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Putting corporate purpose at the core of technology decisions

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About the Canadian Centre for the Purpose of the Corporation

The Canadian Centre for the Purpose of the Corporation (the Centre) is an initiative of Navigator, Canada's leading high-stakes strategic advisory and communications firm. The Centre's mission is to equip Canadian businesses and organizations with insights, tools, and support as they work to redefine and strengthen both the scope of their purpose and the contributions they make more broadly to society. The Centre releases regular analysis and guidance for business based on the expectations of Canadians. These insights inform the design of tailor-made strategic solutions for businesses and organizations to define, advance, and implement their purpose. The Centre is led by Navigator Managing Principal Graham Fox (Chair), alongside a panel of experts in policy, governance, business, law, communications, equity and diversity, sustainability and social responsibility.

Foreword

As we begin to adjust the world of work to the realities of the post-pandemic era, it is critical to recognize that public expectations of businesses have also evolved with the times. From climate change mitigation to social responsibility, citizens expect corporations to articulate a clear view of why they exist and to make decisions about investments and behaviour that are consistent with that mission.

Included in these considerations are decisions about technology: when to use them, how to deploy them and to what end.

Of course, the planning and adoption of technology are fundamental to the viability of any business. But technology adoption is not inherently good. Technologies are neither good nor bad – and it is in their use that organizations determine their impact. A purposeful company, therefore, determines the desired outcomes of technology adoption before it makes the investment.

In this thought-provoking new research paper, Dr. Sara Diamond and Dr. Cindy Gordon explore the relationship between technology and corporate purpose, specifically with regards to artificial intelligence (AI) and machine learning (ML). The authors examine why it is so critical that corporate leaders consider the impact of these technologies on their organization as a whole before any decisions on adoption and deployment are made. To guide these processes, they make specific recommendations for board executives and leaders for the effective adoption of AI and ML.

In their expert view, “a purposeful company is skeptical as to whether a new technology or a new use of existing technology is better than current practice. Purpose must look well beyond quarterly profits and instead speak to long-term sustainability and social balance.”

Technologies do not exist in a vacuum. Everything about them – from design to adoption to impacts – is shaped by decisions humans make. Before tackling technological change, therefore, purposeful companies lead by analyzing impacts on their multiple stakeholders and undertaking change in collaboration with communities, users and customers, keeping their investors, shareholders and boards well-informed.

In the end, Diamond and Gordon caution directors to not be swept away by technology for its own sake. Rather, they make a most compelling case that corporate leaders must ensure technology is embedded in a strategy that is genuinely guided by purpose.

Graham Fox
Former Executive Chair, Canadian Centre for the Purpose of the Corporation

Introduction

The planning and adoption of technology are fundamental to the viability of a business.

Corporate purpose encompasses the core identity of a business and the holistic vision of how the business addresses fundamental issues impacting stakeholders and profitability.

A purposeful company, therefore, establishes the outcomes it wants technology to achieve inside and outside its virtual and physical walls before it makes the investment. These considerations include equitable productivity; a circular economy framework; greenhouse gas (GHG) reduction and other climate impacts; and high levels of employment and a healthy marketplace, resulting in social stability.

A purposeful company is skeptical as to whether a new technology or a new use of existing technology is better than current practice. Purpose must look well beyond quarterly profits and instead speak to long-term sustainability and social balance.

Technologies do not exist in a vacuum. Their design, functionality, integration, adoption and impacts are framed by decisions humans make. Technologies are dynamic systems, not isolated tools. Implications may be immediate, as machines displace groups of workers. Implications may also be longer term, as the types of skills needed in an enterprise or sector change – inadvertently hollowing out job opportunities if transition programs are lacking – or substantively changing a company's work culture. Before tackling technological change, therefore, purposeful companies lead by analyzing impacts on their multiple stakeholders and undertaking change in collaboration with communities, users and customers, keeping their investors, shareholders and boards well-informed.

Technology decision-making and adoption is often fragmented, with too many functional leaders involved. Alternatively, purposeful companies should consider having a single individual hold ultimate accountability for such decisions. This leader would assist their company in identifying the ways in which technologies impact each step of the value chain and ensure that there is a risk management framework in place. Their responsibilities could include technology and software platform planning and choices; process design (ensuring technologies, data and software are integrated); and data governance, with sustaining operating oversight plans. They would establish principles for distributed technology operations in their company.

Considerations are even more complex for companies that produce technologies. In the development of these technologies, corporate leaders must look beyond

their organization to consider wider supply chain implications and environmental best practices, as well as economic, social and cultural impacts. To wit, the adoption of technologies brought about by the pandemic has transformed the world of work well beyond the internal dynamics of the companies that produce them. The workplace remains increasingly hybrid. Innovations in AI that rely on cloud computing can provide remote worker support for eLearning and collaboration and communications efficiencies brought about by thoughtfully adopted generative AI. Pandemic innovations have also seen a growth in online human resource supports for mental health and wellness.

AI and machine learning influence every aspect of online technologies. Connectivity to the internet continues to expand, which means that products and services reach an ever-growing network of business-to-business and business-to-consumer customers. A recent Digital 2022 - Global Overview report (2022) found that across all devices, the average internet user aged 16 to 64 spends seven hours online daily. More than two-thirds of the world's population now uses a mobile phone with unique users reaching 5.31 billion in early 2022.

In this paper, we discuss the relationship between purpose and technological fluency with respect to two contemporary opportunities. The first is the new wave of automation through the adoption of artificial intelligence (AI), machine learning (ML) and robotics. The second is the potential of "circular economy" approaches. The circular economy is of heightened relevance in an era of supply chain pressures, amplified by extreme weather conditions, geo-political dynamics and rising inflation pressures. According to the Ellen MacArthur Foundation, "[a] circular economy decouples economic activity from the consumption of finite resources. It is a resilient system that is good for business, people and the environment." A circular economy retains and recovers as much value as possible from resources by reusing, repairing, refurbishing, remanufacturing, repurposing or recycling products and materials.

We also identify recommendations for board executives and leaders for the effective adoption of AI and ML, and further suggest that AI and ML are fundamental tools to manage efficiencies and maximize value in a reuse economy. Our thinking recognizes that most Canadian firms are small businesses.

Of course, we understand that businesses operate across national borders and must address competitive challenges and standards in other places. Further, we understand that technological dependency must go hand in hand with increased cyber security. We do not intend to minimize these considerations, but they are not the focus of this paper.

Artificial intelligence and machine learning — shift to predicting futures vs. rear-view mirror governance

Although AI is not a new technology, it is now impacting every industry, with effects far beyond the workplace. AI is increasingly ubiquitous in our homes and communities, becoming, as Goldfarb et al. (2020) suggest, a general use technology. What is unique and special about AI is its ability to recognize patterns better and more efficiently than humans. AI is a technology that increasingly enables a machine to simulate human behaviour.

Machine learning is a subset of AI that allows a machine to automatically learn from past data without explicit programming. It is here that we have seen the most dramatic changes in late 2022 and 2023 with the accelerated release and adoption of deep learning foundational Large Language Model technology,[1] popularized through ChatGPT (OpenAI). Microsoft Bing, Cohere (a Canadian scale-up), LLaMA from Meta, PaLM2 or Bard from Google are quickly being brought into core applications. Other market plays that should not be underestimated include Amazon-Q, Baidu's ErnieBot, and Elon Musk's Grok at X.

Also disruptive are image generators such as DALL-E, Stable Diffusion, Mid-journey and Images.ai that generate images from text prompts and have elicited copyright concerns on the part of artists and designers, and design efficiency tools such as Jasper.ai and Adobe Sensei, while also inspiring new creative applications.

A related technology is GAN (generative adversarial networks). GAN technologies are deep learning algorithms that use unsupervised learning for image recognition and training production that have emerged in the last decade.[2] These can be transformational in identifying cancers, support effective marketing, or they can lead to manipulation and misinformation and increased risks of digital identity theft or fraud. Deep fake technologies simulate human behaviour so effectively and operate so dynamically that it is difficult for humans to distinguish between reality and deep fakes.

These tools have many potential benefits but amplify the homogenizing nature of ML training systems, reflect biases, challenge copyright, and replace human creative thinking and jobs. The arrival of generative AI has ushered in a year that Forbes describes as "the year when… generative AI output becomes indistinguishable from the human output." Critical approaches to their application are important. Businesses need a workforce that includes deep knowledge of human culture, including social scientists, humanists, designers and psychologists. We are in an era where the design of technologies and their implementation should not be left to engineers.

In the past twelve months, we have seen an explosion of AI investments in generative AI. The impact of generative AI on economies and enterprise will be revolutionary. McKinsey Global Institute estimates that generative AI will add between $2.6 and $4.4 trillion U.S. in annual value to the global economy, increasing the economic impact of AI by 15 to 40 per cent. McKinsey projects that AI will automate half of all work between 2040 and 2060, with generative AI pushing that window a decade earlier than previous estimates. Goldman Sachs predicts a 7 per cent — or nearly $7 trillion — increase in global GDP attributable to generative AI, and the firm expects that two-thirds of U.S. occupations will be affected by AI-powered automation. These challenges to the nature and availability of work are a clarion call to corporations to have a clear-eyed view of their AI adoption and governance strategies. Financial services, media, energy, automotive, oil and aerospace industries lead adoption; retail, travel, government services and health care are least likely to adopt (IBM Global AI Adoption Index, 2022). As of 2022, before the growth of generative AI, close to 25 per cent of business-to-consumer companies used AI for marketing and sales, the deployment of virtual assistants, and sentiment analysis (IBM, 2022).

The applications of AI and ML range widely. Algorithms can sort through documents at unprecedented speeds; identify molecular and cellular patterns to create new materials and substrates; predict health outcomes based on genetic patterns; predict supply chain issues; support financial analysis and reporting; help source talent for human resources; identify customer risk churn patterns and analyze sentiment drift; identify similarities and differences between consumers; predict sales forecasts accurately; identify the mood and health of a workforce from data analysis and communication patterns; and recommend products or services that have higher odds of catching consumer interest. More broadly, AI can predict trends emerging within an industry or society. AI and ML can be of immense value to small- and medium-sized enterprises and take-up is growing, according to the Brookfield Institute.

AI and ML increasingly shape the ways that business-to-consumer (B2C) companies manage their customers. Many global companies have announced that personalization (the act of tailoring an offering to the interests of an individual) and seamless omni-channel experiences (offering products to a consumer whether they are in person, on a mobile device or on a laptop), will be at the centre of their strategies. Home Depot, JP Morgan Chase, Starbucks and Nike are convinced their competitive advantage will be based on the ability to capture, analyze and utilize personalized customer data at scale. Starbucks achieved a 150 per cent increase in user interaction using predictive analytics and AI, a three-fold improvement in per-customer net incremental revenues.

During the pandemic we saw phenomenal growth rates in B2C online shopping. The market is rebalancing as was reflected earlier in 2023 in Amazon and Shopify's sharp declines due to a fall in ecommerce spending. What will remain are the continual investments in AI/ML algorithms in recommendation engines amassing online behaviours and purchasing history to gain more consumer insights to lock in a hook for a repurchase. Companies will require customer-responsive enterprise systems to design, develop, customize, optimize and sustain the customer's experience within a company's online environment and beyond, including social media commentary and evaluation. And they will need trusting consumers who continue to share their data in an era of intensified focus on data and AI governance.

The challenges of AI and ML

While these projections represent potential profitability, as AI and ML and their adoption mature, implementation brings a series of challenges that must be weighed along with their benefits. Mark Carney notes that this industrial revolution is likely to change the nature of most jobs, rather than eliminate them completely, with about 10 to 15 per cent of jobs estimated to disappear. AI adoption brings labour force disruption. Some repetitive tasks will be replaced by machines, and low-level human judgment in some contexts may be effectively replaced by algorithms.

One direction of AI technologies (narrow AI) is to augment human skills, supporting wise decision-making by humans with the goal of upskilling jobs. A second direction of AI (general AI) is to fully replace humans. Stanford economist Erik Brynjolfsson argues for the augmentation of human skills rather than striving to replace humans with AI. In his view, "[w]e can work on challenges that are easy for machines and hard for humans, rather than hard for machines and easy for humans. The first option offers the opportunity of growing and sharing the economic pie by augmenting the workforce with tools and platforms. The second option risks dividing the economic pie among an ever-smaller number of people by creating automation that displaces ever-more types of workers." Both Carney and Brynjolfsson see tax and economic policy incentives as overly skewed towards automation rather than augmentation, when keeping humans employed can benefit markets, communities and social stability.

For corporations, this means important decisions about the kinds of AI and ML they will use or build. It also suggests the need for appropriate policies that do not penalize companies that balance labour productivity and automation.

While labour market issues represent social and economic challenges, there are other questions that companies must attend to in the wholesale adoption of AI and ML. As we have seen, ML is driven by data, and, as analysts quip, “garbage in is garbage out.” Data fluency is a critical skill for contemporary businesses as reliance on data, and systems that rely on data analytics gain ground. Workers at all levels of a company must ensure the data they gather is accurate, clean and unbiased. This is particularly critical due to generative AI risks in misappropriation of copyright content to train large language models. Generative AI outputs continue to include “hallucinations” of inaccurate analyses and false citations. Their use requires skilful applications, understanding effective prompts, and fact-checking. Outputs are generic, and creative thinking remains of significant importance. Image technologies are best used by creatives who can nudge repetitive stock representations into strong design.

Built-in bias is one of the important challenges companies must face as they buy, build and apply AI systems. Cathy O’Neil, a mathematician and former Wall Street luminary, highlights the risk of algorithmic bias in many contexts. She suggests that people are often too willing to trust mathematical models because they believe these will remove human bias, yet we do not hold algorithms to the same standards as humans. Algorithmic bias, engineer-introduced bias and bias in the data sets used to train algorithms can reinforce inequities and lead to poor decisions that underplay potential markets, or bypass potential talent. Computer scientist Dr. Joy Buolamwini, founder of the Algorithmic Justice League, says in her 2023 book Unmasking AI that many AI image-based systems do not even capture an image if the image is a Black female. British author Caroline Criado Perez points out instances in every industry where the lack of data regarding women’s needs and behaviours results in biases being introduced, whether that is language translation software that mistranslates gender-inclusive languages like Turkish to masculine subjects in English, or human resource selection software that eliminates qualified women from competitions. Panels used to collect data for qualitative surveys are often limited, and hence fail to capture the needs of racialized or Indigenous consumers. These issues are intensified with generative AI systems.

Social scientist Dr. Safiya Umoja Noble, writing in her 2018 book, Algorithms of Oppression, says of bias in search engines (which are driven by AI algorithms): “Technologies and their design do not dictate racial ideologies; rather they reflect the current climate.” The challenges of data and algorithm bias reinforce the importance of explainable AI, which seeks to open the “black box” nature of deep learning recommendations by visualizing data and decision pathways.

It is critical that corporate leaders understand and be able to defend the AI recommendations they decide to implement. Corporate responsibility is intertwined with tackling data and algorithmic bias and ensuring the widescale application of explainable and ethical AI. AI is even relevant for corporate ESG goals. AI for good is a movement that brings together industry and academia to apply AI and ML to hard problems.

The circular economy

A significant and growing trend in the 21st century is the circular economy. In a circular economy, nothing is wasted. The goal is to curtail value loss to benefit a low-carbon economy, while adding transactional strength and profitability at each stage. This is an approach to technology and production that is also relevant for the use and deployment of technologies and services for any scale of business. This approach stands in stark contrast to the current linear economy driven by redundancy, with a straight line from resource extraction to waste disposal.

In the circular economy, products at the end of their useful lives become resources for new applications. Circular economy design seeks returns at all levels of its processes, with the goal of providing alternate revenue streams to the history of planned obsolescence in capitalism. This approach offers the opportunity for companies to consider community benefits, including a broad range of employment opportunities.

Europe has led in the adoption of circular economy practices. In seeking to reach carbon neutrality by 2050, the European Commission emphasized a regenerative growth model. Its 2019 study demonstrated that “applying circular economy principles across the EU economy has the potential to increase EU GDP by an additional 0.5% by 2030, creating an additional 700,000 new jobs” (Cambridge Econometrics, Trinomics, and ICF, 2018). Opportunities for significant circular economy initiatives include: the redesign of electronics for energy efficiency and durability; reuse of batteries and extraction and recycling of materials, including rare minerals; design for reuse of packaging and production of packaging from organic and other recycled materials; reuse of waste materials for energy; design of textiles for reuse, repair, recycling and production from organic or recycled materials; increase of reused and recycled building materials; and reuse of food waste products for biofuel production and materials production, creating markets for recycling.

Side by side with a circular economy is the need to create a market for secondary raw materials. Recycled materials will be increasingly used with materials checked or neutralized for toxicity. There is a circular economy design revolution taking place. Design and designers are successfully providing alternate uses for materials, technologies, waste materials, products and services.

The circular economy offers innovative business models such as the increased use of modular design; additive manufacturing using 3D printing of non-toxic and recycled materials to support local on-demand production; products as services (where producers have responsibility for a product through its life cycle); home delivery systems (we have had test runs through COVID-19), extending product lifespan; and collaborative consumption (bulk buying).

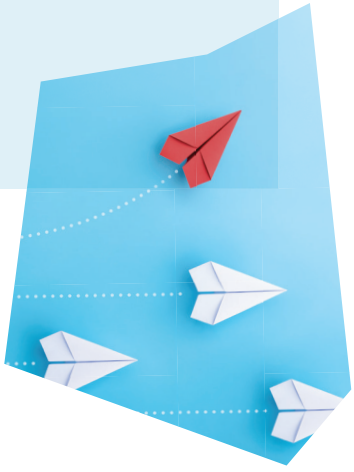
AI and ML play a critical role in the circular economy, supporting platforms that allow digital supply chain management, including the use of block chain, digital tagging and watermarks that allow materials and goods to be traced. An example of Canada's circular economy is the National Research Council's Bioenergy Systems for Viable Stationary Applications program, which remakes biomass and waste into renewable power and fuels.

Other examples include the use of mining waste as resources and zero plastic waste initiatives that focus on 100 per cent reusability of materials, a critical move in a world that could see more plastic than fish in its oceans by 2050.

Innovations in this area have gained prominence. Dell has launched 35 products that will recapture millions of pounds of plastic and carbon fibre through the work of robotic sorting systems driven by artificial intelligence and equipped with computer vision. These systems can efficiently separate recyclable materials from general waste, improving recycling rates and reducing contamination.

Circular economy planning is a highly creative and productive exercise for businesses, one that engages employees across the enterprise. Such planning can offer surprising realizations about efficiencies and revenue opportunities for reuse, whether in the company, sector or larger community.

Building a Corporate Strategy for AI and ML



What can board executives and business leaders do to build corporate strategy in the context of widescale AI and ML adoption and to address the opportunities of a circular economy?

1. Develop a governance framework for technology adoption that draws on corporate purpose

Corporate purpose defines and delivers a long-term, value-creating promise, either in the company's local environment or in the global market environment related to the company's value creation. As writer and motivational speaker Simon Sinek says in his 2009 TED talk, "People don't buy what you do; people buy why you do it." This simple statement is profound as it clearly illustrates the responsibility of board directors and executives to carefully relate technology decisions, including acquisitions, design, operating processes and practices. Board directors and CEOs need to ask governance questions like:

- *How does a specific technology impact and change our products or services?*

- *What greater purpose or value does the adoption of this technology bring to our stakeholder community?*

- *What strategies surrounding its adoption will keep us true to our purpose and values?*

- *What disruptions will result? How will we address these? (Stakeholder technology impact maps, risk analysis and mitigation, and communication strategies are critical tools when planning technology change.)*

- *Given our commitment to climate change mitigation, do we have a circular economy strategy in place for this technology?*

2. Develop ethical data governance and AI policies

Leading scientific, academic and industry leaders, including Yoshua Bengio (the scientific director of MILA, the Montreal Institute for Learning Algorithms) and Geoffrey Hinton (former Google scientist, and chief scientific advisor of the Vector Institute Canada), have expressed concern regarding AI. More than 1,000 technology leaders have requested a pause to allow legislation to catch up. There is no question that AI/ML technology innovations are developing and operating faster than governments can, meaning that good corporate citizenship is critical. Informed corporate good governance remains best practice.

Legislative change is underway in relation to data collection and governance, bias and fairness, and now AI governance. However, the legislative process is very slow. Although the EU is leading, the US and Canada likely won't have formal AI legislation in place until 2025. It is noteworthy that China was the first country to pass generative AI legislation in August 2023.

Of course, companies can prepare themselves for impending legislation by establishing fairness audits for data and algorithms used in decision-making and technology design, conducting AI readiness assessments, and engaging AI experts to develop AI software development and operating policies to ensure AI practices are responsible.

In a world where AI and ML are accelerating, much of the privacy-sensitive analytics are done by advanced search algorithms, such as recommendation engines driven by ML algorithms. Hence privacy, data collection and analysis are linked. Most current legislation relies on a notice-and-choice model. In this model, users are notified their data is being collected and they are asked to

consent to gain access to an online service (Warner & Sloan, 2013). Notice and consent is treated as a contract in which the user forfeits privacy in exchange for services or information. The assumption is that the user is fully informed of the ways their personal data will be used. One challenge is that without full consent, a user can seldom access the full breadth of a service. A second is that privacy notices are often buried and written in legalese, making them hard for most users to understand. After all, data is gold, and its monetized exchange is the basis of the online economy. Given the challenges of privacy breaches and the use of data for unsolicited target marketing, consumer advocates, politicians and lawmakers see the need for stronger consumer protection.

The EU's General Data Protection Regulation (GDPR) places more requirements on companies that collect data. It grants individuals the right to access, transfer, correct their data, restrict access to personal data and ask that it be destroyed. Future legislation may require companies to disclose the ways they collect data, how that data is stored, used, shared and monetized. There may be fines for privacy breaches. This is complex terrain to navigate, as companies would have to disclose their data management and stewardship strategies and explain how their duties of fairness and transparency are safeguarding citizens. Increased pressure for privacy by design and impact on data aggregation methods will come under more intense scrutiny as well.

There are indeed increased expectations of "explainability" — how specific algorithms are used and how their decisions are produced, establishing a channel through which an individual can seek an explanation. Explainability has been foregrounded in political discourse and COVID-19 debates about care decisions in recent years.

This is a fundamental approach of the recent EU's General Data Protection Regulation. It legislates that for any automated decision with "legal effects or similarly significant effects," such as employment, credit or insurance coverage, the person affected has recourse to a human who can review the decision and explain its logic. This incorporates a "human-in-the-loop" component and an element of due process that together provide a check on anomalous or unfair outcomes.

The European Union is leading in requiring "fairness audits" (auditing algorithms that can estimate the demographic parity of ML models). "Fairness audits" are now required by New York City's recently passed law on the use of algorithmic hiring systems. Organizations are beginning to face new requirements around evaluating the risks associated with their AI systems. Frameworks in this area are rapidly emerging as the National Institute of Standards and Technology, the U.S. Department of Commerce, the Institute of Electrical and Electronics Engineers

and other standard-setting bodies bring together experts across academic, industry and policy sectors to develop frameworks for advancing ethical AI and developing corporate governance strategies to mitigate AI risk. Noteworthy AI governance legislative frameworks include: the California Privacy Rights Act (CPRA); the U.S. Blueprint for an AI Bill of Rights; U.S. President Joe Biden's Executive Order for the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence; and Canada's Artificial Intelligence and Data Act (AIDA). The European Union continues its global leadership with its EU Artificial Intelligence Act. The G7 also recently rallied in October 2023 and released a draft set of guiding principles for AI.

Governments in Canada have signalled their concerns about ethical AI, and the value and risk of "automated decision-making" through consultations and guidelines for the civil service. The federal Directive on Automated Decision-Making contains clear definitions regarding AI and ML and tools for "impact level assessment." The Ontario government lays out clearly and simply the appropriate process for data collection and management, the application of AI, and the importance of human decision-making and transparency; it is a valuable guide for corporate adoption. Canada's proposed Artificial Intelligence and Data Act (AIDA), introduced as part of its laws to strengthen privacy protection and trust in the digital economy, opens the policy debate concerning the responsible design, development and deployment of AI systems that impact the lives of Canadians. Questions remain regarding the value of trying to regulate AI at the national level including the need to balance innovation with oversight, rather than seek international protocols through a global regulatory market as proposed by Hadfield and Clark (2023), that is a global means to register emerging technologies and international AI companies that achieve a certain scale.

Company leadership actions may include:

Governance, Regulatory and Operations

- *Ensuring the company has mature data gathering, privacy and governance processes, including knowing who manages data and for what purposes.*

- *Building operating infrastructures that require leaders to think carefully about what data is collected and why, and choosing to collect the minimum data necessary for the business.*

- *Investing in robust technology and data management infrastructure, and operating practices for managing AI/ Machine Learning Operations (MLOps)*

- *Providing a clear and transparent statement on why the company collects data and how it is used.*
- *Avoiding data waste, understanding data lineage, and who governs the company's privacy and risk policies.*
- *Providing users with alternatives for the use of their data when shared with their users, (for example, refusing the sale of one's data to third-party companies).*
- *Communicating to all customers a clear means to opt out and continue to buy services or products.*
- *Augmenting board strategy, finance and audit committees to include experts in AI and ML investment and ethical AI practices.*

Policies, Frameworks and Practices:

- *Ensuring that humans remain at the heart of product and service design.*
- *Adopting explainable AI frameworks and ensuring that explanations are clear not only to technical experts but all stakeholders.*
- *Procuring technical tools and services from diverse, female-led, and Indigenous firms, and building diverse technical talent within the company.*
- *Setting ethical AI procurement standards for tool adoption that align with corporate purpose.*
- *Invoking and monitoring anti-bias policies in data collection and algorithms.*
- *Ensuring cyber security investment considers risks of AI and ML errors.*
- *Staying ahead of and being compliant with legislation and enacting best practices to stay true to the firm's purpose and function as a good corporate citizen.*

Talent and Skills Development

- *Educating board directors and C-suite executives on AI and data fluency.*
- *Supporting data and AI fluency and literacy throughout the organization through training and setting up centres of excellence in learning new skills like: prompt engineering, data bias, advanced analytics and statistics, ethical and integrated design, etc.*
- *Using a diversity and inclusiveness lens to upgrade and recruit skilled talent able to unify corporate strategy with the circular economy and advanced technologies and reflect complex lived experience.*

Canada has excellent third-party resources to support implementing human-centred ethical AI, integrating international standards and protocols. One example is the award-winning company Skills4GoodAI, which uses human rights standards as a test for best practices in assessing data and algorithmic bias.

3. Ensure corporate purpose benchmarking and procurement has a circular economy lens in all its technology supplier decisions.

Inflation management, supply chain shortages and climate crises offer the opportunity to reset business practices toward a circular economy. Businesses can develop circular economy maps for their products, digital technologies, services and waste, identifying reuse and revenue stream strategies when available. They can check their supply chains and look for alternatives, including reuse strategies, and invest in national resources, with potential engagement with Indigenous communities and businesses.

Approaches in circular economy corporate purpose benchmarking include:

- *Building a collaborative business network that addresses all the points in a circular economy strategy so there are benefits within an ecosystem and duplication can be avoided.*
- *Hiring "integrative thinking" designers to bring deep knowledge of materials properties and reuse applications and creating new products with a cradle-to-cradle strategy.*
- *Considering new composite materials, built using AI/ML algorithms, that are increasingly environmentally friendly with rapid degradation rates.*

- *Working closely with municipal circular economy initiatives across Canada, such as the Guelph Circular Opportunity Innovation Launchpad.*

- *Leveraging opportunities to collaborate with research centres to develop circular economy strategies. Such centres include Canada's National Research Council; the Scale AI (supply chains) and the Digital Global Innovation supercluster; Creative Destruction Lab incubators; provincial innovation centres; and university–industry AI research institutes (Borealis AI, MILA, Vector, Alberta Machine Intelligence Institute, Abundant Intelligences). This is a context where innovation with new technologies such as block chains for materials and product tracing, AI and ML to develop generative design, and other trade-offs for reuse offer exciting, competitive advantages.*

4. Support participatory and co-design policies and methods for technology change

As well as the "what," the "how" of technology change is critical. The most important governance question linked to corporate purposes in relation to advancing AI or ML methods, and — any advanced technology approach — is asking, "Will we leave some groups of people worse off as a result of the AI model (algorithm's design) or its unintended consequences?" Similarly, "How will circular design change the jobs that our company can support across the supply chain?" This is a fundamental question regarding employees. Technology adoption should always take workforce impacts into account. For example, companies need to ensure that AI-managed workplaces such as warehouses are compatible with humans.

Participatory design and co-design with a mix of creative, technology, social, legal and change management skills is critical to engage workers in the implementation of AI and increasingly more disruptive AI technology, like Generative AI. Workers bring profound knowledge about manufacturing processes and the ways that materials can be reused and repurposed.

Participatory design emerged in northern Europe in the late 20th century to address technological change. It did so by engaging skilled workers in reimagining production processes with emerging digital technologies. How could technologies more effectively embed human knowledge and assist by augmenting creativity and diminishing repetitive and physically challenging tasks?

The principle of participatory design has mutated into user-centred design, co-design and design thinking. These approaches assume human agency on the part of those who are at the "coal face," who understand a work process and the

value their creativity can bring to problem solving and design. The best robotics practices or AI tools encompass task analysis to create intuitive interfaces for human users. Does participatory design work if workers are asked to design themselves out of a job? It can, when part of their role is to imagine the reuse and repurposing of existing technologies and potential new lines of business that make use of skills they have that are no longer needed in their current role because of automation.

This discussion is relevant to our two specific technology change challenges: the "circular economy" to address technological redundancy, and "ethical AI" as an approach to adopting artificial intelligence/machine learning and robotics tools.

Victor Hugo said, "No force on earth can stop an idea whose time has come."

Corporate directors must not be swept away by technology for technology's sake but must ensure technology is embedded with corporate strategy with purpose.

About the authors

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Dr. Cindy Gordon is the CEO and Founder of SalesChoice Inc., a Software as a Service (SaaS) AI company that has two lines of business: SaaS: SalesInsights, MoodInsights, Sales and Health ChatBots, and Professional Services: (Governance, Strategy & Risk Management, Process Excellence, Design, Development and Education). The company's vision is to end revenue uncertainty for human advantage and helping companies modernize using trusted AI methods. Major customers include: Purolator, Sasktel, and other leading brands in Canada and the USA. She has held executive or partnership roles at Accenture, Citicorp, Xerox and has also been a venture capitalist. She currently teaches AI business strategy at the United States Artificial Intelligence Institute, and AI Ethics and Law at George Brown College. She is a board advisor to the Forbes Business and Technology MBA program at the University of Arizona Global Campus. She is actively educating board directors, CEO's and CHRO's on Responsible AI and helping conduct AI risk assessments. She has authored 14 technology/business books, the most recent of which is The AI Dilemma. She is currently working on a new book on Trusted AI. She is also a Forbes AI thought leader columnist. Her most recent awards include: International Business Excellence Award (2023), Bonhill Group's Digital CEO of the Year (2022), ITWC's Digital Transformation Award for Disruptive AI, , the BDC Start-Up Canada National and Regional Awards, the Mindbridge AI Leader of the Year award, the Governor General's Innovation Award, and the EY CATA Sara Kirke CEO of the Year Award. Recent academic recognition is from MIT in applied AI strategy, and an honorary doctorate recognition in applied AI from George Brown College (2023). She is also a certified board director (ICD.D) and board advisor/angel in generative AI software products like: MoodInsights and Kaji.

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[1] LLMs consist of an artificial neural network with many parameters (tens of millions to billions), trained on large quantities of unlabelled text using self-supervised learning or semi-supervised learning).

[2] AI-generative adversarial networks, sometimes referred to as GANs, are an underlying technology that teaches itself using unsupervised learning to create progressively more believable content by taking two separate algorithms and training them against one another to improve their performance in tandem. The first algorithm, known as the generator, learns how to produce synthetic content from a set of training data, while the second algorithm, known as the discriminator, learns how to determine if a given piece of content produced by the generator is real or fake. Source: https://fsi-live.s3.us-west-1.amazonaws.com/s3fs-public/hai_deepfakes_policybrief_nov20.pdf Humans can no longer distinguish humans from deep fakes. https://www.pnas.org/doi/full/10.1073/pnas.2120481119

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