

## Call for Contributions

# **Artificial Intelligence for Sustainability:** Innovations in Business and Financial Services

An edited collection to be tentatively published by Palgrave Macmillan

**Co-edited by:**

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The Jacques Ménard - BMO Centre for Capital Markets at Concordia University and the Department of Finance at the Université du Québec à Montréal (UQAM) kindly invite you to contribute to the forthcoming edited book ***Artificial Intelligence for Sustainability – Innovations in Business and Financial Services*** to be tentatively published by **Palgrave-Macmillan**.

## **ABOUT THE BOOK**

In light of the ongoing climate crisis, businesses are expected to embrace sustainability to reduce their negative effects on the environment and society, while, at the same time, strengthening their organisations' positive impacts. This sustainability paradigm has pushed enterprises to investigate means to replace fossil fuels with cleaner energy sources, minimise their carbon footprint and waste, optimise their logistics, reduce the negative environmental and social externalities throughout their supply chains, and assess the impacts of their sourcing and procurement practices. Not sufficiently dealing with the environmental and social repercussions of climate change constitutes a substantial financial risk for corporations and investors. Similarly, public administrators and governmental organisations face increasing pressure to act more sustainably, either due to political pressure and demand from voters or due to acute societal crises.

New technologies and innovations have emerged to help meet the growing demand for sustainability. Researchers and global leaders have underscored artificial intelligence (AI) as a vital tool in this transition, assisting businesses in expanding their analytical capabilities in forecasting, measuring, and managing emerging risks. Similarly, governments increasingly use AI solutions in policymaking, engagement with citizens, and in improving the quality of their public services.

AI is best understood as using computer programming to automate tasks that have traditionally relied on human intelligence. A popular branch of AI is machine learning, which uses statistical techniques to allow machines to “learn” with experience by correcting previous errors at each iteration. More recently, deep learning, a sub-domain of machine learning, has proven effective in extracting patterns from big data. Deep learning uses neural networks inspired by the neurological basis of brain functioning to extract patterns from big data. Primary applications of deep learning include image and voice recognition as well as text summarisation and classification, amongst other functions.

In the business sector, AI has been successfully employed in many areas to improve the efficiency and profitability of operations, most notably through the automation of tasks that humans previously handled. AI is also used to enhance business profitability by more accurately forecasting sales, diagnosing when maintenance is needed for machinery, and managing inventory. A 2021 survey conducted by McKinsey

showed that 50% more businesses adopted AI in 2021 than in the previous year. Moreover, a recent study by Accenture shows that AI has the potential to raise profitability by 38% by 2035 across a sample of 12 economies and 16 industries, which translates to about 14 trillion dollars added for these economies.

While the opportunities for AI-related profit enhancements in the business sector are considered substantial, AI also has the potential to help mitigate climate change by enhancing the ability of businesses and the public sector to behave more sustainably. Using AI technologies can help reduce waste through more accurate demand prediction, improve the sustainability of manufacturing and operations through more precise monitoring, lower emissions across the supply chain by optimising routes and transportation options, heighten transparency about operations through improved monitoring, and increase adaptation capacity through forecasting and simulating future scenarios, among other areas.

*Artificial Intelligence for Sustainability – Applications, Innovations, and Policies for Business* is an edited collection that will explore different innovations that utilise AI developments to improve sustainability. The edited book will examine the potentially negative consequences associated with AI, including the need for regulatory oversight, the reduction of human consciousness in decision making, and the potentially negative externalities associated with AI. While the use of AI in the business and public sector has been the subject of many discussions, this book will take a more focused look at AI applications in a sustainability context to differentiate itself from current offerings and thereby close a significant gap in the literature.

## CALL FOR CONTRIBUTIONS

*Artificial Intelligence for Sustainability – Innovations in Business and Financial Services* aims to explore and present new developments and advancements made in artificial intelligence (AI) in the context of sustainability.

The editors are accepting contributions by experts in both the **academic** and **practitioner** communities in data science, artificial intelligence, sustainability sciences, supply chain management, public administration, business, and engineering. The editors invite contributions that:

- Review and critically analyse new developments at the intersection of artificial intelligence (AI) on the one hand and sustainable business practices and public administration on the other hand,
- Focus on the sustainability benefits and possible downsides of applying AI technologies to business, investment, and regulatory processes and activities,
- Explain and demonstrate the predictive capabilities of AI in a sustainability context, using different model types such as supervised, unsupervised, and semi-supervised learning, and/or
- Explore broader human, economic, and ethical dimensions related to these technologies such as environmental policy and urban design.

Moreover, chapters that use case studies or comparative studies (between different keys, applications in various industries, or variations between regions) are strongly encouraged. The submissions will be reviewed with an open mind and with a particular focus on the relevance of the chapter with respect to AI for sustainability.

## **POTENTIAL TOPICS FOR CHAPTERS**

### **1. DEMAND MANAGEMENT**

- Forecasting demand more efficiently to reduce product waste
  - Forecasting and AI
  - Real-time customer personalisation

### **2. MANUFACTURING AND OPERATIONS**

- Labour environment
  - Monitoring of environmental conditions (emissions, resource usage)
- Sustainable production
  - 3D printing using sustainable materials
- Robotics and AI in production
  - Productivity, environmental, and safety improvements
- Energy use
  - Energy production and distribution (e.g. smart sensors)
  - Energy planning and design
- Water use
  - Quality and chemistry
  - Leak detection
- Waste management
- Sustainable benchmarking
  - Developing benchmarks
  - Tracking processes to track performance against benchmark
- Sustainable buildings

### **3. TRANSPORTATION**

- Autonomous vehicles
- Drones
- Collaborative (shared) shipping
- Optimising the transport network to reduce emissions
- Traffic forecasting (smart transport)
- Real-time vehicle performance data to monitor the safety of transport

### **4. SOURCING AND FINANCING**

- Supply chain transparency
  - Tracking and quantifying the environmental, social, and economic performance of the supply chain
  - Smart contracts using blockchains

- Sustainable agriculture
  - Protecting/preserving soil, water, biodiversity, and surrounding or downstream resources using AI sensors and drones
    - Crop and soil monitoring
    - Intelligent spraying
    - Species conservation
  - Sustainable fishing
- AI-powered finance solutions
  - Prediction and forecasting applications
  - Financial management solutions

## 5. AI AND SUSTAINABLE CITIES

- Operating the built environment
- Design and construction
- Smart environment

## 6. ROLE OF AI IN SUSTAINABLE DEVELOPMENT AND THE 2030 AGENDA

- Impact tracking
- Monitoring, predicting, and forecasting progress towards the sustainable development goals (SDGs)
- Facilitation of sustainable development activities

## 7. SUSTAINABLE AI ETHICS

- Environmental impact of AI
  - Data storage
  - Carbon emissions and AI modelling
- AI and privacy

## IMPORTANT DATES

- Abstract and CV submission deadline – **September 15, 2022**
- Selection of abstracts and notification to successful contributors – **October 15, 2022**
- Full chapter submission – **January 31, 2023**
- Revised chapter submission – **March 31, 2023**

## GUIDELINES FOR CONTRIBUTORS

Submissions should be written in English using a non-technical writing style. The contributions may include diagrams/illustrations in order to present data, or photographs/figures (all in black & white) to better illustrate the topic of discussion. Submitted chapters should be original and exclusively prepared for the present book. No part of the article should be published elsewhere. Chapters must not exceed 7,000 words (including all references, appendices, biographies, etc.), must use 1.5-line spacing and 12 pt. Times New Roman font, and must use the APA 7th edition reference style.

**Researchers and practitioners are invited to submit abstracts of no more than 500 words, a bibliography for their proposed chapter, and a CV. Abstract submissions are expected by September 15, 2022. Submissions should be sent via email to [ai\\_sustainability@concordia.ca](mailto:ai_sustainability@concordia.ca).**

Authors will be notified about the status of their proposals and will be sent complete chapter guidelines. Full chapters are expected to be submitted by **January 31, 2023**.

**Please note** that there are no submission or acceptance fees for manuscripts.

## ABOUT THE EDITORS

### Thomas Walker<sup>1</sup>

Dr. Walker holds a BSc in Management Information Systems from the Technical University of Darmstadt, Germany, and an MBA and PhD degree in Finance from Washington State University. Prior to his academic career, he worked for several years in the German consulting and industrial sector at such firms as Mercedes Benz, Utility Consultants International, Lahmeyer International, Telenet, and KPMG Peat Marwick. His research interests are in emerging risk management, corporate finance, venture capital, sustainability & climate change, FinTech, corporate governance, securities regulation and litigation, insider trading, and institutional ownership, and he has published over 70 articles, book chapters, and edited books in these areas. He is the lead editor of seven books on sustainable financial systems, sustainable real estate, sustainable aviation, environmental policy, emerging risk management, innovations in social finance, and water risk management. Dr. Walker currently serves as the principal investigator on research grants by the Social Sciences and Humanities Research Council (SSHRC), the Autorité des marchés financiers, and the Global Risk Institute. In 2018, he founded the Emerging Risks Information Center (ERIC, <https://emerging-risks.com>) which conducts targeted research on environmental, technological, and societal risks that affect our world today. In 2021, he became the inaugural director for the Jacques Menard/BMO Center for Capital Markets Research at Concordia University and the Concordia University Research Chair in Emerging Risk Management (Tier I).

### Stefan Wendt<sup>2</sup>

Dr. Wendt is professor and dean in the Department of Business at Bifröst University in Iceland. Previously, he was an associate professor at Reykjavik University's Department of Business Administration in Iceland and research and teaching assistant at the Department of Finance at Bamberg University, Germany, where he received his doctoral degree in 2010. He has taught as a visiting lecturer at École Supérieure de Commerce Montpellier, France, and Baden-Württemberg Cooperative State University (DHBW), Mosbach, Germany. His fields of research include corporate finance and governance, sustainability and ESG, risk management, FinTech and digitalisation, financial markets and financial intermediation, small and medium-sized enterprises, and behavioural finance.

### Sherif Goubran<sup>3</sup>

Dr. Goubran is an assistant professor of sustainable design in the department of architecture, School of Sciences and Engineering, at the American University in Cairo (AUC). He completed his PhD at the Individualised Program (INDI) at Concordia University in 2021. Before that, he completed a MAsc in building engineering in 2016, focusing on energy efficiency in commercial buildings. He holds a BS in architecture at AUC. Goubran's research focus includes building sustainability and sustainability assessment, sustainability in architectural design and human approaches in design. Specifically, his work investigates the theory and practice of sustainability in the built environment, combines qualitative and quantitative methodologies, and explores the shift from incremental to transformational design.

### Tyler Schwartz<sup>4</sup>

Tyler Schwartz holds an MSc degree in Data Science and Business Analytics from HEC Montreal. He currently serves as a research assistant in the Department of Finance at Concordia University and is the co-author of an edited book collection on climate change adaptation, big data in finance (commissioned by Palgrave-Macmillan) and a working paper on social impact bonds (revise/resubmit at World Development). Tyler completed his undergraduate degree at the John Molson School of Business where he received an Honors in Finance. He was also presented with a Concordia University Student Research Assistant (CUSRA) scholarship in 2016, which is awarded to undergraduate students who have an interest in pursuing research activities. His research interests include predictive modelling, bio-statistics, sports analytics, sustainability FinTech, and machine learning.

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