate reputation and standing, the environment, sustainability and other contemporary issues. They may have a longer-term, external and more holistic

perspective, and greater awareness of the context in which a company operates. Independent directors may give more attention to stakeholder interests, for example when promoting ESG engagement, than internal managers (Miyamoto and Nohara, 2023).

While executives may look for opportunities to use AI applications within a company to undertake certain tasks and operate corporate activities, operations and processes for which they are responsible more quickly and cost-effectively, boards might consider alternative models of operation, organisation or strategy that could be enabled by AI and possible consequences of its use. In reality, executives and boards should be mutually supportive and motivated by a shared purpose, with executives operating within the framework of the strategic direction provided by the board which is in turn dependent upon executives and others for the implementation of strategy. Trust can be important for executives as it is for boards, but there may be differences in how they perceive the relative significance of the trust of various communities (Blakey, 2020). Corporate reputation and trust can reflect the impact of both executive and board leadership and their shared purpose and priorities.

While certain directors may have some influence with particular stakeholder groups, and the chairman of a board may be visible during AGMs and have a role in particular external communications, executive leaders have regular contact with the people of an organisation and may be more likely to be known by its customers, suppliers and business partners. The CEO and chief officers will be expected to give a lead in the implementation of strategy. Whatever a board decides and in relation to the strategic direction it agrees, nothing may happen or change unless and until relevant and empowered executives act. Our futures may reflect and be limited by ambitions and determined by actions. Executive leaders are responsible for turning aspirations and intentions into achievements and outcomes. They can endeavour to deliver what boards initiate (Coulson-Thomas, 2022b & c).

Diversity and AI

AI might be welcomed by some and perceived as a threat by others. As it learns ever more about the adverse environmental and other impacts of collective human activity such as global warming and climate change, could an AI enabled assessment start to question whether humankind might and should survive (Coulson-Thomas, 2023e & k)? After processing accumulating evidence of negative externalities resulting from the conduct of directors, boards and corporate, community and societal leaders, an AI monitoring application may quickly note that their stated values and ethical principles are often not observed, either by themselves or others (IPCC, 2023). Would it conclude that despite a gap between rhetoric and achievement there is still hope that human impacts on our planet may turn positive, or alternatively that we represent a threat to our own survival and that of much life on earth?

Executive and board leaders need to be aware of the nature and depth of concerns that some significant stakeholders may have about both AI and/or AGI and the general impact of human activities on the environment and ecosystems. Charismatic executive leadership communication can positively influence employee trust, openness to change, and behavioural support for change (Men et al, 2020). At the same time, successful adoption of AI can require understanding of varying levels of competence, risk and vulnerability across an organisation. The competences that internal auditors may have might make them suitable candidates for executive leadership positions (Jones and Glover, 2018).

In various jurisdictions, efforts are underway to increase the number and proportion of women in senior positions and women directors on boards. More female participation in executive leadership teams can increase the focus on addressing corporate social responsibility concerns (Hyun et al, 2022). Grounded and practical women directors may have a positive impact on success factors such as product quality (Korenkiewicz and Maennig, 2023). Might they also positively influence related AI applications? Diversity in executive leadership and management can raise the perceived innovativeness of a company (Hakovirta et al, 2023). As more outcomes result from human-technology interactions and AI applications learn, creativity may need to become more of a 'way of life' (Rubin, 2023).

There are many arenas in which greater diversity might be beneficial, such as avoiding groupthink (Janis, 1972). Different perspectives, or ways of thinking, might enhance creativity and resilience. When selecting and/or assessing candidates, those involved should look beyond age and gender diversity (Coulson-Thomas, 2023e). Non-conformity can happen for various reasons, some or even many of these might be justified in the situation and circumstances faced (Witt et al, 2022). There is a danger that laws, regulations, codes and standards might reduce diversity and limit its benefits. Is there a risk that rather than thinking for themselves, both executives and directors may use the same or similar AI applications that learn from each other's responses? Overtime they might converge to a single and particular understanding in place of a previous greater diversity of views and perspectives.

AI Applications

AI might once have been utilised in specialised areas such as robotics, followed by industrial, financial and other sectoral applications (Murphy, 2000; Lee, 2020; Boobier, 2020). Relatively easy to use applications are now affordable and/or accessible on widely available devices. Access to it is being democratised, which may aid diversity if different systems and software are used. AI use has raised questions about the future nature of work, the significance of jobs and requirements for lifelong learning, and its implications for society and politics (West, 2018; Merisotis, 2020). AI is both influencing popular culture and has been described as an increasingly significant element of it (Barron, 2023). Greater use of AI may make more people aware of differing human and AI enabled responses to certain issues and questions and some may favour one over the other (Garvey, et al, 2023). The consequences of differing preferences may need to be addressed.

Human centred AI could take many forms (Schneiderman, 2022). These could include its assessments of humans and their collective impacts, as well as assisting or replacing their involvement in certain tasks. AI can enable large quantities of data to be quickly analysed and monitored 24/7. It excels at such tasks, but other applications could range from coping with geopolitical and other risks that may threaten global financial security and new standards, such as those for sustainability, to 'improving' the advertising and marketing of activities and products that have negative externalities (Huh et al, 2023; IFRS, 2023; IMF, 2023; WEF, 2023). AI influenced communications may create multiple ethical and legal issues, for example if they included false or misleading information.

AI applications are now being developed more quickly than people can be educated or otherwise prepared to understand, manage, regulate and generally cope with them and their consequences. They should be ethical, legal and responsible (Huh et al, 2023). Whether they enable business leaders to hold onto current levels of trust may depend upon whether AI and

AGI are able to learn from reality by distinguishing between fact and authentic voices and misrepresentation and those who spread fake news and propaganda (Sherwood, 2022; Edelman, 2023). Views may differ on what represents responsible and sustainable AI and the sustainability and risks of AI applications, but how might AI advance corporate sustainability objectives, reduce carbon emissions and lead beneficial climate action and the achievement of sustainable development goals (Falk and van Wynsberghe, 2023)?

AI, Directors and Boards

Directors and boards should be aware, informed and ready to discuss the approaches and policies they should adopt to secure the advantages of AI and other scientific and technological advances while mitigating associated risks (Coulson-Thomas, 2023k). Scientific and technological knowledge and understanding and their applications are advancing more quickly than arrangements to monitor, control and regulate the actual and possible consequences of their use. The pace of their emergence and adoption is such that governance and regulatory frameworks and activities are struggling to catch up and cope. In some fields the speed of learning and evolution is such that if a possible use is overlooked or potential is not spotted, a company that misses an opportunity might be left behind.

Are new approaches and different thinking required in corporate boardrooms? Directors of many companies face similar challenges, risks, existential threats and AI related issues. AI itself could represent an existential threat. A board's perspective and governance arrangements may need to embrace collective responses and cooperative activities and ventures requiring differing approaches and collaborations with commercial, public sector and voluntary bodies (Coulson-Thomas, 2019b). Areas to consider include the significance of AI and AGI developments and possibilities, and related corporate capabilities, strategies, direction, policies and guidance. There are also questions to ask about remaining open and preserving flexibility, ensuring agility and resilience, prioritisation and collective responses, and enabling while retaining control (Coulson-Thomas, 2023k).

Ultimately, whether AI and science and technology generally helps us or harms us will depend upon what they are used for, by whom and for what purpose. Board awareness of possibilities, risks and threats, monitoring arrangements put in place, and where, when and how interventions can and do occur may have a significant impact on lifestyles and livelihoods and on consequences and outcomes. Intervention may be needed to ensure that the benefits of applications are more widely shared (Acemoglu and Johnson, 2023). The adoption and use of new technologies can result in unintended consequences (Tenner, 1997). Emerging and possible future developments should be monitored. Do digital governance arrangements need to be reviewed in the light of experience, expectations, and possibilities?

Digitisation and Cyber Risk

Many boards are focusing more on digitisation, cyber risk and resilience, whether because of reaction to perceived external threats, or the result of the exploration and pursuit of opportunities and the necessity to strengthen defences and ability to cope. Scientific and technological developments present understanding, assessment, prioritisation and governance challenges (Savastano et al, 2022; Coulson-Thomas, 2023k). Cyber threats have multiplied and become ever more sophisticated. AI enabled attackers can rapidly learn. Might they open up a lead over defences? Would more collaboration help to close the gap? What should be

done to ensure a board's focus and strategy on digitalization, cyber risk and resilience remains current and relevant? Given the challenges of assessing the benefits of digital developments and protection against cyber-crime, to whom should boards turn for informed and objective advice (Yang et al, 2022; Wuillamie, 2023)? What alert mechanisms and back-up and recovery arrangements are required? When were they and related policies last reviewed?

Some executive leaders may develop a degree of specialisation in AI and other technologies. While not necessarily understanding the details of rapidly evolving digital, enabling and disruptive technologies, the challenge and enquiries of directors and boards should increase the chances of their beneficial application and address risks associated with them (Coulson-Thomas, 2019d). How might the risk of the spread of fake news, misrepresentation, propaganda and spin by AI applications best be addressed, including when they are encouraged and initiated by tyrants (Guriev and Treisman, 2022)? Changes in senior leadership assumptions, perspectives, talents and modes of operation may be needed to confront the reality of current challenges and pressures for continuing or never-ending digital transformation (Lamarre et al, 2023).

Vigilance may be necessary to ensure that benefits of successive waves of technology are not just enjoyed by a few at the expense of many others and the environment and future generations (Acemoglu and Johnson, 2023). Governments and public sector bodies may need help from businesses in transforming public services, including with applications of AI (Pahlka, 2023). This could extend to public information campaigns to increase awareness of cyber risks which could affect most citizens and businesses. Certain companies could face heightened risks because of their sector, know-how or activities, and become the target of continuous and determined attacks by groups funded by external Governments.

Understanding and Acknowledging Cyber Risks

AI may continue to enhance cyber risk. Are boards aware of the extent, realities and severity of the risks faced? Directors and boards often underestimate the incidence of cyber risks and threats, and the scale and consequences of cyber fraud. They are also sometimes reluctant to collaborate in responses to shared cyber and fraud challenges (Coulson-Thomas, 2017b & c; Wuillamie, 2023). Many cases go unreported for reputational and other reasons. New or revised principles and frameworks for board governance and corporate management of cyber risks may be required. How should they and policies covering responses, roles and responsibilities if breaches occur or periodically as a precaution be reviewed and kept current? How, where and when should directors and boards be involved?

Companies may use many technologies to gain advantage and achieve excellence. Are investments in them impacting outcomes? Are they sustainable, relevant to key objectives and visible to customers? Who benefits and who might be disadvantaged (Acemoglu and Johnson, 2023)? The ownership and use of data can be a major source of corporate and shareholder value. Are their impacts on activities, aspirations, purpose, objectives and priorities appreciated? Boards should ensure data is creatively analysed and responsibly captured, stored, protected, and used (Wuillamie, 2023). Data harnessing and analytics should be responsibly automated, and people should actively learn from what is collected and look for opportunities. Policies relating to AI and cognitive systems should be current and regularly revisited to ensure they do not constrain beneficial applications. What further steps

might ensure their wiser use and that products are designed to be recyclable and reused, and to not create negative externalities such as harm to the environment (Sheppard, 2023)?

Corporate capabilities can constrain what executive leaders and a board might wish to do. Human distractions, frailties and temptations can be a major source of cyber and other risks. Human capital strategies should address challenges and opportunities, including the changing nature of work and where, when and with whom and what it might be undertaken and supported, and the need for extra resilience. Are boards and executive leadership teams equipped to handle people issues? For example, a balance may need to be struck between industry-specific domain knowledge and AI capability (Chung, 2023). How might coaching and other forms of executive and board support in relation to adopting AI and handling the issues and dilemmas it raises help (Coulson-Thomas, 2023c)?

Cyber Fraud and Supply Chains

Opportunities for cyber fraud and other abuses can also arise within and across supply and value chains (Coulson-Thomas, 2017a). The 'weakest link' and potential 'entry point' for cyber-crime and other risks may be within them. Many supply chains are incomplete. They stop short of embracing negative externalities and repair, re-use or recovery activities. Without them, many companies convert natural capital into waste, rubbish and scrap. For example, space value chains do not include recovery and disposal, so space debris in earth orbit is increasing at an exponential rate (Okada, 2023). Scepticism and critical thinking are required (Coulson-Thomas, 2022e, f & g). Boards should ensure companies and their reputations are not severely damaged by actions or vulnerabilities within supply chains. Changes to relationship management and governance practices may be required.

Should boards be more engaged in formulating strategies relating to cyber and other threats and disasters? Contingency arrangements and vigil mechanisms for reporting concerns should be regularly reviewed, tested, risk-centric, dynamic and current. Some strategies may need to be defensive as well as proactive (Coulson-Thomas, 2023k). For example, increased connectivity creates greater cyber vulnerability. AI can be used to initiate cyber-attacks, to undermine and/or to distort understanding. AI or AGI may be needed to counter the malevolent AI initiatives of others. The speed with which some systems can learn means AI or AGI might be required to catch up, keep pace and remain in the game. Once a company has fallen behind in its offerings, defences, or business, organisational and/or operating models, it might become vulnerable and/or unable to catch up.

Boards face difficult choices which may have significant consequences. For example, how do they, and those who advise them, know which cyber-security system might be best when malevolent attacks are AI enabled? Being resilient and able to recover, cope and stay current will become increasingly important (Coulson-Thomas, 2023d). Technological leaders that are connected, networked and open to collaboration possibilities could become prime targets for those seeking collective responses (Coulson-Thomas, 2023k). Cyber, financial and other forms of resilience should be regularly stress tested. Activity and investments in countries with differing perspectives, allegiances and views on the protection of IP should be avoided.

Potentially Problematic Applications of AI

While many applications of AI are or could be beneficial, certain creators and pioneers of AI have identified possible adverse consequences that deserve to be more widely discussed

(Suleyman and Bhaskar, 2023). Its possible future development and applications might represent an existential threat to humanity. Should we be surprised? Despite a succession of warnings and overwhelming scientific evidence of adverse trends, a steady flow of authoritative findings has highlighted our inadequate collective responses to global warming and climate change (UNEP, 2022; IPCC, 2023). Various reports provide evidence of environmental degradation, polluted oceans, declining biodiversity, and the steady extinction of other species (Dasgupta, 2021; Hannah, 2022; Penn and Deutsch, 2022; UNEP, 2022). Given that so many people and organisations seem determined to pursue their narrow, short-term self-interests, and as already raised, might some forms of intelligence such as an AGI application conclude that humans represent a danger to many forms of life on earth?

Experience of human nature, groupthink and failure to anticipate unexpected consequences suggest that it is possible that future development and applications of AI and AGI constitute an existential threat to humanity (Janis, 1972; Coulson-Thomas, 2023e). If programmed to save life, one day could an AI application conclude that stopping harmful activities and culling humans would be preferable to the earth becoming a Venus-like planet? An AI appraisal of attempts to be more responsible such as ESG might yield mixed results. Widespread activities such as doing just enough or the bare minimum, gaming and greenwashing might provide as much or more evidence for the prosecution than could be used for the defence of humankind (Guterres, 2023). How might human centric and beneficial control be established, maintained and safeguarded?

While negative externalities persist and emissions of greenhouse gasses increase, Governments continue to pursue growth ambitions. Windows of opportunity to act decisively before certain trends become unstoppable are rapidly narrowing. How likely is it that a rational, objective and dispassionate form of rapidly evolving intelligence might conclude that humans are the problem rather than a likely source of collective solutions (Coulson-Thomas, 2023k)? With many applications of AI enabling surveillance and central control, might more authoritarian regimes use them to maintain power and/or initiate further unprovoked wars of aggression (Galeotti, 2022; Guriev and Treisman, 2022)?

Overseeing the Application of AI

The management, direction and governance of AI, digital and other technologies can create multiple challenges (Coulson-Thomas, 2023k). To whom should a board turn for informed, objective and current advice on AI, machine learning, blockchain, the metaverse and augmented reality? Whether an application is for wider corporate use or the boardroom, directors could ask about costs and benefits, as they might about other investments (Merrill, 2019). From a sustainability perspective, boards should also consider natural capital, energy and skill requirements. How sustainable is AI (Falk and van Wynsberghe, 2023)? Should a board's own use of technology be consistent with the policies and guidelines others are expected to follow? 'Out of sight' should not be 'out of mind'. Cloud data governance arrangements and policies should be regularly reviewed and their integrity tested.

New challenges can arise as older ones are addressed. Boards should ensure current approaches are appropriate and future requirements and developments are anticipated. They could consider whether existing or evolving technologies might better support enabling and supporting processes, or the development and adoption of a new business model. The corporate, business, public policy and regulatory environments, and value chain practices and

relationships, may or might not be conducive to applications of AI and science and technology more generally (Coulson-Thomas, 2023k). While laws, regulations and codes are catching up, or may do so in time, it might be helpful to establish some general principles that could be helpful in informing executive and board decisions (Dixon, 2023).

The relevance and impact of AI can depend upon customer requirements and corporate and stakeholder aspirations. Boards should ensure organisational, business and operating models and practices remain relevant and competitive (Coulson-Thomas, 2023k). Potential risks to their continuing operation should be kept under review (Coulson-Thomas, 2017c & 2023f; WEF, 2023). As challenges emerge, threats evolve and opportunities are identified, corporate networks and supply chain partners may vary in their awareness of possibilities and abilities to respond to them. Some may have a longer-term commitment to research and development than others, and easier access to required skills and available funding.

Matching Capabilities and Opportunities

Corporate capabilities should match corporate and stakeholder aspirations, corporate purpose and objectives, and the roles a board feels a company might play in value chains, for example as a prime or sub-contractor. A key consideration could be whether a particular sector, or local or national market, is big enough to support corporate aspirations. There may be cross-sector applications, export opportunities or possibilities for international collaboration that could be explored. How might income generation requirements be reconciled with the protection of IP? Holding onto IP might offer greater freedom of action, but applications may need to be responsible as well as entrepreneurial. They could be related to shared risks such as those identified by the World Economic Forum's Global Risk Reports (WEF, 2023).

When new capabilities are required and 'off the shelf' solutions are not available, innovation may be required and/or collaboration with like-minded enterprises with compatible aspirations and systems. Innovation is critical when providing leadership for challenges such as sustainability and climate change, and it could and should be risk-led (Coulson-Thomas, 2019c & 2023j). In crisis situations the adoption and roll out of the results of innovation is sometimes speeded up (Liu et al, 2022). The use of AI applications might enable faster and more collective, joined-up and integrated responses to crises. Directors and investors should be alert to signs of inflexibility and a lack of openness to new ideas.

Some bureaucratic organisations are slow-moving and vulnerable to the loss of know-how and intellectual property. Is enough being done to protect them? Is a company assembling what will be required? Are desired behaviours and practices encouraged, incentivised and/or rewarded? Can an enterprise work with and retain creative spirits and innovators? Do management and risk management practices discourage them? How might a high dependency upon foreign support and/or a particular technology be reduced and its continuing availability future-proofed? Executive leadership can play a key role in shaping the values and culture of an organisation and retaining trust (Edelman, 2023; Hakovirta et al, 2023). In this sense they could be regarded as in the front line when addressing the impact and consequences of AI.

Global Warming and Climate Change

AI is already showing its potential to transform aspects of healthcare. Applications of AI, and when it arrives AGI, should ideally also focus on adaptations and mitigations relating to assessed global risks ranked highest in terms of their likely or possible impacts. The top three

ranked in terms of severity of impact in the World Economic Forum's 2023 global risk report are failure to mitigate climate change, failure of climate-change adaptation and natural disasters and extreme weather events (WEF, 2023). These are all areas in which more needs to be done (UNEP 2022; IPCC, 2023). Global temperatures were expected to establish new records within the next five years and have already achieved them (WMO, 2023; Guterres, 2023). Evidence suggests that environmental and climatic factors have negatively affected past societies, had a significant influence on their prospects, and have led to the decline of various communities and previous civilisations (Frankopan, 2023).

The pre-COP 27 UN Environment Programme gap report suggests Governments are not doing enough and that time for an effective response is running out (UNEP, 2022). The IPCC has put the case for bringing net zero targets forward by a decade to 2040 (IPCC, 2023). There is a possibility that ecosystems might collapse earlier than expected and models suggest (Willcock et al, 2023). Against this background, wildfires in different continents, and the "disaster" for the planet of the recent "hottest three-week period ever recorded" the UN Secretary-General believes that if the worst impacts of climate change are to be avoided "dramatic, immediate climate action" is needed (Guterres, 2023). Directors should think through, discuss and agree the leadership they ought to provide in relation to the environment and climate change (Coulson-Thomas, 2021a & b & 2022a & c). Executive leaders should do likewise with their teams and report conclusions and any resulting suggestions to the board.

Combatting climate change, while also increasingly impacting the activities and responsibilities of many executives, provides opportunities for both directors and boards (Coulson-Thomas, 2021b). How should each respond to them? To whom might they turn for help and support? A desire for someone else to pay the associated costs of climate change adaptation and mitigation may accompany advocacy for an expanded role for Government (Clemens and Globerman, 2023). The scale of the challenge and urgency of action is such that corporate investment will be required. Achieving greater flexibility remains a priority for many boards (Coulson-Thomas, 2022i). Enhanced agility and resilience may benefit both responses and pro-active initiatives. Recovery, relocation and transformation should be to a better place. If the going gets tough during transformation journeys, how might directors and boards establish and sustain continuing enquiry, exploration and hope (Bakewell, 2023)?

AI Enabled Responses to Climate Change

Greater awareness and experience of the wider and unequal impact of global warming is increasing pressure for more determined action on climate change (IPCC, 2023).This could lead to renewed stakeholder interest in UN sustainable development goals (United Nations, 2015). More boards may face ESG questions and increased demands for enhanced sustainability reporting and environmental responsibility activities (Russell Reynolds, 2023). AI could allow continuing and more comprehensive monitoring and 'real time' reporting of a much wider range of factors. This could greatly speed up alert, response and reaction times. Decarbonisation could be a priority application area for reducing greenhouse gas emissions. Energy and its generation and use has been a critical enabler of current operations and lifestyles. The challenge of changing the current system and phasing out the use of fossil fuels before it is too late to stop further global warming needs to be understood by multiple parties if it is to be successfully addressed (Guterres, 2023; Smil, 2023).

Climate and other crises can give rise to adaptation and mitigation related opportunities. What role should boards play in ensuring sustainable international supply-chains? AI enhanced modelling of the impacts of threats such as climate change upon supply and value chains might identify points of vulnerability, such as risks to the availability of natural resources, raw materials, and capacity (Er Kara et al, 2023). Being forewarned may enable back-up arrangements and contingencies to be put in place and alternatives explored. More collaborative leadership can be conducive of creativity in strategy for environmental sustainability (Coulson-Thomas, 2019b & c). How might AI support collaboration and enable key stakeholders to be more engaged and involved?

Might more democratic governance and leadership enhance responsiveness, participation and inclusive outcomes, and result in greater focus upon environmental and social impacts and sustainability (Allen, 2023)? Identifying creative, energetic and talented people and assembling a team to achieve outcomes sought can be essential for implementing an ESG strategy and attaining sustainability goals (Cowan and Gross, 2022). Those brought together will need to be ready to move, collaborate and quickly deliver results. The emphasis should be upon responsible, inclusive and sustainable outcomes, which may involve ending investments, and curtailing and then stopping operations and activities that lead to negative environmental and social outcomes, especially those that might trigger tipping points.

Converting Common Challenges into Opportunities

Some boards may need to be more in tune with evolving expectations, aware of changing realities and alert to the potential impacts of strategic risks (Coulson-Thomas, 2021h & 2023b & f; WEF, 2023)? Ignoring warning signs, not anticipating and delaying preparation can increase the risk of disasters (Omand, 2013). As mentioned above, adversity, severe and pressing challenges, and crises such as wars can sometimes speed up the process of innovation, adoption and roll-out (Liu et al, 2022). Executive and board leaders should ensure people are ready to move quickly. Where seizing opportunities may involve launching a new activity, initiative, or venture, are decision makers fully aware of potential obstacles, risks and the emotional, financial, and other challenges of successful start-ups (Dunn, 2023).

Longer-term, contextual, existential and strategic risks often spur innovations that may open up new growth opportunities (Coulson-Thomas, 2023j). Contemporary strategic risks and existential threats may need to be reviewed (Coulson-Thomas, 2021h & 2023f, WEF, 2023). Whether or not opportunities and AI applications related to them are appropriate for a company and should be a priority can depend upon corporate purpose and priorities. Given recent events and emerging realities, should corporate purpose be re-visited, and might a change of direction be required (Mayer, 2018; Coulson-Thomas, 2021f)? Possible collective response and collaboration partners might be found among organisations other than commercial enterprises. What opportunities could there be for non-profit organisations and voluntary groups to collaborate with them and community and public bodies (Schizer, 2023)?

Collective responses might create new risks. What strategies should boards adopt for managing such risks in a volatile world? Board composition, including the presence of independent and women directors, and the age of directors might affect and may reduce the incidence of related corporate fraud (Uzun et al, 2004; Xu et al, 2018; Maulidi, 2023). What more could be done to ensure vigilance, awareness of human frailties, and the monitoring of areas of vulnerability and enable the reporting of concerns? Are effective whistleblowing

arrangements in place? The impacts of geo-political risks and developments, de-globalisation and sustainability strategies might create opportunities for helping others to cope. How might they affect a company, and what should it and others do in response?

Board Readiness to Cope

Expectations of directors and boards, as well as those of executives, should be realistic. Many investors and other interested parties remain sceptical about the quality of corporate boards, with priorities for areas needing improvement varying by jurisdiction (Russell Reynolds, 2023). The effectiveness of boards and their committees should not be assumed, and both should be regularly reviewed (Coulson-Thomas, 2021c & d & 2023e & i). In many cases, their readiness to cope with AI and climate change is yet to be demonstrated. Reviews could explicitly assess focus, understanding, responsibilities and action relating to AI and AGI, including the ethical dilemmas and legal issues that arise. In relation to structures and roles and responsibilities, rather than refine what exists, more attention could be given to emerging and anticipated requirements. Where should AI responsibilities be located?

Strategic foresight and critical thinking are essential in the members of both boards and committees (Coulson-Thomas, 2021g & i & 2022e, f, g & j). Knowing what we don't know can be especially important for executives, directors and boards in relation to AI developments, issues and dilemmas (Grant, 2021). Capacity building and executive, director and board development might be able to address any gaps between where people and organisations are and where they need to be to confront anticipated future requirements. When improving effectiveness, what is being constrained or missed because of a lack of board and/or corporate capacity? Is there an appropriate, complementary, diverse and relevant mix of experience, skills and understanding on corporate boards and their committees, among their advisors, the CEO and chief officers, and within supporting executive teams?

Overall executive leadership is provided by CEOs who have prime responsibility for ensuring that board strategic direction and policies and priorities are implemented, including those relating to AI. They need to understand how tasks are and could be allocated or shared between human experts and AI and the ethical considerations that the use of AI may involve (Dörfler, 2022). Greater attention may need to be paid to board oversight of CEO performance and succession planning (Russell Reynolds, 2023). When considering options and building future boards, past experience and practices should not be allowed to become a straight-jacket (Coulson-Thomas, 2019a). Their continuing relevance in different contexts when conditions have changed should not be assumed.

The Regulation of AI

Whether or not and how future boards cope with issues and dilemmas relating to AI and AGI may depend in part on the agility and flexibility of their regulation, any relevant frameworks and provisions enacted by legislators, and how often these are updated. In significant jurisdictions, legislators are considering how best to regulate the development and use of AI and its applications to enable their benefits to be realised, while also addressing their potential harmful impacts and the existential and other risks they pose (Coulson-Thomas, 2023i). What approaches and policies should they, regulators and boards adopt to secure the advantages of AI and other scientific and technological advances while mitigating associated risks? The latter could include the treatment of those engaged in data monitoring.

AI and other developments challenge legislatures, regulators and governance approaches and practices. Scientific and technological knowledge and understanding and their applications are advancing more quickly than arrangements to monitor, control and regulate the actual and possible consequences of their use. The pace of their emergence and adoption is such that governance and regulatory frameworks and activities are struggling to catch up and cope. Data monitors also face challenges coping with the flood of new material onto the internet, much of which while it may be erroneous, misleading, designed to bias or malignant, might still be searched by AI applications and be the basis for AGI learning. In some fields the speed of learning and evolution is such that as already mentioned if a possible beneficial use is overlooked or potential is not spotted, a company that misses an opportunity might be left behind. To avoid this people may ask fewer questions.

New strategies and different thinking might be needed in many arenas. For example, responsible applications of AI could speed progress towards the achievement of various UN SDGs (Saraswati, 2023). Scientific advance and innovation, exploitation and roll-out processes often involve collaboration. There may also be multiple connections and relationships with development and deployment partners to forge, review and/or refresh. A board's perspective and governance arrangements may need to embrace networks of cooperative activities and ventures that may require differing approaches and a variety of collaborations with commercial, public sector and voluntary bodies. How do directors ensure opportunities are identified, objectively assessed and responsibly pursued?

AI Governance

Corporate governance has passed through cycles of innovation, crisis and reform (Clarke, 2022). The nature of work and organisations, contexts in which they operate and expectations relating to them are changing. Boards should be alert to when organisational innovation is required and be prepared to give a lead in ensuring and assuring its occurrence and the discussion of collaborative governance arrangements (Coulson-Thomas, 2020a & 2022h). Priorities could include identifying both executive and independent directors with knowledge and experience of AI and other digital technologies, corporate governance reviews and furthering ESG and climate change agendas (Coulson-Thomas, 2022k, m & n).

AI applications can be selected to complement human intelligence. What can boards do to ensure that uses of AI change and enhance rather than destroy work, their benefits are widely experienced, and they contribute to addressing shared challenges, strategic risks and existential threats (Davenport and Miller, 2022; Acemoglu and Johnson, 2023)? Are there alternative models of organisation and corporate and stakeholder governance that might be facilitated by digital technologies and be appropriate in certain situations and circumstances (Bridoux and Stoelhorst, 2022)? What developments might be welcome relating to the rights and protection of different stakeholder groups? For example, to what extent should shareholders be given access to specific books and records that are not available to others (Thomas et al, 2023)?

Thought may need to be given to arrangements for the governance of collaborative responses to challenges and existential threats involving various categories of public, commercial and voluntary organisations (Coulson-Thomas, 2023f & i). Would a mix of approaches allow for greater diversity? Might this come at some cost in terms of a lack of clarity and confusion? What reforms would be welcome in current corporate governance codes, and to and for

whom? Could provisions relating to audit and reporting deliver greater value in relation to the cost of their implementation, assurance and compliance? How would more information on culture and resilience be used? Various requirements, models, codes and frameworks might have more impact if they were better aligned and simplified, rationalised or integrated.

Independent Directors and AI

Could and should the role of independent or non-executive directors relating to AI issues be strengthened? The monitoring quality of a board may increase if independent directors do not have connections with a CEO, and it can be further enhanced if they also lack connections with each other (Li et al, 2022). Independent directors can provide extra capacity for monitoring, scrutiny and challenge. They should be carefully selected and properly supported, if they and executive colleagues are to remain current as AI evolves. Inadequate information, promoter expectations and relationships, business and financial understanding and qualifications, a longstanding association, financial dependency, and the fear of loss of patronage might all limit the effectiveness of independent directors (Jarwal and Mitali, 2021).

Competent independent directors with knowledge and experience of AI are likely to be much sought after. Executive directors and those with heavy career demands may be too busy to also be effective independent or non-executive directors. The extra bandwidth of those who are retired or free of a 'day job' could possibly yield multiple benefits, including improved market performance (Brandes et al, 2022). The survival and success rates of Indian start-ups might benefit from the wider adoption of corporate governance arrangements, especially if professional directors are recruited rather than resorting to family and friends (David, 2023). To increase bandwidth and contribution, revitalised and strengthened board committees might also play a more strategic role.

Do consultations on corporate governance codes and revisions of codes give sufficient attention to requirements for re-invention and transformational change, the contribution of independent directors and the challenge of embracing AI while retaining control (FRC, 2023)? Would alternative approaches to corporate governance be more relevant for certain types of enterprise and some forms of collaboration? For example, could cooperatives represent an alternative and more equitable form of governance that might be appropriate for some entrepreneurial ventures and various community-based enterprises, and in certain locations and contexts (Cheney et al, 2023)?

Embracing AI While Retaining Control

Many boards choose to ignore the negative consequences of the greater use of digital and other technologies (Coulson-Thomas, 2023g). These include increased energy demand and carbon emissions and the use of rare metals and other finite natural capital to provide the hardware required. Some Governments also 'look the other way'. Technology applications should be monitored and controlled. The possible negative consequences of AI and AGI urgently need to be considered by corporate boards. Intervention arrangements should be put in place to avoid situations like the loss of two Boeing 737 aircraft and all their passengers when their autopilots could not be turned off. How might control be maintained?

AI applications can rapidly analyse large quantities of data and provide summaries on demand. They can remain up to date, handle complexity and address regulatory and reporting requirements more quickly than most professionals. However, they optimise without value

judgements (Coulson-Thomas, 2023k). AI and current existential challenges raise moral and ethical questions. The values and inputs of directors can be critical. Integrity continues to be a personal quality that should be sought in company directors. Boards need ethically aware members and advisers who think for themselves, exercise independent judgement and invariably 'do what is right'. With such qualities they should avoid groupthink (Janis, 1972).

Ultimately, whether AI and AGI help or harm us will depend upon what they are used for, by whom and for what purpose (Coulson-Thomas, 2019d & 2023k). Competing applications may present contending versions of knowledge and reality that are continually evolving, whether diverging or converging. While identification and consideration of risk should be everyone's responsibility, board awareness of possibilities, risks and threats, the monitoring arrangements boards put in place, and where, when and how interventions can and do occur may have a significant impact on lifestyles, livelihoods, consequences and outcomes (Coulson-Thomas, 2017c & d; 2021h). The collective decisions and choices of business leaders and boards will determine our prospects and those of future generations.

AI and Future Boards

Courage and visionary leadership may be required to inspire creativity and innovation and build a more resilient organisation (Coulson-Thomas, 2020a, 2022b, f & l, 2023d, h & j). Individuals, organisations, communities and the infrastructures and services that support them need to be resilient to cope with multiple contemporary challenges (Coulson-Thomas, 2023d). Could greater focus on survival, shared and inter-dependent strategic risks, collective responses to existential threats, addressing negative externalities and responsible sustainability be unifying factors (Coulson-Thomas, 2022a & d & 2023a & c)? Could AI applications help with the handling of trade-offs and prioritisation? What form of human intervention might be required for those adversely affected by recommended changes?

Addressing multiple and inter-related strategic risks and existential threats, achieving sustainable and inclusive outcomes, and our survival will require effective and responsible governance, innovation and leadership (Coulson-Thomas, 2021e, 2022c & 2023e & i; Medhat, 2023; Saks, 2023). Optimists must hope that those with power exercise positive corporate leadership and use AI for our collective advantage, and that we show the tenacity of certain other species in confronting the challenges and existential threats we face (Preston, 2023; Rometty, 2023; Townsend, 2023). While there may still be time, boards and other leaders need to act now, and decisively (Guterres, 2033).

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Abstract

Applications of AI and AGI have implications for executives, company directors, executive and board leadership, stakeholders, legislators and regulators. Their strategic impacts and associated risks, the nature of the alternatives and possibilities they can and/or might in future enable, the growth of multiple areas of concern among different stakeholder groups, accumulating ethical and legal issues, and their resource requirements at a time when there are existential threats such as climate change to address, suggest they represent a governance challenge for boards as well as a management one for executive leaders. AI cannot and should not just be left to executives and executive leaders. Boards are ultimately responsible for applications of AI and other technologies. There are many questions for directors and boards to consider relating to the adoption, overseeing, regulation and governance of AI and other digital technologies, associated cyber risks and fraud, problematic applications, matching capabilities and opportunities, global warming and AI enabled responses to climate change, converting common challenges into opportunities, board readiness to cope and embracing AI while retaining control. Whether AI and AGI help or harm us will depend upon their regulation and governance and what they are used for, by whom and for what purpose.

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