

As we collectively face the health, social, and economic impacts of climate change, the transformative power of AI does not lie in what it can do, but in *why* and *how* business leaders implement this powerful tool. We put forward strategic “do’s and don’ts” that guide businesses along an AI development pathway fit for the 21st century.

AI IS NOT READY FOR THE 21ST CENTURY: **WHAT CAN BUSINESS LEADERS DO?**

by Lysanne Rivard & Pascale Lehoux



A simple Google search of what AI can do will bring up no shortage of examples of how the cornerstone technology of the Fourth industrial revolution is transforming all sectors of the economy. From manufacturing, health, education, arts, government services, and financial institutions, we have come to expect that AI and machine learning algorithms will continue to play a key role in our everyday lives. Automation and personalization are the central pillars driving innovation in technology and business operations and both pillars rest squarely on the shoulders of algorithms.

Determined by our social values and business practices, the transformative power of AI indeed lies in the key problems it targets, the business practices that develop and exploit them, and the vast digital and physical infrastructures on which they rely, as digital literacy and Internet connectivity are now essential social skills and goods.

B Corporation³ that uses the income generated from its search ads to plant trees around the world. Data is not sold to advertisers, there are no third-party trackers, and rather than pledging for more sustainability, the company implements regenerative⁴ practices. For example, their solar panels produced twice the amount of clean electricity needed to power the searches made through their engines.

AI may be the cornerstone technology of the Fourth industrial revolution, but business leaders hold the key towards the social revolution needed to ensure that AI is fit

THE TECHNOLOGY OF THE FUTURE IS NOT READY FOR THE 21ST CENTURY

However, as we enter the age of climate change and start seeing its myriad impacts on our health¹, our societies, and our economies, the real revolution is not technological, it's social. Instead of *what* AI can do, it is the *why* and the *how* of AI that hold the true transformative power of this technology for the 21st century. Determined by our social values and business practices, the transformative power of AI indeed lies in the key problems it targets, the business practices that develop and exploit them, and the vast digital and physical infrastructures on which they rely, as digital literacy and Internet connectivity are now essential social skills and goods.

What does harnessing the *why* and the *how* of AI look like in practice? The Ecosia² search engine is a great example. Google and Ecosia are both search engines, but their business models and operations vastly differ. Ecosia is a Certified



for the 21st century. Toward this ambitious but necessary end, we put forward strategic “do’s and don’ts” to guide business leaders along a new innovation development pathway so that AI-based solutions can tackle, without further contributing to, the complex social, environmental, and economic challenges of our time⁵.

DO'S AND DON'TS FOR AN AI FIT FOR THE 21ST CENTURY

The following “do’s and don’ts” apply to the key development stages of an AI-based solution and are relevant across industries. They stem from our extensive research on Responsible Research and Innovation⁶ (RRI), Responsible Innovation in Health⁷ (RIH), and responsible digital and AI-based solutions, including a vast multidisciplinary review of practice-oriented tools for solution developers and entrepreneurs aiming to make responsible AI-based solutions. The “don’ts” capture some of the main pitfalls and misconceptions we’ve encountered that can inadvertently lead to ‘responsibility-washing’ an AI-based solution.

When identifying the targeted problem...

✓ Do target the specific needs of a vulnerable group that are not met by current solutions⁸. Ensure that the digital literacy skills and Internet

A critical, contextualized, and nuanced understanding of the root causes of the problem you aim to remedy, as well as its evolving social, political, economic, and environmental ramifications impacting your end-users, will help to avoid developing ‘band-aid’ solutions.

Toronto, Ontario, Canada Sept 27 2019 Climate strike march with thousands of young students protesting climate change.

connectivity required to use your AI-based solution align with those of your end-users by carefully examining whether socioeconomic status, social position, or individual capabilities (e.g., knowledge, perceived self-efficacy) impact the capacity to benefit from the innovation.

✗ Don’t equate social innovation with responsible innovation. Targeting an important social problem (e.g., United Nations’ Sustainable Development Goals) does not automatically make your solution responsible. Because “the overall responsibility of a given innovation is intimately linked to how and

where it is used,”⁹ carefully consider the context of use of your solution, especially if it was developed with a dataset from a different social, political, demographic, and/or economic context¹⁰.

When engaging with stakeholders...

✓ Do engage with a diverse and relevant set of stakeholders using a formal and accountable



FIGURE 1 12 do's and don'ts for an AI fit for the 21st century

Targeted problem	Stakeholder engagement	Organizational structure	Business model	Digital and physical infrastructure	
Do meet the needs of vulnerable groups as well as their digital skills and means	Do use a formal and accountable method to engage a diverse and relevant set of stakeholders	Do protect your mission through a stakeholder-centered legal structure	Do identify strategies to increase value for society	Do use frugal, low-tech, green, and regenerative design approaches	Do ensure your solution can withstand extreme climate events
Don't oversimplify a 'social' problem into a 'responsible' target	Don't 'participation wash' your pre-defined solution	Don't surrender to the exit-oriented start-up pathway	Don't design a data-centric business model	Don't assume high-tech is always best	Don't ignore the physicality of the digital

method throughout the design, development, and pilot stages of your solution. Also, ensure that stakeholders' ideas and feedback influence important development and implementation decisions in a meaningful manner. This can be achieved by employing transparent decision-making mechanisms that allow for deliberation and consensus building when conflicting perspectives or priorities arise.

✗ Don't 'participation wash' your solution. Though meaningfully engaging with key stakeholders throughout the design and implementation of an AI solution is necessary, it is not sufficient. A critical, contextualized, and nuanced understanding of the root causes of the problem you aim to remedy, as well as its evolving social, political, economic, and environmental ramifications impacting your end-users, will help to avoid developing 'band-aid' solutions.

When developing the structure of your enterprise...

✓ Do set up a stakeholder-centered corporate governance structure, such as the B Corp legal framework of Certified B Corporations. The latter "are legally required to consider the impact of their decisions on all of their stakeholders," that is "workers, communities, customers, suppliers, and the environment"¹¹. This governance structure "allows companies to

protect their mission and ensures that the company will continue to practice stakeholder governance even after capital raises and leadership changes."¹²

✗ Don't be pressured to follow the conventional start-up pathway where investors and shareholders seek rapid growth and a rapid exit. When seeking seed capital through social finance or impact investing, it is important to know the difference between 'impact first' investors and 'financial first' investors and how they come to define and measure a desirable social, environmental, or economic impact.

When developing your business model...

✓ Do implement a business model that provides more value to end users, stakeholders, and society. There are several ways to

achieve this. For instance, businesses can pursue a social or environmental mission, adopt a pricing scheme based on customers' ability to pay, employ individuals with particular needs (e.g., low literacy, disabilities), or comply with a social responsibility program (e.g., SA8000 standard for decent work, ISO 26000 for social responsibility)¹³.

✗ Don't implement a data-centric business model. In the digital industry, there is pressure to monetize data through data-centric business models (see the work of Shoshana Zuboff on surveillance capitalism¹⁴). Data are a means to an end and as such, it

Climate change requires that all settings rethink their access to and use of resources and circular economy principles¹⁸ are also applicable to the high-tech industry (e.g., modular design, repairability).



is important to know and understand data risks that extend beyond privacy and cybersecurity, including risks to equity and democracy, both in the short and long term.

When developing your AI-based solution...

✓ Do use the latest frugal, low-tech, green, and regenerative approaches to develop and use the digital and physical infrastructure required to run your AI-based solution. Because the digital industry is one of the most polluting and extractive industries in the world¹⁵, this represents a significant challenge for both start-ups and established enterprises. To become part of a digital ecosystem that is revolutionizing the industry, turn to inspiring businesses for practical examples on how to follow a different path. In addition to Ecosia mentioned above, notable examples include Fairphone – “the phone that cares for people and planet”¹⁶ and Framework – an “upgradable and repairable” laptop winner of the reddot Best Design Award and listed as a 2021 Best Invention by TIME Magazine¹⁷.

✗ Don’t fall for a techno-progressive discourse where complex problems automatically require high-tech solutions or that frugal solutions are only fit for

resource-poor settings. Climate change requires that all settings rethink their access to and use of resources and circular economy principles¹⁸ are also applicable to the high-tech industry (e.g., modular design, repairability).


✓ Do ensure that the digital and physical infrastructure on which your AI-based solution relies is climate change resilient and develop contingency plans in the case of extreme climate events.

✗ Don’t fall for a techno-utopian discourse where ‘data saves lives.’ Though advanced data capture and analytics are important allies to better understand and address complex problems, we cannot escape the physicality of the digital¹⁹. This is especially important for equity in the age of climate change as more vulnerable populations are always the hardest hit by and take longer to recover from climate events. For example, if your AI-based solution consists of home sensors and data analytics remotely monitoring the health of an elderly patient living independently, what is the contingency plan if the digital and physical infrastructure of your solution, i.e., the patient’s home, is struck by an extreme climate event (e.g., forest fire, landslide, flooding) and the electricity is cut off for an extended period of time?

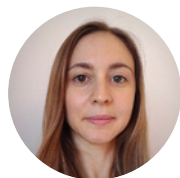


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READY TO TRANSFORM THE IMPACT OF AI?

As we enter the age of climate change, the transformative power of AI does not lie in *what* it can do, but in *why* and *how* leaders wield this technology. Businesses ready to transform the impact of AI can follow the strategic “do’s and don’ts” as they set an innovation pathway fit to tackle the defining challenges of our time. 

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REFERENCES

- ¹ Romanello, M., McGushin, A., Di Napoli, C., Drummond, P., Hughes, N., Jamart, L., ... & Hamilton, I. (2021). The 2021 report of the Lancet Countdown on health and climate change: code red for a healthy future. *The Lancet*, 398(10311), 1619-1662.
- ² <https://www.ecosia.org/>
- ³ <https://www.bcorporation.net/en-us>
- ⁴ <https://www.dropbox.com/s/3y1fk5pd2cuqt6a/Regeneration%20Report%202021.pdf?dl=0>
- ⁵ Lehoux, P., Rivard, L., & Silva, H. P. (2022). *Responsible Innovation in Health: Concepts and Tools for Sustainable Impact*. Palgrave Macmillan.
- ⁶ Stilgoe, J., Owen, R., & Macnaghten, P. (2013). Developing a framework for responsible innovation. *Research Policy*, 42(9), 1568-1580. <https://doi.org/10.1016/j.respol.2013.05.008>
- ⁷ Silva, H. P., Lehoux, P., Miller, F. A., & Denis, J.-L. (2018). Introducing responsible innovation in health: a policy-oriented framework. *Health Research Policy and Systems*, 16(1), 1-13.
- ⁸ Silva, H. P., Lefebvre, A.-A., Oliveira, R. R., & Lehoux, P. (2021). Fostering responsible innovation in health: an evidence informed assessment tool for innovation stakeholders. *International Journal of Health Policy and Management*, 10(4), 181.
- ⁹ *ibid.*
- ¹⁰ Alami, H., Rivard, L., Lehoux, P., Hoffman, S. J., Cadeddu, S. B. M., Savoldelli, M., Samri, M. A., Ahmed, M. A. A., Fleet, R., & Fortin, J.-P. (2020). Artificial intelligence in health care: laying the foundation for responsible, sustainable, and inclusive innovation in low-and middle-income countries. *Globalization and Health*, 16(1), 1-6.
- ¹¹ <https://www.bcorporation.net/en-us/about-b-corps/legal-requirements/>
- ¹² *ibid.*
- ¹³ Silva, H. P., Lefebvre, A.-A., Oliveira, R. R., & Lehoux, P. (2021). Fostering responsible innovation in health: an evidence informed assessment tool for innovation stakeholders. *International Journal of Health Policy and Management*, 10(4), 181.
- ¹⁴ Zuboff, S. (2019). *The age of surveillance: the fight for a human future at the new frontier of power*. *New York: Public Affairs*.
- ¹⁵ Crawford, K. (2021). *The atlas of AI: Power, politics, and the planetary costs of artificial intelligence*. Yale University Press.
- ¹⁶ <https://www.fairphone.com/en/>
- ¹⁷ <https://frame.work/>
- ¹⁸ Raworth, K. (2017). *Doughnut economics: seven ways to think like a 21st-century economist*. Chelsea Green Publishing.
- ¹⁹ <https://theconversation.com/hidden-in-plain-sight-the-infrastructures-that-support-artificial-intelligence-146087>