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Algorithmic Decision-Making and Corporate Risk: Toward Transparency Through Corporate Disclosures

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Kevin X. Kuhn*

Algorithmic Decision-Making and Corporate Risk: Toward Transparency Through Corporate Disclosures

TABLE OF CONTENTS

I. Introduction	974
II. Corporate Reliance on Algorithmic Decision-Making ...	976
III. Existing Transparency Tools and Their Shortcomings ..	980
A. Existing Transparency Tools	980
B. Securities Law as a Transparency Tool	982
IV. Legal Analysis of Fraud and Misleading Claims Under the Exchange Act	985
V. Proposal for Transparency into Corporate Reliance on Algorithmic Decision Systems	990
A. Reform 10-K and 8-K Reports	990
B. Reevaluate the Scierter Element of Fraud Claims and Good Faith Defense to Misleading Claims	992
C. Require Interagency Coordination Between the USPTO and the SEC	993
VI. Conclusion	994

I. INTRODUCTION

Consider this hypothetical scenario: a national car seller implements an algorithmic decision-making system to raise profits by ten percent in the next year. The algorithm will target the most competitive geographic market for a particular vehicle, recommend a price,

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and screen consumers for creditworthiness. The algorithm is immensely successful, and the corporation achieves its goal for increased profits. But a disturbing trend emerges when multiple consumers file lawsuits alleging discriminatory practices. Consumers claim that the corporation gave Black borrowers with otherwise equal credentials less favorable loan terms than white borrowers. Barred from bringing suit by a contractual arbitration provision and class action waiver, the consumers take to the media. In turn, shareholders demand transparency and ultimately file suit alleging securities fraud under the Securities Exchange Act.¹

This fact pattern may be a familiar one. It is analogous to algorithmic discrimination in fintech,² employee hiring,³ and consumer data privacy.⁴ Consumers themselves face hurdles and contractual bars to bringing suit,⁵ and the enforcement agencies struggle to keep pace with advances in technology.⁶ Securities regulations present a final check on the untethered use of algorithmic decision-making. With modest development, securities laws can provide transparency and enforcement to deter inappropriate use of algorithmic decision systems in the corporate context. This Comment proposes three concepts to enable that development: modernize Securities and Exchange Commission (SEC) disclosure requirements, adapt the scienter and causation elements in securities fraud claims, and create a United States Patent and Trademark Office (USPTO) and SEC working group.

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1. Securities Exchange Act (Exchange Act) of 1934, 15 U.S.C. § 78m.
 2. See Jennifer Miller, *Is an Algorithm Less Racist Than a Loan Officer?*, N.Y. TIMES (Sept. 18, 2020), <https://www.nytimes.com/2020/09/18/business/digital-mortgages.html> [<https://perma.cc/FE5J-WPU7>].
 3. See Alina Kochling & Marius C. Wehner, *Discriminated by an Algorithm: A Systematic Review of Discrimination and Fairness by Algorithmic Decision-Making in the Context of HR Recruitment and HR Development*, 13 BUS. RES. 795 (2020), <http://link.springer.com/content/pdf/10.1007/S40685-020-00134-w.pdf> [<https://perma.cc/47MA-5ZF8>].
 4. See *In re Facebook, Inc. Sec. Litig.*, 405 F. Supp. 3d 809 (N.D. Cal. 2019) (explaining how the political consulting firm, Cambridge Analytica, collected millions of Facebook users' data without consent).
 5. See *Lewis v. Epic Sys. Corp.*, 823 F.3d 1147 (7th Cir. 2016) (upholding arbitration agreements and class action waivers as a condition of employment). *But see* California Consumer Privacy Act, CAL. CIV. CODE § 1798.192 (West 2020) [hereinafter CCPA] (“[a]ny provision of a contract or agreement of any kind that purports to waive or limit in any way a consumer’s rights under this title [the CCPA], including, but not limited to, any right to a remedy or means of enforcement” is “void and unenforceable”).
 6. Although the Federal Trade Commission has been slow to react to the potential harms resulting from algorithmic systems, they have taken recent steps to improve that response. See Elisa Jillson, *Aiming for Truth, Fairness, and Equity in Your Company’s Use of AI*, FED. TRADE COMM’N BUS. BLOG (Apr. 19, 2021, 9:43 AM), <https://www.ftc.gov/business-guidance/blog/2021/04/aiming-truth-fairness-equity-your-companys-use-ai> [<https://perma.cc/L4ZW-9X5E>].

After scoping the problem in this introduction, this Comment proceeds in three parts. Part II evaluates corporate reliance on algorithmic decision-making. Parts III and IV take a critical look at how corporate filing requirements under the Exchange Act have adapted, or not adapted, to algorithmic decision-making. Part V proposes a new approach to advance the policy goals of the Exchange Act. I conclude with a proposal that corporations should disclose these risks in SEC filings now rather than wait for legislation. More realistically, Congress and the SEC should consider updating the SEC's regulations.

II. CORPORATE RELIANCE ON ALGORITHMIC DECISION-MAKING

Algorithmic decision-making is a broad term intended to encompass machine learning and artificial intelligence systems that use data to recommend courses of action.⁷ At its basic level, algorithmic systems find correlations in a set of training data and optimize processes based on user-defined target parameters.⁸ Some systems continue to evolve when they are in operation or use powerful transfer learning techniques to improve performance.⁹ In many cases, algorithmic decision-making systems can optimize business methods more effectively than humans. Corporations were quick to adopt the technology. But as these systems evolve, they sometimes perpetuate or exacerbate human biases that were “baked in” to the code; the systems might proceed outside the bounds of normative behavior. Thus, a problem emerges: if algorithms are employed to optimize a decision, they can make decisions without explaining or justifying the process. And it may have arrived at that decision using correlations that exacerbate historical discrimination. Whether the decision optimizes profits, for example, is irrelevant if it does so through discrimination.

Few, if any, business sectors avoid using algorithmic decision-making, but some embrace it more than others. Customer relationship management companies use algorithmic decision-making to deliver a predictive customer experience and optimize profits—some predict customer needs before the customer is even aware of those needs.¹⁰ Real estate advertisers leverage artificial intelligence algorithms to

7. For a full treatment of the legal implications of machine learning on the artificial intelligence field, see David Lehr & Paul Ohm, *Playing with the Data: What Legal Scholars Should Learn About Machine Learning*, 51 U.C. DAVIS L. REV. 653 (2017).

8. *Id.* at 668–70.

9. Jason Brownlee, *A Gentle Introduction to Transfer Learning for Deep Learning*, MACH. LEARNING MASTERY (Sept. 16, 2019), <https://machinelearningmastery.com/transfer-learning-for-deep-learning/> [<https://perma.cc/Y4J9-6HBA>].

10. *Salesforce Einstein*, SALESFORCE, <https://www.salesforce.com/products/einstein/features/> [<https://perma.cc/JQF7-APB6>] (last visited May 18, 2021).

micro-target ads based on inferences about consumers.¹¹ Banks and lenders use algorithmic decision-making as an alternative to FICO credit scores to predict creditworthiness.¹² Health care networks use machine learning algorithms to recommend medical diagnoses and treatments.¹³ Human resource firms use algorithmic decision-making to recommend hiring and firing decisions for “organizational optimization.”¹⁴ School systems use algorithmic systems to predict when interventions could prevent students from dropping out.¹⁵ Algorithmic systems make decisions that are equivalent in weight to the decisions made by corporate executives.

Algorithmic decision-making systems are effective because they can identify correlations that are too complicated for humans to identify, but that can also introduce hidden flaws. In complex applications like climate change, cancer treatment, and economics, algorithmic decision-making systems have led to huge breakthroughs.¹⁶ But the very reason these systems are so effective also makes them dangerous. Take, for example, predictive policing. In the early 2010s, police forces from Los Angeles to New York embraced new technology that could predict when and where a crime would occur.¹⁷ But these algorithms had a fatal flaw that was unknown to the police officers using them.¹⁸

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11. Facebook, Inc., FHEO No. 01-18-0323-8 (Mar. 28, 2019), https://www.hud.gov/sites/dfiles/Main/documents/HUD_v_Facebook.pdf [<https://perma.cc/4666-XL45>] (charging Facebook with discriminatory housing practices for using user data to microtarget ads based on protected classes).
 12. *CFPB Announces First No-Action Letter to Upstart Network*, CONSUMER FIN. PROT. BUREAU NEWSROOM (Sept. 14, 2017), <https://www.consumerfinance.gov/about-us/newsroom/cfpb-announces-first-no-action-letter-upstart-network/> [<https://perma.cc/XCW4-R9WU>].
 13. See Thomas Grote & Philipp Berens, *On the Ethics of Algorithmic Decision-Making in Healthcare*, J. MED. ETHICS, 205 (2020), <https://jme.bmj.com/content/medethics/46/3/205.full.pdf> [<https://perma.cc/8TUW-QTPD>].
 14. See Kochling & Wehner, *supra* note 3, at 795–96.
 15. CTR. FOR DEMOCRACY & TECH, ALGORITHMIC SYSTEMS IN EDUCATION: INCORPORATING EQUITY AND FAIRNESS WHEN USING STUDENT DATA 4 (Aug. 2019), <https://cdt.org/wp-content/uploads/2019/08/2019-08-08-Digital-Decision-making-Brief-FINAL.pdf> [<https://perma.cc/7RVJ-C233>].
 16. Kelsey Tsipsis, *Machine Learning Identifies Links Between World’s Oceans*, MIT NEWS (Mar. 20, 2019), <https://news.mit.edu/2019/machine-learning-identifies-links-between-world-oceans-0320> [<https://perma.cc/398T-35TM>] (climate change); Jessica Kent, *Deep Learning Identifies Best Treatments for Lung Cancer Patients*, HEALTH IT ANALYTICS (Oct. 19, 2020), <https://healthitanalytics.com/news/deep-learning-identifies-best-treatments-for-lung-cancer-patients> [<https://perma.cc/7Q3H-HDLC>] (cancer treatment); Sendhil Mullainathan & Jann Spiess, *Machine Learning: An Applied Econometric Approach*, 31 J. ECON. PERS. 87, 103 (2017) (economics).
 17. Caroline Haskins, *Dozens of Cities Have Secretly Experimented with Predictive Policing Software*, VICE (Feb. 6, 2019, 9:00 AM), https://www.vice.com/en_us/article/d3m7jq/dozens-of-cities-have-secretly-experimented-with-predictive-policing-software [<https://perma.cc/7GSE-NNWK>].
 18. *Id.*

The algorithms used seismic models to predict future crimes based on previous arrests.¹⁹ Previous arrests were a poor proxy for future crime because they disparaged neighborhoods with a history of crime, thus embedding racial and socioeconomic biases into the algorithm.²⁰ Police had no role in developing the system and had little control over its operation.²¹ Driven by discrimination lawsuits, virtually all police departments discontinued use of the systems.²² While the predictions frequently led to arrests, the problem was that those arrests reproduced racial biases by “polic[ing] . . . ethnic minority neighbourhoods [sic] at double the rate of white neighbourhoods [sic].”²³

Bias and discrimination caused by algorithmic systems are problems in the corporate context, too. In the U.S. credit market, algorithmic decision-making was supposed to “fix” discrimination. Not only did it perpetuate discrimination, it made it harder to spot.²⁴ While systems designed to recommend interventions for school children had some success, that success came with a significant cost to children’s privacy.²⁵ Microtargeting of real estate advertisements similarly found proxies for race, sex, and other protected classes and perpetuated housing discrimination by only making certain advertisements available to consumers with certain characteristics.²⁶ While many of these systems achieved their target metric of profitability, they did so in an unlawful or simply immoral manner.

Optimization variables are a key factor that sets the trajectory of an algorithmic system. In many cases, third parties develop the algorithmic systems, or corporations buy them off-the-shelf. If set to optimize a particular metric—profit, for example—the system will take a training data set and get to work. But software engineers, corporate

19. In the same way that shock waves ripple across the earth’s surface following an earthquake, these models showed how arrests occurred in geographic proximity to prior arrests. See Deirdre Mulligan & Kenneth Bamberger, *Procurement as Policy: Administrative Process for Machine Learning*, 34 BERKELEY TECH. L.J. 773, 802–03 (2019).

20. *Id.*

21. *Id.*

22. Avi Asher-Schapiro, *In a U.S. First, California City Set To Ban Predictive Policing*, REUTERS (June 17, 2020, 12:29 AM), <https://www.reuters.com/article/us-usa-police-tech-trfn/in-a-u-s-first-california-city-set-to-ban-predictive-policing-idUSKBN23031A> [<https://perma.cc/Z8UM-3VJ5>]; Haskins, *supra* note 17.

23. Asher-Schapiro, *supra* note 22.

24. Talia B. Gillis & Jann L. Spiess, *Essay, Big Data and Discrimination*, 86 U. CHI. L. REV. 459, 459 (2019) (discussing how simply excluding data about race and gender failed to minimize discrimination against Black and Hispanic borrowers because the machine learning algorithms identify proxies for race and gender and use historical data to predict creditworthiness); see also Facebook, Inc., *supra* note 11 (charging Facebook with discriminatory housing practices for using user data to microtarget ads based on protected classes).

25. CTR. FOR DEMOCRACY & TECH, *supra* note 15, at 13–14.

26. Facebook, Inc., *supra* note 11

leaders, and humans in general struggle to set the right optimization metrics.²⁷ As described above, arrests are a problematic metric for crime. Similarly, re-arrest rate is a bad proxy for recidivism. In the corporate context, optimization for profit can overpower important metrics for stability and long-term growth.²⁸

“Explainable AI” seeks to solve this problem by asking the algorithm to explain how it arrived at a decision.²⁹ But explainable AI is not a panacea. As professors Deirdre Mulligan and Kenneth Bamberger acknowledge, there is a difference between explaining the decision and justifying it.³⁰ And when algorithms evolve while making critical decisions without a human in the decision-making loop, post hoc justifications might be too late. Software developers sometimes disfavor explainable AI, arguing that their product’s job is simply to find correlations rather than causation.³¹ But for this argument to hold water, the underlying training data needs to be perfect; it cannot have baked-in biases. Otherwise, the algorithm will identify correlations that perpetuate the biases baked into the training data and, perhaps, the source code itself. And scholars agree that perfect training data is a white whale.³²

The bias conundrum is not just a problem in the corporate sector; the government faces similar challenges. The United States Department of Agriculture (USDA) implemented an algorithmic system to identify fraud and misuse in the food stamp program.³³ The system revoked a store’s eligibility after flagging suspicious purchases.³⁴ Investigative reporter Florangela Davila uncovered the reason: East African immigrant women shopped in groups and had certain purchasing tendencies that raised flags in the system.³⁵ For example, they would purchase large quantities of Halal meat by the dollar amount, not by the pound.³⁶ So, a string of three or four \$100

27. Rachel Thomas & David Uminsky, *Reliance on Metrics Is a Fundamental Challenge for AI*, ARXIV (FEB. 20, 2020), <https://arxiv.org/ftp/arxiv/papers/2002/2002.08512.pdf> [<https://perma.cc/L7AD-N29K>] (unpublished conference paper).

28. *Id.* at 2.

29. For a thorough explanation of explainable AI versus unexplainable AI, see Wojciech Samek & Klaus-Robert Müller, *Towards Explainable Artificial Intelligence*, in LECTURE NOTES IN COMPUT. SCI., EXPLAINABLE AI: INTERPRETING, EXPLAINING AND VISUALIZING DEEP LEARNING 5 (Wojciech Samek et al. eds., 2019).

30. Mulligan & Bamberger, *supra* note 19, at 787.

31. *Id.*

32. Carolin Kemper, *Kafkaesque AI? Legal Decision-Making in the Era of Machine Learning*, 24 U.S.F. INTELL. PROP. & TECH. L.J. 251, 255 (2020) (discussing how “overfitting” an algorithm with too much training data can cause problems, but too little training data can introduce bias).

33. Mulligan & Bamberger, *supra* note 19, at 798.

34. *Id.* at 798–99.

35. *Id.* at 799.

36. *Id.*

purchases within a few minutes raised a flag. Unfortunately, the USDA made its decision to revoke the store's eligibility without any further investigation.³⁷ Professors Mulligan and Bamberger effectively argue in favor of utilizing the administrative process as the cure—in procuring the algorithmic system, operating the system, and adjudicating agency action.³⁸

III. EXISTING TRANSPARENCY TOOLS AND THEIR SHORTCOMINGS

“The only good is knowledge and the only evil is ignorance” –
Socrates

Transparency in algorithmic decision-making is critical to better understand how corporations make decisions and to hold them accountable. In the same way that corporate executives justify their actions to a board of directors and shareholders, decisions relying on algorithms should be held to similar standards of transparency. Especially since algorithmic decisions stand to cause unforeseen consequences, transparency is the best approach, even when the algorithms produce generally favorable results. But today, there are few sources for transparency. Indeed, corporations tend to shroud incidents of algorithmic discrimination behind layers of bureaucracy.³⁹

A. Existing Transparency Tools

In some applications, intellectual property rights provide transparency. For example, publicly available patent applications led to the disclosure that Clearview AI ignored a court order and developed facial recognition technology for commercial and law enforcement applications.⁴⁰ But when journalists or privacy advocates press companies to explain how they will implement dystopian patents, they typically

37. *Id.*

38. *Id.* at 800.

39. See *Decision Machines Project*, BUREAU OF INVESTIGATIVE JOURNALISM, <https://www.thebureauinvestigates.com/projects/decision-machines> [https://perma.cc/5CN5-2938] (last visited May 18, 2021).

40. See Caroline Haskins et al., *A Clearview AI Patent Application Describes Facial Recognition for Dating and Identifying People Who Are Unhoused or Use Drugs*, BUZZFEED NEWS (Feb. 11, 2021, 4:07 PM), <https://www.buzzfeednews.com/article/carolinehaskins1/facial-recognition-clearview-patent-dating> [https://perma.cc/Q63J-KFPE]; *Thornley v. Clearview AI, Inc.*, 984 F.3d 1241 (7th Cir. 2021); see also Christina Lamoureux, *Clearview AI Plans To Take Its BIPA Challenge over Standing to the Supreme Court*, NAT'L L. REV. (Feb. 24, 2021), <https://www.natlawreview.com/article/breaking-news-clearview-ai-plans-to-take-its-bipa-challenge-over-standing-to-supreme> [https://perma.cc/Z7S2-DAKN] (describing Clearview AI's petition for a stay of the Seventh Circuit's mandate during the pendency of the company's petition for a writ of certiorari to the Supreme Court).

balk.⁴¹ Corporations might file patents to block competitors, reserve technology for the future, or myriad other reasons. But when an algorithmic system *is disclosed* in a patent, that patent is a powerful transparency tool and serves an important function.

The underlying purpose of patent law, enshrined in the Constitution, is to “[t]o promote the Progress of Science and useful Arts.”⁴² To that end, patent law seeks to encourage innovation by rewarding the fruits of labor with a limited monopoly while simultaneously disclosing inventions for others to build on.⁴³ Algorithmic decision-making systems fall on the outer edge of patentable subject matter. The Supreme Court interpreted 32 U.S.C. § 101 in *Alice Corp. v. CLS Bank* to mean that algorithms are patentable if implemented in a transformative way and do not block others from using fundamental principles.⁴⁴ They are not patentable in the abstract.⁴⁵ Modern innovations in AI complicate this analysis, but commentators generally agree that a more expansive interpretation of patentable subject matter furthers the important policy goal of promoting innovation.⁴⁶

Applied to the area of algorithmic decision-making, patentability promotes innovation in three important ways. First, it allows other inventors to learn from the prior art and make improvements. Second, it rewards the inventor with a limited monopoly. Third, though there is no consensus on this point, it promotes transparency. Opponents of patentability for algorithmic decision-making systems argue that systems are difficult to build but easy to copy.⁴⁷ Nevertheless, algorithmic system inventors typically seek patent protection, and the USPTO tends to grant it.

To use patents as transparency tools, journalists and researchers attempt to (1) identify the patented technology, (2) show that the corporation is using the technology, and (3) use disclosures in the patent to show how the algorithm might have unintended negative consequences. This analysis typically breaks down at step two because of the difficulty of showing that the corporation uses the technology. A patent “working requirement” requires making or using the invention

41. See Body Chip, U.S. Patent No. 7777631B2 (filed Apr. 29, 2007); see also Ceylan Yeginsu, *If Workers Slack Off, the Wristband Will Know. (And Amazon Has a Patent for It.)*, N.Y. TIMES (Feb. 1, 2018), <https://www.nytimes.com/2018/02/01/technology/amazon-wristband-tracking-privacy.html> [https://perma.cc/L2PV-ATRE] (detailing how Amazon uses patented haptic-feedback devices to monitor warehouse employees).

42. U.S. CONST. art. 1, § 8, cl. 8.

43. *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.* 489 U.S. 141, 146–47 (1989).

44. *Alice Corp. Proprietary Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 217 (2014).

45. *Id.* at 226.

46. Daniel Taylor, Comment, *Down the Rabbit Hole: Who Will Stand Up for Software Patents After Alice?*, 68 ME. L. REV. 217, 230 (2016).

47. See MARTIN ADELMAN ET AL., CASES AND MATERIALS ON PATENT LAW 111 (5th ed. 2018).

as a condition of holding the patent.⁴⁸ The U.S. does not have a working requirement and except for a brief period in the 1830s, never has.⁴⁹ A policy goal of a working requirement is to ensure that companies produce and patent technology in the same county. Indeed, in medieval times in Great Britain, the King granted patents to foreigners if they would stay in Great Britain and “teach their arts to those willing to learn.”⁵⁰ This practice fell out of favor during the rise of disclosure requirements.⁵¹ Currently, most countries require disclosure of the technology sufficient to enable a person of ordinary skill in the art to make, use, or otherwise practice the patented technology.

A working requirement would certainly reveal when a corporation uses a patented technology, but imposing that requirement would disrupt the U.S. patent system and put it at odds with the rest of the world. Instead, perhaps the SEC could help bridge the gap. The SEC’s website has a useful tool to find recent patents filed by a particular corporation. Conceivably, watchdogs could use the tool to find problematic patents, but they would still have to find a source to correlate that technology with a corporate practice. Corporate disclosures could—and *should*—be that source, but the current practice means most corporate disclosures are too broad to provide actionable information in this regard.

Trademarks can be effective transparency tools in some contexts.⁵² Trademark law has a working requirement—although it is called an in use requirement—thus, the mark has to be in commercial use to be valid.⁵³ However, the subject matter eligible for trademark protection is limited and does not include algorithmic decision systems.

B. Securities Law as a Transparency Tool

Shareholders of publicly traded companies present one last check on unfair practices, as even a powerhouse technology company like Amazon will pull back on questionable technology at the behest of its shareholders.⁵⁴ Nevertheless, shareholders can only respond to known risks. Currently, shareholders only become aware of negative

48. Marketa Trimble, *Patent Working Requirements: Historical and Comparative Perspectives*, 6 U.C. IRVINE L. REV. 483, 484 (2016).

49. *Id.* at 488.

50. *Id.* (quoting ERNEST LUNGE, COMPULSORY WORKING AND REVOCATION OF PATENTS 2 (1910)).

51. *Id.* at 498.

52. Amanda Levendowski, *Trademarks as Surveillance Transparency*, 36 BERKELEY TECH. L. J. 439, 439 (2021).

53. 15 U.S.C.A. § 1051(a).

54. See Todd R. Weiss, *Amazon Apologizes for Price Testing Program that Angered Customers*, COMPUTERWORLD (Sept. 28, 2000, 12:00 AM), <https://www.computerworld.com/article/2588337/amazon-apologizes-for-price-testing-program-that-angered-customers.html> [<https://perma.cc/R5UG-UJDJ>].

consequences associated with algorithmic decision-making after the fact and are rarely apprised of their associated risks beforehand.⁵⁵

Congress enacted the Securities Exchange Act of 1934 (Exchange Act) to promote corporate transparency following discontent over corruption that contributed to the Great Depression.⁵⁶ The Act requires publicly traded corporations to file quarterly and annual reports to the SEC, which are available to the public.⁵⁷ The purpose of these disclosures, among other things, is to identify risks so that shareholders can make informed decisions about their investments.⁵⁸ Under the Exchange Act,⁵⁹ publicly held securities and companies of a certain size must file annual reports—Form 10-K—and quarterly reports—Form 8-K.⁶⁰ Of importance here, 17 C.F.R. § 229.105 requires disclosure of risk factors that “make an investment in the registrant or offering speculative or risky.”⁶¹ A sample of 10-K reports from tech companies shows the vast difference in reporting risks.⁶²

There is no consensus concerning what risks corporations have to report, but they consistently tend to report certain categories of risk. The most apparent example is cybersecurity risk.⁶³ Virtually every major company includes cybersecurity risks in their 10-K reports.⁶⁴ Perhaps these disclosures were meaningful at one time, but they have

55. This is clear because of the lack of shareholder calls for action in the absence of reporting of negative consequences. *See, e.g.*, Rebecca Klar, *Google Pressed To Conduct Racial Equity Audit*, THE HILL (April 28, 2021, 1:23 PM), <https://thehill.com/policy/technology/550723-google-pressed-to-conduct-racial-equity-audit> [<https://perma.cc/EE29-GX9L>] (calling for action *after* widespread reporting that lack of diversity at Google contributed to algorithmic bias on YouTube).

56. JACK ELLENBERGER & ELLEN MAHAR, LEGISLATIVE HISTORY OF THE SECURITIES ACT OF 1933 AND SECURITIES EXCHANGE ACT OF 1934, at ix (1973) (published for the Law Librarians' Society of Washington, D.C.).

57. Securities Exchange Act (Exchange Act) of 1934, 15 U.S.C. § 78m. The statute may also be referred to as the 1934 Act.

58. ELLENBERGER & MAHAR, *supra* note 56.

59. 15 U.S.C. § 78a–99.

60. Since this Comment focuses on a critical application of the Exchange Act, SEC regulations, and related case law, the Comment does not fully present the regulatory requirements related to SEC filings. For more in-depth treatment of the issue, see TREATISE ON THE LAW OF SECURITIES REGULATION, 79A C.J.S. *Securities Regulation* § 93 (2019).

61. 17 C.F.R. § 229.105 (2019).

62. *Compare* Salesforce, Annual Report (Form 10-K) (Mar. 17, 2021), *with* Amazon, Annual Report (Form 10-K) (Feb. 2, 2021).

63. Edward A. Morse et al., *SEC Cybersecurity Guidelines: Insights into the Utility of Risk Factor Disclosures for Investors*, 73 BUS. LAW. 1 (2018).

64. Grace F. Johnson, *Examining Cybersecurity Risk Reporting on US SEC Form 10-K*, ISACA J., Sept. 2018, at 3 (100% of the thirty-three companies examined from the S&P 100 Index in 2016 included “consequences of undetected incidents” as a risk in their 10-K reports).

deteriorated into a complicated web of boilerplate language that means little to a prospective investor.⁶⁵

The Exchange Act provides two causes of action that shareholders or the SEC can bring to deter dishonesty.⁶⁶ But over time, corporation-friendly court decisions have created a high pleading standard for plaintiffs that dilutes the ability of shareholders to bring suit.⁶⁷ If a corporation fails to disclose a significant risk or knowingly conceals a risk, either the SEC or shareholders could bring actions under § 10(b) for fraud and § 18 for misrepresentation. Generally, § 10(b) lawsuits arise more frequently because of that section's broader application and plaintiff-friendly damages calculation.⁶⁸ However, § 18 claims need not satisfy the heightened pleading requirement for fraud claims under § 10(b).⁶⁹ Therefore, both claims have an important and distinct role.

Despite the noble goals of the Exchange Act, disclosure requirements have fallen short of their target, particularly regarding disclosures of risk. As a heavily litigated area, corporations learned to disclose certain categories of risk broadly while glossing over pertinent details that investors need to make informed decisions. To address this, the SEC recently updated 17 C.F.R. § 229.105 for the first time in thirty years.⁷⁰ The Commission's goal was to account for new technological developments and improve the readability of disclosure documents. In pertinent part, § 229.105 now requires a two-page bullet-point summary. The amendment seeks a "principles-based disclosure framework" rather than imposing prescriptive categories.⁷¹ While that might be the intent, it fails to meet the needs of investors since it does not require entities to disclose whether and to what degree they rely on algorithmic systems or how coders developed those systems.

65. *Id.* at 5 (showing a trend toward vague or general disclosure of cybersecurity risks rather than specific risks).

66. The avenues for relief are found in §§ 10(b) and 18 of the Act.

67. Christopher J. Hardy, Comment, *The PSLRA's Heightened Pleading Standard: Does Severe Recklessness Constitute Scierter?*, 35 U.S.F. L. REV. 565 (2001).

68. Peter M. Saporoff, *Five Advantages to Section 18 of the Securities Act – A New Weapon for Institutions*, NAT'L L. REV. (Sept. 29, 2015), https://www.natlawreview.com/article/five-advantages-to-section-18-securities-act-new-weapon-institutions#google_vignette [<https://perma.cc/D2BM-4C8J>].

69. *Id.*

70. Modernization of Regulation S-K Items 101, 103, and 105, 85 Fed. Reg. 63726 (Oct. 8, 2020) (codified at 17 C.F.R. §§ 229, 239 & 240).

71. *Id.* at 63754.

IV. LEGAL ANALYSIS OF FRAUD AND MISLEADING CLAIMS UNDER THE EXCHANGE ACT

To illustrate how suits would proceed under the Exchange Act, consider the hypothetical scenario from the Introduction, described in greater detail here.

A reputable AI software development company provides an algorithmic decision-making system to ABC Corporation. The software company offers two packages: one-time purchase and software as a service (SaaS). For both packages, the software company designs and builds a software package to analyze data inputs provided by ABC Corporation. The software includes “deep learning,” meaning will evolve and learn based on the data inputs and desired outputs. The SaaS package provides ongoing support to fine-tune the software to support the customer’s goals and fix any unexpected issues. ABC Corporation purchased the one-time purchase package and told the software developers to maximize profits in its resale division and minimize risk in its consumer lending division.

Executives plan to blindly implement the system’s recommendations over a one-year period to see if its recommendations are more profitable than ABC Corporation’s traditional pricing structure. In ABC Corporation’s 10-K report, executives claim, “We are embarking on a bold plan to optimize profits in our car sales and consumer lending divisions. We expect to see a ten percent increase in profits over last year.” In the risk section of the 10-K, there is no mention of the algorithmic decision-making system and simply a general stipulation about market risks.

Six months into the trial period, ABC Corporation’s profits exceeded their expectations. However, the corporation recognized a strange trend: Black consumers routinely complained that they did not qualify for loans, and the car prices in low-income communities were higher than in wealthy communities. Executives were puzzled but continued to use the platform because of the impressive profits. The relationship between ABC Corporation and the software development company soured after ABC Corporation realized that its data team could not manipulate the proprietary platform. The software development company refused to help unless ABC Corporation purchased the significantly more expensive SaaS option. Nevertheless, ABC Corporation continued to use the software and ignored the complaints from Black consumers.

ABC Corporation’s Q1 8-K report highlighted the monumental success of the “bold plan to optimize profits,” claiming that it now projects that it will exceed the previous year’s profits by fifteen percent. In the risk section, ABC noted, “our new lending policies have attracted a number of nuisance arbitration actions alleging discrimination. Our top-flight data team is working closely with our compliance team to

ensure compliance with our corporate nondiscrimination policy. The arbitration actions will be handled swiftly and fairly through our partnership with ABC Arbitrators.”

The issue arising in this hypothetical is the same under § 10(b), fraud, or § 18, misleading claims: whether it is deceptive to omit the key fact that the “bold new plan” is actually the use of an algorithmic decision-making system. The analysis differs if the suit is an SEC enforcement action or a shareholder lawsuit; the SEC does not have to prove reliance on a statement or damages in a claim of fraud.⁷² Thus, to prove a claim of fraud under § 10(b), the SEC must show that there was (1) material misrepresentations or materially misleading omissions, (2) in the offer or sale of securities, (3) made with scienter.⁷³

While there are numerous SEC enforcement actions for fraud under § 10(b), there are very few specifically for failing to disclose risks in 10-K or 8-K reports.⁷⁴ Part of the reason could be artificial: SEC enforcement actions that occur wholly within the agency are not searchable in its database.⁷⁵ Another possibility is that the SEC might, as a policy matter, not prioritize enforcement actions for fraudulent misrepresentations of risks. Understandably, shareholders would have better visibility in the absence of other fraudulent behavior.

Analogizing algorithmic decision-making to traditional fraudulent misrepresentation like that in *Securities and Exchange Commission v. True North Financial Corp.* most likely would result in a dismissal. In the hypothetical, the statement that ABC expected to see a ten percent increase in profits over last year because of the corporation’s plan could violate § 10(b) if that statement knowingly misrepresented facts. But courts have defined scienter in this context to mean manipulative or deceptive conduct; courts limit manipulative conduct to certain types of trading practices that would not apply here.⁷⁶ Thus, the in-

72. Sec. & Exch. Comm’n v. Morgan Keegan & Co., 678 F.3d 1233, 1244 (11th Cir. 2012).

73. Sec. & Exch. Comm’n v. Merch. Cap., LLC, 483 F.3d 747, 766 (11th Cir. 2007).

74. See Sec. & Exch. Comm’n v. True N. Fin. Corp., 909 F. Supp. 2d 1073, 1087 (D. Minn. 2012) (holding that the statement of executives of a property ownership fund claiming a “risk of default” was a material misrepresentation made with scienter since the two principal executives were already in default in the wake of the 2008 financial crisis).

75. *Commission Opinions and Adjudicatory Orders*, U.S. SEC. & EXCH. COMM’N, <https://www.sec.gov/litigation/opinions.htm> [<https://perma.cc/7S9G-27YY>] (last visited May 18, 2021). The databases list cases by party name and release number, but it is not internally searchable. *Id.*

76. Aaron v. Sec. & Exch. Comm’n, 446 U.S. 680, 690–91, 694–95 (1980) (holding that the scienter standard under Rule 10b-5 applies to both private suits and enforcement actions brought by the SEC); see also THOMAS LEE HAZEN, *TREATISE ON THE LAW OF SECURITIES REGULATION* 626 (7th ed. 2016) (describing the evolution of case law on interpreting Rule 10b-5’s scienter requirement).

quiry would be whether the executives knew that omitting the details of their “bold new plan” was deceptive.

Dismissal is likely because using an algorithmic decision system is deceptive when executives know, before implementing the system, that it will produce an unintended consequence. The SEC could argue that it is deceptive to omit the fact that this new plan is the employment of an algorithmic decision-making system, but that would be a major leap for a court of first impression. A more likely application of § 10(b) would require showing that executives knew that the algorithmic decision-making system would generate negative consequences. But given the complexities of algorithmic decision-making systems, executives would not know about negative consequences until after implementing the system. The whole premise of algorithmic decision-making systems is that they can identify correlations that lead to “smarter” decisions that human operators are incapable of understanding.⁷⁷ Since the executive’s optimism was genuine and could not have been misleading until after the test period, the scienter element would not be satisfied in the hypothetical. Case dismissed.

If the hypothetical here cannot sustain an enforcement action under § 10(b), the question turns to whether the SEC could successfully bring an action under § 18 of the Exchange Act.⁷⁸ Liability for misleading statements applies where a statement is “at the time and in light of the circumstances under which it was made false or misleading with respect to any material fact.”⁷⁹ Similar to fraud claims, the plaintiff must show reliance on the statement in shareholder suits, but courts do not require that showing in SEC proceedings.⁸⁰ Unlike a fraud claim, misleading claims do not require the plaintiff or the SEC to show scienter.⁸¹ However, proof of good faith is an affirmative defense.⁸²

As a threshold matter, executives who rely on algorithmic decision-making systems are presumably always doing so in good faith. The good faith defense will save the hypothetical executive here. But what if the algorithmic decision-making system is a low-budget commercial product using bad training data? Courts should require due diligence

77. P.J.G. Lisboa, *Interpretability in Machine Learning—Principles and Practice*, in *FUZZY LOGIC AND APPLICATIONS* 15, 18 (Francesco Masulli et al. eds., 2013).

78. 15 U.S.C. § 78r; see *Newby v. Enron Corp.*, 540 F. Supp. 2d 800, 812–17 (S.D. Tex. 2007) (interpreting 15 U.S.C. § 78r). Under 15 U.S.C. § 78r, the plaintiff must show (1) that a document filed under the Exchange Act contained a false or misleading statement, (2) the plaintiff actually relied on the statement, and (3) the reliance caused a loss to the plaintiff.

79. *Newby*, 540 F. Supp. 2d at 812–13.

80. See Donald C. Langevoort, *Basic at Twenty: Rethinking Fraud on the Market*, 2009 WIS. L. REV. 151, 157 (2009).

81. See *U.S. Sec. & Exch. Comm’n v. Jensen*, 835 F.3d 1100, 1114 n.6 (9th Cir. 2016).

82. *Id.* at 1121.

in order to assert the good faith defense. Executives cannot operate with willful blindness or deliberate indifference to the possibility that their algorithmic system might create negative consequences.

In the hypothetical above, the executives initially acted in good faith. Once they became aware of alleged disparate impact, however, they were on notice that the algorithmic decision-making system perpetuated or even exacerbated discrimination. The SEC would have a strong argument that following the Q1 8-K report, omitting the material fact that the discriminatory lending practices resulted from an algorithmic system was misleading. That the corporation continued to refuse to pay for the SaaS package while using the platform means that an enforcement action brought by the SEC would likely survive a motion to dismiss. The disposition will turn on a fact-intensive inquiry, and, as a policy matter, the SEC might be hesitant to wade into those waters altogether.

In the realm of private litigation, the good faith defense couples with a heightened pleading requirement to create a high burden for plaintiffs to survive a motion to dismiss.⁸³ In response to a perceived onslaught of shareholder class action lawsuits, Congress enacted the Private Securities Litigation Reform Act⁸⁴ (PSLRA) to require plaintiffs to meet the heightened pleading requirements of the *Federal Rules of Civil Procedure*.⁸⁵ Despite this high burden, class action suits alleging fraud because of material misrepresentations in SEC disclo-

83. See 17 C.F.R. § 240.10b-5 (1951); see also *Loos v. Immersion Corp.*, 762 F.3d 880, 886–88 (9th Cir. 2014) (finding there are six elements to a securities fraud claim under § 10(b) and Rule 10b-5 that must be present to survive a motion to dismiss: “(1) a material misrepresentation or omission; (2) scienter (*i.e.* a wrongful state of mind); (3) a connection between the misrepresentation and the purchase or sale of a security; (4) reliance upon the misrepresentation . . . ; (5) economic loss; and (6) loss causation” (citing *Dura Pharm., Inc. v. Broudo*, 544 U.S. 336, 341–42 (2005))).

84. PRIVATE SECURITIES LITIGATION REFORM (PSLRA) ACT OF 1995, Pub. L. No. 104–67, 109 Stat. 737 (1995). The PSLRA was enacted to reduce a perceived onslaught of frivolous securities litigation. The Act requires: (1) pleading with particularity, (2) a strong inference of scienter, and (3) loss causation. *Id.* Congress passed the Act in 1995 over a veto of President Clinton. Lisa Girion, *1995 Tort Reform Act Said To Provide Safe Harbor for Fraud*, L.A. TIMES (July 21, 2002, 12:00 AM), <https://www.latimes.com/archives/la-xpm-2002-jul-21-fi-suits21-story.html> [<https://perma.cc/9GT6-GDFJ>]. It was originally envisioned by House Speaker Newt Gingrich during his pro-corporation “contract with America.” *Id.* Many now believe the Act contributed to corporate fraud and allowed companies to escape liability. *Id.*

85. See FED. R. CIV. P. 9(b); 15 U.S.C. § 78u–4(b)(1), (2); *Dura Pharms., Inc. v. Broudo*, 544 U.S. 336, 345 (2005) (explaining that plaintiffs that must “state with particularity facts giving rise to a strong inference that the defendant acted with the required state of mind”) (quoting 15 U.S.C. §§ 78u–4(b)(1), (2)).

tures are relatively common.⁸⁶ However, the disposition is typically either settlement after certification or dismissal.⁸⁷

The *Facebook* case demonstrates an extremely high burden on the plaintiff class, even at the pleading stage, to allege fraudulent misrepresentation in a private lawsuit.⁸⁸ Turning to our hypothetical, it is unlikely that a shareholder class action lawsuit under § 10(b) could survive a motion to dismiss. As in *Facebook*, here the executive knew that the algorithmic decision-making system produced an unexpected negative consequence but only highlighted the increase in profits. However, all of the statements are forward-looking and if accompanied by cautionary statements, would fall into the safe harbor provision of PSLRA. Here, the excerpt about profit expectations does not incorporate a cautionary statement, but the risk section does include a general statement about market risks.

The same overconfidence that could lead an executive to tout the prowess of an algorithmic decision-making system would provide proof of good faith, to defeat a claim under § 18, and a lack of scienter, to defeat a claim under § 10(b). This result follows because courts currently interpret scienter as the state of mind of the person making the statement, not the state of mind of the programmer, developer, or the algorithmic system. The only conceivable way to meet the scienter element would be if the executive knew that the algorithmic system was flawed, in which case they probably would not make an overly confident statement in an SEC disclosure.

If shareholders were able to show scienter under § 10(b), the plaintiff would also have to show causation. Causation means a but-for connection between the alleged action and the drop in share price.⁸⁹ Applied to the hypothetical, plaintiffs would have to show that the “bold new plan” and associated arbitrations caused a drop in share price. The more likely scenario is that the share price would rise, driven by profits that exceeded even the executive’s ambitious predictions. In the realm of algorithmic decision-making systems specifically, and technology more broadly, causation is a difficult matter.

As currently interpreted by the courts, the Exchange Act is incapable of addressing concerns related to reliance on algorithmic decision-making systems. To make meaningful change, courts or Congress

86. *See, e.g., In re Facebook, Inc. Sec. Litig.*, 405 F. Supp. 3d 809, 818 (N.D. Cal. 2019).

87. *Id.* at 832, 834, 847–49 (dismissing the case because the executive statements downplaying the Cambridge Analytica scandal were protected by the PSLRA safe harbor provision since they were accompanied by “meaningful cautionary statements” and because executives thought the issues had been fixed, so the scienter element under § 10(b) was not met).

88. *Id.* at 832.

89. Langevoort, *supra* note 80, 173–81 (discussing the presumption that efficient markets will react to “bad news”).

should update the scienter and causation elements of § 10(b) and require due diligence to claim the good faith defense under § 18.

V. PROPOSAL FOR TRANSPARENCY INTO CORPORATE RELIANCE ON ALGORITHMIC DECISION SYSTEMS

Change is needed to protect civil society from the unintended consequences of algorithmic decision-making systems, but it is important to do so while not unnecessarily obstructing the uncontested benefits from those systems. To promote that goal, this Comment proposes three things. First, Congress and the SEC should modernize disclosure requirements under the Exchange Act. Second, courts or Congress should update the scienter and causation elements of fraud claims under the Exchange Act. Third, Congress should mandate meaningful interaction between the USPTO and the SEC to improve corporate transparency while progressing the underlying purposes of both intellectual property and securities law.

A. Reform 10-K and 8-K Reports

Corporations should disclose reliance on algorithmic systems now because algorithmic systems introduce risk that is material to business operations. Even a modest interpretation of 17 C.F.R. § 229.105 requires disclosure if algorithmic systems' decisions are material, that is, if they could adversely affect the corporation's present or future business expectations.⁹⁰ Many corporations are already relying on algorithmic systems to make such decisions.⁹¹ They might argue that the algorithmic systems only recommend business decisions and executives make the actual decisions. But that argument is flawed. If an algorithmic system recommends a course of action and is unable to justify its reasoning, then the material decision is the one the algorithm makes, not the thumbs-up or thumbs-down from executives.

This point about corporate decision-making is not a new issue that arises only because of algorithmic decision systems. To illustrate this point, imagine a scenario where an executive relies on recommendations from a team of in-house economists. When faced with questions from the SEC or by shareholders, the executive would either learn the intricacies of the reasoning or bring along one of the leading economists to articulate the reasoning. But either way, the executive is the one who will be held accountable for the decision. In the context of algorithmic decision-making, it is virtually impossible for an executive

90. *Yan v. ReWalk Robotics Ltd.*, 973 F.3d 22, 33 (1st Cir. 2020).

91. See Mihailis E. Diamantis, *The Extended Corporate Mind: When Corporations Use AI To Break the Law*, 98 N.C.L. REV. 893, 896 (2020) (discussing Vital, an algorithm that was appointed to the board of Deep Knowledge Ventures and helped it avoid bankruptcy by evaluating potential investments).

to articulate the precise justification of the algorithm's specific recommendation. The executive can only justify it by showing the underlying algorithmic system is sound. Therefore, it is material to the decision-making process to disclose the use and reliability of an algorithmic system.

As demonstrated by disclosures related to cybersecurity, even if corporations do disclose reliance on algorithms, without specific requirements from the SEC, they will likely do it in such an opaque manner that it fails to inform potential investors. Instead, the SEC should consider a return to prescriptive disclosure requirements. More precisely, the SEC should require corporations to disclose the specific patented technology that they rely on if those systems influence decisions that are material to business operations. Additional disclosure about system maintenance, training data, and verification should be required. Requirements like this could be incorporated by policy guidance, but rulemaking would be necessary to create meaningful change.

Professors Mulligan and Bamberger proposed algorithmic impact assessments as a novel method for disclosures related to algorithmic systems in the government sector.⁹² They argue that government agencies that use algorithmic decision-making systems should conduct an algorithmic impact assessment much in the same way that government agencies conduct environmental impact assessments currently.⁹³ The assessment would document a dialogue between the government agency and the software developer, showing target metrics, training data, and how the vendor mitigated bias. The assessment would be publicly available and serve as a testament to the agency's commitment to transparency.

The SEC should require an algorithmic impact assessment provision within 10-K disclosures under 17 C.F.R. § 229.105. This approach addresses the key issues head-on since it prompts corporate executives to investigate, participate, and document the parameters within which their algorithmic systems will operate. Although corporations might scoff at the additional burden, it is work they should already be doing. The minimal disclosure in a 10-K will not impact their competitive advantage or disclose trade secret information. Further, this solution provides clarity and predictability because it provides specific requirements rather than adapting existing requirements on a decision-by-decision basis. Simply put, if a corporation uses an algorithmic system to make material business decisions, it should be required to complete an algorithmic impact assessment and disclose it to the SEC.

92. Mulligan & Bamberger, *supra* note 19, at 824, 835–38.

93. *Id.* at 836.

B. Reevaluate the Scierer Element of Fraud Claims and Good Faith Defense to Misleading Claims

A court applying existing precedent to evaluate scierer would look at the state of mind of the executive who communicated the decision that the algorithm made. But this analysis breaks down. The executive will not have the requisite state of mind if they implement a decision made by an algorithmic system unless they know that the system is flawed. The troubling consequences of algorithmic systems are often unforeseeable and take time to become apparent. Consider the example of consumer lending algorithmic systems that resulted in racially biased lending practices.⁹⁴ There, executives thought they were making well-informed decisions using the best data available. The scierer element, even in the worst scenarios to date, has not been satisfied.⁹⁵

Instead, the scierer element should evolve to become a question of whether the corporation used due diligence to adopt the best available technology, follow industry best practices, or establish a similar “reasonable corporation” standard. In effect, scierer analysis should look at the state of mind of the executives during the acquisition, development, training, and operation of the algorithmic decision system. Under this approach, a court would look at whether the corporation inquired about diversity in the programmers behind the software, what the training data set encompassed, and how the software provider and corporation would interact in the future to modify the system and correct for unforeseen consequences. Perhaps this analysis would look at the algorithmic impact assessment recommended in the previous section. If the corporation conducted an algorithmic impact assessment, the assessment might say, for example, that each quarter the corporation will evaluate results for discriminatory impact. A court could consider that when evaluating scierer. Similarly, if the corporation completed an assessment and followed its recommendations, then it would not meet the scierer element and could claim the good faith defense when defending a claim under § 18.

In the hypothetical proposed above, this new standard would allow a private litigant, or the SEC, to meet the scierer element since ABC Corporation did not adequately correct for biases nor did it establish a mechanism for correcting the issue. A private litigant would still have to prove causation and reliance to the heightened standard required under the PSLRA, but at least the claim would have a chance to proceed beyond the motion to dismiss phase. The SEC would have a

94. See Miller, *supra* note 2.

95. Yavar Bathaee, *The Artificial Intelligence Black Box and the Failure of Intent and Causation*, 31 HARV. J.L. & TECH. 889, 913 (2018) (arguing that the predominant “Effect Intent” test for scierer which “requires that a person intended the unlawful consequences of his action” is problematic when applied to algorithmic decision-making).

strong claim under this new standard against ABC Corporation. In a claim under § 18, this standard would preclude the good faith defense since ABC Corporation knew about potential biases and failed to take corrective action.

C. Require Interagency Coordination Between the USPTO and the SEC

Transparency about when and how a corporation relies on patented algorithmic decision systems promotes the policy goals of both intellectual property and securities law. Since intellectual property law seeks to disseminate information so that others can improve upon existing inventions, it is valuable for inventors to know which patents corporations rely on to make their most important business decisions. Securities laws also seek transparency, but it values transparency as a way to prevent corruption. Coordination between the USPTO and the SEC could help both agencies achieve their goals while also incorporating much-needed transparency into algorithmic systems.

The missing element in current SEC disclosures is determining which specific patents corporations rely on to make material business decisions. A working group with representatives from both agencies could easily find overlap and propose creative solutions to this problem. The SEC already links to the USPTO on its website, where it lists patents held by a corporation.⁹⁶ Admittedly, the SEC would have to leverage its authority under 17 C.F.R. § 229.105 to get corporations to identify those patents that the corporation relies on to make material business decisions, but that aligns with the underlying purpose of the Exchange Act and is far from arbitrary and capricious agency action.

Without cooperation between the two offices, the SEC alone might miss the mark. The USPTO faces an abundance of challenges, and the patentability of algorithmic systems is questionable. Some commentators believe there is an overabundance of patents issued by the USPTO that have led to an excessively broad range of patentable material.⁹⁷ Perhaps greater cooperation between the USPTO and the SEC could work towards solving that problem too. Indeed, if corporations are required to flag the patents they use for material business decisions, then the patents they do not use would be identified by virtue of not being flagged. Perhaps that could reveal trends that would allow the USPTO to draw a finer distinction based on the utility of algorithmic patents under § 101 rather than its current reliance on patentable subject matter under § 101 and *Alice*.⁹⁸

96. *Commission Opinions and Adjudicatory Orders*, *supra* note 75.

97. David S. Olson, *Taking the Utilitarian Basis for Patent Law Seriously: The Case for Restricting Patentable Subject Matter*, 82 TEMP. L. REV. 181, 212 n.111 (2009).

98. *Alice Corp. Proprietary Ltd. v. CLS Bank Int'l*, 573 U.S. 208 (2014).

VI. CONCLUSION

Corporate decision-making that executives delegate to algorithms creates risk. The foregoing proposals seek to protect civil society, and the corporations themselves, from those risks. While corporations should already be performing due diligence prior to adopting algorithmic decision systems, history shows that many do not. It is well within the SEC's authority to adapt its disclosure requirements. Simultaneously, Congress should act too. The Exchange Act serves the purpose of informing investors of risks, but the Exchange Act has not evolved to address the risks associated with state-of-the-art technology in the corporate context. The underlying policy goals of the SEC align with the USPTO's goals in this area, and perhaps greater collaboration between the two agencies will spur a solution. With the proposals recommended here, shareholders will get a slightly better glimpse into the corporate decision-making process that will inform their investment decisions and provide another layer of assurance that algorithmic systems will not perpetuate bias and discrimination.