



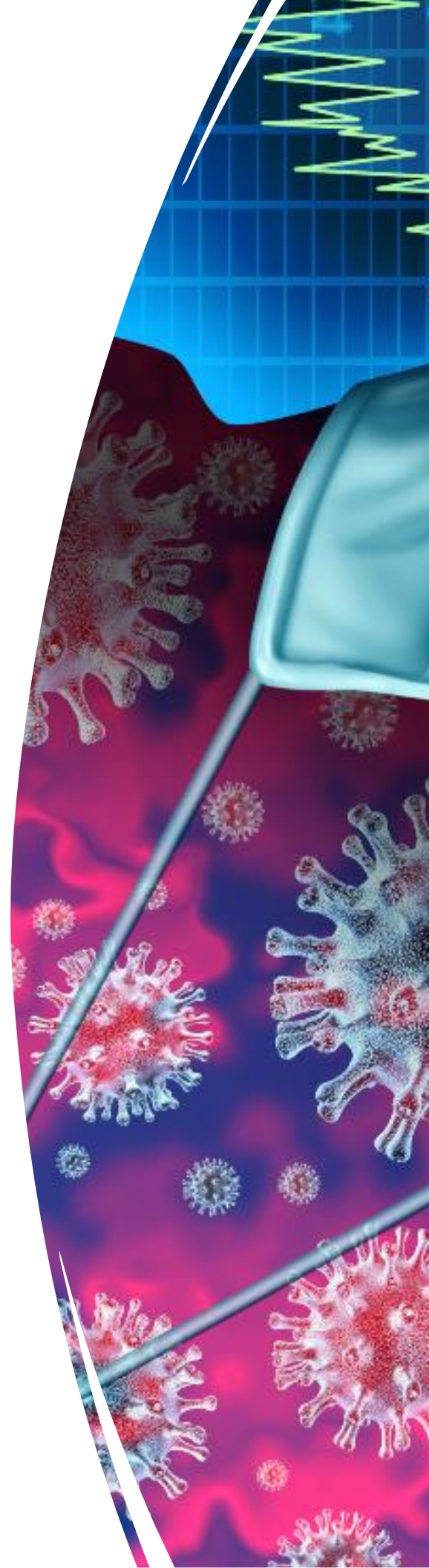
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ESG Tech: Attractions and Challenges for Fintechs in the Age of Covid-19

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ESG Tech: Attractions and Challenges for Fintechs in the Age of Covid-19*

Responsible Investment (RI) refers to the consideration of environmental, social and governance (ESG) factors in investment decisions.¹ While it has a long history dating back to at least the 19th century, RI has really taken off in the last decade in Canada and in the rest of the world.² RI is deployed using different strategies that can be used independently or in combination. Whatever approach is chosen, the availability of relevant and reliable information is crucial. However, RI faces a major challenge which flows from the diversity of transparency regimes and reference frameworks governing the disclosure of ESG information.³ Disclosure regimes regarding environmental information have been criticized, in particular with respect to data concerning climate change.⁴ The Covid-19

* The authors gratefully acknowledge the financial support of the Chaire Fintech AMF - Finance Montréal. The paper builds on research initiated in the IDEX project *Financial markets captured by artificial intelligence, a challenge for lawyers* of the UMD-DRES at the Université de Strasbourg.

¹ Céline Louche & Steven Lyndberg, “Responsible Investing”, in John H. Boatright, Ed., *Finance Ethics*, Honoken, John Wiley & Sons, 2010, p. 393, 394-399.

² OECD, *Investment Governance and the Integration of Environmental, Social and Governance Factors*, Paris, 2017.

³ Charlotte Villiers & Jukka Mähönen, “Accounting, Auditing, and Reporting : Supporting or Obstructing the Sustainable Companies Objective?”, in Beate Sjøfjell et Benjamin J. Richardson, Eds., *Company Law and Sustainability: Legal Barriers and Opportunities*, Cambridge, Cambridge University Press, 2015, p. 75.

⁴ Final Report of the Expert Panel on Sustainable Finance, *Mobilizing Finance for Sustainable Growth*, Ottawa, 2019.

crisis has spurred similar critiques for social information disclosure. Indeed, in the context of this health crisis, occupational health and safety and, more generally, the treatment of employees are becoming important issues that deserve to be better understood by investors because of the risks associated with them.⁵ Thus, while there is a consensus on the relevance of ESG information, the lack of terms of reference is problematic for investors and issuers.

Regulators are well aware of the importance of transparency issues regarding ESG factors. In the context of the Covid-19 crisis, the United States Securities and Exchange Commission (SEC) has urged listed companies to disclose forward-looking information despite the difficulties in order to help society as a whole adjust to the crisis.⁶ In Canada, the Canadian Securities Administrators (CSA) have encouraged reporting issuers to disclose relevant information during this turbulent period.⁷

In short, if there is a consensus on the relevance of information relating to ESG criteria, the absence of reference frameworks is problematic for both investors and companies. Specifically, for issuing companies, this results in compliance costs as they have to disclose information against various frames of reference. For investors, the costs of analysis are significant, exacerbated by the difficulties in comparing companies. In a recent report, the SEC Investor Advisory Committee summed up the problem well: “There is a lack of consistent, comparable, material information in the marketplace and everyone is frustrated — Issuers, investors, and regulators”.⁸

Against this backdrop, this paper explores the contribution that fintechs can make in supporting investors and asset managers with respect to their collection and use of ESG data. Before going further, it is worth clarifying the concept of fintech. Indeed, the word fintech is typically used in one of two ways. The most common use is to refer to new, emerging businesses that use innovative technology-based business models, mostly digital channels.⁹ The second use is to simply refer to the use of new technology to render

⁵ Leo Strine, “Toward Fair and Sustainable Capitalism”, Institute of Law and Economics, Research Paper 19-39, University of Pennsylvania, 2019.

⁶ Jay Clayton & William Hinman, The Importance of Disclosure – For Investors, Markets and Our Fight Against COVID-19, Securities and Exchange Commission, April 8, 2020 <<https://www.sec.gov/news/public-statement/statement-clayton-hinman>>.

⁷ Canadian Securities Administrators, *COVID-19: Continuous Disclosure Obligations and Considerations for Issuer*, May 29, 2020 <[https://www.securities-administrators.ca/uploadedFiles/General/pdfs/COVID-19 Continuous Disclosure Obligations and Considerations for Issuers.pdf](https://www.securities-administrators.ca/uploadedFiles/General/pdfs/COVID-19%20Continuous%20Disclosure%20Obligations%20and%20Considerations%20for%20Issuers.pdf)>.

⁸ Recommendation from the Investor-as-Owner Subcommittee of the SEC Investor Advisory Committee Relating to ESG Disclosure, May 14, 2020 <<https://www.sec.gov/spotlight/investor-advisory-committee-2012/recommendation-of-the-investor-as-owner-subcommittee-on-esg-disclosure.pdf>>.

⁹ Basel Committee on Banking Supervision. 2018. Sound Practices, Implications of Fintech Developments For Banks and Bank Supervisors, February 2018, p. 8 <<https://www.bis.org/bcbs/publ/d431.pdf>>.

financial or banking services.¹⁰ This can range from automating a decision like a portfolio recommendation to using a dialogue system (“chatbots”) for customers to book appointments with account managers. In this article, we use the term fintech in the former manner.

Of particular interest for our purpose are the opportunities that offer advances in artificial intelligence (AI) and machine learning (ML).¹¹ Indeed, as it has been amply chronicled, in the last decade,¹² AI definitely has taken off, namely supported by the accessibility and availability of big data, and improved level of computational power. Thus, it appears apposite to explore how fintechs may leverage AI and ML to develop ESG tech services that meet the needs of investors and asset managers regarding ESG information.

In addition to exploring opportunities, our paper discusses the issues raised by the involvement of fintechs with respect to ESG data. As ESG information providers, fintechs have the potential to influence asset allocation by investors and portfolio managers. This, in turn, affects issuing companies through the price mechanism as they are rewarded or punished for their ESG track record through the cost of capital. Ultimately, this can have concrete consequences for firms’ stakeholders. Hence the need to ensure the accountability of fintechs in this area, amongst others.

The paper proceeds as follows. Part 1 offers an overview of responsible investment in Canada. It presents the methods, strategies and tools related to RI. It also highlights the challenges the quality and objectivity of ESG information raise for RI. Part 2 discusses the attractions and challenges associated with the development of technology-based services meeting the ESG data needs of investors and asset managers. More specifically, it identifies the potential that fintechs can make in this respect. At the same time, it underscores the policy and legal issues that should be addressed in order for fintechs to deliver on their potential.

1. Environmental, Social and Governance (ESG) Factors and Responsible Investment: An Overview

1.1 Background on Responsible Investment

1.1.1 Responsible Investment in Canada

The Canadian market for RI has grown exponentially in recent years. Assets are increasingly being managed according to at least one responsible investment strategy: according to the Responsible Investment Association (RIA), at the end of 2019, the total

¹⁰ Ryan Clements, *Regulating Fintech In Canada And The United States: Comparison, Challenges And Opportunities*, Calgary, The School of Public Policy, University of Calgary, vol. 12(23), January 2019, p. 2.

¹¹ For a definition of artificial intelligence and machine learning, see infra notes 59-62 and accompanying text.

¹² See, e.g., A. Agrawal, J. Gans & A. Goldfarb, *Prediction Machines - The Simple Economics of Artificial Intelligence*, HBR Press, Boston, 2018

responsible investment assets under management (RI AUM) approached \$3,2 trillion, up from \$518,0 billion in 2010 and \$2,1 trillion in 2017, a compound annual growth rate of 23% in this two-year span.¹³ Comparatively, RIA's European equivalent, Eurosif, recorded a decrease in total RI AUM, from 11 trillion euros in 2016 to 9 trillion euros in 2018.¹⁴

The RIA lists seven investment strategies labelled as “responsible”, on par with Eurosif:

- **Impact investing**, which seeks positive, measurable social and/or environmental impact as well as financial returns;
- **Shareholder engagement**, that aims at influencing corporate policies by voting proxy and adopting shareholder resolutions that promote ESG values, and by engaging management about ESG issues;
- **Thematic ESG investing**, which targets certain ESG themes such as diversity in leadership positions or clean energy sources;
- **Positive screening**, also known as “best in class”, which allows investors to select companies that have the best ESG score in a certain industrial sector;
- **ESG integration**, through which asset managers explicitly incorporate ESG factors in their traditional financial analysis;
- **Negative screening**, which excludes select companies or sectors from the permissible investment category according to certain criteria (ex: weapons, pornography, tobacco, etc.);
- **Norms-based screening**, by which investors select the companies based on their compliance to certain international norms or standards.¹⁵

Of these strategies, ESG integration is the most widely used in Canada, with 95% of all RI AUM being managed accordingly. In Canada, ESG integration has registered an annual growth of 26% between 2017 and 2019.¹⁶ A similar interest was observed for this strategy in Europe, where Eurosif recorded an annual growth of 27% between 2016 and 2018, the highest annualized growth rate of any RI strategies in the European market, despite it accounting for less than half of the total RI AUM in Europe.¹⁷

¹³ Responsible Investment Association, "2020 Canadian Responsible Investment Trends Report" (November 2020), online (pdf) : *Responsible Investment Association* <<https://www.riacanada.ca/content/uploads/2021/01/2020-RI-Trends-Report-FINAL-Jan-21-UPDATED.pdf>> at p 4.

¹⁴ Eurosif, "European SRI Study 2018" (November 2018), online (pdf): *Eurosif* <<http://www.eurosif.org/wp-content/uploads/2018/11/European-SRI-2018-Study.pdf>> [Eurosif, "2018 Study"]; Eurosif, "European SRI Study 2016" (November 2016). online (pdf): *Eurosif* <<http://www.eurosif.org/wp-content/uploads/2016/11/SRI-study-2016-HR.pdf>> [Eurosif, "2016 Study"].

¹⁵ Responsible Investment Association, "2020 Canadian Responsible Investment Trends Report" (November 2020), online (pdf) : *Responsible Investment Association* <<https://www.riacanada.ca/content/uploads/2021/01/2020-RI-Trends-Report-FINAL-Jan-21-UPDATED.pdf>> at p 7.

¹⁶ *Ibid* at p 18.

¹⁷ Eurosif, "2018 Study" at p 74.

Most responsible investments in Canada are managed by pension funds, which account for \$1.6 trillion of the \$2.2 trillion RI AUM attributable to institutional investors. The balance is managed by a wide range of organizations, from insurance companies and mutual funds to faith-based organizations, foundations, and university endowments.¹⁸ In addition, the growth of ESG investing in Canada has been mirrored in the availability of responsible or ESG financial products at the consumer level. Assets in RI retail mutual funds have seen a 36% growth between 2018 and 2020, and assets in ESG or RI exchange-traded funds (ETFs) have more than doubled.¹⁹

Globally, the market for sustainable investment was expected to exceed \$30 trillion in total assets at the end of 2019, with the European Union and United States spearheading the movement.²⁰

1.1.2 Covid-19: Putting the Spotlight on the “S”

Traditionally, the “social” component of ESG investing has concerned the relationships between companies and their stakeholders - primarily their employees and consumers - and the management of their supply chain. In 2013, the United Nations Principles for Responsible Investment (a global network of investors – hereinafter “PRI”) listed six factors to consider when evaluating the “social” aspect of ESG corporate analysis:

- Consumer rights;
- Supply chain management;
- Health and safety;
- Product safety;
- Labor relations; and
- Community relations.²¹

Clark, Feiner and Viehs proposed a similar list in 2014, adding the controversial or uncontroversial nature of the business, the engagement with diversity and human rights issues and a commitment toward responsible marketing and R&D practices.²²

¹⁸ Responsible Investment Association, "2020 Canadian Responsible Investment Trends Report" (November 2020), online (pdf) : *Responsible Investment Association* <<https://www.riacanada.ca/content/uploads/2021/01/2020-RI-Trends-Report-FINAL-Jan-21-UPDATED.pdf>> at p. 26.

¹⁹ *Ibid* at pp 28-29.

²⁰ OECD, “OECD Business and Finance Outlook: Sustainable and Resilient Finance”, Paris, 2020, OECD Publishing, at p 20.

²¹ UN PRI, *Integrated Analysis: How Investors are Addressing Environmental, Social and Governance Factors in Fundamental Equity Valuation* (February 2013), online (pdf): *UN PRI* <<https://www.unpri.org/download?ac=312>> at p 44.

²² Gordon L Clark, Andreas Feiner & Michael Viehs, *From the Stockholder to the Stakeholder: How Sustainability Can Drive Corporate Performance* (2014) online (pdf): *Arabesque* <http://www.arabesque.com/docs/sray/From_the_stockholder_to_the_stakeholder.pdf>.

Despite these factors, the “social” component of ESG investment has been viewed as less clear and perhaps “softer” than its environmental and governance counterparts. As proposed by Wood in 2016, if environmental assessments are based on easily quantifiable data, and governance principles are based on industry standards widely regarded as desirable, “[t]he S invokes issues which are often hard to quantify, not so clearly linked to the risk-reward analysis in investment decision-making and may touch on culturally specific norms that do not so easily translate into guidance”.²³ This conclusion is reflected in the heterogeneity of corporate disclosure regarding social factors, characterized by the lack of verifiable and measurable data on human capital, despite a recent modification of SEC’s disclosure requirements.²⁴ For all these reasons, the “S” traditionally attracted less scholarly attention, and was less integrated into investors’ decision-making processes than its counterparts.²⁵

The COVID-19 pandemic and its aftermath might challenge this situation. First, health and safety issues, especially among essential workers, have made the headlines since the start of the pandemic. A major outbreak at the Cargill meat processing facility in High River, Alberta, counts amongst the most important and deadliest COVID-19 outbreaks to have taken place in Canada.²⁶ Amazon warehouse workers have died after contracting the virus in the workplace in May 2020, an event that did not prevent another Amazon warehouse in Brampton, Ontario, to be the site of a major outbreak in March 2021.²⁷

Investors have also been aware of the deficiencies underscored and magnified by the pandemic. Institutions representing over \$9.5 trillion in AUM issued a statement addressing the social issues raised by the pandemic regarding health and safety measures, paid leaves, and the preservation of customer-supplier and employer-

²³ David Wood, “What do we mean by the S in ESG: Society as a stakeholder in responsible investment” in Tessa Hebb et al, *The Routledge Handbook of Responsible Investment*, New York, Routledge, 2016, p 553, at p 555.

²⁴ Intelligize, “Human Capital Disclosure Report: Learning on the Job” (27 April 2021), online (pdf): *Intelligize* <<https://www.intelligize.com/intelligize-report-companies-avoid-revealing-human-capital-metrics/>>.

²⁵ Mark Fulton, Bruce M Kahn & Camilla Sharples, *Sustainable Investing: Establishing Long-Term Value and Performance* (June 2012) online (pdf): SSRN <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2222740>.

²⁶ Kathryn Blaze Baum, Carrie Trait & Tany Grant, “How Cargill became the site of Canada’s largest single outbreak of COVID-19”, *The Globe and Mail* (2 May 2020) online: *The Globe and Mail* <<https://www.theglobeandmail.com/business/article-how-cargill-became-the-site-of-canadas-largest-single-outbreak-of/>>.

²⁷ Denise Paglinawan, “Peel Region orders all workers at Amazon warehouse in Brampton to self-isolate”, *Canadian Press* (12 March 2021) online: *National Post* <<https://nationalpost.com/pmnn/news-pmnn/canada-news-pmnn/peel-region-orders-all-workers-at-amazon-warehouse-in-brampton-to-self-isolate>>.

employee relationships.²⁸ This statement was followed in February 2021 by a joint statement issued by 154 institutional investors totalling more than \$14 trillion in AUM calling for an “effective, fair and equitable global response to COVID-19”.²⁹ In the same vein, the PRI issued a bulletin listing immediate actions that could be taken by responsible investors in wake of the pandemic. Most notably, responsible investors were encouraged to engage companies that fail in their crisis management, including with regards to workers’ safety, and those that use “the cover of the crisis to avoid scrutiny” regarding, among other things, human rights issues down their supply chain.³⁰

In a policy paper from July 2020, the PRI acknowledged that the “S” does suffer from a lack of understanding comparatively to its “E” and “G” counterparts. However, it also wished that the pandemic propels a more serious and committed take regarding social issues in responsible investment, saying that “[t]he impact of the pandemic on the poorest people and on levels of inequality is prompting investors to focus more on social issues and human rights”.³¹

Finally, whereas the pandemic has brought many social issues into light, its aftermath will assuredly be characterized by the advent of alternative financing sources for socially purposed projects, not only because public finances in every major economy will emerge from the pandemic sorely weakened. For instance, in June 2020, the City of Toronto issued the first “social bond” in Canada’s public sector, an initiative that will most likely be followed by other government bodies throughout the country.³² One can also predict that more government bodies will turn to “Social Impact Bonds” (SIBs), by which governments transfer the financial risk of implementing certain social programs to investors, in exchange for higher returns, under a pay-for-outcome structure.³³ These developments

²⁸ Domini, “Investor Statement on Coronavirus Response” (27 March 2020) online (pdf): *Domini* <<https://www.domini.com/uploads/files/INVESTOR-STATEMENT-ON-CORONAVIRUS-RESPONSE-06.23.2020.pdf>>.

²⁹ Access to Medicine Foundation, News Release, “Global Investor Statement in Support of an Effective, Fair and Equitable Global Response to COVID-19” (23 February 2021) online (pdf): *Access to Medicine Foundation* <https://accesstomedicinefoundation.org/media/uploads/downloads/6040e4d2c9b04_AccessToMedicineFoundation_COVID19InvestorStatement_04MAR2021.pdf>.

³⁰ UN PRI, “PRI Bulletin: How Responsible Investors Should Respond to the COVID-19 Coronavirus Crisis” (27 March 2020) online (pdf): UN PRI <<https://www.unpri.org/download?ac=10266>>.

³¹ UN PRI, “Sustainable and Inclusive COVID-19 Recovery and Reform” (6 July 2020) online (pdf): UN PRI <<https://www.unpri.org/download?ac=10839>>.

³² City of Toronto, “City of Toronto issues inaugural social bond, a first in Canada’s public sector” (16 June 2020) online: City of Toronto <<https://www.toronto.ca/news/city-of-toronto-issues-inaugural-social-bond-a-first-in-canadas-public-sector/>>.

³³ Deloitte, “Paying for outcomes Solving complex societal issues through Social Impact Bonds” online (pdf): Deloitte <<https://www2.deloitte.com/content/dam/Deloitte/ca/Documents/insights-and-issues/ca-en-insights-issues-paying-for-outcomes.pdf> >; Jesse Hajer, “Social Impact Bonds: A Costly

will surely heighten the relative importance of social factors in the elaboration of ESG investing strategies.

1.1.3 ESG Investing and Financial Intermediation

The RI market's growth, both in Canada and abroad, have been stimulated by an expanding body of literature, which indicates that firms having operational-level sustainability objectives and processes outperform firms with no such commitment.³⁴ From this point of view, RI practices have the dual function of rewarding sustainable corporate practices and incentivizing firms to adopt them at the operational level. In this way, the market for RI "converts" investors' attention to ESG matters into measurable sustainable practices.

Financial intermediaries, and specifically information intermediaries, play a pivotal role in this conversion process.³⁵ It is generally accepted that richer and more pertinent information result in better ESG corporate practices,³⁶ but the RI market's quick expansion has resulted in a complexification of the information ecosystem. The intermediation chain is now composed of a plurality of actors, from fund and asset managers, to ESG indices setters and rating providers.³⁷

In its *Business and Finance Outlook for 2020*, the OECD has grouped the various actors of the ESG information market into four distinct categories. First, the **issuers**, which supply equity or debt, are the primary providers of ESG information to the market. This information is then processed by a variety of **information intermediaries**, whether ESG ratings setters or index providers. Once processed into a more palatable form, the ESG information is exploited by **information users** such as funds or asset managers, who incorporate it into their investment decisions.

Finally, **ESG framing bodies and standard setters** strongly influence the quantity and quality of ESG information outputted by issuers and information intermediaries, in turn affecting investors' decision-making processes. First, disclosure bodies and market regulators, including exchanges and self-regulating organizations, set disclosure standards and determine the appropriate level of ESG disclosure to be provided by issuers. Standard setters, for their part, adopt guidelines for sustainable conduct at the

Innovation" (19 January 2020) online (pdf): Canadian Centre for Policy Alternatives <https://www.policyalternatives.ca/sites/default/files/uploads/publications/Manitoba%20Office/2019/01/Social_Impact_Bonds_Costly_Innovation.pdf>.

³⁴ See e.g. Robert G Eccles, Ioannis Ioannou & George Serafeim, "The Impact of Corporate Sustainability on Organizational Processes and Performance" (2014) 60:11 *Management Science* 2381. DOI: <<https://doi.org/10.1287/mnsc.2014.1984>>.

³⁵ UN PRI at p 23.

³⁶ Robert G Eccles, Jock Herron & George Serafeim, "Reliable sustainability ratings: The influence of business models on information intermediaries" in Tessa Hebb *et al*, *The Routledge Handbook of Responsible Investment*, New York, Routledge, 2016, p 620, at p 623.

³⁷ UN PRI at p 27.

operational level. This complex ecosystem has just recently been engaged by financial regulators, specifically concerning ESG taxonomies, approaches, and marketing to investors.³⁸ For instance, the SEC announced in March 2021 the creation of an enforcement task force dedicated to climate and ESG issues, whose initial focus will be to “identify any material gaps or misstatements in issuers’ disclosure of climate risks under existing rules”, as well as to “analyze disclosure and compliance issues relating to investment advisers’ and funds’ ESG strategies”.³⁹

1.2 Methods and Tools to Conduct Responsible Investment

1.2.1 Approaches

As seen earlier, ESG integration is the most widely used RI strategy in Canada, accounting for 95% of all RI AUM. According to the CFA Institute, ESG integration refers to “the explicit and systematic inclusion of ESG factors in investment analysis and investment decisions”.⁴⁰ It is worth noting that if this strategy has been traditionally linked with fundamental analysis, the CFA Institute saw an increase in the use of ESG data in quantitative analysis: “quant managers who perform ESG integration have constructed models that integrate ESG factors alongside other factors, such as value, size, momentum, growth, and volatility”.⁴¹

The “integration” *per se* of ESG data in the investment strategy is done in three phases:

- The **research phase**, including both the collection of data from corporate disclosure and third-party researchers, and the materiality analysis;
- The **security and portfolio analysis**, where managers assess the impact of this collected data on the investment performance of the company or portfolio; and
- The **investment decision** itself to buy, hold or sell, flowing from the previously realized analysis.⁴²

³⁸ See e.g. Allison Bennington, “Recommendation from the Investor-as-Owner Subcommittee of the SEC Investor Advisory Committee Relating to ESG Disclosure” (28 May 2020), online (blog): *Harvard Law School Forum on Corporate Governance* <<https://corpgov.law.harvard.edu/2020/05/28/recommendation-from-the-investor-as-owner-subcommittee-of-the-sec-investor-advisory-committee-relating-to-esg-disclosure/>>; *Idem* at pp 23-24.

³⁹ US Securities and Exchange Commission, “SEC Announces Enforcement Task Force Focused on Climate and ESG Issues” (4 March 2021) online: SEC.gov <<https://www.sec.gov/news/press-release/2021-42>>.

⁴⁰ CFA Institute, “ESG Integration in Canada” (2020) online (pdf): CFA Institute <<https://www.cfainstitute.org/-/media/documents/article/position-paper/cfa-esg-integration-canada-web-3pp.ashx>>.

⁴¹ *Ibid* at p 19.

⁴² *Ibid* at p 12.

1.2.1.1 In-House Analysis

Institutional investors who are strongly committed to sustainable investing practices often set up a dedicated team of ESG analysts.⁴³ while still relying to some extent on external data.⁴⁴ ESG analysts will have a strong background regarding ESG issues and will often perform tasks related to the research phase, whether regarding the collection of ESG data or the analysis of its materiality.

When performed in-house, ESG analysis usually starts with an exclusionary screening, by which specific sectors, or companies that do not meet a particular threshold score, are excluded. Then, the ESG data garnered in the research phase will be integrated in the financial analysis, whether at the security level (ESG data will be factored in fair value analysis of as specific security) or at the portfolio level (the investor will set up a layer of ESG analysis through which ESG data will inform the general investment strategy).⁴⁵

1.2.1.2 External Service Providers

Even investors who are deeply committed to responsible investing need, at some point, to rely on external data or service providers. These information intermediaries research and aggregate ESG information (whether publicly available or not), then present it in a palatable way to investors, often in the form of metrics and indices. Well-known data or service providers are Bloomberg, MSCI, FTSE4Good, True Value Labs, Sustainalytics or Refinitiv.⁴⁶

1.2.2 Frameworks

The need to outsource some parts of the data gathering and analysis is fostered by the number and complexity of norms and standards, sometimes competing, used in the construction of ESG models:

- The **OECD Guidelines of Multinational Enterprises** are government-backed standards for responsible conduct
- The **International Labour Organization (ILO) conventions and recommendations**, outline principles regarding workers' rights.

⁴³ Danyelle Guyatt, "Stakeholder perspective – 'The need to collaborate to ensure supply meets demand'" in Tessa Hebb et al, *The Routledge Handbook of Responsible Investment*, New York, Routledge, 2016, p 520, at p 524.

⁴⁴ OECD, *supra* note 21 at p 106.

⁴⁵ See e.g. Axa Group, "Climate-related investment & insurance report" (April 2018) online (pdf): Axa Group <https://www-axa-com.cdn.axa-contento-118412.eu/www-axa-com%2Fcf61ff6c-ee1d-4dcb-92ba-ed243ae7f2fb_2018+tcfd+full+report+-+final+-+b.pdf#page=17&zoom=100,44,116>.

⁴⁶ World Economic Forum, "Seeking Return on ESG: Advancing the Reporting Ecosystem to Unlock Impact for Business and Society", Geneva, World Economic Forum, 2019, online (pdf): <http://www3.weforum.org/docs/WEF_ESG_Report_digital_pages.pdf> at p 10.

- The **United Nations Global Compact** is a voluntary pact by which signatory companies commit to ten principles regarding human rights, labor practices and the environment.
- The various **International Organization for Standardization (ISO)** standards are voluntary standards aimed at promoting the safety and quality of products and services.
- The **United Nations Principles for Responsible Investments** is a network of investors committed to sustainable investing. Being a signatory will influence the global attitude of an investor toward ESG issues, therefore impacting its investment decisions.⁴⁷

The compliance to any or all of these guidelines might be a criterion used by investors in selecting investee firms.

1.3 Some Challenges to ESG Investing: Quality and Objectivity of Information

1.3.1 Diversity of Reporting Frameworks

The diversity and complexity of standards and guidelines is mirrored at the corporate disclosure level, where issuers are faced with multiple reporting frameworks regarding ESG matters.

The Sustainability Accounting Standard Board (SASB) develops “industry specific disclosure standards across financially material environmental, social, and governance topics that facilitate communication between companies and investors about decision-useful information”⁴⁸. In parallel, the Global Reporting Initiative (GRI) published in 2016 “the first global standards for sustainability reporting”⁴⁹ whereas the Carbon Disclosure Project (CDP, which “runs the global environmental disclosure system”)⁵⁰ and the Climate Disclosure Standards Board (CDSB, which “[offers] companies a framework for reporting environmental information”)⁵¹ focus on environmentally-oriented disclosure.

Above and beyond these multiple standards are also frameworks focused on the best ways to develop disclosure and how to integrate these practices into a broader corporate strategy. An example would be the Task Force on Climate-Related Financial Disclosure (TCFD) whose aim is to “develop recommendations for more effective climate-related disclosures that could promote more informed investment, credit, and insurance underwriting decisions”.⁵² This diversity of standards and frameworks have been harshly

⁴⁷ OECD, *supra* note 21 at p 107.

⁴⁸ SASB, "About Us", online: SASB <<https://www.sasb.org/about/>>.

⁴⁹ GRI, "Our mission and history", online: GRI <<https://www.globalreporting.org/about-gri/mission-history/>>.

⁵⁰ CDP, "What we do", online: CDP <<https://www.cdp.net/en/info/about-us/what-we-do>>.

⁵¹ CDSB, "About CDSB", online: CDSB <<https://www.cdsb.net/our-story>>.

⁵² TCFD, "Our goal", online: <<https://www.fsb-tcf.org/about/>>.

criticized, notably by Davies, Dudek and Wyatt who called it an “alphabet soup of acronyms”.⁵³

Companies, which are the main producers of ESG data through corporate disclosure, struggle in navigating these various standards, and in determining the appropriate level of ESG reporting to include in their continuous disclosure documents.⁵⁴ At the investor-level, the incomparability of ESG data has been pinpointed as a main hindering factor to the leveraging of such data by end-users.⁵⁵ Amel-Zadeh and Serafeim also concluded in 2018 that “the greatest challenges investors face in integrating ESG information into their investment processes are the lack of cross-company comparability and the lack of standards governing the reporting of ESG information”.⁵⁶

1.3.2 Beyond Securities Disclosure

With time, the diversity and complexity of voluntary disclosure standards will probably be alleviated by financial regulators’ actions. The year 2020 has seen interventions from the World Economic Forum and the International Organization of Securities Commissions (IOSCO), that both issued reports calling for a convergence of reporting standards regarding ESG matters.⁵⁷ The IOSCO reiterated its call for “globally consistent, comparable, and reliable sustainability disclosure standards” in a February 2021 media release, indicating its commitment to tackle the issue.

While a certain standardization of ESG disclosure requirements might come sooner than later, an uncharted universe of data still lies beyond the scope of reporting standards. Indeed, to evaluate a company’s exposure to ESG risks, investors may require information that does not depend on companies’ disclosure. While already relying on publicly available, non-disclosure-related data (such as that compiled by the World Bank, Eurostat, etc.), institutional investors might need information that is not readily available, including with regards to inequality indicators, community impact or climate targets of companies.⁵⁸

⁵³ Paul A Davies, Paul M Dudek & Kristina S Wyatt, "Recent Developments in ESG Reporting" in Daniel C Etsy & Todd Cort, *Values at Work: Sustainable Investing and ESG Reporting*, Cham, Palgrave MacMillan, 2020, p 161 at p 161.

⁵⁴ World Economic Forum, *supra* note 47 at p 12; Intelligize, *supra* note 25.

⁵⁵ World Economic Forum, *ibid.* at p 6.

⁵⁶ Amir Amel-Zadeh & George Serafeim, “Why and How Investors Use ESG Information: Evidence from a Global Survey” 74:3 *Financial Analysts J* 87 at p 92.

⁵⁷ World Economic Forum, “Toward Common Metrics and Consistent Reporting of Sustainable Value Creation” (January 2020) online (pdf): <http://www3.weforum.org/docs/WEF_IBC_ESG_Metrics_Discussion_Paper.pdf>; IOSCO, *Sustainable Finance and the Role of Securities Regulators and IOSCO* (April 2020) online (pdf): <<https://www.iosco.org/library/pubdocs/pdf/IOSCOPD652.pdf>>.

⁵⁸ OECD, *supra* note 21 at pp 110-111.

This need for alternative sources of information exacerbates the appeal of external data providers, which may have the capacity and manpower to compile and process such a volume of data. However, these providers have also been criticized for the lack of transparency of their models and, in the case of ESG ratings, their divergence. As pointed out by the World Economic Forum, “If left unaddressed, low transparency and confusion reduces users’ trust in ESG information, and lessens faith in the ability of ESG ratings to support meaningful decision-making”.

2. Supporting ESG Investing with Artificial Intelligence: Attractions and Challenges

2.1 A Thumbnail Sketch of the Use of AI and ML in Portfolio Management

2.1.1 General Observations

The last couple of decades have brought about new technologies and new levels of computing power, which combined with an increase in data sources, allow for new use cases being identified and new applications being developed. This applies broadly across all sectors of activity including asset management. Artificial Intelligence (AI) and Machine Learning (ML) are the latest technology attracting attention in investment. AI and ML enable the natural evolution of new technology that leverage computing power and large data sets to identify patterns and outliers, to structure non-traditional data sources and to generate value through efficiently scaling and automating support and decision-making processes.

Today, AI and ML are being employed in the financial sector to improve customer experience, increase the efficiency and accuracy of operational workflows, and enhance performance supporting multiple aspects of the investment process.

In this section, we provide a brief survey of the uses of AI and ML in asset management in particular those that have an impact in ESG investment processes. Both of these terms are used frequently and very often interchangeably which is indicative of the existence of many different understandings of AI and ML. We therefore begin by defining these key terms which gives us a foundation to discuss further use cases of AI and ML in the asset management industry and more specifically in ESG investing.⁵⁹

2.1.1.1 Definitions

Artificial intelligence refers to an area of science that studies and attempts to reproduce the different mechanisms that make up human intelligence. This includes various fields

⁵⁹ See, in general, N.J. NILSSON, *The Quest for Artificial Intelligence: A History of Ideas and Achievements*, Cambridge, Cambridge University Press, 2010; OECD, *Artificial Intelligence in Society*, OECD Publishing, Paris, 2019, p. 19-35; U.S., NATIONAL SCIENCE AND TECHNOLOGY COUNCIL, COMMITTEE ON TECHNOLOGY, *Preparing for the Future Of Artificial Intelligence*, Washington , 2016; *One Hundred Year Study on Artificial Intelligence: Report of the 2015-2016 Study Panel*, Stanford University, 2016.

such as neuroscience, psychology, behavioral sciences, biology, anthropology, mathematics, statistics, engineering and computer science. It also encompasses the applied branches of those domains which attempt to replicate human cognition as it manifests by performing certain tasks and decision-making processes at performance levels only accessible to human beings. These efforts are a concerted combination of computer science and statistical methods that harness massive data sets and exponentially growing computing power.

Machine learning is a field of computer science that focuses on the problem of designing algorithms and methods that effectively compress knowledge in a computer system so that it can perform complex tasks through a similar process. to "learning" as opposed to hard static programming. These methods are based on substantial amounts of data from which the system obtains information relevant to the task at hand. Different types of "learning" have been developed for different tasks and analogies can be drawn from the human cognitive process as some methods can be described as reproducing reasoning and learning from experience.

From these definitions we see that ML is a body of knowledge that enables computers to process data in order to perform certain cognitive tasks. ML is then a set of tools and methods by which a computer can "learn" to perform a variety of tasks ranging from the simple to the complex related to human cognition. In this regard, ML is not a subset of AI but rather a computational approach that investigates the question of how to encode knowledge and experience into a computer system through a process analogous to learning. It is then an AI catalyst more than a subfield.

In order to generate value through these technologies, such models must be incorporated into a system or work process that connects data with a decision or an action within a business context and objective. Hence the notion of an AI System.⁶⁰

An *AI system* is a process of value creation (economic and / or social value, improvement of processes, automation of tasks, etc.) which interacts with the context or environment (data and / or human expertise), which represent this information through models / methods / approaches to then generate predictions and / or decisions which, when placed in context, serve to increase the efficiency / capabilities of the users of the system.

The use of technologies commonly categorized under the IA label is used in various ways by financial sector actors in their digital *transformation* initiatives. However, we can generally recognize two types of applications: statistical AI and symbolic AI.⁶¹

Statistical AI [refers to](#) applications that create value or more efficient processes from data, thanks to information representation and predictive algorithms that improve the modeling and prediction capabilities of quantitative teams. These applications automate and / or optimize existing investment decision-making processes.

⁶⁰ OECD, *Recommendation of the Council on Artificial Intelligence*, Paris, May 21, 2019.

⁶¹ OECD, *Artificial Intelligence in Society*, OECD Publishing, Paris, 2019, p. 27, 28.

Symbolic AI designates applications that create value from the representation of knowledge and human expertise; this acquisition process leverages unstructured information, which is then transformed into structured and predictive data to increase the opportunities to create value from the data. These applications create new opportunities for the automation and / or optimization of decision-making processes in places not yet explored by statistical AI.

In a world where asset owners align their principles to achieve sustainability goals, market intermediaries and asset managers are under pressure to leverage AI and ML technologies to capture these components and subjective underlying ESG footprints in their investments. These efforts fall under the second category of AI and ML applications that deal with data structuring, information retrieval, Natural Language Processing and Natural Language Understanding (NLP and NLU respectively), knowledge-based structures and language models and ontologies.

These applications of AI technologies have the potential to change the way ESG investment is approached. In particular, the fintech ecosystem is quickly moving to occupy this space and explore the use of these technologies to provide innovative solutions to support ESG investing.

2.1.1.2 ESG Information, AI and ML: Potential for Fintechs

What is the potential for fintechs in meeting the demand regarding ESG information for portfolio managers? To sketch an answer to this vast question, we rely on the basic framework used by the Financial Stability Board in its report *Artificial intelligence and machine learning in financial services*.⁶² In a nutshell, the framework addresses the question by looking at the developments from the supply and demand perspectives.

From the supply perspective, fintechs benefit from advances in computer processing, the diffusion of AI and ML tools, access to faster and cheaper hardware, and availability of powerful cloud-based computing systems. In addition, fintechs' development is supported by the rapid growth of datasets for learning and prediction combined with the declining cost of data storage.

In this setting, AI and ML technologies play a key role for fintechs. Using large datasets, fintechs can feed algorithms to structure information as well as “learning”, i.e. infer a rule or procedure that explains the data, which can serve to make predictions. Well-known general applications of ML include facial, voice and object recognition. In the financial sector, ML can serve to identify patterns in satellite images, energy consumption data, emissions levels, social media chatters, stock prices, etc., that are relevant for market participants. Combined with natural language processing (NLP) technology, AI and ML can also assist in the extraction and understanding of qualitative information present in

⁶² Financial Stability Board, *Artificial intelligence and machine learning in financial services*, 2017, at p. 7-10.

ESG disclosures as well as identification of investor sentiment with social media data analysis.⁶³

In any use case in ESG investing, there are broadly three main elements of the work process where AI technologies can be leveraged.

- a. Data collection. Whether it is about extracting information from ESG corporate disclosures or structuring alternative sources of data like carbon emission readings or satellite imagery, AI technologies can be used to construct rich structured databases. In particular, extracting information from text requires document intelligence algorithms and Optical Character Recognition (OCR) capabilities. Analyzing satellite imagery or other complex alternative data requires computer vision or knowledge representation algorithms.
- b. Information extraction. Once rich data sets are available, then another pain point is the extraction of actionable information. For example, in the case of disclosures, this implies developing models that can understand content at the qualitative level so that it can assist or automate the ESG analysis process. Techniques like summarization, sentiment analysis, topic modelling, transfer learning and sentence similarity metrics can be used to enable unsupervised and supervised analysis of ESG content.
- c. Metrics and Reporting. A third pain point has to do with actioning of the information obtained in the previous step. According to the business context, specific metrics can be designed to quantify the content or relevance of that information. This enables quantitative integration of ESG information in the investment processes. At the same time, producing reports that align with standards can also be automatized via AI technologies like text generation and summarization.

Relatedly, regulation, in particular at the European level, is driving the disclosure of ESG data. Thus, regulation is creating new opportunities for fintechs with respect to both the collection and verification of ESG data: “ESG data based on AI will become extremely popular as they are the only ones able to properly monitor the materiality of companies”.⁶⁴

From the demand perspective, there are incentives for institutions and investors to use AI and ML tools, either developed in-house or provided by fintechs. The FSB identifies three primary factors driving the demand. Firstly, there are opportunities for cost reduction, risk management gains, and productivity improvements. Secondly, competition creates an incentive for market participants to keep up with their rival by investing in such tools.

⁶³ IOSCO, IOSCO Research Report on Financial Technologies (Fintech), February 2017, p. 28.

⁶⁴ R. O’Leary & M. Hauman, “Regulatory implications of ESG Investment”, (2020) 51 J. Fin. Transformation 163, 166.

Thirdly, there is a need to improve the efficiency of regulatory compliance, which could be met by regtech.⁶⁵

According to the IOSCO, “[m]arket intermediaries and asset managers’ use of AI and ML is growing, as their understanding of the technology and its utility evolves”.⁶⁶ Still, it remarks that the use of AI and ML by asset managers remain in its nascent stages, serving primarily to support human decision-making. Specifically, portfolio managers have recourse to IA and ML to optimise portfolio management, suggest investment recommendations, and improve internal research capabilities.⁶⁷

A particular area of interest for portfolio managers concerns the role that AI and ML can play in generating superior returns to clients. Alpha generation involves processing, analysing and studying data that are relevant to firms’ future performance. Thus, there is a demand for AI and ML tools to conduct data analytics from traditional and alternative sources. This demand grows with the volume of relevant real-time data: “AI and ML enable asset managers to find patterns in this data at scale, potentially identifying signals for generating returns for clients.”⁶⁸

With respect to ESG data, the enhanced disclosure obligations in Europe is likely to contribute in stimulating demand for AI and ML analytics: “it will be vastly more effective from a cost-benefit perspective, as well as an efficiency perspective, to employ the power of AI and machine learning tools to pull this data, analyze it, and deliver it to the company’s designated ESG officer or analysts to provide a final, human quality control.”⁶⁹ While there is no specific mandatory obligation of ESG information in Canada, the European initiatives nevertheless have an influence on the expectations of investors who are increasingly demanding more extensive disclosure of ESG data.⁷⁰

⁶⁵ D.W. Arner et al., “FinTech, RegTech, and the Reconceptualization of Financial Regulation”, (2017) 37 Nw. J. Int’l L. & Bus. 371.

⁶⁶ IOSCO, The use of artificial intelligence and machine learning by market intermediaries and asset managers, Consultation Report, July 2020, p. 7.

⁶⁷ *Ibid.*

⁶⁸ B. Novick et al., Artificial intelligence and machine learning in asset management, BlackRock, Public Policy, October 2019, p. 6.

⁶⁹ R. O’Leary & M. Hauman, “Regulatory implications of ESG Investment”, (2020) 51 J. Fin. Transformation 163, 166.

⁷⁰ S. Erlichman, “Demand for Better ESG Oversight and Disclosure in Canada”, Harvard Law School Forum on Corporate Governance, December 16, 2020.

2.1.2 Opportunities

Factors from the supply and demand sides suggest that there are opportunities for fintechs in the ESG data market. Although fintechs are still at a nascent stage in this area, we can identify two areas of development in light of the information intermediaries' landscape.

The first area consists of ESG ratings. Firms in this segment provide ESG scores using metrics that harness existing international frameworks, such as the U.N. Global Compact, or rely on proprietary models. Leaders in this field already use AI, ML and natural language processing to comb through structured and unstructured data in order to come up with their assessment of firms.⁷¹ The segment for ESG scoring is already crowded with dominant players such as MSCI ESG Ratings, Vireo Eris (Moody's) and Sustainalytics (S&P) enjoying a first-mover advantage buttressed by the reputational capital and financial capabilities of the organisations to which they are related.

This does not mean that there are no opportunities in this segment. A number of commentators have criticized the scores attributed by mainstream ESG rating organizations. From an academic perspective, Professor Ingo Walter aptly emphasized the daunting task of creating reliable metrics for scoring with respect to environmental, social and governance targets.⁷² From an anecdotal perspective, in 2018, Exxon was ranked by Sustainalytics ahead of Tesla, Berkshire Hathaway, Alphabet and General Motors: "Sustainalytics ranks Exxon top of the five companies overall, because it puts a 40% weight on social issues, where Exxon does well thanks to strong policies for its workers, supply chain and local communities".⁷³ What this suggests is that there is room for fintechs information providers that could provide bespoke services to investors and portfolio managers on the ESG subscores, rather than attempt to develop a general scoring of firms using broad – and crude – frameworks.

A second area related to the previous concentrates on the production of raw ESG data. In the financial sector, large data sets on financial variables, such as transactions, stock price movements and default rates have been around for decades.⁷⁴ However, "[t]he availability of comparable ESG raw data remains the main hurdle for investors, well ahead of the costs and limited advanced analytical capabilities."⁷⁵ Thus, rather than compete with

⁷¹ R. O'Leary & M. Hauman, "Regulatory implications of ESG Investment", (2020) 51 J. Fin. Transformation 163, 166-167.

⁷² I. Walter, "Sense and Nonsense in ESG Ratings", (2020) J. Fin. & Acct. (forthcoming). See also F. Berg et al., *Rewriting History II: The (Un)Predictable Past of ESG Ratings*, Finance Working Paper N° 708/2020, ECGI, January 2021.

⁷³ J. Mackintosh, "Is Tesla or Exxon More Sustainable? It Depends Whom You Ask", WSJ, September 17, 2018. See also B. Nauman, "Heavy flows into ESG funds raise questions over ratings", FT, March 3, 2020.

⁷⁴ J. Hull, "Machine learning and its impact on financial institutions", (2019) 12 *Journal of Risk Management in Financial Institutions* 204.

⁷⁵ M. Macpherson et al., *Artificial Intelligence and FinTech Technologies for ESG Data and Analysis*, Network for Sustainable Financial Markets, February 5, 2021, p. 2 < https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3790774 }.

incumbent on ESG scoring, fintechs could rather develop rich data sets on specific social issues (employee safety, forced labor, diversity and inclusion, etc.) that would be useful for asset owners, portfolio managers and institutional investors in making capital allocation decisions.⁷⁶ Indeed, “pragmatism dictates that using multiple sources of ESG information can assist investors in avoiding unexpected risks especially in portfolio construction”.⁷⁷ For instance, in a recent paper Berg et al. studied the implications of the rewriting of the ESG scores produced by Refinitiv, an influential rating provider.⁷⁸ They found that the revision had a significant impact on ESG scores and outcome variables. This suggests that portfolio managers and investors should not rely on a single ESG data provider, a conclusion that is particularly worth pondering as regulators are increasingly voicing their concerns with regard to investment funds (incorrectly) labelling themselves as ESG investors.⁷⁹

2.2 Potential Contribution of Fintechs

2.2.1 Improve Informational Efficiency

According to the efficient capital market hypothesis (EMH), all available information is used to assess the expected returns on the securities and thereby set prices.⁸⁰ Empirical studies indicate that securities markets generally reach the semi-strong form of informational efficiency, that is securities prices fully reflect all available public information, whether "good" or "bad" news.⁸¹ In addition, the disclosure of new information has an immediate effect on the price insofar as it is relevant for its evaluation that is to say in the assessment of risk and return.

⁷⁶ See, e.g., J. Jones, Investors want to know how companies handle ESG issues - and they have a list, *The Globe and Mail*, March 11, 2021; C. Bartram et al., *Investor Due Diligence On Modern Slavery*, ISS ESG, April 9, 2021.

⁷⁷ M. Macpherson et al., Artificial Intelligence and FinTech Technologies for ESG Data and Analysis, Network for Sustainable Financial Markets, February 5, 2021, p. 5 < https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3790774 }.

⁷⁸ F. Berg et al., Rewriting History II: The (Un)Predictable Past of ESG Ratings, Finance Working Paper N° 708/2020, ECGI, January 2021.

⁷⁹ D. Michaels, SEC to Hunt for Climate-Friendly Marketing That Misleads Investors, *WSJ*, March 4, 2021; J. Eaglesham & A. Hirtenstein ESG Disclosure Rules From Europe Challenge U.S. Fund Managers, *WSJ*, March 22 2021.

⁸⁰ Eugene Fama, “Efficient Capital Markets: A Review of Theory and Empirical Works”, (1970) 25 *J. Fin.* 383.

⁸¹ Sheryl Kennedy, “Canada’s Capital Markets: How Do They Measure Up?”, *Bank of Canada Review*, Summer 2004, 33.

In their seminal paper, Gilson and Kraakman explain that the initial distribution of information significantly influences the level of market efficiency.⁸² They propose a framework where the cost of information is the central factor determining the extent of its distribution. In other words, the informational efficiency of the market depends on the cost of information for investors. Specifically, Gilson and Kraakman distinguish three categories of information cost: i) acquisition cost; ii) processing cost; iii) verification cost. A look at financial markets indicates that various mechanisms and techniques have emerged over time to reduce information costs and improve informational efficiency.

From this perspective, fintechs can improve informational efficiency with respect to ESG data by reducing information costs and thereby enhancing dissemination.⁸³ For instance, applications can allow market participants to have access, collect and analyse information on a greater scale.⁸⁴ These applications can provide investors with access to alternative sources of information that complement the information disclosed voluntarily or mandatorily by issuers.⁸⁵ Investors may also benefit from such applications to comb through issuers' public disclosures and pronouncements to extract qualitative information thereof.⁸⁶ A notable *caveat* to point out here is that EMH does not discriminate between accurate and inaccurate information. Stated differently, publicly disseminated inaccurate data can find its way in stock prices, to the extent that they are material to investors. Thus, it will be important for fintech to embed safeguards to protect against dissemination of inaccurate data.

Relatedly, considering this caveat, fintechs could develop tools that allow investors to assess the credibility of qualitative information, which is notoriously harder to verify,⁸⁷ by confronting it with non-issuer data. In turn, enhancing ESG information verification could improve that quality of issuer-based disclosure: "Exposing what companies are truly doing, not just what they are reporting creates incentives for corporations to quantify and increase

⁸² Ronald J. Gilson & Reinier Kraakman, « The Mechanisms of Market Efficiency », (1984) 70 Va. L. Rev. 549.

⁸³ M. Gao & J. Huang, "Informing the Market: The Effect of Modern Information Technologies on Information Production", (2020) 33 *Review of Financial Studies* 1367.

⁸⁴ Financial Stability Board, *Artificial intelligence and machine learning in financial services: Market developments and financial stability implications*, November 2017, p. 24-25.

⁸⁵ Madelyn Antoncic, "Uncovering hidden signals for sustainable investing using Big Data", (2020) 13 *Journal of Risk Management in Financial Institutions* 106, 109.

⁸⁶ T. Loughran & B. McDonald, "Textual analysis in accounting and finance: A survey", (2016) *Journal of Accounting Research* 1187.

⁸⁷ Denis Cormier et al., "Attributes of Social and Human Capital Disclosure and Information Asymmetry between Managers and Investors", (2009) 26 *Can. J. Adm. Sci.* 71.

their net SDGs [sustainable development goals] contributions and SDG ratings in order to become more attractive for investors”.⁸⁸

The potential contribution of AI and ML to informational efficiency described above remains exploratory and is ultimately an empirical question. So far, there has not been enough initiatives to conduct meaningful case studies. In this respect, the study by Gao and Huang, which focuses on the effect of information technologies on information production, is notable.⁸⁹ In their paper, they analyzed the impact of the staggered implementation of the EDGAR system in the 1990s in the United States. The advent of EDGAR was a watershed moment as it allowed securities disclosure to enter the digital age. Gao and Huang found that such “modern information dissemination technology” did not have a crowding-out effect on information production by outsiders such as investors and analysts. That is, it did not negatively affect their incentives to produce information. Rather, they found that technology led to a crowding-in effect. With the cost of accessing information being reduced, outsiders had greater incentives to produce information. In sum, the empirical evidence marshalled in this study suggests that advances in technologies that enhance information dissemination can indeed have a positive effect on the informational efficiency of securities prices.

2.2.2 Enhance Risk Management

Firms and investors are effectively risk averse where they face financial constraints.⁹⁰ For this reason, they engage in risk management. Still, financial constraints impede their ability to hedge.⁹¹ For this reason, the net worth level is a determinant of risk management.

In its report on the use of AI in the financial sector, the IOSCO explains that risk management involves “using data to price and manage exposure, including credit, market, operational and liquidity risk”.⁹² Specifically, the IOSCO notes that ML based risk management systems are already being harnessed “for credit risk monitoring which could help provide an early-warning indicator of potential customer defaults and can help create a dynamic measurement of a customer’s risk profile to better understand when to write off a debt.”⁹³

⁸⁸ M. Antoncic, “Uncovering hidden signals for sustainable investing using Big Data”, (2020) 13 *Journal of Risk Management in Financial Institutions* 106, 109.

⁸⁹ M. Gao & J. Huang, “Informing the Market: The Effect of Modern Information Technologies on Information Production”, (2020) 33 *Review of Financial Studies* 1367.

⁹⁰ K.A. Froot et al., “Risk Management: Coordinating Corporate Investment and Financing Policies”, (1993) 48 *J. Fin.* 1629.

⁹¹ A. Rampini et al., Risk Management in Financial Institution, (2020) 75 *J. Fin.* 591.

⁹² IOSCO, *The use of artificial intelligence and machine learning by market intermediaries and asset managers* - Consultation Report, June 2020, at p. 8.

⁹³ Ibid.

Investment models increasingly consider nonfinancial risks.⁹⁴ Indeed, ESG factors constitute key signals of risk and return for both financial and non-financial firms.⁹⁵ Thus, investors are increasingly seeking ESG data to incorporate in their models. Yet, as mentioned, there remains a dearth of high quality data that investors can confidently use to assess nonfinancial risks and opportunities.⁹⁶

In this context, a contribution of fintechs would be to use IA to assist investors in the integration of nonfinancial risks in their capital allocation decisions.⁹⁷ Fintechs could thereby support investors by replacing “dated” sustainability and materiality analyses with ‘alternative data’ using AI, machine learning and natural language processing (NLP) to cull through tens of thousands of news items, social media and reports in dozens of languages, providing up-to-date information going beyond what is present in unaudited, self-reported annual firm reports or firms’ marketing efforts.”⁹⁸

2.3 Fostering the Development of Fintech : Issues and Risks

2.2.1 Policy Issues

2.2.1.2 *Opacity of AI-based recommendations*

A well-known issue associated with AI, and namely deep learning, is the limited explainability of the inner workings of the “black-box”.⁹⁹ In the words of Gensler and Bailey, explainability refers to “the notion that decisions and outcomes of a model can be explained to customers, management, and regulators”.¹⁰⁰ The extent to which this actually becomes an issue is highly context-specific - meaning that the depth of what needs to be “explainable” depends on many factors, such as the impact and materiality of the AI-based decision, applicable legal and regulatory requirements, potential oversight, etc. Opacity may be caused by the volume of factors considered, the multitude of intermediary steps

⁹⁴ J. Dye, M. McKinnon & C. Van der Byl “Green Gaps: Firm ESG Disclosure and Financial Institutions’ Reporting Requirements”, (2021) 3 *J Sustain Res* 1.

⁹⁵ M. Antoncic, Why sustainability? Because risk evolves and risk management should too, (2019) 12 *Journal of Risk Management in Financial Institutions* 206, 207.

⁹⁶ M. Antoncic, “Uncovering hidden signals for sustainable investing using Big Data”, (2020) 13 *Journal of Risk Management in Financial Institutions* 106, 107.

⁹⁷ Financial Stability Board, *Artificial intelligence and machine learning in financial services: Market developments and financial stability implications*, November 2017, p. 16, 17.

⁹⁸ M. Antoncic, “Uncovering hidden signals for sustainable investing using Big Data”, (2020) 13 *Journal of Risk Management in Financial Institutions* 106, 109.

⁹⁹ T. Wischmeyer, “Artificial Intelligence and Transparency: Opening the Black Box”, in T. Wischmeyer & T. Rademacher, Eds., *Regulating Artificial Intelligence*, Cham, Springer, 2020 at p. 75.

¹⁰⁰ G. Gensler & L. Bailey, *Deep Learning and Financial Stability*, Working Paper, November 1, 2020 at p. 13 < https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3723132>.

followed to arrive at the decision, the autonomy of the system, and the disconnect from human logic.¹⁰¹ It may also depend on the level of sophistication of the type of AI used. Deep learning, for example, is typically more opaque. In any case, because of these factors, an inherent feature of some forms of AI is that a precise explanation of how an output occurred might not be possible (“local explanation”), although this type of explanation is not often needed. Rather, an explanation regarding the variable used, the model strategy and methodology, and the overall process and underlying policies may give stakeholders (such as clients, regulators, oversight bodies, external auditors for example) the information they require.

The potential opacity of AI-based recommendations raises salient policy issues that are common in all areas where AI is used. In the financial sector, the opacity of AI is cited as a growing concern by financial institutions and regulators.¹⁰² From our perspective, we can identify two policy challenges associated with the potential opacity of AI-based recommendations of AI systems.

The first challenge relates to financial stability. In a paper published in 2017, the FSB reviewed the financial stability issues raised by the use of AI systems across the financial sector.¹⁰³ While it identified a number of benefits associated with AI for market participants, the FSB noted “network effects and scalability of new technologies may in the future give rise to additional third-party dependencies” which “could in turn lead to the emergence of new systemically important players.”¹⁰⁴ Of particular interest for our purpose are the challenges regarding the potential lack of interpretability or “auditability” of some types of AI, or the perception thereof. To this regard, the FSB is concerned with the consequences deriving from the use of opaque models by market participants: “if multiple firms develop trading strategies using AI and machine learning models but do not understand the models because of their complexity, it would be very difficult for both firms and supervisors to predict how actions directed by models will affect markets”.¹⁰⁵ In addition, the destabilising effect could be reinforced by a herding phenomenon, should a critical mass of market participants use similar or identical AI systems.¹⁰⁶ However, we are of the view that there are ways to satisfactorily use AI, at least the less opaque types, and have the information required for interpretation and audits readily available. A key component, raised by the FSB, is that AI enablers understand their own AI models. This means that they must have governance checks and balances throughout AI model

¹⁰¹ World Economic Forum, *Navigating Uncharted Waters – A Roadmap to Responsible Financial Innovation with AI in Financial Services*, 2020, p. 34.

¹⁰² *Ibid.*

¹⁰³ Financial Stability Board, *Artificial intelligence and machine learning in financial services*, 2017.

¹⁰⁴ *Ibid.*, at p. 33.

¹⁰⁵ *Ibid.*, at p. 34.

¹⁰⁶ *Ibid.*, at p. 25.

lifecycles, from strategy approval, design and development standards, independent validation, to monitoring schedules and review processes. Some stakeholders, such as financial institutions, already have such frameworks in place.

A second challenge may affect the viability of the services offered by Fintech firms with respect to ESG guidance and information. Specifically, opacity exacerbates information asymmetries between Fintech firms and market participants thereby inducing an adverse selection problem.¹⁰⁷ On the one hand, Fintech may not be able to offer the same type of quality assurance as traditional firms using tools, such as third-party certification,¹⁰⁸ but as explained above, there are ways by which AI-based recommendations can be satisfactorily explained, such as by explaining, if required, the variable used, the model strategy and methodology, and the overall process and underlying policies. On the other hand, even equipped with information disclosed by Fintech firms, market participants may not have the ability or the resources to assess the quality of the services offered. This raises the issue of distrust towards technology and a bias against “new” sources of information versus more traditional ones. However, AI-based recommendations could be explained adequately using some ways tailored to how AI technology work.

2.2.1.3 Behavioral Biases

The efficient market hypothesis (EMH) rests on the assumption that market participants, whether they are individual or institutional investors, are rational actors. However, the rationality of individuals is limited as highlighted by research in behavioral psychology and neuroscience.¹⁰⁹ Investors’ analysis are not always rational in that they can be influenced by heuristics, cognitive biases and cognitive shortcuts.¹¹⁰ In short, as the Turner Review noted in its review of the causes of the financial crisis: “Market efficiency does not imply market rationality”.¹¹¹

Specifically, research in behavioural finance provides a number of insights that are useful to think about the implications of IA in the financial sector. First, behavioural finance suggests that investors are prone to relying on mental shortcuts, known as “heuristics”, a

¹⁰⁷ G.A. Akerlof, "The Market for 'Lemons': Quality and the Market Mechanism", (1970) 84 *Quart. J. Econ.* 488.

¹⁰⁸ Lucas Enriques & Sergio Gilotta, « Disclosure and Financial Market Regulation », in Niamh Moloney et al., Eds., *The Oxford Handbook of Financial Regulation*, Oxford, Oxford University Press, 2015.

¹⁰⁹ Nicholas Barberis & Richard Thaler, “A Survey of Behavioral Finance”, in G.M. Constantinides, M. Harris & R.M. Stulz, Eds., *Financial Markets and Asset Pricing, Handbook of the Economics of Finance*, Vol. 1 Part B, North Holland, Elsevier, 2003, p. 1053.

¹¹⁰ Donald C. Langevoort, *Selling Hope, Selling Risk*, Oxford, Oxford University Press, 2016, p. 10-13.

¹¹¹ *The Turner Review: A Regulatory Response to the Global Banking Crisis*, London, Financial Services Authority, 2009, p. 40.

tendency which biases their choices and predisposes them to commit errors. Heuristic-driven biases affecting market participants include the availability heuristic the representative heuristic and anchoring and adjustment. Secondly, whereas traditional finance assumes that market participants are objective and evaluate decisions purely in terms of risk and return; behavioural finance introduces the idea that the descriptive context of a particular decision influences market participants' perception of risk and return. This phenomenon, referred to as "framing dependence", entails that factors external to a particular investment choice often colour the market participant's appreciation of its actual risk/return characteristics and bias their choices accordingly. Thirdly, individuals' and investors' behaviour tend to be affected by an overconfidence bias, as they fail to recognize that they have inadequate information regarding a particular choice. Thus, market participants make less than rational decisions because they overestimate the information they possess and because they are overconfident of their trading abilities¹¹².

In corollary, behavioral finance research suggests that the pervasive manifestations of human cognition are not likely to be drowned out or nullified within financial markets. If cognitive biases such as framing dependence and heuristics affect all individuals, including investors, institutional investors, brokers, analysts, and portfolio managers, then even efficiency-favouring factors such as arbitrage will not correct all market inefficiencies.¹¹³ An important implication is that behavioural biases affect not only the decision-making process, but also that they affect stock prices. Stated differently stock prices will not (always) reflect firms' fundamental value. Furthermore, market participants may also affect each other's decisions through their social interactions¹¹⁴. This phenomenon, known as the "herding" effect, affects market professionals as well.

From the perspective of our inquiry into the contribution of IA with respect to ESG information, two salient observations flow from the foregoing. On the positive side of the ledger, introducing AI tools to assist investors in their processing of ESG information may serve to curb the behavioral biases highlighted above. In other words, such tools may serve to "tame the animal spirits of the stock markets". Of course, this positive take on the contribution of IA rests on the assumption that behavioral biases will not be embedded in the algorithms. On the negative side of the ledger, AI could come to reinforce behavioral biases. A particular preoccupation concerns herding.

Concerns with respect to the impact of IA in reinforcing herding behavior has been notably voiced by the FSB. Given its role, the FSB was concerned with the impact of herding on financial stability risks: "If machine learning-based traders outperform others, this could in the future result in many more traders adopting similar machine learning strategies [...] As

¹¹² Donald C. Langevoort, "Taming the Animal Spirits of the Stock Markets: A Behavioral Approach to Securities Regulation", (2002) 97 *Nw. U. L. Rev.* 135.

¹¹³ Hersch Shefrin, *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing*, Boston, Harvard Business School Press, 2000, p. 6.

¹¹⁴ Donald C. Langevoort, "Taming the Animal Spirits of the Stock Markets: A Behavioral Approach to Securities Regulation", (2002) 97 *NW. U. L. REV.* 135.

with any herding behaviour in the market, this has the potential to amplify financial shocks.”¹¹⁵ While the FSB noted that there did not exist evidence of such herding occurring presently, recent studies found herding pattern in the context of P2P lending platforms,¹¹⁶ and earlier studies similarly with respect to analyst newsletters in emerging markets where the environment is more opaque.¹¹⁷

In any case, given that herding “increases the volatility of prices, destabilizes markets and increases the fragility of the financial system”, regulators should monitor closely the impact of the use of IA on investor behavior, including with respect to the ESG information.

2.2.1.4 Monopoly

While this paper primarily focuses on the financial regulation issues raised by the use of AI with regard to ESG information, the competition issues raised by fintechs need nonetheless to be briefly sketched as they are relevant for regulators in their reflection on the elaboration of the framework governing fintechs.

As evidence shows, the collection and processing of information are activities that are likely to elicit substantial economies of scale. The remarks of the S.E.C. with respect to the position of credit rating agencies is particularly relevant with respect to fintechs:

Economies of scale and sunk costs may be economic factors which may favor the larger, more established rating agencies. Large rating agencies can allocate the costs of, among other things, analytical software, administrative, legal, compliance, marketing and support staff across a wider range of ratings providing a more efficient cost base. In addition, these rating agencies have large sunk costs in the form of developed ratings, methodologies and procedures and ratings outstanding which new entrants must create from scratch.¹¹⁸

Moreover, first entrants are able to build reputational capital as they can build a track record regarding the quality of their services. Indeed, reputational capital is hard to build quickly and therefore tends to go to the first movers. Again, the comments of the S.E.C. are apposite:

¹¹⁵ Financial Stability Board, *Artificial intelligence and machine learning in financial services*, 2017, p. 25.

¹¹⁶ See, e.g., Yang Jiang et al., “Investor Platform Choice: Herding, Platform Attributes, and Regulations”, (2018) 35 *Journal of Management Information Systems* 86 (finding that herding exists at the platform level, i.e. subsequent investors follow their predecessors’ actions when choosing their own P2P lending platforms).

¹¹⁷ Sushil Bikhchandani & Sunil Sharma, *Herd behaviour in financial markets: a review*, IMF Working Papers 00/48, 2000.

¹¹⁸ S.E.C., Annual Report on Nationally Recognized Statistical Rating Organizations, 2011, p. 12.

When the quality of a firm's product is difficult to assess at the time of purchase, consumers often use the quality of prior products produced by the firm as a benchmark for their purchasing decision. A firm that has a long history of producing quality products develops a reputational asset which allows it to command a higher price.¹¹⁹

In sum, the combination of scale economies and reputation creates a natural barrier to entry that is susceptible to dampen competition in the market for information services regarding ESG information.

If there is insufficient competition, investors risk being deprived from an effective check on the quality and integrity of ESG information, thereby facilitating shirking on the part of established intermediaries.¹²⁰ Lack of competition can also negatively affect innovation, as well as diversity of thinking and opinions. A related element is that competition is important for the enforcement of reputational sanctions that shape intermediaries' conduct.¹²¹ In a competitive market, information about prices charged, the level of service provided, and performance, tends to be more visible. Furthermore, there are more alternatives with which to compare services offered. Thus, in an oligopolistic setting, reputational sanctions are less effective.

2.2.2 Selected Legal Issues

2.2.2.1 General Observations

As Clements notes, "Fintech is a 'disruptive' phenomenon, which presents many challenges and complexities for the regulatory framework."¹²² With respect to objectives, fintechs prompt a reflection on the place of innovation fostering as a regulatory goal alongside investor protection, market efficiency and market stability.¹²³ Innovation fostering creates tensions with the classical goals of financial regulation, as it may not be possible to successfully pursue all of those goals.¹²⁴ In Canada, such tensions have been

¹¹⁹ *Ibid.*

¹²⁰ See, by analogy with credit rating agencies, John C. COFFEE, *Gatekeepers – The Professions and Corporate Governance*, Oxford, Oxford University Press, 2006, p. 285; EUROPEAN SECURITIES MARKETS EXPERT GROUP, *Role of Credit Rating Agencies*, Report to the European Commission, 2008, p. 11; J.A. GRUNDFEST & E. PETROVA, *Buyer Owned and Controlled Rating Agencies: A Summary Introduction*, The Rock Center on Corporate Governance, 2009, p. 4.

¹²¹ J. HÖRNER, « Reputation and Competition », (2002) 92 *Am. Econ. Rev.* 644.

¹²² Ryan Clements, *Regulating Fintech In Canada And The United States: Comparison, Challenges And Opportunities*, Calgary, The School of Public Policy, University of Calgary, vol. 12(23), January 2019, at p. 3.

¹²³ Ontario, *Capital Markets Modernization Taskforce: Final Report*, January 2021 at 2.5.

¹²⁴ Chris Brummer & Yahsa Yadav, "Fintech and the Innovation Trilemma", (2019) 107 *Geo. L. Rev.* 235.

underscored by a report of the Competition Bureau that discussed “how to strike the right balance in regulation to ensure Canadians are protected while promoting innovation”.¹²⁵

With respect to regulatory approaches, financial innovation forces a revision of the classic rules-based and principles-based models. While the Canadian framework is tilted toward a principles-based model,¹²⁶ the Competition Bureau advocated a modernisation of regulatory regimes so that it further embrace this model in order to promote greater innovation and competition in the financial services sector.¹²⁷ In any case, the challenges to the regulatory framework are exacerbated by the fact that the products and services emerging from new technologies (crypto assets and currencies, P2P lending, robo-advisors, etc.) do not fit well in the traditional categories underpinning financial regulation.

Faced with such challenges, regulators have experimented with a number of responses.¹²⁸ Financial regulators abroad and in Canada have turned to dynamic regulation to manage new and innovative financial technologies.¹²⁹ Dynamic regulation, which takes the form of hubs and sandboxes, facilitate development and proof of concepts of new technologically-innovative business models, but may have overall limited outcomes.¹³⁰ Regulators have also resorted to “adapted regulation” by adapting existing regulatory regimes to the particularities of technology-based financial services, without changing regulatory requirements altogether.¹³¹

With respect to regulating technology, many regulators world-wide have stated that their rules are “technology-neutral”. This means that such rules are “blind” to technology, and the use of technology such as AI is irrelevant to their applicability. Therefore, regulated persons and corporations are accountable for compliance to applicable regulation, regardless if they choose to use AI, or any other technology, to provide a service or perform a given regulated activity such as ESG reporting.

¹²⁵ Competition Bureau of Canada, *Technology-Led Innovation in The Canadian Financial Services Sector — A Market Study*, Ottawa 2017. See also Competition Bureau of Canada, *Regulatory Highlights Following the Competition Bureau’s Market Study*, Ottawa, 2018 <https://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/04392.html>>.

¹²⁶ Ryan Clements, *Regulating Fintech In Canada And The United States: Comparison, Challenges And Opportunities*, Calgary, The School of Public Policy, University of Calgary, vol. 12(23), January 2019, at p. 4.

¹²⁷ Competition Bureau of Canada, *Technology-Led Innovation in The Canadian Financial Services Sector — A Market Study*, Ottawa 2017.

¹²⁸ Dominique Payette, “Regulating Robo-Advisers in Canada”, (2018) 33 *Banking & Finance Law Review* 423.

¹²⁹ Dynamic regulation refers to discretionary powers entrusted to regulators to exempt persons of regulatory requirements, in given circumstances and in order to achieve a predefined goal. See Dominique Payette, “Regulating Robo-Advisers in Canada”, (2018) 33 B.F.L.R. 423, 450-451.

¹³⁰ *Ibid.*

¹³¹ *Ibid.*

From a policy perspective, technological neutrality also makes sense, in our opinion. While the use of AI to perform regulated activities needs to be thoroughly analyzed against applicable regulatory backdrop – analysis which may bring about and force new ways to interpret current regulation – we are of the view that there is no immediate need for generalized regulatory reforms in regulated fields such as ESG reporting. A starting point of reflection would be to assess “how far” interpretation of current rules has to be stretched to reach and determine compliance of AI, and if such “stretching” is significant enough to likely entail an increase in risk related to inadequate compliance. In some cases, AI-specific regulation may be warranted for a given regulated activity. At a certain point, when AI gets increasingly sophisticated, regulators and governing authorities may also want to consider agreed upon sets of AI standards in their respective fields.

Regardless of the policy position - AI-specific regulations or not - the foundational regulatory principles that typically guide regulators is the protection of the public and investors, as well as interest of different stakeholders in key social services and economic markets. This remains equally applicable when they consider emerging risks associated with Fintech and AI, and when they assess whether fintech and AI is safe and unharmed for those end-consumers, services and markets. This remains equally applicable for ESG reporting with the use of technology, including AI.

2.2.2.2 *Registration Requirement*

As a basic principle, *CSA National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations* (“NI 31-103”) provides that all firms and individuals acting as financial intermediaries must fit and register in one of the categories established by securities legislation. The three main categories are: dealers (trading), advisers (advising and portfolio management), and fund managers (investment funds management). For our purpose, the adviser category is the most relevant.

Market participants must register if they engage in securities advice, i.e. advise another with respect to investment in or the purchase or sale of securities, or the business of managing a securities portfolio.¹³² The registration regime rests on the concept of “business trigger” as explained by regulators: “We look at the type of activity and whether it is carried out for a business purpose to determine if an individual or firm must register”.¹³³ Amongst others, regulators will consider the following factors where determining whether a firm or individual is advising on securities for a business purpose: i) engaging in activities similar to a registrant; ii) directly or indirectly carrying on the activity with repetition, regularity or continuity; iii) being, or expecting to be, remunerated or compensated; iv) directly or indirectly soliciting.¹³⁴

¹³² See, e.g., Quebec Securities Act, RLRQ c V-1.1, s. 5 (QSA).

¹³³ *Policy Statement to Regulation 31-103 Respecting Registration Requirements, Exemptions and Ongoing Registrant Obligations*, December 31, 2020, s. 1.3 (CP31-103).

¹³⁴ *Ibid.*

Registrants are subject to regulatory requirements developed by the securities authorities. They are also subject to oversight mechanisms that provide regulators with information, and enable them to conduct inspections and examinations. To sanction non-compliance, regulators have enforcement powers to reprimand, suspend, cancel or restrict registration.

From our perspective, the critical question is to determine whether ESG information providers using AI engage in securities advice and, therefore, are subject to the registration requirement. While there is a dearth of case law on this question in Canada,¹³⁵ it is interesting to note that at least one decision has recognized that providing clients with a computer software for analyzing financial and stock market data did constitute investment advice.¹³⁶ This decision suggests that AI-based information services could be qualified as advice as defined by securities law.¹³⁷

However, this does not end the analysis as NI31-103 provides an exemption from the registration requirement for those who provide “general advice”, that is advice that does not purport to be tailored to the needs of the person receiving the advice.¹³⁸ In Companion Policy 31-103 (CP 31-103) securities regulators offer guidance with respect to this exemption by stating that they will not consider advice about specific securities to be tailored to the needs of the recipient where three conditions are met. First, it is a general discussion of the merits and risks of the security. Second, it is delivered through investment newsletters, articles in general circulation newspapers or magazines, websites, e-mail, Internet chat rooms, bulletin boards, television or radio. Third, it does not claim to be tailored to the needs and circumstances of any recipient.

The exemption resembles the publisher’s exclusion under the U.S. *Investment Advisor Act of 1940*¹³⁹ that states that the definition of “investment adviser” does not include “the publisher of any bona fide newspaper, news magazine or business or financial publication of general and regular circulation”.¹⁴⁰ According to the U.S. Supreme Court, the crucial

¹³⁵ Borden Ladner Gervais, *Securities Law and Practice*, Thomson Reuters, §11.1.5 (online).

¹³⁶ *Services informatiques Iceberg International Inc.*, Decision no 8128, (1987) 18 Quebec Securities Commission Bull. No. 6, p. A6.

¹³⁷ For a similar discussion regarding index providers, see P.G. Mahoney & A.Z. Robertson, “Advisers by Another Name”, University of Virginia School of Law, Law and Economics Paper Series 2021-01, 2021.

¹³⁸ Regulation 31-103, respecting Registration Requirements, Exemptions and Ongoing Registrant Obligations, RLRQ, c V-1.1, r. 10, s. 8.25. In Ontario, s. 34(1) the *Securities Act* provides a similar exemption for “a person or company that engages in or holds himself, herself or itself out as engaging in the business of providing advice, either directly or through publications or other media, with respect to investing in or buying or selling securities, including any class of securities and the securities of a class of issuers, that are not purported to be tailored to the needs of anyone receiving the advice.”

¹³⁹ *Investment Advisers Act of 1940*, 15 U.S.C. §80b-2(a)(11) (2018).

¹⁴⁰ *Investment Advisers Act of 1940* 15 U.S.C. §80b-2(a)(11)(D) (2018).

dimension of the publisher's exclusion pertains to the absence of personalized advice.¹⁴¹ Thus, the "mere fact that a publication contains advice and comment about specific securities does not give it the personalized character that identifies a professional investment adviser."¹⁴² In this respect, the publisher's exclusion differs however from the general advice exemption as qualified by CP 31-103.

In light of the regulatory guidance, it appears that fintechs providing AI-based ESG information can benefit from the general advice exemption to the extent that their services concern only the general merits and risks of securities and that they do not offer personalized advice.¹⁴³ However, the conditions of the exemption remain unclear and could be interpreted in a way that limits the scope of services that fintechs can offer to market participants. In particular, the wording of CP 31-103¹⁴⁴ raises doubts as to the ability of fintechs to tailor the ESG data provided to their clients' needs in order to be valuable. If this interpretation were to prevail, fintechs would be limited to providing generic data of lesser value for markets participants.

From this perspective, regulators should reflect on the opportunity to review the general advice exemption to offer more legal certainty to fintechs. Regulators should also monitor the area in order to determine whether the policy issues identified above warrant a closer supervision of fintechs providing information-based services to market participants. In time, this could warrant the enactment of a particular regime for fintechs as the ones elaborated for credit rating agencies¹⁴⁵ and proxy voting advisors.¹⁴⁶

2.2.2.3 Insider Trading

Securities law imposes two prohibitions on primary, secondary and tertiary insiders of reporting issuers.¹⁴⁷ First, it prohibits insiders from trading in the issuer's securities when they are in possession of material non public information (MNPI) relating to it.¹⁴⁸ Second,

¹⁴¹ *Lowe v. SEC*, 472 U.S. 181, 210 (1985).

¹⁴² *Ibid.*, 208.

¹⁴³ See, e.g., *U.S. v. Park*, 99 F. Supp. 2d 889 (N.D. Ill., 2000).

¹⁴⁴ As the comments are worded in s. 8.25 NP31-103, the exemption's conditions appear to be cumulative.

¹⁴⁵ NI 25-101 - Designated Rating Organizations.

¹⁴⁶ National Policy 25-201 Guidance for Proxy Advisory Firms.

¹⁴⁷ The primary insider corresponds essentially to the corporate officer, i.e. the person who occupies a managerial position. In Canada, it also includes the shareholder who owns more than 10% of the voting shares. The secondary insider is the person who, by reason of his professional activity or his functions, is brought to have 'inside information'. The secondary insider is the person with the information from a primary insider. The tertiary insider is one who has knowledgeable information, no matter how it was accessed. See QSA, ss. 89, 189.

¹⁴⁸ QSA, s. 187,

insiders cannot communicate MNPI with another person, that is, give "tips".¹⁴⁹ MNPI consists of information still unknown to the public and that could affect the decision of a reasonable investor.¹⁵⁰ Those who contravene these prohibitions face administrative, civil, criminal and criminal sanctions.¹⁵¹

For fintechs, a particular provision in the Québec *Securities Act* (QSA) raises an issue regarding insider trading prohibition. Specifically, s. 189 QSA provides that "every person who has acquired privileged information that he knows to be such concerning a reporting issuer" cannot trade on the basis nor communicate the MNPI. This provision arguably creates an autonomous information-connection category of persons targeted by insider trading prohibition,¹⁵² aside from the approach that exists in common law provinces that relies on an "information connection" test, defined by possession of inside information, and an additional "person connection" test.¹⁵³

The information connection approach may raise issues for fintechs to the extent that the information they have access to and communicate qualify as MNPI. Indeed, in such a case, although they are "outsiders" vis-à-vis reporting issuers, fintechs could be subject to the prohibitions because they are in possession of MNPI, no matter how they accessed it. Of course, the key element here is to qualify the information as MNPI.

As mentioned previously, a contribution of fintechs with respect to ESG information would most likely involve raw data coming from satellite images, energy consumption, spending patterns, etc. Such data are unlikely to constitute MNPI as they are general and obtained from public sources rather than from insiders. Further, the data are not material in the sense that they would not affect the decision of a reasonable investor. Likewise, fintechs' analysis of issuers' public disclosure with AI tools would not create MNPI. Indeed, in both cases, it is because of the data's analysis by the fintechs' algorithm that market insights are developed, a consequence that does not constitute insider trading according to the mosaic theory.¹⁵⁴

¹⁴⁹ QSA, s. 188.

¹⁵⁰ QSA, s. 5.

¹⁵¹ QSA, s. 204, 208.1, 273.1.

¹⁵² A similar rule exists in Australia. See J. "There Was Movement at the Station for the Word Had Passed Around: How Does a Company Possess Inside Information under Australian Insider Trading Laws?", (2006) 3 *Macquarie J. Bus. L.* 241.

¹⁵³ Insider Trading Task Force, *Illegal Insider Trading in Canada: Recommendations on Prevention, Detection and Deterrence*, 2003, at p. 37.

¹⁵⁴ According to the mosaic theory "analysts and investors are free to develop market insights through assembly of information from different public and private sources". See Carlo V. di Florio, Director of the SEC Office of Compliance Inspections and Examinations, at the IA Watch Annual IA Compliance Best Practices Seminar (Mar. 21, 2011), available at <http://www.sec.gov/news/speech/2011/spch032111c vd.htm>; Allan Horwich, "The Mosaic Theory of Materiality – Does the Illusion Have a Future?", (2015) 43 *Sec. Reg. L. J.* 129. Although the mosaic theory is not addressed directly in Canadian securities law, there are statements that

From this, it follows that the insights generated by a fintech regarding issuers' ESG track record, for instance would not constitute MNPI to the extent that it used external data and issuers' public disclosures. However, the situation would become more delicate were fintechs to obtain private non material information from insiders to conduct analysis with their algorithms. And even more so, if the insider knows that her disclosure serves to complete a mosaic.

2.2.2.4 Accountability

The myth that Fintechs are necessarily “outlaws” is tenacious. There is a generalized misconception that AI-based solutions and services offered by small and big FinTechs alike, are so technologically sophisticated that they fall “out of scope” of current frameworks and thus remain “ungoverned”, or unregulated. On the contrary, current legal and regulatory frameworks ensure that persons and corporations that enable AI bear the legal, regulatory and even ethical responsibility for them, however technologically sophisticated they choose to perform activities. This is equally true for any type of AI-based ESG recommendation or reporting. It might be true that sophisticated AI models might become autonomous in some respect, and thus make decisions “on their own”, by applying what they have been taught in novel, perhaps unintended ways – this in turn might generate unintended content. However, this should not have any bearing on the legal accountability of the implicated stakeholders. This includes investor protection rights and other pertaining financial market rules for ESG reporting.

AI underpinning any given technology-based service or activity is therefore by no means legally independent from its enabling persons, such as Fintech engaging in AI-based ESG recommendations or reporting. Simply put, it is the legal responsibility of AI enablers such as Fintechs to operate AI in a way that respects, at all times, the rule of law. By way of example, AI must not be operated in such a way that would entail neglectful conduct, or breach an obligation stemming from the extracontractual liability regime at civil law or common law (torts). Another, more targeted example, would be the respect by AI models of targeted statutory law such as PIPEDA.¹⁵⁵

Thus, even if they are not specifically regulated, fintechs remain subject to the general civil liability regimes that apply to other market participants. Fintechs that provide ESG information can be held liable towards market participants where they communicate false or misleading data. In the absence of a statutory regime, the issue would be governed by

implicitly recognize it. See, e.g., *Statement of Allegations of Staff of the Ontario Securities Commission, In the Matter of Richard Bruce Moore*, at ¶ 11 (Apr. 11, 2013), http://osc.gov.on.ca/en/Proceedings_soa_20130411_moorerb.htm; *Autorité des marchés financiers v. Lamarre*, 2014 QCBDR 29.

¹⁵⁵ *Personal Information Protection and Electronic Documents Act*, S.C. 2000, c. 5.

the general common law (or civil law) liability regime as financial analysts¹⁵⁶, credit rating agencies¹⁵⁷ and other market participants.¹⁵⁸

Indeed, liability regimes equally apply in the case where an AI enabler has operated AI in such a way that caused injury to another party. One of the pillars of any given legal system are liability frameworks – they ensure trust of society, by having parties compensate when they effectively damage. Such frameworks also work to deter harmful activities. With the use of AI for ESG recommendations or reporting (whether by fintech or other types of stakeholders), these mechanisms will ensure AI enablers bear legal liability that is consistent with allocation of liability under applicable law, in circumstances which may warrant to indemnify a party that has suffered damages because of a defect or faulty AI model.

In most jurisdictions, fault-based liability mechanisms are based on a number of requirements that are not self-evident. This means that most of these requirements have to be proved mostly by the plaintiff, i.e. the person claiming injury, which would also equally apply to a plaintiff suing an AI enabler for damages. On top of or in lieu of fault-based liability, some particular fields may warrant, no-fault insurance or other types of monetary compensation mechanisms put in place by legislation might apply – an example would be in case of car accidents.

An interesting parallel can be drawn between the liability for products, things and even animals with that for AI, to demonstrate that as they currently stand, most civil liability systems adequately ensure that AI enablers (if required criteria are established) may be held to damages. Several jurisdictions effectively have civil liability mechanisms to ensure liability for defective products and goods. For instance, tort law provides for a “product liability tort”, which aims to ensure accountability and deter putting dangerous products on the market. Extracontractual liability also provides for liability for the “act of a thing”, which ensures that custodians are legally liable for when things cause damage to another party – even so if the thing has behaved autonomously – for example a pipe that burst. Another useful comparison is also that with responsibility for animals, which have owners (and in some cases custodians) of animals be legally liable for injury caused by their animal, even if they were acting of their own accord and even if it has escaped.

Finally, it is worth emphasizing that in addition to legal accountability, the use of AI in the financial industry at large triggers some ethical questions that concern AI enablers’ duties to act in a responsible way that goes beyond what is legally warranted. Fintechs using AI

¹⁵⁶ See Stephanie Ben-Ishai, "Corporate Gatekeeper Liability in Canada", (2007) 42 *Tex. Int'l L.J.* 441, 447.

¹⁵⁷ Stéphane Rousseau, *A Question of Credibility: Enhancing the Accountability and Effectiveness of Credit Rating Agencies*, Commentary 356, Toronto, C.D. Howe Institute, 2012 at p. 12.

¹⁵⁸ Paul Davis et al., *Short Selling in Canada: Regulations are Weak and a New Path Forward is Needed to Reduce Systemic Risk*, McMillan, November 2019 <https://mcmillan.ca/insights/publications/short-selling-in-canada-regulations-are-weak-and-a-new-path-forward-is-needed-to-reduce-systemic-risk/>.

for ESG reporting will have to consider how these duties apply to them. These duties go beyond legal requirements, although sometimes they overlap, i.e. breach of ethical duties can sometimes result in legal liability.

These responsibilities, which AI enablers bear, take a completely new dimension, when considering the role these new tools can play in clearing the fractured landscape of ESG data analysis. By improving the RI market's informational efficiency, Fintechs could play a pivotal role in fostering this market's positive feedback loop, by which good corporate behaviours are rewarded and encouraged. Hence, their impact on every stakeholder affected by corporate conduct, whether shareholders, employees, communities and the environment, must not be understated and should be kept in mind when devising new policy solutions.