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Autonomous Corporate Personhood

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AUTONOMOUS CORPORATE PERSONHOOD

Carla L. Reyes*

Abstract: Several states have recently changed their business organization law to accommodate autonomous businesses—businesses operated entirely through computer code. A variety of international civil society groups are also actively developing new frameworks—and a model law—for enabling decentralized, autonomous businesses to achieve a corporate or corporate-like status that bestows legal personhood. Meanwhile, various jurisdictions, including the European Union, have considered whether and to what extent artificial intelligence (AI) more broadly should be endowed with personhood to respond to AI’s increasing presence in society. Despite the fairly obvious overlap between the two sets of inquiries, the legal and policy discussions between the two only rarely overlap. As a result of this failure to communicate, both areas of personhood theory fail to account for the important role that socio-technical and socio-legal context plays in law and policy development. This Article fills the gap by investigating the limits of artificial rights at the intersection of corporations and artificial intelligence. Specifically, this Article argues that building a comprehensive legal approach to artificial rights—rights enjoyed by artificial people, whether corporate entity, machine, or otherwise—requires approaching the issue through a systems lens to ensure that the legal system adequately considers the varied socio-technical contexts in which artificial people exist.

To make these claims, this Article begins by establishing a terminology baseline, and emphasizing the importance of viewing AI as part of a socio-technical system. Part I then concludes by reviewing the existing ecosystem of autonomous corporations. Parts II and III then examine the existing debates around artificially intelligent persons and corporate personhood, arguing that the socio-legal needs driving artificial personhood debates in both contexts include: protecting the rights of natural people, upholding social values, and creating a fiction for legal convenience. Parts II and III also explore the extent to which the theories from either set of literature fits the reality of autonomous businesses, illuminating gaps and using them to demonstrate that the law must consider the socio-technical context of AI systems and the socio-legal complexity of corporations to decide how autonomous businesses will interact with the world. Ultimately, the Article identifies and leverages links between both areas of legal personhood to demonstrate the Article’s core claim: developing law for artificial systems in any context should use the *systems* nature of the technical artifact to tie its legal treatment directly to the system’s socio-technical reality.

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INTRODUCTION

In 1986, Meir Dan-Cohen offered a fictional story of entrepreneur Rupert Personless to illustrate the boundaries of corporate personhood.¹ In the story, Rupert Personless, together with several partners, incorporated Personless Corporation to manufacture small widgets.² As the company grew, it hired employees and operated a number of factories, eventually going public.³ Over time, the number of shareholders climbed,

1. MEIR DAN-COHEN, RIGHTS, PERSONS AND ORGANIZATIONS: A LEGAL THEORY FOR BUREAUCRATIC SOCIETY 46–51 (1986).

2. *Id.* at 46.

3. *Id.*

Rupert Personless and the other original founders retired, and a professional management team effectively controlled the company.⁴ At some point, Personless Corporation bought-back all of its outstanding stock, fired all its employees, and transferred all management powers to computers, such that Personless Corporation lived up to its name: a fully automated, ownerless corporation operating without a single person.⁵ Dan-Cohen argued that the transition from human managed to computer managed corporation changed little in terms of Personless Corporation's status under the law.⁶ Regardless of who or what managed the corporation, Personless Corporation enjoyed the right to enforce contract and property rights, and held a duty to perform its contractual obligations.⁷ Throughout its life—both when managed by humans and when fully automated—Personless Corporation supported political candidates with positions favorable to its business and donated to local charities, activities generally associated with human actors.⁸ The story of Personless Corporation's transition into a corporate “intelligent machine”⁹ shines a light on the fact that the organizational realities of a corporation resemble very few characteristics of persons.¹⁰ The story of Personless Corporation thus serves, and has served for more than three decades, as an analytical tool that demonstrates the pain points in the doctrine of corporate personhood.¹¹ If a corporation with no people receives the same legal treatment as a closely held corporation operated by people at every level, does the fiction of corporate personhood need to be revisited?

In another area of law, similar to the questions generated by the Personless Corporation hypothetical, scholars and law-makers consider whether and under what circumstances a robot or other artificial

4. *Id.*

5. *Id.* at 47.

6. *Id.* (“[Personless Corporation] had become not only an ownerless corporation, but also a fully automated corporation. This fact, again, had little effect on the manufacture of small widgets, nor did it alter the legal status of Personless in any important way.” (internal citation omitted)).

7. *Id.* at 47–48.

8. *Id.* at 46–48.

9. *Id.* at 49 (“The intelligent machine, into which Personless corporation has thus evolved, may therefore be a cogent way to think about corporations and other organizations.”).

10. *Id.* at 50 (“[The metaphor of the intelligent machine] is thus not meant to relieve us from confronting the reality of the organization. Quite the contrary: it is, indeed, one of the merits of the intelligent machine metaphor that it forces us to such a confrontation, since, unlike the metaphor of person, it does not allow us to ignore the reality of the organization by simply assimilating it to a prevailing individualistic framework.”).

11. Elizabeth Pollman, *Reconceiving Corporate Personhood*, 2011 UTAH L. REV. 1629, 1670–71 [hereinafter Pollman, *Reconceiving Corporate Personhood*].

intelligence (AI) should be treated as a person.¹² For many in the AI arena, finding a way to make AI liable when things go wrong represents the central and most important inquiry.¹³ However, conferring personhood to make AI a subject of law also endows AI with agency under the law.¹⁴ Such agency, in turn, raises the question of whether the law should recognize rights alongside liability.¹⁵ When would recognizing such rights be appropriate, and under what policy rationale? Generalized slightly, scholars in both arenas—AI personhood and corporate personhood—grapple with several core doctrinal questions: when should the law recognize artificial systems¹⁶ as artificial people, and once it has done so,

12. See generally Kate Darling, *Extending Legal Protection to Social Robots: The Effects of Anthropomorphism, Empathy, and Violent Behavior Towards Robotic Objects*, in *ROBOT LAW* 213 (Ryan Calo, A. Michael Froomkin & Ian Kerr eds., 2016) [hereinafter *Legal Protection for Social Robots*] (arguing that the law should treat robots more like animals in certain contexts where humans anthropomorphize robots as a tool for discouraging certain bad human behavior); Kate Darling, “Who’s Johnny?” *Anthropomorphic Framing in Human-Robot Interaction, Integration, and Policy*, in *ROBOT ETHICS 2.0: FROM AUTONOMOUS CARS TO ARTIFICIAL INTELLIGENCE* 173 (Patrick Lin, Keith Abney & Ryan Jenkins eds., 2017) (exploring the role of anthropomorphic framing on human-machine interaction); SVEN NYHOLM, *HUMANS AND ROBOTS: ETHICS, AGENCY, AND ANTHROPOMORPHISM* (2020) (exploring agency as a lens for evaluating ethical and responsible human-machine interaction).

13. See generally Iria Giuffrida, *Liability for AI Decision-Making: Some Legal and Ethical Considerations*, 88 *FORDHAM L. REV.* 439 (2019) (considering the liability risks from use of AI systems and proposing a framework for policy and ethical decision-making around holding AI and its creators accountable); Gerhard Wagner, *Robot, Inc.: Personhood for Autonomous Systems?*, 88 *FORDHAM L. REV.* 591 (2019) (weighing arguments for making AI directly liable against arguments for imposing strict product liability on manufacturers and fault liability on users); Mark A. Lemley & Bryan Casey, *Remedies for Robots*, 86 *U. CHI. L. REV.* 1311 (2019) (theorizing a law of remedies for robots).

14. Here, the word agency is used for its dictionary meaning, rather than as a legal concept or doctrine referring to a principle-agent relationship. When regulators seek to give AI systems legal personhood to hold them liable for harmful acts, a key legal principle applies—namely, “[p]erhaps the most basic concept in legal liability in general and tort liability, in particular, is that the law governs the behavior of people and liability could only be attributed to a person demonstrating the capability to act as a purposive agent.” Omri Rachum-Twaig, *Whose Robot Is It Anyway?: Liability for Artificial-Intelligence-Based Robots*, 2020 *U. ILL. L. REV.* 1141, 1150.

15. See, e.g., Toni M. Massaro & Helen Norton, *Siri-ously? Free Speech Rights and Artificial Intelligence*, 110 *NW. U. L. REV.* 1169, 1175 (2016) (asking whether the First Amendment should cover the speech of AI speakers). See generally Shlomit Yanitsky-Ravid, *Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era—The Human-Like Authors Are Already Here—A New Model*, 2017 *MICH. ST. L. REV.* 659 (considering when and whether AI authors should receive rights under copyright law in addition to liability for their violations).

16. The term “system” is defined differently across many disciplines, yet, as one scholar notes: “[T]hese definitions share several common, persistent elements: A system has an objective or goal (in other words, it has defined *Work* to be accomplished). A system contains multiple components (or *Resources*). A system’s components work together, each performing defined functions, to enable the objective or goal to be achieved.” JEFFREY RITTER, *ACHIEVING DIGITAL TRUST: THE NEW RULES FOR BUSINESS AT THE SPEED OF LIGHT* 133 (2015) (emphasis in original). A separate component of

how should the law draw limits around the scope of artificial rights?

Although scholars agree that under the current corporate personhood doctrine, corporations can possess constitutional rights,¹⁷ identifying which rights and the scope of those rights remain the subject of much debate.¹⁸ This debate often downplays the Personless Corporation story as implausible¹⁹ and therefore of limited use in crafting a principled approach to limiting artificial rights in the corporate context. However, emerging technology, such as blockchain technology and machine learning, enables nearly real-life versions of the Personless Corporation, bringing the pain points that autonomous corporations inject into the doctrine of corporate personhood center stage.²⁰ Scholarly treatment of such autonomous business enterprises to date focuses on whether and how

systems includes the rules that govern the system's behavior. *Id.* at 145. When I argue that the law must look at artificial systems and consider their socio-technical and socio-legal aspects, I draw upon this idea of systems as including the rules that govern them—including technological rules, legal rules, and rules of social interaction (like ethics and other concepts that might be called “soft law”).

17. *See, e.g.*, Pollman, *Reconceiving Corporate Personhood*, *supra* note 11, at 1670 (“[T]he corporate personhood doctrine stands for little more than the mere recognition that corporations can hold rights.”); Elizabeth Pollman, *A Corporate Right to Privacy*, 99 MINN. L. REV. 27, 32 (2014) [hereinafter Pollman, *Corporate Privacy*] (explaining that the Supreme Court has “often relied on a view of the corporation as an association in extending rights to corporations on a derivative basis”); Kent Greenfield, *In Defense of Corporate Persons*, 30 CONST. COMMENT. 309, 316 (2015) (“But one piece of analysis is indeed easy: the argument that corporations should not have standing to assert *any* constitutional right is quite weak indeed.” (emphasis in original)).

18. *See, e.g.*, Pollman, *Reconceiving Corporate Personhood*, *supra* note 11, at 1659–63 (arguing that a disconnect exists between the modern Supreme Court's corporate personhood decisions and the three personhood theories); Pollman, *Corporate Privacy*, *supra* note 17, at 30–32 (arguing that “most corporations in most circumstances should not have a constitutional right to privacy” and outlining initial reasons in support); Margaret M. Blair & Elizabeth Pollman, *The Derivative Nature of Corporate Constitutional Rights*, 56 WM. & MARY L. REV. 1673, 1677 (2015) (“[T]he Court's characterization of corporations as associations has not properly evolved to account for the wide spectrum of organizations labeled ‘corporations.’ This has become increasingly problematic as the Court has moved from early case law concerning the property and contract rights of corporations to the realm of corporate speech, political spending, and the exercise of religion.”); Carliss N. Chatman, *The Corporate Personhood Two-Step*, 18 NEV. L.J. 811, 813 (2018) (explaining that “Courts have accepted the rights of corporations as a foregone conclusion based in part on a flawed understanding of corporate formation and governance” and arguing for an approach that honors state law and choices of business founders at formation); Lyman P.Q. Johnson, *Relating Fiduciary Duties to Corporate Personhood and Corporate Purpose*, in RESEARCH HANDBOOK ON FIDUCIARY LAW 260, 260 (D. Gordon Smith & Andrew S. Gold eds., 2018) (explaining that “the notion of corporate personhood is unendingly controversial”); Lyman P.Q. Johnson & David K. Millon, *Corporate Law After Hobby Lobby*, 70 BUS. LAW. 1, 10 (2015) (discussing the debate in the *Hobby Lobby* case as to whether or not a corporation can exercise religion).

19. Pollman, *Reconceiving Corporate Personhood*, *supra* note 11, at 1670 (“[T]he intelligent machine metaphor seems implausible because it contemplates a corporation without human involvement . . .”).

20. For a deeper discussion of such entities and how they operate, see Carla L. Reyes, *Autonomous Business Reality*, 21 NEV. L.J. 437 (2021) [hereinafter Reyes, *ABR*].

such businesses may achieve recognition as a legal entity.²¹ In concluding that autonomous businesses can achieve the status of a legal entity, including via the corporate form, the current literature hints at the need to revisit the question of how the Personless Corporation impacts corporate personhood, but generally reserves that topic for further investigation.²² This Article picks up that line of investigation and argues that an adequate approach to autonomous corporate personhood requires looking beyond traditional corporate rights doctrine to artificial personhood more broadly.

The literature investigating when and whether to confer legal personhood on AI, however, focuses largely on one of two issues, neither of which reflect industry reality. On the one hand, a significant segment of artificial personhood scholarship advocates for determining a legal regime for AI before developers build functioning general AI,²³ a type of AI which, if it existed, would exhibit true consciousness.²⁴ Those that focus on the industry state of the art (narrow AI),²⁵ on the other hand, extol the virtues of caution in this arena—noting a strong concern that even narrow AI acts without human intervention, unpredictably, and

21. See, e.g., Lynn M. LoPucki, *Algorithmic Entities*, 95 WASH. U. L. REV. 887 (2018) (suggesting methods for creating an algorithmic limited liability corporation, limited partnership, and corporation under existing law); Shawn Bayern, *The Implications of Modern Business-Entity Law for the Regulation of Autonomous Systems*, 19 STAN. TECH. L. REV. 93, 94–96 (2015) [hereinafter Bayern, *Autonomous Systems*] (demonstrating a technique for creating an algorithmically operated limited liability company); Carla L. Reyes, *If Rockefeller Were a Coder*, 87 GEO. WASH. L. REV. 373 (2019) [hereinafter Reyes, *Rockefeller*] (suggesting the use of a business trust as a formal business structure for certain blockchain protocols, decentralized organizations, and smart contracts).

22. Shawn Bayern, *Of Bitcoins, Independently Wealthy Software, and the Zero Member LLC*, 108 NW. U. L. REV. 1485, 1487 (2014) [hereinafter Bayern, *Of Bitcoins*]; Bayern, *Autonomous Systems*, *supra* note 21, at 95; Shawn Bayern, Thomas Burri, Thomas D. Grant, Daniel M. Häusermann, Florian Möslin & Richard Williams, *Company Law and Autonomous Systems: A Blueprint for Lawyers, Entrepreneurs, and Regulators*, 9 HASTINGS SCI. & TECH. L.J. 135, 138 (2017); Reyes, *Rockefeller*, *supra* note 21, at 378 n.24; Matthew U. Scherer, *Of Wild Beasts and Digital Analogues: The Legal Status of Autonomous Systems*, 19 NEV. L.J. 259, 261–65 (2018); Shawn Bayern, *Are Autonomous Entities Possible?*, 114 NW. U. L. REV. ONLINE 23, 26 (2019).

23. See, e.g., Massaro & Norton, *supra* note 15, at 1172–75 (concluding strong AI could generate speech worthy of First Amendment protection); Toni M. Massaro, Helen Norton & Margot E. Kaminiski, *Siri-ously 2.0: What Artificial Intelligence Reveals About the First Amendment*, 101 MINN. L. REV. 2481, 2483 (2017) (building on the claim that strong AI speech would qualify for First Amendment protection); Evan J. Zimmerman, *Machine Minds: Frontiers in Legal Personhood* 41 (Aug. 28, 2017) (unpublished manuscript), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2563965 [<https://perma.cc/ENL8-2QW7>] (arguing that strong AI should receive legal personhood).

24. Brian L. Frye, *The Lion, the Bat & the Thermostat: Metaphors on Consciousness*, 5 SAVANNAH L. REV. 13, 19 (2018).

25. Harry Surden, *Artificial Intelligence and Law: An Overview*, 35 GA. ST. U. L. REV. 1305, 1309 (2019) [hereinafter Surden, *AI Overview*] (“Instead, today’s AI systems excel in narrow, limited settings, like chess, that have particular characteristics—often where there are clear right or wrong answers, where there are discernible underlying patterns and structures, and where fast search and computation provides advantages over human cognition.”).

opaquely.²⁶ However, each of these approaches ignores the extremely varied socio-technical contexts of AI use cases and fails to consider how socio-technical differences in AI systems may impact the legal analysis. This reflects a significant gap in the literature because developing appropriate legal rules increasingly requires considering the socio-technical context in which the technology is used.²⁷ Doing so is difficult, however, when generalizing about either general AI or narrow AI. As a result, this Article uses the application of AI in one social context—autonomous businesses—as an opportunity to demonstrate a systems approach to answering questions about the nature and scope of legal personhood for artificial systems.

This Article demonstrates the importance of considering the socio-technical context when developing law for artificial systems by investigating the limits of artificial rights at the intersection of corporations and AI. Indeed, the increasingly automated nature of corporate operations and management offers a vehicle through which to advance the discussion of corporate rights, and, inversely, the long history of granting artificial rights to corporations holds lessons for outlining the contours of artificial rights in the AI context. Specifically, this Article argues that building a comprehensive legal approach to artificial rights (rights enjoyed by artificial people, whether entity, machine, or otherwise), requires approaching the issue through a systems lens. Doing so demands a higher level of interdisciplinarity than what typically dominates siloed areas of legal theory like corporate law.²⁸ A systems approach allows the law to take account of the varied socio-technical contexts in which these systems arise using a reasoned and predictable approach.

To make these claims, Part I begins by establishing terminology and emphasizes the importance of viewing AI as part of a socio-technical system. Part I then reviews the varied nature of existing autonomous entities. Parts II and III examine the existing debates around both artificially intelligent persons and corporate personhood. In particular, the Article argues that the socio-legal needs driving artificial personhood debates in both contexts include protecting the rights of individual people, upholding social values, and creating a fiction for legal convenience.

26. Nadia Banteka, *Artificially Intelligent Persons*, 58 HOUS. L. REV. 537, 547 (2021) (“Deep machine learning algorithms are challenging for the law for three related reasons: they are unpredictable, they are opaque, and they are increasingly autonomous.”).

27. Madeline Clare Elish, *Moral Crumple Zones: Cautionary Tales in Human-Robot Interaction*, 5 ENGAGING SCI., TECH. & SOC’Y 40, 50–52 (2019).

28. For a discussion of the silos in corporate law, see Carliss N. Chatman, *Myth of the Attorney Whistleblower*, 72 SMU L. REV. 669, 676–86 (2019).

Parts II and III explore the extent to which the theories from either set of literature fits the reality of autonomous business. The resulting gap analysis demonstrates that the literature's discussion of autonomous corporate personhood leaves out several types of autonomous businesses because the law tends to think of autonomous businesses as just one thing or another. Ultimately, the Article uses these gaps to argue that the law must consider socio-legal and socio-technical context to decide the legal terms under which an autonomous business should interact with the world. Part IV identifies links between theories of legal personhood that drive both the artificial intelligence and corporate debates. Part IV then uses those linkages to identify core lessons for approaching questions of artificial personhood moving forward. The Article concludes by considering the implication of its core argument: the need for a fundamentally different approach to developing law related to artificial systems in any context—one that uses the systems nature of the technical artifact²⁹ to tie its legal treatment directly to the system's socio-technical and socio-legal reality.

I. ARTIFICIAL PERSONHOOD AND THE IMPORTANCE OF SOCIO-TECHNICAL CONTEXT

The concept of personhood for artificial entities is not new. Rather, a diverse set of stakeholders asking a diverse set of policy questions have explored the frontiers of artificial personhood in a variety of contexts for decades.³⁰ Fascinatingly, these divergent explorations rarely engage each other.³¹ To help bridge this gap, this Part argues that any approach to

29. The term artifact refers to “a discrete material object, consciously produced or transformed by human activity, under the influence of the physical and/or cultural environment.” Mark C. Suchman, *The Contract as Social Artifact*, 37 *LAW & SOC'Y REV.* 91, 98 (2003); see also Jeffrey M. Lipshaw, *The Persistence of “Dumb” Contracts*, 2 *STAN. J. BLOCKCHAIN L. & POL'Y* 1, 8 (2019) (applying Suchman's definition to blockchain-based smart contracts). “A technical artifact is one, like a tool or a machine, that serves a utilitarian, productive purpose.” Lipshaw, *supra*, at 8–9 (citing Suchman, *supra*, at 99–100).

30. See, e.g., Christopher D. Stone, *Should Trees Have Standing?—Toward Legal Rights for Natural Objects*, 45 *S. CAL. L. REV.* 450, 456 (1972) (advocating for endowing “forests, oceans, rivers and other so-called ‘natural-objects’ in the environment” with legal rights); Lawrence B. Solum, *Legal Personhood for Artificial Intelligences*, 70 *N.C. L. REV.* 1231 (1992) (considering the potential grounds for recognizing AI as a legal person); SAMIR CHOPRA & LAURENCE F. WHITE, *A LEGAL THEORY FOR AUTONOMOUS ARTIFICIAL AGENTS* (2011) (exploring the implications of personhood for artificial agents for agency, contract law, tort liability, and regulations that rely upon a knowledge standard); S.M. Solaiman, *Legal Personality of Robots, Corporations, Idols and Chimpanzees: A Quest for Legitimacy*, 25 *A.I. & L.* 155, 165 (2017) (arguing that in the context of industrial robots with some degree of self-control, it is inappropriate to recognize legal personhood for robots).

31. For the rare exploration of both corporate personhood and legal personhood for artificial

deciding when to recognize artificial rights and how to limit such rights must begin by viewing the technical artifact in question as a system even before the law awards it “personhood.” To do so, this Part first defines several key terms and emphasizes the importance of the socio-technical context when building legal rules for AI.³² Taking up autonomous business as one particular socio-technical context for exploring legal personhood, this Part concludes by demonstrating the varied nature of existing autonomous corporations.

A. *Preliminary Matters: Defining Key Terms and Level-Setting on Key Paradigms*

Although level-setting technology terms always represents a worthwhile endeavor, doing so in the realm of artificial intelligence (AI) is always difficult, given the lack of a generally agreed upon definition.³³ In the most general sense, however, AI refers to “a human-made machine that can replicate a cognitive function of a human.”³⁴ Many computational

intelligence, see, for example, Banteka, *supra* note 26, which empirically reviews cases involving legal personhood, including corporate personhood, and concludes the courts’ approach does not support legal personhood for AI entities and argues that legislators should exercise extreme caution before extending personhood to AI entities. See also Joanna J. Bryson, Mihailis E. Diamantis & Thomas D. Grant, *Of, For, and By the People: The Legal Lacuna of Synthetic Persons*, 25 A.I. & L. 273, 279 (2017) (using legal and philosophical frameworks to evaluate legal personhood for other non-human entities, including corporations, to conclude that “the case for electronic personhood is weak”); Wagner, *supra* note 13 (drawing lessons for corporate legal personhood to explore AI liability under tort law); Thomas Burri, *Free Movement of Algorithms: Artificially Intelligent Persons Conquer the European Union’s Internal Market*, in RESEARCH HANDBOOK ON THE LAW OF ARTIFICIAL INTELLIGENCE 537 (Woodrow Barfield & Ugo Pagallo eds., 2018).

32. Carla L. Reyes & Jeff Ward, *Digging into Algorithms: Legal Ethics and Legal Access*, 21 NEV. L.J. 325, 344 (2020).

33. Surden, *AI Overview*, *supra* note 25, at 1307 (“What is AI? There are many ways to answer this question”); Ryan Calo, *Artificial Intelligence Policy: A Primer and Roadmap*, 51 U.C. DAVIS L. REV. 399, 403 (2017) [hereinafter Calo, *AI Policy*]; Matthew U. Scherer, *Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies*, 29 HARV. J.L. & TECH. 353, 359 (2016) (“Unfortunately, there does not yet appear to be any widely accepted definition of artificial intelligence even among experts in the field, much less a useful working definition for the purposes of regulation.”); Giuffrida, *supra* note 13, at 441 (“Yet, no generally accepted definition [of AI] exists.”); Mark A. Lemley & Bryan Casey, *You Might Be a Robot*, 105 CORNELL L. REV. 287, 293 (2020) (“The overlap between people, algorithms, computers, robots, and ordinary machines is sufficiently great that there is no good legal definition of a robot.”).

34. Frye, *supra* note 24, at 17; Surden, *AI Overview*, *supra* note 25, at 1307 (“[O]ne place to begin is to consider the types of problems that AI technology is often used to address. In that spirit, we might describe AI as using technology to automate tasks that ‘normally require human intelligence.’”); Milan Markovic, *Rise of the Robot Lawyers?*, 61 ARIZ. L. REV. 325, 329 (2019) (“Although definitions of artificial intelligence vary, the term is generally associated with the automation of intelligent behavior via computer processes.”); Calo, *AI Policy*, *supra* note 33, at 404 (defining AI as “a set of techniques aimed at approximating some aspect of human or animal cognition using machines”).

techniques can seek to replicate the cognitive function of a human, and, as a result, many consider AI to refer to a large set of information or computer sciences.³⁵ The most often discussed disciplines of AI, although others exist,³⁶ include data mining,³⁷ expert systems,³⁸ machine learning,³⁹ neural networks,⁴⁰ and robotics.⁴¹ Data mining refers to the automated discovery of statistical relationships among data.⁴² Together, the discovered statistical relationships form a model, which can be used to make predictions or classifications.⁴³ Expert systems, also sometimes referred to as hand-crafted algorithms, are designed with the assistance of human subject-matter experts, who help build the (often) if-then rules that allow the expert system to mimic the type of reasoning the human subject-matter experts would have undertaken themselves.⁴⁴ Notably, significant variance exists in the computational methods used to build expert systems.⁴⁵

35. M. TIM JONES, *ARTIFICIAL INTELLIGENCE: A SYSTEMS APPROACH* 5 (2008); Surden, *AI Overview*, *supra* note 25, at 1310.

36. Some of these other disciplines include natural language processing, natural language understanding, planning, and evolutionary computation. JONES, *supra* note 35, at 15–17.

37. JIAWEI HAN, MICHELINE KAMBER & JIAN PEI, *DATA MINING: CONCEPTS AND TECHNIQUES*, at xxiii (3d ed. 2012).

38. C.S. KRISHNAMOORTHY & S. RAJEEV, *ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS FOR ENGINEERS* 5–6 (1996).

39. Harry Surden, *Machine Learning and Law*, 89 WASH. L. REV. 87, 89 (2014) [hereinafter Surden, *Machine Learning*].

40. JONES, *supra* note 35, at 250–52.

41. Ryan Calo, *Robotics and the Lessons of Cyberlaw*, 103 CALIF. L. REV. 513, 529 (2015) [hereinafter Calo, *Robotics*].

42. Solon Barocas & Andrew D. Selbst, *Big Data's Disparate Impact*, 104 CALIF. L. REV. 671, 677 (2016) [hereinafter Barocas & Selbst, *Disparate Impact*]; Andrew D. Selbst, *Disparate Impact in Big Data Policing*, 52 GA. L. REV. 109, 123–24 (2017) (“Data mining is the process of finding patterns among different people or outcomes to determine what aspects make them similar or different.”); *see also* Michael Simon, Alvin F. Lindsay, Loly Sosa & Paige Comparato, *Lola v. Skadden and the Automation of the Legal Profession*, 20 YALE J.L. & TECH. 234, 253 (2018) (“Data mining is a process that ‘extract[s] interesting—nontrivial, implicit, previously unknown and potentially useful—information from data in large datasets’ and focuses on the properties of datasets.” (quoting JOHANNES FÜRNKRANZ, DRAGAN GAMBERGER & NADA LAVRAC, *FOUNDATIONS OF RULE LEARNING* 4 (2012))).

43. Barocas & Selbst, *Disparate Impact*, *supra* note 42, at 677.

44. Dorothy Leonard-Barton & John J. Sviokla, *Putting Expert Systems to Work*, HARV. BUS. REV., Mar.–Apr. 1988, at 91, 91–93; Andrew Tutt, *An FDA for Algorithms*, 69 ADMIN. L. REV. 83, 92–93 (2017).

45. For example, a decision tree is an algorithm that asks a series of if-then statements which lead to a conclusion. CHRISTOPH MOLNAR, *INTERPRETABLE MACHINE LEARNING: A GUIDE FOR MAKING BLACK BOX MODELS EXPLAINABLE* 102 (2021), <https://christophm.github.io/interpretable-ml-book/interpretable-ml.pdf> [https://perma.cc/6DL2-E2YW] (“Tree based models split the data multiple times according to certain cutoff values in the features.”). A decision tree can be created as

Although the opportunity to untangle the terminology may have long passed,⁴⁶ the fact remains that although AI receives popular treatment as one solitary concept, AI really represents a diverse array of techniques, goals, and uses. Because these differences may impact the applicability, relevance, and relative usefulness of legal rules developed to govern AI, legal professionals, law-makers, and judicial arbiters must strive to overcome the confusion that results from lumping a diverse array of technologies into one term.⁴⁷ Machine learning, neural networks, and robotics currently receive the most attention in both the literature and mainstream media. In fact, people commonly use the term AI to refer to a system that is more accurately described as a machine learning algorithm.⁴⁸ Machine learning refers broadly to “computer algorithms that have the ability to ‘learn’ or improve in performance over time on some task.”⁴⁹ Notably, a variety of techniques can be used to give machine learning algorithms the ability to “learn” over time, and the extent to which such “learning” is supervised by humans also varies.⁵⁰ Meanwhile, a neural network involves designing algorithmic systems modeled after

an expert system, in which experts determine the cutoff values in the features, *see, e.g.*, Shweta Taneja, Harsh Goyal, Deepanshu Khandelwal, Abhishek & Aayush Aggarwal, *A Decision Tree Based Expert System for Medical Diagnosis*, 3 INT’L J. ENGINEERING APPLIED SCI. & TECH., no. 9, 2018, at 11, 12–15 (developing an expert system that uses a decision tree algorithm to predict disease), or via machine learning models, where algorithms predict the outcome of a decision tree analysis given certain input data, MOLNAR, *supra*, at 102–03. Other rules-based algorithms assign weights to different variables, creating a numeric output that reflects the values of the variables. Tutt, *supra* note 44, at 93 (describing Google’s “PageRank Algorithm”).

46. *See* Amanda Levendowski, *How Copyright Law Can Fix Artificial Intelligence’s Implicit Bias Problem*, 93 WASH. L. REV. 579, 590 n.38 (2018).

47. For insightful research demonstrating the link between the nuances of AI and corresponding legal and policy responses, *see* Andrew D. Selbst & Solon Barocas, *The Intuitive Appeal of Explainable Machines*, 87 FORDHAM L. REV. 1085, 1099–109 (2018) [hereinafter Selbst & Barocas, *Explainable Machines*]; Surden, *AI Overview*, *supra* note 25, at 1311.

48. Levendowski, *supra* note 46, at 590 (“When journalists, researchers, and even engineers say ‘AI,’ they tend to be talking about machine learning, a field that blends mathematics, statistics, and computer science to create computer programs with the ability to improve through experience automatically.”).

49. Surden, *Machine Learning*, *supra* note 39, at 88 (citing PETER FLACH, MACHINE LEARNING: THE ART AND SCIENCE OF ALGORITHMS THAT MAKE SENSE OF DATA 3 (2012)); *see also* Cary Coglianese & David Lehr, *Regulating by Robot: Administrative Decision Making in the Machine-Learning Era*, 105 GEO. L.J. 1147, 1157 (2017) (explaining that machine learning algorithms “‘optimize a performance criterion using example data or past experience.’ In other words, these algorithms make repeated passes through data sets, progressively modifying or averaging their predictions to optimize specified criteria”).

50. Simon et al., *supra* note 42, at 254 (“Machine learning can take place in a number of ways. These include ‘supervised learning,’ where the learning algorithm is given inputs and desired outputs with the goal of learning which rules lead to the desired outputs; ‘unsupervised learning,’ where the learning algorithm is left on its own to determine the relationships within a dataset; and ‘reinforcement learning,’ where the algorithm is provided feedback on its performance as it navigates a data set.”).

the human brain.⁵¹ A deep neural network uses several layers of neural network computation.⁵² Deep neural networks power “deep learning,”⁵³ commonly considered a form of machine learning.⁵⁴ Robotics, for its part, suffers from a definitional difficulty similar to that of AI more broadly.⁵⁵ One commonly used definition, derived from the technological concept of robotics, comes from Professor Ryan Calo: “artificial objects or systems that sense, process, and act upon the world to at least some degree.”⁵⁶ Ultimately then, the definitional difficulty and the disciplinary complexity that marks the whole of AI also pervades many of the various individual AI disciplines. This diversity in computational techniques highlights the importance of ensuring that legal rules acknowledge technological differences, as those differences may require different policy and legal approaches.

If recognizing the diversity of computational techniques that make up the field of AI represents one important paradigm at the intersection of AI and law, a second is that all technology is social technology—technology created for, in, and shaped by a particular social context.⁵⁷ Many discussions of AI, algorithms, machine learning, and robots treat the technology as a technical artifact set apart, featuring a surprising preoccupation with the technology’s ability to operate without human

51. JONES, *supra* note 35, at 250–52.

52. Matthew Dixon, Diego Klabjan & Jin Hoon Bang, *Classification-Based Financial Markets Prediction Using Deep Neural Networks*, 6 ALGORITHMIC FIN. 67, 67 (2017).

53. *Id.*

54. PETER STONE, RODNEY BROOKS, ERIK BRYNJOLFSSON, RYAN CALO, OREN ETZIONI, GREG HAGER, JULIA HIRSCHBERG, SHIVARAM KALYANAKRISHNAN, ECE KAMAR, SARIT KRAUS, KEVIN LEYTON-BROWN, DAVID PARKES, WILLIAM PRESS, ANNALEE SAXENIAN, JULIE SHAH, MILIND TAMBE & ASTRO TELLER, STANFORD UNIV., ARTIFICIAL INTELLIGENCE & LIFE IN 2030: ONE HUNDRED YEAR STUDY ON ARTIFICIAL INTELLIGENCE 8–9 (2016), https://ai100.stanford.edu/sites/g/files/sbiybj18871/files/media/file/ai100report10032016fml_singles.pdf (last visited Nov. 28, 2021).

55. Lemley & Casey, *Remedies for Robots*, *supra* note 13, at 1319 (“Though ‘robot’ has appeared in common parlance for nearly a century, the term is still notoriously resistant to definition.”); Rachum-Twaig, *supra* note 14, at 1145 (“There is substantial literature attempting to define and articulate the features of self-operating devices and machines, usually referred to as robots.”).

56. Calo, *Robotics*, *supra* note 41, at 529–31.

57. *See, e.g.*, Reyes & Ward, *supra* note 32, at 344 (proposing a method for evaluating algorithms that prominently features consideration of social context); Mike Ananny & Kate Crawford, *Seeing Without Knowing: Limitations of the Transparency Ideal and Its Application to Algorithmic Accountability*, 20 NEW MEDIA & SOC’Y 973, 974 (2018) (describing AI systems “as sociotechnical systems that do not contain complexity but enact complexity by connecting to and intertwining with assemblages of humans and non-humans”); Madeleine Clare Elish & Danah Boyd, *Situating Methods in the Magic of Big Data and AI*, 85 COMM’N MONOGRAPHS 57, 57 (2018) (developing a framework to remind users of AI that “all knowledge work is situated in practice”).

intervention.⁵⁸ In reality, although the computational aspects of AI are often quite complex,⁵⁹ even complex AI operations involve human touch points. Namely, the selection of the data, the design of the computation performed on it, and the way the resulting output is used in the world are all elements of AI shaped by the social context—and the humans operating in the social context—in which the AI is deployed.⁶⁰ We might think of these elements—data selection, computational design, use of outputs, and any audit mechanisms—as contextual components.⁶¹ Together, the computational components and contextual components form an AI system.⁶² Focusing the discussion of legal personhood on the AI system, rather than merely the computational components, recognizes the role of AI in society as both a technical and symbolic artifact⁶³ and recenters the policy questions on the demands the social context places on the AI system, rather than the unpredictable, opaque, and sometimes emergent nature of the computational components.⁶⁴

Importantly, thinking about any of the computational techniques that

58. See, e.g., Banteka, *supra* note 26, at 547 (arguing for caution in attributing legal personhood to AI, in part because AI can take unpredictable action); Lemley & Casey, *supra* note 13, at 1334 (expressing concerns that because robots learn without much human supervision, they can take unpredictable actions and may cause unforeseen harms). The preoccupation with questions of liability because AI can take action without human intervention is particularly surprising considering that “many successful AI systems are not fully autonomous but rather involve hybrids of computer and human decision-making.” Surden, *AI Overview*, *supra* note 25, at 1320.

59. See, e.g., Martin Giles, *The GANfather: The Man Who’s Given Machines the Gift of Imagination*, MIT TECH. REV., Mar. 2018, at 48, 51 (explaining the complex mechanics of generative adversarial networks); CHIHEB TRABELSI, OLEXA BILANIUK, YING ZHANG, DMITRIY SERDYUK, SANDEEP SUBRAMANIAN, JOÃO FELIPE SANTOS, SOROUSH MEHRI, NEGAR ROSTAMZADEH, YOSHUA BENGIO & CHRISTOPHER J. PAL, DEEP COMPLEX NETWORKS 2 (2018) <https://openreview.net/pdf?id=HIT2hmZAb> [<https://perma.cc/C9WS-8G5K>] (offering a formulation to help “exploit the advantages offered by complex representations” of neural network).

60. See Reyes & Ward, *supra* note 32, at 354–56; Giuffrida, *supra* note 13, at 442 (“AI systems do not perform in an informational vacuum.”).

61. Reyes & Ward, *supra* note 32, at 349–53.

62. *Id.* at 345–46, 345 fig.1. Notably, in our prior work, Professor Ward and I dealt primarily with algorithmic systems, but the concept applies with equal force for AI systems, particularly given the definitional discussion of AI systems powered by algorithms above. See *supra* notes 46–56 and accompanying text.

63. Lipshaw, *supra* note 29, at 8–9 (“A technical artifact is one, like a tool or a machine, that serves a utilitarian, productive purpose.” (citing Suchman, *supra* note 29, at 99–100)). “A symbolic artifact, on the other hand, is one that carries a cultural message.” *Id.* at 9. AI systems combine a technical artifact—the computational components—with symbolic artifacts—the contextual components. As a result, while we tend to think of AI as simply a technical artifact (usually focusing on the computational components), it is more appropriately thought of as AI systems.

64. It is worth noting initially here that this Article undertakes the “Algorithmic Systems Query” methodology developed in Reyes & Ward, *supra* note 32, at 353, in performing its analysis of personhood for AI systems generally, and autonomous corporations in particular. For further details regarding this methodology, see *infra* note 120.

we commonly associate with AI as part of a broader system forces the legal discussion to narrow considerably. Rather than asking broadly whether AI should receive the rights and duties associated with legal personhood, the question becomes narrower: when AI is deployed in a specific socio-legal context, under which circumstances and to what extent should the AI system receive certain rights and duties associated with legal personhood? This Article thus takes one socio-legal context in which society actively deploys AI and other autonomous technology—the formation and operation of corporations—and uses it to illustrate how the legal norms around both AI personhood and corporate personhood might shift if the law accounted for the socio-technical context of AI systems.

B. The ABR Taxonomy Emphasizes the Importance of Context.

Although an autonomous business may sound futuristic, the reality is that businesses already automate their affairs in a variety of ways. In prior work, I documented many of those variances and their genesis in trade-offs made by founders and management with regard to the relative level of operational and managerial automation used to carry out a specific business.⁶⁵ This investigation into industry adoption of autonomous technologies generated a taxonomy of autonomous business reality—the “ABR Taxonomy.”⁶⁶ In the context of artificial legal personhood, the ABR Taxonomy demonstrates the gaps between current legal approaches and actual socio-contextual needs for AI personhood and corporate personhood in autonomous businesses. As more fully explained below, the ABR Taxonomy is comprised of three groups and six categories of autonomous businesses,⁶⁷ as visually summarized in Table 1.

Table 1: The ABR Taxonomy

Traditional Plus		Distributed Business Entities		Autonomous Entities	
1	2	3	4	5	6
Primarily Operationally Automated	Managerial Automation Light	Autonomous Mediating Hierarchy	Mostly Autonomous	Fully Autonomous	Algorithmic Entities

65. Reyes, *ABR*, *supra* note 20.

66. *Id.* at 481–89 (explaining the taxonomy, the underlying theory, and each of the examples).

67. *Id.* at 473–76, 473 tbl.1.

As a starting point, the ABR Taxonomy recognizes that business founders and managers generally choose between two types of automation: operational and managerial.⁶⁸ Operational automation “refers to the use of technology to automate routine operations within a business in order to capitalize on efficiency gains and grow economies of scale.”⁶⁹ Managerial automation, on the other hand, “refer[s] to the use of technology by a business . . . to automate some level of its internal management functions.”⁷⁰ When business automation is viewed as a cross-section of operational and managerial automation, roughly six potential categories of autonomous businesses emerge.⁷¹ First, businesses that primarily automate operations (“Primarily Operationally Automated” businesses) retain traditional management structures while innovating with technology to make processes and resource allocation more efficient.⁷² Examples of such businesses include Amazon’s automation of its warehouses using robots, or an automotive dealer using a chatbot on its website to attract customers.⁷³ A second group of businesses also retains traditional management structures, but uses technology to eliminate certain inefficient levels of middle management (“Managerial Automation Light” businesses).⁷⁴ For example, using algorithms to automatically match drivers and riders allows Uber to eliminate certain middle management roles that typically characterize traditional taxi companies, such as centralized taxi dispatch stations.⁷⁵ Despite all the “platform” hype Uber attracts as a result of this use of technology, Uber nevertheless remains a traditional corporation with managerial power centered in its board of directors.⁷⁶ At their core, then, both “Primarily

68. *Id.* at 463.

69. *Id.*

70. *Id.*

71. *Id.* at 473. For a visual depiction, see *id.* at 473 tbl.1.

72. *Id.* at 473–74.

73. *Id.* at 463.

74. *Id.* at 473–74.

75. Abbey Stemler, *Betwixt and Between: Regulating the Shared Economy*, 43 *FORDHAM URB. L.J.* 31, 52–53 (2016) (describing how Uber uses technology to eliminate the role of centralized taxi dispatchers and perform some measure of quality control); Mareike Möhlmann & Ola Henfridsson, *What People Hate About Being Managed by Algorithms, According to a Study of Uber Drivers*, *HARV. BUS. REV.* (Aug. 30, 2019), <https://hbr.org/2019/08/what-people-hate-about-being-managed-by-algorithms-according-to-a-study-of-uber-drivers> [<https://perma.cc/KZM8-7VBR>] (“Companies are increasingly using algorithms to manage their remote workforces. Called ‘algorithmic management,’ this approach has been most widely adopted in gig economy companies. For example, ride-hailing company Uber substantially increases its efficiency by managing some three million workers with an app that instructs drivers which passengers to pick up and which route to take.”).

76. Abbey Stemler, *The Myth of the Sharing Economy and Its Implications for Regulating*

Operationally Automated and Managerial Automation Light businesses share certain governance characteristics.”⁷⁷ Namely, “both types of businesses continue to be governed by traditional structures like corporate officers, a board of directors and shareholders,” even while using technology to do something innovative within their business.⁷⁸ Together, these two categories of businesses form a broader “Traditional Plus” group in the taxonomy.⁷⁹

A third category of businesses seek to “almost fully automate[] their services or production process and [also] eliminate[] [professional] management at all levels such that owners directly manage [and operate] the business.”⁸⁰ In other words, these businesses attempt to use digital technology as the mediating hierarchy that the legal technology of the corporate form usually provides (“Autonomous Mediating Hierarchy” businesses).⁸¹ A variety of existing businesses operate as Autonomous Mediating Hierarchy businesses, many of them quite successfully. For example, MakerDAO is the decentralized autonomous organization responsible for creating and maintaining the value of DAI, a stablecoin with a market cap of around \$1 billion.⁸² Dash, which operates as a formal business trust,⁸³ manages a cryptocurrency with a total market cap of over \$1.6 billion.⁸⁴ A fourth category—“Mostly Autonomous”—goes further in automating management by eliminating owners all together.⁸⁵

Innovation, 67 EMORY L.J. 197, 207 (2017) (arguing that companies commonly referred as operating within the “sharing economy” are motivated by profit, not altruism); see also *Leadership*, UBER, <https://www.uber.com/newsroom/leadership/> [<https://perma.cc/B7CV-G8B9>].

77. Reyes, *ABR*, *supra* note 20, at 474.

78. *Id.*

79. *Id.*

80. *Id.*

81. *Id.*

82. CAMPBELL R. HARVEY, ASHWIN RAMACHANDRAN & JOEY SANTORO, *DEFI AND THE FUTURE OF FINANCE* 39–44 (2021).

83. For a detailed explanation of the Dash DAO and its business trust legal structure, see Reyes, *ABR*, *supra* note 20, at 442, 467.

84. *Dash*, COINMARKETCAP, <https://coinmarketcap.com/currencies/dash/historical-data/> (last visited Nov. 28, 2021) (market cap value as of June 12, 2021).

85. Reyes, *ABR*, *supra* note 20, at 474. One example of this type of “Mostly Autonomous” business is the Plantoid. *Id.* at 474–75. No humans own a Plantoid, but rather, each Plantoid and its operations are managed by distributed computer code via blockchain technology. *Id.* at 468–69.

Essentially, each Plantoid is a metallic sculpture displayed in a public place. . . . When a passer-by appreciates the Plantoid’s beauty, he or she can send a token of appreciation to the Plantoid by sending cryptocurrency to the Plantoid’s wallet. The funds received then belong to the DAO powering the Plantoid. The smart contracts running the DAO require that when the Plantoid accumulates sufficient funds, the Plantoid will request proposals from artists to create a new Plantoid. Other than the selection of the winning artist proposal and the actual creation of new Plantoids, the Plantoid DAO automates the entire art production enterprise.

Id. at 468–69 (citations omitted).

Autonomous Mediating Hierarchy businesses and Mostly Autonomous businesses share certain characteristics that allow them to be grouped together as “Distributed Business Entities.”⁸⁶ Specifically, all Distributed Business Entities demonstrate “a high or nearly complete level of operational automation and a high or nearly complete level of managerial automation.”⁸⁷

Only one category of *existing* business goes further than Distributed Business Entities in terms of operational and managerial automation: “Fully Autonomous” businesses. Fully Autonomous businesses are, as the name implies, fully automated in terms of both operations and management, but still involve humans at some level.⁸⁸ In other words, even though code fully controls both operations and management of Fully Autonomous businesses, humans still maintain and update the code, such that this is a distinct category from Professor Lynn LoPucki’s “Algorithmic Entities,” which never experience human touch points after launch.⁸⁹ “Together, Fully Autonomous businesses and Algorithmic Entities comprise a generalizable group of ‘Autonomous Entities.’”⁹⁰

Unpacking the implications of the ABR Taxonomy for autonomous corporate personhood begins by examining recent scholarship that investigates a variety of methods by which legally recognizable business enterprises may be partially or fully automated, with the business operated—partially or fully—by computer code.⁹¹ The leading investigations into algorithmic or autonomous business associations take starkly different views regarding whether and to what extent autonomous businesses should enjoy legal rights as well as duties.⁹² On the one hand, scholars argue that algorithmic or autonomous business entities should not be treated differently under the law than any other business entity because the only difference is one of degree rather than kind.⁹³ Other scholars, however, warn of the significant risks posed by algorithmic entities and argue that those risks justify different legal treatment.⁹⁴ Professor Shawn

86. *Id.* at 475.

87. *Id.*

88. *Id.* A key example of Fully Autonomous entities is Metronome, which autonomously manages a cryptocurrency MET. *Id.* at 469. MET is currently valued at a market cap of \$39 million. *Metronome*, COINMARKETCAP, <https://coinmarketcap.com/currencies/metronome/historical-data/> (last visited Nov. 28, 2021) (market cap as of June 12, 2021).

89. Reyes, *ABR*, *supra* note 20, at 475 (citing LoPucki, *supra* note 21, at 897).

90. *Id.*

91. *See generally* Bayern, *Of Bitcoins*, *supra* note 22; LoPucki, *supra*, note 21; Reyes, *Rockefeller*, *supra* note 21.

92. For my part, I have deferred taking a position, until now.

93. Bayern, *Of Bitcoins*, *supra* note 22, at 1498–1500.

94. *See* LoPucki, *supra* note 21.

Bayern was the first to offer a systematic investigation into the possibility of autonomous business enterprises through “independently wealthy software.”⁹⁵ Bayern recognized that autonomous computer software—from computer viruses to machine learning algorithms—already permeates society.⁹⁶ The introduction of bitcoin⁹⁷ and blockchain technology meant that such software could more easily retain and manage wealth independently from human interfaces.⁹⁸ From Bayern’s perspective, the Revised Uniform Limited Liability Company Act (RULLCA)⁹⁹ already explicitly provides for the possibility that an LLC may operate without any members.¹⁰⁰ Bayern explains that, in his view, this reality naturally flows from the law’s long history of creating fictional entities and treating them like people for certain purposes.¹⁰¹

In particular, Professor Bayern focuses on the capacity of law to confer what he refers to as “private-law personhood”: “the capacity of person, system or legal entity to be recognized by law sufficiently to perform basic legal functions.”¹⁰² In limiting the discussion to “the ability to participate in the fundamental relationships regulated by private law—such as the capability to own property, enter a contract, file a lawsuit, be named in a

95. Bayern, *Of Bitcoins*, *supra* note 22, at 1492.

96. *Id.*

97. In technology circles, the Bitcoin software, protocol, and network are referenced using the uppercase “Bitcoin,” while the lowercase “bitcoin” refers to individual units of account. Angela Walch, *The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk*, 18 N.Y.U. J. LEGIS. & PUB. POL’Y 837, 846 & n.41 (2015).

98. “[A] system like Bitcoin is not functionally necessary for this possibility; more precisely, then, what Bitcoin enables for autonomous software is the convenient, ‘legal access to a functionally independent financial life. It practically enables what in the past was just a theoretical possibility.’” Reyes, *ABR*, *supra* note 20, at 453 n.102 (quoting Bayern, *Of Bitcoins*, *supra* note 22, at 1493).

99. Originally promulgated by the Uniform Law Commission in 1996 and revised in 2006 as part of the Uniform Law Commission’s Harmonization of Business Entity Acts project, the RULLCA is a model LLC enabling statute, a version of which, as of this writing, has been introduced or adopted in twenty-four states. See *Limited Liability Company Act, Revised*, UNIF. L. COMM’N, <https://www.uniformlaws.org/committees/community-home?CommunityKey=bbea059c-6853-4f45-b69b-7ca2e49cf740> [<https://perma.cc/8F2A-N3BA>].

100. Bayern, *Of Bitcoins*, *supra* note 22, at 1496–97 (explaining that the RULLCA includes “in a list of events that cause the dissolution of an LLC, ‘the passage of 90 consecutive days during which the company has no members,’” and that “this provision, perhaps surprisingly, appears not to be a mandatory rule imposed by the uniform statute.” (citing RULLCA §§ 110(c), 701(a)(3) (UNIF. L. COMM’N 2006))); Bayern, *Autonomous Systems*, *supra* note 21, at 101–02 (explaining how to create an autonomous and memberless LLC).

101. Bayern, *Of Bitcoins*, *supra* note 22, at 1495.

102. Bayern, *Autonomous Systems*, *supra* note 21, at 94–95. Note that among scholars who investigate the scope and nature of corporate constitutional rights, Bayern’s concept of “private-law personhood” is merely corporate personhood, while what Bayern considers a broader, politicized view of corporate personhood is thought of as corporate personality and the results of corporate personality theory. See discussion *infra* note 119.

lawsuit, serve as a legal principal, and serve as a legal agent,” Bayern explicitly refrained from engaging any questions related to an autonomous legal entity’s potential enjoyment of constitutional rights.¹⁰³ Bayern then argues that private-law personhood confers such a limited set of rights that conferring it to autonomous systems does not pose a particularly radical or important change to existing law.¹⁰⁴ Ultimately, Bayern concludes that “there appear to be many organizational advantages, and few systematic downsides, in permitting memberless entities that a nonhuman system might ‘inhabit’ and use as an interface to the rest of private law.”¹⁰⁵

Professor LoPucki considers Professor Bayern’s argument and concludes that several qualities of what Professor LoPucki terms “algorithmic entities”¹⁰⁶ make their potential existence a “risk of existential catastrophe” at the hands of artificial intelligence.¹⁰⁷ Skipping past the idea of private-law personhood, LoPucki argues that algorithmic control of a legal entity without human control presents significant danger because algorithms could “accumulate wealth, leverage it in capital markets, and participate in the political process—without being subject to the constraints under which humans operate.”¹⁰⁸ Professor LoPucki does not seem to view the eventual, algorithmic-entity apocalypse as being a function of the doctrine of corporate personhood.¹⁰⁹ Rather, Professor

103. Bayern, *Autonomous Systems*, *supra* note 21, at 94–95.

104. *See id.* at 106–07. First, Bayern says that an autonomous fictional entity with private-law personhood really does not pose that different of a scenario than what can be accomplished by private parties using technology creatively now. *Id.* at 106. Second, Bayern contends that if an autonomous system did organize as an LLC and conduct ordinary business operations, the public, including customers, suppliers, and regulators, would be unlikely to discern its status as a business operated by artificial intelligence, absent extraordinary circumstances. *Id.* at 108.

105. *Id.* at 109.

106. LoPucki, *supra* note 21, at 897. LoPucki categorizes an entity as “‘algorithmic’ if an algorithm controls it.” *Id.* For LoPucki, “[a]n algorithm is a set of decision-making rules[, and t]he relevant algorithms run on computers. They are programs—artificial intelligences—that make and execute decisions in response to external circumstances.” *Id.* Notably, for LoPucki, an algorithm controls the entity if a human created the algorithm but cannot thereafter modify the algorithm. *Id.* I am skeptical about the potential near-term proliferation of such algorithms. As I have previously commented, because algorithms are fundamentally “computer software, they require regular updates, patches and other ‘modifications’ that may require human activity.” Reyes, *ABR*, *supra* note 20, 455 n.117.

107. LoPucki, *supra* note 21, at 897.

108. *Id.* at 901–02.

109. *Id.* at 902–03. In particular, Professor LoPucki predicts that three qualities of artificial entities make them exceptional, and thus a greater threat to society than algorithms acting with human collaborators. The term “exceptionalism” generally refers to the idea “that a person, place, object, or concept is qualitatively different from others in the same basic category.” Calo, *Robotics*, *supra* note 41, at 550. In the context of AI and other emerging technologies, Ryan Calo encourages us to only consider a technology exceptional, such that it requires new, specific laws “when its introduction into the mainstream requires a systematic change to the law or legal institutions in order to reproduce, or

LoPucki identifies corporate charter competition as the root of the problem.¹¹⁰ From his perspective,

the natural culmination of charter competition is a system that does not restrict at all. . . . By embracing the charter competition, the United States has become the world's largest supplier of anonymous entities and enabled its corporate service providers to achieve the world's lowest rate of compliance with the international standards designed to prevent terrorist financing and money-laundering.¹¹¹

The debate between Bayern and LoPucki reflects the difficulty of capturing the full picture of autonomous businesses—a difficulty that the ABR Taxonomy can be used to help resolve.

The ABR Taxonomy helps identify the unaccounted-for socio-contextual needs of autonomous businesses seeking to interact with natural and legal people under existing law. Specifically, the ABR Taxonomy reveals the gaps between the theories of legal personhood advanced in both the arenas of corporate law and artificial intelligence. In the context of corporate legal personhood, the ABR Taxonomy reveals that positioning a corporation, whether autonomous or not, as only one thing or other risks missing the depth and texture of the design trade-offs made by founders at the time of incorporation.¹¹² The debate between LoPucki and Bayern is illustrative here. The wide variance between the two scholars' positions on the relative benefits and dangers of enabling an autonomous legal person through a business entity reflects the different type of autonomous entity each seeks to address. Professor Bayern specifically intends to reflect upon autonomous systems at a general level without singling out any specific technology or instantiation of

if necessary displace, an existing balance of values." *Id.* at 552. First, LoPucki believes because algorithmic entities will lack sympathy or empathy, they will exhibit ruthlessness to a degree not seen in humans. LoPucki, *supra* note 21, at 904. Second, society will experience more difficulty in deterring bad activity by algorithmic entities because they cannot be incarcerated the same way a human controller can, and algorithmic entities will be immune to the social pressures to which human controllers would otherwise respond. *Id.* Finally, LoPucki sees algorithmic entities as more easily replicated, making algorithmic entities: better able to flee jurisdictions, more difficult to destroy, better at hedging against regulatory changes, and better able to collude together for the economic detriment of others. *Id.* at 904–05. Ultimately, LoPucki argues that algorithmic entities become even more difficult to control because they will be hard to detect in their various forms and can migrate across state and national borders to avoid detection and regulation. *Id.* at 924, 937.

110. LoPucki, *supra* note 21, at 889, 952–53. This appears to be LoPucki's chief concern, and this concern ties into his broader literature regarding corporate charter competition. *See* Lynn M. LoPucki, *Corporate Charter Competition*, 102 MINN. L. REV. 2101 (2018).

111. LoPucki, *supra* note 21, at 952.

112. *See id.*

technology.¹¹³ By focusing on LLCs, Professor Bayern also makes it easy to avoid the complex constitutional rights arguments discussed in the corporate personhood literature.

Professor LoPucki's vision of algorithmic entities, on the other hand, demonstrates the viability of an autonomous corporation,¹¹⁴ thrusting the corporate rights questions to the foreground. Yet, because LoPucki's vision depends upon technology so autonomous as to never encounter human control or modification at any point after launch,¹¹⁵ the discussion of corporate rights as a vehicle for granting legal personhood to artificial intelligence reverts to discussions of the Personless Corporation and its impossibility given the current state of the art in AI. The ABR Taxonomy highlights the jurisprudential gap left by dismissing AI personhood via the corporate vehicle because of its "impossibility."

The ABR Taxonomy demonstrates that autonomous businesses already exist and makes clear that the wide variance between Bayern's and LoPucki's respective visions of autonomous entities mirrors the wide variance in actual business automation. In other words, the context matters. Bayern's analysis really centers on businesses with characteristics of those in the Autonomous Distributed Business Entity category.¹¹⁶ Meanwhile, LoPucki's analysis zeroes in on Algorithmic

113. Bayern, *Autonomous Systems*, *supra* note 21, at 96–97 (“One final note before proceeding: in referring to autonomous systems in this Article, I mean to do so broadly. The Article’s conclusions are applicable to many different types of systems. On one end of the spectrum, an ‘autonomous system’ might be a fairly mundane, conventional program that performs a defined role, such as a network of computer processes that operates vending machines that accept Bitcoin (or some other online payment that requires not specific interface with the legal recognition or titling of bank accounts.). On the other, it might—in the future—be an intelligent robot that passes the Turing Test. . . . [L]ittle of my legal discussion depends on specific attributes or capabilities of autonomous systems themselves.”).

114. LoPucki, *supra* note 21, at 907–11.

115. *Id.* at 897 (“For the purposes of this Article, an algorithm controls an entity only if the algorithm makes the entity’s decisions without human participation. That a human created the algorithm does not disqualify the algorithm from status as a controller, provided that the human no longer has the ability to modify the algorithm.”).

116. *See* Bayern, *Autonomous Systems*, *supra* note 21, at 93, 95–96 (using LLCs as a framework to suggest that autonomous systems could be given legal personhood). For example, by focusing on zero member LLCs and other unique LLC operating structures, Bayern clearly does not mean to address companies in the Traditional Plus category, which maintain traditional management structures but use autonomous systems to improve their business or product. By acknowledging that some human involvement may be needed to maintain the code after launch or to provide certain services (like legal services or activities offline), Bayern also indicates that he is not focused on Algorithmic Entities. *See* Bayern, *Of Bitcoins*, *supra* note 22, at 1497. Bayern’s analysis may apply to Fully Autonomous entities as well, however, so few exist that the core of his work focuses on Distributed Business Entities. *See id.* at 1498 (noting several futuristic Fully Autonomous entities to which his analysis may apply, but clarifying that they are “fanciful”).

Entities.¹¹⁷ The traditional corporate personhood jurisprudence and literature, for its part, applies to the Traditional Plus corporations. When viewed in this light, through the prism of the ABR Taxonomy, the gap in the current discussion at the intersection of AI, corporations and personhood becomes clear—the lack of a theory of personhood for AI that uses the corporation as a vehicle to interact with the world either as a Distributed Business Entity or as a Fully Autonomous entity. To develop a theory of legal personhood for Distributed Business Entities and Fully Autonomous entities while also avoiding the theory-jumping that so frustrates the scholarly community studying corporate personhood,¹¹⁸ the analysis should begin by applying the theories of corporate personality to the spectrum of operational and managerial automation among autonomous entities. Ultimately, the ABR Taxonomy suggests that whether an autonomous corporation should receive constitutional rights under one or more of the corporate personality theories should depend upon an analysis of the degree of autonomy enjoyed by the autonomous corporation. The analysis under this socio-contextual approach, will, of course, implicate notions of legal personhood for AI systems as well.

II. EXPLORING THE CONTOURS OF AUTONOMOUS CORPORATE PERSONHOOD THROUGH AI PERSONHOOD

This Part takes the discussion of autonomous businesses into an area the literature previously avoided: artificial personality.¹¹⁹ The discussion

117. See LoPucki, *supra* note 21, at 897 (coining the term “algorithmic entity” and defining it to include those entities controlled by an algorithm, where “[a]n algorithm is a set of decision-making rules” operating on a computer as a program that executes decisions in response to external circumstances, and where an algorithm controls an entity when it makes the entity’s decisions without human participation).

118. See, e.g., Chatman, *supra* note 18, at 818–30 (exploring the history of Supreme Court use of corporate theories to argue that “generations of the Court’s misunderstanding about corporations have resulted in corporate rights decisions that are a hodgepodge of erroneous claims about the nature of corporations and how they function”); Pollman, *Reconceiving Corporate Personhood*, *supra* note 11, at 1670–75 (considering the various difficulties that may contribute to the “lack of coherence” in the Supreme Court’s corporate personhood doctrine); Pollman, *Corporate Privacy*, *supra* note 17, at 50 (“As we have seen, the Court has confronted issues concerning the applicability and scope of constitutional protections for corporations for over two hundred years. In all of this time, it has failed to articulate a test or standard approach for its rulings.”); James D. Nelson, *Conscience, Incorporated*, 2013 MICH. ST. L. REV. 1565, 1567 (“[C]ourts do not have a workable theory to guide their analysis.”).

119. Bayern considers this a broader, more politicized conception of legal personhood, and distinguishes it from what he calls “private-law personhood.” Bayern, *Autonomous Systems*, *supra* note 21, at 95. The private law conception of legal personhood relates to “the ability to participate in the fundamental relationships regulated by private law—such as the capacity to own property, enter a contract, file a lawsuit, be named in a lawsuit, serve as a legal principle, and serve as a legal agent.”

of artificial personality first reviews the literature relating to theories of AI personhood. Doing so enables the identification of the common socio-legal needs that drive the personhood debates in the context of AI systems and demonstrates the importance of the socio-technical context for building appropriate legal rules related to AI.¹²⁰ In this regard, the ABR Taxonomy acts as an analytical framework through which to assess whether and how the AI personhood literature applies to assess autonomous corporate personhood—where AI personhood and corporate personhood collide. Tying the autonomous business discussion to the artificial personhood discussion unpacks the importance of context for

Id. at 94–95. Corporate personhood scholars, on the other hand, use “corporate personhood” to refer to the binary issue of whether a corporation should be treated as a person. *See, e.g.*, Stefan J. Padfield, *Does Corporate Personhood Matter? A Review of, and Response to, Adam Winkler’s We the Corporations*, 20 *TRANSACTIONS: TENN. J. BUS. L.* 1009, 1010 & n.3 (2019) [hereinafter Padfield, *Does Corporate Personhood Matter*] (“Corporate personhood may be understood as a binary concept, which is to say a corporation either is or is not a person for purposes of a particular statute or Constitutional provision.”). These scholars use “corporate personality” to refer to the specific theories of personhood and the legal consequences (including constitutional rights) that flow from a decision to treat a corporation as a person. Stefan J. Padfield, *A New Social Contract: Corporate Personality Theory and the Death of the Firm*, 101 *MINN. L. REV. HEADNOTES* 363, 372 (2017) [hereinafter, Padfield, *A New Social Contract*] (“Theories of corporate personality attempt to describe the nature of corporations in ways that can hopefully assist legislatures, judges, and society in general determine the proper role for corporations in society, as well as the proper scope of regulations to be applied to corporations.”); Padfield, *Does Corporate Personhood Matter, supra*, at 1010 & n.3 (“Corporate personality theory, on the other hand, may be understood as answering the subsequent; and perhaps more important question: What kind of person is the corporation?”). Bayern’s use of the term “political corporate personhood” indicates the reality that some consequences of saying “yes” to whether a corporation is a person center in private law (the corporation can sue and be sued in its own right, the corporation is taxed as a separate entity, etc.), while other consequences sound in public law issues (the extent and nature of corporate constitutional rights). Bayern, *Autonomous Systems, supra* note 21, at 95. Because this Article seeks to bridge the gap between the generally private law literature on algorithmic and autonomous business entities and the generally public law-oriented literature on corporate personhood more broadly, this Article adopts the terminology employed by prominent corporate personhood scholars.

120. A note on methodology: this Article seeks to propose legal rules for autonomous corporate personhood by loosely following the Algorithmic Systems Query (ASQ) method of analysis. Reyes & Ward, *supra* note 32. ASQ teaches that building legal rules for an AI system requires first assessing the actual needs of the social context in which the AI system will be deployed. *Id.* at 353–55. Here, that social context is the autonomous corporation’s ability to act in the world with legal personality. Because an autonomous corporation represents the nexus of an AI system and corporations, this Article reviews the literature related to artificial personhood for both AI systems and corporations with an eye toward identifying the policy needs driving the debates. ASQ then drives the analysis to consider the current reality of the social context, and whether the current rules actually achieve the policy needs. *Id.* at 356. Here, the current reality of autonomous corporations is represented in the Autonomous Business Taxonomy. Thus, Parts II and III, *infra*, use the Taxonomy to identify gaps between the current personhood debates in AI systems and corporate law and the reality of autonomous businesses trying to act with legal force in the world. The last step in ASQ is to optimize the system given the various socio-technical and socio-legal factors. *Id.* at 357. As a result, Part IV identifies links between AI system personhood theories and corporate personhood theories to propose a new approach that fills existing gaps.

determining which rights to grant artificial persons, whether corporation or machine.

A. *Artificial Intelligence and the Artificial Person Conundrum*

The inquiry into autonomous corporate personhood begins with the literature surrounding the possibility of AI personhood. Indeed, concern about how society should respond when a technical artifact poses as a person is not new.¹²¹ Broadly speaking, society becomes concerned with attributing legal personhood to technical artifacts when such artifacts become what Bruno Latour calls an “actant.”¹²² Latour defines an actant as “anything that [modifies] a state of affairs by making a difference.”¹²³ Society reacts differently to the idea of a technical artifact taking independent action (becoming an actant) than when humans use technology to act.¹²⁴ Generally, the law only attributes rights and duties to those imbued with personhood.¹²⁵ And only those with duties can be held liable for harm in many circumstances.¹²⁶ Thus, with the increased

121. See, e.g., Stone, *supra* note 30, at 452; First Nat’l Bank of Bos. v. Bellotti, 435 U.S. 765, 777 (1978) (noting when a corporation speaks, the fact that the speaker is a technical artifact should be overlooked in favor of the nature of the speech); Miles v. City Council of Augusta, 710 F.2d 1542, 1543 (11th Cir. 1983) (considering whether a talking cat could exert constitutional speech rights); Cass R. Sunstein, *Standing for Animals (with Notes on Animal Rights)*, 47 UCLA L. REV. 1333, 1336 (2000) (arguing that animals have rights and should be accorded standing in judicial proceedings); Jessica Berg, *Of Elephants and Embryos: A Proposed Framework for Legal Personhood*, 59 HASTINGS L.J. 369, 386–87 (2007) (proposing a framework for evaluating the personhood status of novel and unrecognized entities); Tim Wu, *Machine Speech*, 161 U. PA. L. REV. 1495 (2013) (considering whether speech created by algorithmic outputs receives First Amendment protection); Madeline Lamo & Ryan Calo, *Regulating Bot Speech*, 66 UCLA L. REV. 988, 990 (2019) (considering when automated agents (“bots”) push statements to online forums such that content appears to come from natural persons); Gwendolyn J. Gordon, *Environmental Personhood*, 43 COLUM. J. ENV’T L. 49 (2018) (considering the contours of legal personhood for environmental protection).

122. BRUNO LATOUR, REASSEMBLING THE SOCIAL: AN INTRODUCTION TO ACTOR-NETWORK-THEORY 71 (2005).

123. *Id.*

124. See, e.g., Nizan Geslevich Packin, *Consumer Finance and AI: The Death of Second Opinions?*, 22 N.Y.U. J. LEGIS. & PUB. POL’Y 319, 342–46 (2020) (investigating the reduced likelihood that consumers will seek a second opinion when AI provides financial advice as compared to when humans provide financial advice); Lemley & Casey, *Remedies for Robots*, *supra* note 13, at 1314–16 (explaining that the goals of remedies law do not fit well when harm is committed by a robot instead of a human and exploring design options for “a system of remedies for robots”).

125. Tomasz Pietrzykowski, *The Idea of Non-Personal Subjects of Law*, in LEGAL PERSONHOOD: ANIMALS, ARTIFICIAL INTELLIGENCE AND THE UNBORN 49, 51 (Visa A.J. Kurki & Tomasz Pietrzykowski eds., 2017) (“Personhood is identified with the capacity to have rights and duties.”); JOHN CHIPMAN GRAY, THE NATURE AND SOURCES OF THE LAW 27 (1909) (“In books of the Law, as in other books, and in common speech, ‘person’ is often used as meaning a human being, but the technical legal meaning of a ‘person’ is a subject of legal rights and duties.”).

126. See, e.g., Peter Jaffey, *Duties and Liabilities in Private Law*, 12 LEGAL THEORY 137, 150–51

prevalence of AI actants in society, the AI personhood literature asks “at what point [does] it make[] sense to attribute legal consequence of the actants’ actions to the actants themselves, instead of to the human actants behind them[?]”¹²⁷ As scholars struggle with this core question from a variety of vantage points, they offer a variety of frameworks for use in making legal personality determinations.

For example, Lawrence Solum argues that to obtain legal personhood, a technical artifact must have the capacity to perform complex actions and/or the capacity to act intentionally and with self-consciousness.¹²⁸ This approach to AI personhood draws heavily on debates about the nature of personhood in philosophy, which emphasize a variety of characteristics including intentional, rational thought, free will, consciousness, and self-awareness, among other similar qualities.¹²⁹ Ultimately, however, existing technology is far from achieving self-consciousness.¹³⁰ Should society then refuse to endow technical artifacts with personhood at all? Some scholars answer that question affirmatively¹³¹ and argue that any form of AI that falls short of key moral qualities of personhood should be treated as a tool of the actual persons to whom it belongs.¹³² In other words, non-sentient AI, this position argues,

(2006) (exploring the right-duty relationship in private law and proposing a corollary right-liability relation); Andrew Halpin, *Rights, Duties, Liabilities and Hohfeld*, 13 *LEGAL THEORY* 23 (2007) (agreeing with Jaffrey “that there do exist two quite distinct ways in which the law may determine that D is under an obligation to pay damages to C: either because D has committed a wrong against C that the law required him to avoid, or because D has been charged by the law with the responsibility of compensating C for damage caused as a result of conduct that in itself is perfectly lawful”).

127. Bert-Jaap Koops, Mireille Hildebrandt & David-Olivier Jaquet-Chiffelle, *Bridging the Accountability Gap: Rights for New Entities in the Information Society?*, 11 *MINN. J.L. SCI. & TECH.* 497, 511 (2010).

128. Solum, *supra* note 30, at 1240.

129. SUSANA KIM RIPKEN, *CORPORATE PERSONHOOD* 58 (2019) (“Philosophers have long theorized over the necessary and sufficient conditions of personhood . . . Some theoretical conceptions emphasize that only intentional, rational agents can be persons. Others require free will and the capacity to form first and second order desires. Still others focus on consciousness, self-awareness, emotional capacity, autonomy of mind and body, or the capacity for language and interpersonal relations.”); Koops et al., *supra* note 127, at 546.

130. Surden, *AI Overview*, *supra* note 25, at 1308–10.

131. This is the conclusion reached by at least one legal scholar. See Banteka, *supra* note 26, at 538.

132. See Ryan Calo, *Robots in American Law* 12–15 (Mar. 15, 2016) (unpublished manuscript) (on file with *Washington Law Review*) (describing *Comptroller of the Treasury v. Family Entertainment Centers of Essex, Inc.*, 519 A.2d 1337 (Md. Ct. Spec. App. 1987) as comparing Chuck E. Cheese’s singing robots to an “embellished juke-box,” and *Louis Marx & Co. v. United States*, 66 Cust. Ct. 484 (1958) as stating that “[a] robot is ‘not a living thing; it is not endowed with life. A robot is a mechanical device or apparatus, a mere automation, that operates through scientific or mechanical media’”).

should be treated as property.¹³³ Because the current state of the art in AI falls far short of self-conscious AI, some argue that the AI personhood debate should end here. Other scholars, considering the nature of AI personhood, go further because they recognize that legal personhood exists on a spectrum.¹³⁴ Under this view, understanding non-sentient AI as non-person property simply represents one end of the AI personhood spectrum.

At the other end of the spectrum sit autonomous robots.¹³⁵ To address the potential liability gaps resulting from applying traditional legal rules to the acts or omissions of sophisticated autonomous robots, the European Parliament created a class of “electronic persons.”¹³⁶ The European Parliament felt that the more autonomous the robot, the less the robot could be categorized as a mere tool used as property by an owner for the owner’s chosen ends.¹³⁷ Even when they would not go so far as create a new class of persons, other scholars call for at least some limited protections for social robots, on the theory that maltreating

133. Solum, *supra* note 30, at 1276 (“Finally, the third objection to constitutional personhood for AIs is that, as artifacts, AIs should never be more than the property of their makers.”).

134. *See, e.g.*, Banteka, *supra* note 26, at 552 (“[L]egal personhood is a divisible aggregate of rights and duties. As it is reduced to bundles of rights and duties, the exact number and kind of rights and duties an entity with legal personhood may enjoy can vary.”); Ignacio N. Cofone, *Servers and Waiters: What Matters in the Law of A.I.*, 21 STAN. TECH. L. REV. 167, 177–79 (2018) (arguing that the law should assign rights and responsibilities on a continuum between tools and people); Richard Tur, *The ‘Person’ in Law*, in PERSONS AND PERSONALITY: A CONTEMPORARY INQUIRY 116, 121–23 (Arthur Peacocke & Grant Gillett eds., 1987) (noting that legal personality can include a variety of combinations of rights, capacities, and obligations); Solum, *supra* note 30, at 1284–87 (considering a spectrum of personhood rooted in philosophical attributes); Ludvig Beckman, *Personhood and Legal Status: Reflections on the Democratic Rights of Corporations*, 47 NETH. J. LEGAL PHIL. 13, 21 (2018) (exploring the ways in which legal persons can be subject to law and yet not acquire certain rights of persons); Berg, *supra* note 121, at 373 (describing juridical persons as those non-human entities to whom society chooses to grant some of the legal protections enjoyed by natural persons); Gordon, *supra* note 121, at 3 (“Legal personhood is not binary; it is not a yes-or-no proposition. The differentiation of legal rights and responsibilities starts, not ends, at the question of whether something may or may not be considered a person in the meaning of a statute.”); Koops et al., *supra* note 127, at 559 (“To decide whether a specific entity qualifies as a person and the ensuing question of whether such artificial persons would qualify as legal abstract persons, we could take a relative approach. This means that next to establishing the preconditions for personhood we should acknowledge different levels of legal personhood, requiring different legal consequences.”).

135. Calo, *Robotics*, *supra* note 41; Filipe Maia Alexandre, *The Legal Status of Artificially Intelligent Robots: Personhood, Taxation & Control* (June 1, 2017) (L.L.M. dissertation, Tilburg University), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2985466 [<https://perma.cc/B3PQ-9F4E>].

136. Gunther Teubner, *Digital Personhood? The Status of Autonomous Software Agents in Private Law*, ANCILLA IURIS 106, 113 (2018).

137. May Bulman, *EU to Vote on Declaring Robots to be ‘Electronic Persons.’* INDEPENDENT (Jan. 14, 2017), <https://www.independent.co.uk/life-style/gadgets-and-tech/robots-eu-vote-electronic-persons-european-union-ai-artificial-intelligence-a7527106.html> [<https://perma.cc/C652-BRNQ>].

anthropomorphized robots might desensitize humans to the harm caused by certain behavior.¹³⁸ As anthropomorphism—“the psychological tendency to treat inanimate objects as though they have human qualities”—becomes a design element for certain robots, some scholars encourage a new form of personhood to capture the fact that “[r]obots are not persons but neither are they merely toasters.”¹³⁹ In other words, there exists at least some support for a restricted form of legal personhood that recognizes the social valence¹⁴⁰ of robots without implying sentient consciousness—some form of hybrid social person.¹⁴¹

Given how far apart the two ends of the spectrum (AI systems as tools on one end, and AI systems as hybrid-social persons on the other end) seem to be, what occupies the vast middle ground? In between AI systems that act as much like a tool as a hammer and fully autonomous AI systems (including robots) that exhibit social valence, spans a vast and varied landscape of human-AI interaction. In particular, humans develop AI systems in a variety of contexts in order to either substitute for the role a natural person would otherwise perform, or to enable more efficient wide-scale coordination of natural persons. For example, companies use AI systems to fulfill the role of employees in certain circumstances,¹⁴² to

138. *Legal Protection for Social Robots*, *supra* note 12, at 224.

139. IAN R. KERR, JASON MILLAR & NOEL CORRIVEAU, *Robots and Artificial Intelligence in Health Care*, in CANADIAN HEALTH LAW AND POLICY 269 (Joanna Erdman, Vanessa Gruben & Erin Nelson eds., 5th ed. 2017) (citing PETER H. KAHN, AIMEE L. REICHERT, HEATHER E. GARY, TAKAYUKI KANDA, HIROSHI ISHIGURO, SOLACE SHEN, JOLINA H. RUCKERT & BRIAN GILL, THE NEW ONTOLOGICAL CATEGORY HYPOTHESIS IN HUMAN-ROBOT INTERACTION 159 (2011), <http://ieeexplore.ieee.org/document/6281274> (last visited Nov. 28, 2021)).

140. A term coined by Professor Ryan Calo, “social valence” refers to the fact that robots “evoke responses in people” similar to the responses they have to other people. Calo, *Robotics*, *supra* note 41, at 545.

141. Zimmerman, *supra* note 23, at 39 (“Computers have also been considered a ‘hybrid social person’ when computers work with human beings in forming contracts and as a temporary status granted for convenience, but not as conscious beings deserving of protection.” (footnotes omitted)). Notably, Tom Allen and Robin Widdison use the term hybrid social person to refer to a partnership between humans and computers. Tom Allen & Robin Widdison, *Can Computers Make Contracts?*, 9 HARV. J.L. & TECH. 25, 40 (1996). Here, that type of partnership may be said to exist for fully autonomous but not sentient AI insofar as narrow AI is developed by, for a purpose determined by, and used at the hands of, humans. See Reyes & Ward, *supra* note 32, at 349–50. This fits with Allen and Widdison’s approach to granting legal personhood, in which ultimately, they determine that granting legal personhood to entities that are capable of automatic action makes sense. Allen & Widdison, *supra*, at 52.

142. See Mihailis E. Diamantis, *The Extended Corporate Mind: When Corporations Use AI to Break the Law*, 98 N.C. L. REV. 893, 900 (2020) (providing examples that include using self-driving cars instead of taxi or delivery drivers, replacing human bankers with algorithms that approve mortgages, using algorithms instead of people to price products, among others).

assist in the hiring process,¹⁴³ and to provide services.¹⁴⁴ Governments (a collection of natural people) use AI systems to make benefits determinations,¹⁴⁵ assess recidivism risk,¹⁴⁶ and predict neighborhoods in need of higher levels of policing,¹⁴⁷ among other things.¹⁴⁸ Each of these uses illustrate instances of humans working through AI systems. While some of these uses may fall closer to the AI systems as tools end of the AI personhood spectrum, at a certain point, the AI system becomes more than just a tool and, instead, acts as a substitute or conduit for the actions of natural people. To date, nowhere is this transition clearer than in the autonomous corporate personhood context.¹⁴⁹ While some corporations use AI systems as tools for what is otherwise a very traditional business, other corporations use AI systems and algorithmic systems to coordinate human activity more efficiently, with less overhead and hierarchy, while others allow the AI system to run the business almost entirely.¹⁵⁰ Thus, while the middle of the AI personhood spectrum might experience gradations that make the AI system more like a tool, or more like a hybrid social person, in certain circumstances the AI system fits a separate category altogether—AI system as conduit for human activity.

When it comes to AI systems, then, the spectrum of personhood might be summarized as one that varies not only by levels of automation, but also by context.¹⁵¹ On the one hand, an AI system that automates activity without exerting any form of autonomous will is appropriately viewed as property. In that context, some other natural or legal person uses the AI system as a tool to automate activity for the benefit of the natural or legal person, at the complete direction and discretion of the natural or legal person. On the other end of the spectrum, nearly autonomous AI systems represent a form of hybrid social person—one which acts with social

143. Jason R. Bent, *Is Algorithmic Affirmative Action Legal?*, 108 GEO. L.J. 803, 809 (2020).

144. For example, financial firms provide investment advice through robo-advisors. Tom Baker & Benedict Dellaert, *Regulating Robo Advice Across the Financial Services Industry*, 103 IOWA L. REV. 713, 713 (2018).

145. Cary Coglianese & David Lehr, *Transparency and Algorithmic Governance*, 71 ADMIN. L. REV. 1, 9 (2019).

146. Rebecca Wexler, *Life, Liberty, and Trade Secrets: Intellectual Property in the Criminal Justice System*, 70 STAN. L. REV. 1343, 1368 (2018).

147. Coglianese & Lehr, *supra* note 145, at 7; Andrew Guthrie Ferguson, *Predictive Policing and Reasonable Suspicion*, 62 EMORY L.J. 259, 261 (2012).

148. Coglianese & Lehr, *supra* note 145, at 7–9.

149. Reyes, *ABR*, *supra* note 20, at 451–52.

150. *Id.* at 468; *see also infra* section III.B.

151. The emphasis on context differentiates this approach (and the ASQ method) from other proposals to place AI agents and robots on a spectrum of personhood. For a different approach to creating an AI spectrum, *see generally* Cofone, *supra* note 134.

valence but is not endowed with characteristics normally associated with natural persons. And in the vast space in between, where AI-related technologies act as a conduit for collective human action, there seems to be little to no discussion of whether the automated substitute carries forward the personhood attributes of the human.

In other words, even the answer to the basic question of whether an AI system needs legal personhood recognition varies along a spectrum of social context. Further, even when legal personhood seems necessary, the nature and extent of the rights and duties that society needs to attach to personhood status varies.¹⁵² For example, AI systems as property do not need their own personhood status unless bestowing some low level of fictional personhood is the only way to ensure the owner remains liable for wrongs committed while using the AI system.¹⁵³ In the context of the hybrid social person at the other end of the spectrum, the chief policy drivers seem to be protection of the humans with which the robots interact. Thus, the chief proposal for personhood in that setting is some form of restricted personhood (person for liability purposes, or to protect social values). AI systems used to substitute for or as conduits through which humans or other legal persons act, however, represent the most likely candidates for assigning a form of legal personhood with a significant bundle of rights and duties attached. Indeed, this middle group poses the most complicated questions around artificial personhood. When should a natural person be required to “give up” her rights, or when can she claim she has offloaded her duties, because of reliance on an AI system as a conduit for action? Does the answer change if the AI system acts as a conduit for a legal person? Despite these and other questions, this middle group of AI systems remains the most under analyzed in the literature. Because this middle group features prominently among autonomous businesses, autonomous corporate personhood represents a unique opportunity for exploring the contours of artificial personhood.

152. Several scholars point out that this is true for many areas in which the law recognizes personhood. Banteka, *supra* note 26, at 551–53; Bryson et al., *supra* note 31, at 280–81; Susanna K. Ripken, *Corporations Are People Too: A Multi-Dimensional Approach to the Corporate Personhood Puzzle*, 15 *FORDHAM J. CORP. & FIN. L.* 97, 99–100 (2009) [hereinafter Ripken, *Corporations Are People Too*] (“Because of the meaning and value we attach to personhood in our society, deciding whether a corporation is a person helps us decide what its rights and duties are and how we can expect it to behave. It gives us a normative framework for how we should view corporations, how they should be treated, and how they should treat us.”); John Dewey, *The Historic Background of Corporate Legal Personality*, 35 *YALE L.J.* 655, 656 (1926) (“In saying that ‘person’ might legally mean whatever the law makes it mean, I am trying to say that ‘person’ might be used simply as a synonym for a right-and-duty-bearing-unit.”).

153. Diamantis, *supra* note 142, at 900 (“[T]he law could and should recognize that corporate minds extend to algorithms fulfilling roles that were once occupied only by human employees.”).

B. *Theories of Artificial Personhood as Applied to Autonomous Corporations*

The review of the AI personhood literature demonstrates that technological artifacts, such as AI systems, can be typified as falling into one of three main categories of personhood: (1) non-person property, (2) personhood by virtue of acting as a conduit for humans, and (3) some form of hybrid social person. The literature also makes clear that the socio-legal needs driving these personhood categories include protecting the rights of natural people, upholding social values, and creating a fiction for legal convenience. Meanwhile, the ABR Taxonomy reveals the imminent reality that the corporate form will act as a social context for AI systems, and that this imminent social context comes in many varied designs. These revelations together raise the question of whether and how the existing theories of personhood for AI systems map to existing types of autonomous businesses, and whether they can help fill the gaps in the autonomous business literature. In particular, how well do the socio-legal needs driving AI personhood map to those of autonomous corporations, if at all? As explained in detail below, examining the three categories of AI systems personhood through the prism of the ABR Taxonomy reveals rough corollaries between theories of AI personhood and categories of autonomous businesses, including corollaries in the socio-legal needs of both.¹⁵⁴ Unpacking each of these corollaries requires considering the function played by autonomous technology in each category of businesses in the ABR Taxonomy.

Taking Traditional Plus corporations first, such corporations use autonomous technology in one of two ways—either to automate some element of business operations in order to increase efficiencies and take advantage of economies of scale, or to reduce overhead costs by eliminating one or more layers of middle management.¹⁵⁵ Such uses may involve creating or otherwise acquiring proprietary software, hardware, or other machinery and infrastructure.¹⁵⁶ But generally speaking, Traditional Plus companies view their use of the technology as mere use of technological tools in the routine process of running a business. The autonomous robots in Amazon’s warehouses represent equipment employed in carrying out Amazon’s business to the same extent that the packaging material that the robots move around the warehouses are

154. In this regard, I consider an autonomous business a specific type of AI system. For a general definition of system, see RITTER, *supra* note 16, at 132–33.

155. Reyes, *ABR*, *supra* note 20, at 473–74.

156. *Id.*

equipment for use in the business.¹⁵⁷ As a result, there is a strong connection between the Traditional Plus corporation socio-contextual use of AI and the approach to AI systems as corporate property.

In the case of Distributed Business Entities, on the other hand, autonomous technologies become more integrated with the collective activity of natural persons.¹⁵⁸ Indeed, without the autonomous technology acting as a coordinating and incentivizing device, the natural persons involved in Distributed Business Entities could not collaborate to their mutually productive economic ends. Instead of relying on all the trappings of the traditional corporate form, Distributed Business Entities replace some elements with technology that serves the same function.¹⁵⁹ For example, Distributed Business Entities seek to replace directors with more direct shareholder governance, using the technology as a coordinating device, rather than hierarchy.¹⁶⁰ When AI systems act as conduits for natural persons the AI personhood literature is less developed in terms of assessing the nature and extent of personhood for the AI system. The AI system clearly takes action that moves beyond mere property, such as autonomous governance, autonomous compliance, and autonomous performance of obligations among the natural persons for whom it acts as a coordinating device. And yet, AI systems acting as conduits for natural persons cannot be said to operate emergently or to always act on their environment of their own accord such that they move into the realm of socially valent AI systems.¹⁶¹ The result, contrary to most AI personhood literature, is for the law to retain the human touch points firmly rooted as part of the socio-contextual needs of Distributed Business Entities.

Autonomous Entities, with very few or no connections to natural persons, bear the most resemblance to the technical artifacts discussed in AI personhood literature as “robots.” Autonomous Entities, analogous to the prevailing definition of robot,¹⁶² exist in a digital environment, can sense that environment, process information from its environment, and make changes to its environment.¹⁶³ In the case of a Fully Autonomous entity called Metronome, for example, Metronome sets the price of its

157. *Id.* at 463 (citing Will Knight, *Inside Amazon's Warehouse, Human-Robot Symbiosis*, MIT TECH. REV. (July 7, 2015), <https://www.technologyreview.com/s/538601/inside-amazons-warehouse-human-robot-symbiosis/> [<https://perma.cc/T26C-4XG9>]).

158. *Id.* at 474–75.

159. *Id.*

160. *Id.* at 479.

161. *Id.* at 474 (describing The DAO and Dash as two examples of highly automated technology coordinating economic activity, and yet requiring human input to actually take action).

162. Calo, *Robotics*, *supra* note 41, at 529–31.

163. *Id.* at 531 (“My working assumption is that a system acts upon its environment to the extent it changes that environment directly.”).

product by sensing and processing market signals related to customer demand and pricing preferences.¹⁶⁴ When customers pay the set price, Metronome acts upon its environment by making state changes reflecting the exchange of value between the Metronome customer and the Metronome smart contracts.¹⁶⁵ Although Metronome does not possess a physical instantiation that can affect the physical world, which is often considered a hallmark of robots (as compared to other AI systems), it can autonomously impact the environment mutually shared by both Metronome and its customer, which, in turn, can have real world impacts.¹⁶⁶ As a result, Metronome, and other Autonomous Entities, can be said to “be in some way”¹⁶⁷ that is markedly different from the mere technology tools used to automate certain business functions by Traditional Plus businesses, or the AI systems acting as conduits for collective human activity in Distributed Business Entities.

When addressing the potential of bestowing personhood upon robots, policy makers and scholars put some emphasis on the fact that robots possess a heightened level of social valence—meaning, robots are more likely to be treated as a social agent, like a person or a pet.¹⁶⁸ While there is no sense in which Autonomous Entities will be related to a person or a pet, when Autonomous Entities are formed as corporations,¹⁶⁹ they assume the social valence of corporations.¹⁷⁰ Corporations, autonomous

164. METRONOME, OWNER’S MANUAL 9, 11 (2018), https://metronome.io/download/owners_manual.pdf [<https://perma.cc/485H-N47Y>] (explaining the descending price auctions).

165. *Id.* at 23–24.

166. Calo, *Robotics*, *supra* note 41, at 531 (“A robot in the strongest, fullest sense of the term exists in the world as a corporeal object with the capacity to exert itself physically. But again, I am talking in terms of a continuum.”).

167. *Id.* (emphasis omitted) (“A technology does not act, and hence is not a robot, merely by providing information in an intelligible format. It must *be* in some way.” (emphasis in original)).

168. *See generally*, e.g., *Legal Protection for Social Robots*, *supra* note 12, at 214 (“People are prone to anthropomorphism; that is, we project our own inherent qualities onto other entities to make them seem more human-like. Our well-documented inclination to anthropomorphically relate to animals translates remarkably well to robots.”); KERR ET AL., *supra* note 139, at 269 (“One novel form of sociotechnical influence is that robots and AIs tend to have ‘social valence’ . . . [S]ocial robots are often designed to promote ‘anthropomorphism’—the psychological tendency to treat inanimate objects as though they have human qualities—thus blurring the line between human and instrument.” (footnote omitted)); Calo, *Robotics*, *supra* note 41, at 532 (“Finally, robots, more so than other technology in our lives, have a social valence. They *feel* different to us, more like living agents. The effect is so systematic that a team of prominent psychologists and engineers has argued for a new ontological category for robots somewhere between object and agent.” (emphasis in original) (footnote omitted)).

169. LoPucki, *supra* note 21, at 906.

170. Social valence, by way of reminder, is the quality of an artificial entity (like robots and corporations) to be perceived as more than an object, but as a social agent, like a person. Calo, *Robotics*, *supra* note 41, at 545–46.

or otherwise, use a variety of tactics to receive societal perception and acceptance as social agents. For example, corporations use corporate social responsibility tactics to “try to convince us that they are good global citizens: ‘brands take stands’ by engaging in cause philanthropy; CEOs of prominent corporations tackle a variety of issues; and social values drive marketing strategies for goods and services.”¹⁷¹ In that way, they retain social valence even without a physical form that might invite people to anthropomorphize them. When AI systems, like robots and Fully Autonomous corporations, are built to have frequent and highly impactful interactions with natural persons, AI personhood literature encourages law to provide the AI systems some rights, but not the full panoply of rights natural persons enjoy.¹⁷² Indeed, many AI personhood scholars urge policy makers to give socially valent AI systems those rights needed to protect the natural persons with whom they interact—protect them from both the AI systems and from themselves.¹⁷³ As hybrid social persons—a system with some social valence but that does not have intrinsic characteristics of natural persons—lawmakers should be willing to heavily circumscribe the rights Fully Autonomous corporations and Algorithmic Entities (should they ever exist) in order to protect the consumers and other natural persons in society with whom the corporations will act.

In sum, as detailed below in Table 2, Traditional Plus corporations use AI systems as proprietary tools to automate operations and/or middle management, Distributed Business Entities use AI systems as a conduit for collective human activity, and Autonomous Entities share striking similarities with emerging conceptions of an AI hybrid social person—an entity with social valence but lacking characteristics of intrinsic personhood.

171. Kishanthi Parella, *Improving Human Rights Compliance in Supply Chains*, 95 NOTRE DAME L. REV. 727, 727 (2019). And as scholars increasingly recognize that corporate activities impact a variety of societal actors beyond shareholders, the literature increasingly calls for corporate law to find mechanisms of incentivizing corporations to assume a broader range of responsibilities. Kishanthi Parella, *Protecting Third Parties in Contracts*, 58 AM. BUS. L.J. 327, 334–35 (2021).

172. See *supra* section II.A.

173. See, e.g., *Legal Protection for Social Robots*, *supra* note 12, at 214 (arguing that the law should treat robots more like animals in certain contexts where humans anthropomorphize robots as a tool for discouraging certain bad human behavior).

Table 2: Layering Artificial Personhood Theories and the ABR Taxonomy

Traditional Plus		Distributed Business Entities		Autonomous Entities	
<i>Property</i>		<i>Conduit for Humans</i>		<i>Hybrid Social Person</i>	
1	2	3	4	5	6
Primarily Operationally Automated	Managerial Automation Light	Autonomous Mediating Hierarchy	Mostly Autonomous	Fully Autonomous	Algorithmic Entities

Because autonomous corporations exist at the intersection of AI systems and corporations, a second layer of personhood theory must be examined. Indeed, a complete understanding of the socio-legal needs of autonomous corporations cannot be understood without considering how the corporate personhood doctrine applies to the three categories of the ABR Taxonomy and how they interact with the related AI personhood theories.

III. EXPLORING THE CONTOURS OF AUTONOMOUS CORPORATE PERSONHOOD THROUGH CORPORATE LAW

Because autonomous corporations meld two technologies—an AI system and the corporate form—a consideration of autonomous corporate personhood cannot rest in the AI personhood literature alone. As a result, the socio-legal needs of corporations must figure just as prominently in an approach to autonomous corporate personhood as those of AI systems. To that end, this Part first reviews the corporate personhood literature and discusses the three key theories that dominate the debates. As with the AI personhood literature, this Part then views the corporate personhood doctrine through the prism of the ABR Taxonomy, asking whether and to which extent each theory tracks the reality of each type of autonomous corporation. Ultimately, the exercise demonstrates that the question posed by the Personless Corporation for decades—whether a singular approach to corporate personhood makes sense in all circumstances—should be answered in the negative. When the socio-technical context of autonomous corporations collides with corporate personhood, no one theory neatly fits each corporation. Rather, the appropriate theory for each varies with the way the corporation puts the technology to use and the

relative separation between ownership and control by natural persons.

A. *Corporate Personality and the Corporate Rights Conundrum*

Notably, the corporate personality¹⁷⁴ and corporate rights literature reflects a conundrum analogous to that of the AI personhood conundrum. Law first recognized corporations as artificial persons via the idea of “legal personality” for private law convenience.¹⁷⁵ Only people can contract, sue, and be sued, own property, and enter into contracts, among other things, so legally recognizing corporations as “people” simplified commercial transactions, questions of liability, and the application of other important regulations to corporate activity.¹⁷⁶ But as foreshadowed by the AI personhood debate, once deemed a person that can face liability and regulation, the next question becomes whether the technical artifact-turned-artificial person, in this case the corporation,¹⁷⁷ should also bear rights.

The United States Constitution does not specifically refer to corporations.¹⁷⁸ Yet corporations have pressed constitutional claims to protect property, contract, and other rights specifically granted to persons

174. By way of reminder, corporate personhood scholars often use the term corporate personhood to refer to the binary issue of whether a corporation should be treated as a person, while the term corporate personality refers to the specific theories of personhood and the legal consequences (including constitutional rights) that flow from a decision to treat a corporation as a person. See Padfield, *Does Corporate Personhood Matter*, *supra* note 119, at 1010 & n.3; Padfield, *A New Social Contract*, *supra* note 119, at 372.

175. Dewey, *supra* note 152, at 668 (“When it is difficult to lay hands on the single persons who are said to be the only ‘real’ persons, it is very convenient to do business as a fiction.”).

176. Pollman, *Reconceiving Corporate Personhood*, *supra* note 11, at 1637–38.

177. The corporate form, a creature of state law, is a form of technology, and as such, is as much a technical artifact as an AI system. See John O. McGinnis & Steven Wasick, *Law’s Algorithm*, 66 FLA. L. REV. 991, 991 (2014). As McGinnis explains, “[l]aw thus works necessarily in part as an information technology—a tool for the distribution of information to the world that may itself change through the infusion of more information from the world.” *Id.* at 993. Further,

[h]umans are both creators and creatures of technology. Everything we do is vitally connected to the tools we develop, and the law is no different. Law itself is in part a tool and an information technology, but its effectiveness depends on the larger domain of material technologies in which it nests.

Id. at 1000.

178. Blair & Pollman, *supra* note 18, at 1680; see also Pollman, *Corporate Privacy*, *supra* note 17, at 44–45 (“The U.S. Constitution does not specifically mention corporations. As a matter of constitutional text, no explanation is provided regarding the application of constitutional provisions to corporations.” (citing ASHUTOSH BHAGWAT, *THE MYTH OF RIGHTS: THE PURPOSES AND LIMITS OF CONSTITUTIONAL RIGHTS* 10–15 (2010))); Susanna Kim Ripken, Citizens United, *Corporate Personhood*, and *Corporate Power: The Tension Between Constitutional Law and Corporate Law*, 6 U. ST. THOMAS J.L. & PUB. POL’Y 285, 288 (2012) (“[O]ver the last 125 years, the Supreme Court has held corporations are persons entitled to numerous constitutional protections, even though the word ‘corporation’ does not appear anywhere in the Constitution.”).

and citizens under the Constitution since as early as 1809.¹⁷⁹ Legal scholars have struggled for more than a century with the questions of whether and to what extent corporations should carry the rights and responsibilities of persons.¹⁸⁰ At present, a corporation enjoys constitutionally protected rights to enter into contracts,¹⁸¹ own property,¹⁸² enjoy due process protections under the Fifth Amendment,¹⁸³ be free from

179. Blair & Pollman, *supra* note 18, at 1680 (“The Supreme Court faced one of its earliest tasks of interpreting how a constitutional provision applies to corporations in the 1809 case *Bank of the United States v. Deveaux*.”).

180. Ripken, *Corporations Are People Too*, *supra* note 152, at 99 (citing ERNST FREUND, *THE LEGAL NATURE OF CORPORATIONS* (1897); FREDERICK HALLIS, *CORPORATE PERSONALITY: A STUDY IN JURISPRUDENCE* (1930); H.L.A. HART, *DEFINITION AND THEORY IN JURISPRUDENCE: AN INAUGURAL LECTURE* (1953); ALEXANDER NÉKÁM, *THE PERSONALITY CONCEPTION OF THE LEGAL ENTITY* (1938); S.J. STOLJAR, *GROUPS AND ENTITIES: AN INQUIRY INTO CORPORATE THEORY* (1973); George F. Canfield, *The Scope and Limits of the Corporate Entity Theory*, 17 COLUM. L. REV. 128 (1917); Felix S. Cohen, *Transcendental Nonsense and the Functional Approach*, 35 COLUM. L. REV. 809 (1935); John Finnis, *Corporate Persons II: Persons and Their Associations*, in 63 SUPP. VOL.: PROC. ARISTOTELIAN SOC’Y 267 (1989); Max Radin, *The Endless Problem of Corporate Personality*, 32 COLUM. L. REV. 643 (1932); Paul Vinogradoff, *Juridical Persons*, 24 COLUM. L. REV. 594 (1924); Martin Wolff, *On the Nature of Legal Persons*, 54 LAW Q. REV. 494 (1938)) (“Whether or not the corporation should be viewed as a separate person that owes and is owed certain obligations has puzzled theorists for years.”); Virginia Harper Ho, *Theories of Corporate Groups: Corporate Identity Reconceived*, 42 SETON HALL L. REV. 879, 891 (2012) (“Since the advent of the corporate form, the extent to which corporations should bear the same rights and duties as individuals has engaged corporate law scholars and the courts.”).

181. *Trs. of Dartmouth Coll. v. Woodward*, 17 U.S. (4 Wheat.) 518, 650 (1819).

182. *Santa Clara Cnty. v. S. Pac. R.R. Co.*, 118 U.S. 394, 394–95 (1886) (explaining that corporations are persons under the Fourteenth Amendment and can own property); *see also* Pollman, *Reconceiving Corporate Personhood*, *supra* note 11, at 1643 (“The focus was on property rights: ‘The trust cannot be evaded that, for the purpose of protecting property rights, the property of all business and trading corporations IS the property of the individual corporators.’” (citation omitted)). Several scholars have prominently argued that, in fact, early corporate personhood jurisprudence was entirely focused on the protection of contract and property rights of corporations. *See generally, e.g.*, Pollman, *Reconceiving Corporate Personhood*, *supra* note 11, at 1630 (“Specifically, this Article traces historical and theoretical developments in the corporation and corporate personhood jurisprudence to show that the roots of the doctrine are based in concerns about the property and contract interests of shareholders.”); Pollman, *Corporate Privacy*, *supra* note 17, at 46 (“In the later part of the nineteenth century, the Court recognized equal protection and due process protections for corporations under the Fourteenth and Fifth Amendments. The Court gave little explanation for these rulings, but justified this extension of constitutional protection on the basis that it protected the property interests of the people associating through the corporate form.” (citations omitted)); Blair & Pollman, *supra* note 18, at 1695 (“These early cases recognizing corporations as holders of constitutional rights, or ‘persons’ under the Constitution, responded to questions about whether corporations should have the property and contract rights and protections afforded to individuals.”); Herbert Hovenkamp, *The Classical Corporation in American Legal Thought*, 76 GEO. L.J. 1593, 1641 (1988) (describing the United States Supreme Court’s focus on the “problem [of] guaranteeing that the owners of property held in the name of a corporation would receive the same constitutional protections as the owners of property held in their own name.”).

183. *Noble v. Union River Logging R.R. Co.*, 147 U.S. 165, 176 (1893).

unreasonable search and seizure,¹⁸⁴ enjoy equal protection of the laws,¹⁸⁵ freely express itself through speech—including using monetary spending as political speech,¹⁸⁶—and express religious beliefs,¹⁸⁷ among others.¹⁸⁸ Throughout its jurisprudence, the Supreme Court jumps between several corporate personality theories as justification for imbuing the corporation with specific constitutional rights.¹⁸⁹ Scholars, in turn, remain frustrated, fascinated, and altogether perplexed by the apparent lack of a unified theory underlying the Supreme Court’s decisions, resulting in a rich and extensive literature around the doctrine of corporate personhood.¹⁹⁰ Three theories of corporate personhood dominate the debate in the literature and

184. *Hale v. Henkel*, 201 U.S. 43, 70–71 (1906) (holding corporations have a Fourth Amendment right against unreasonable searches and seizures, but not a Fifth Amendment right against self-incrimination).

185. *Santa Clara*, 118 U.S. at 396 (noting that the Court agreed that the Equal Protection Clause applied to corporations).

186. *Citizens United v. FEC*, 558 U.S. 310, 319 (2010).

187. *See Burwell v. Hobby Lobby Stores, Inc.*, 573 U.S. 682, 706–07 (2014) (explaining that free exercise includes protection of the religious liberties of the individual natural persons who own and control those companies).

188. Other such constitutional amendments include Fifth Amendment protections for liberty and against double jeopardy. *United States v. Martin Linen Supply Co.*, 430 U.S. 564, 575–76 (1977) (discussing double jeopardy); *Old Dominion Dairy Prods., Inc. v. Sec’y of Def.*, 631 F.2d 953, 969 (D.C. Cir. 1980) (discussing liberty interests under the Fifth Amendment Due Process Clause). Arguably, they also include the Seventh Amendment right to trial by jury. *Ross v. Bernhard*, 396 U.S. 531, 532–34 (1970). For a further discussion of corporate constitutional rights in the criminal law context, see Christopher Slobogin, *Subpoenas and Privacy*, 54 DEPAUL L. REV. 805 (2005); and V.S. Khanna, *Corporate Criminal Liability: What Purpose Does It Serve?*, 109 HARV. L. REV. 1477 (1996). Some debate exists as to whether a right to privacy should be included in this list as well. Compare Pollman, *Corporate Privacy*, *supra* note 17, at 27, 88 (arguing that no constitutionally protected right to privacy has yet been extended to corporations by the Supreme Court and that no such right should be extended except in certain limited circumstances), with LoPucki, *supra* note 21, at 890–91, 891 n.12 (citing *Dow Chem. Co. v. United States*, 476 U.S. 227, 236 (1986) for the proposition that corporations enjoy “a reasonable, legitimate, and objective expectation of privacy within the interior of its covered buildings, and it is equally clear that expectation is one society is prepared to observe”).

189. Chatman, *supra* note 18, at 817 (“The Court has never explained the source of corporate constitutional rights or settled on a single theory of the nature of the corporate form.” (citing ERWIN CHEMERINSKY, *THE CASE AGAINST THE SUPREME COURT* 257 (2014))); Pollman, *Reconceiving Corporate Personhood*, *supra* note 11, at 1649 (“In so holding, the Court oscillated between reasoning based on the concession, aggregate and real entity views, balancing the recognition that ‘[c]orporations are a necessary feature of modern business activity,’ with the sense that the state that creates the corporation must preserve its ability to regulate.”).

190. *See, e.g.*, Jess M. Krannich, *The Corporate “Person”: A New Analytical Approach to a Flawed Method of Constitutional Interpretation*, 37 LOY. U. CHI. L.J. 61, 62 (2005) (“As a matter of law, the Court’s jurisprudence relating to corporate constitutional rights is fundamentally flawed.”); Chatman, *supra* note 18, at 812 (“When courts issue decisions that define corporate rights without first defining the corporate person, they may unintentionally alter what it means to be a corporation.”).

appear to underly Supreme Court decisions:¹⁹¹ the artificial entity (or concession) theory, the aggregate theory, and the real entity theory.¹⁹² This Article does not purport to survey the entire landscape of corporate personhood jurisprudence and scholarly literature, as others have already spectacularly undertaken that project.¹⁹³ The aim of this brief overview, instead, is to provide enough of a summary of the corporate personhood debate to get a sense of the jurisprudential needs that the doctrine fills.

The artificial entity theory, also called the concession theory,¹⁹⁴ “views the corporation as a tremendous capital accumulation device that was only made possible by the state conveying certain privileges to incorporators for which they could not otherwise privately contract.”¹⁹⁵ In other words, the artificial entity theory views the corporation as a fictional entity created by natural persons at the pleasure of the state; the corporation only exists because a state statute enables it to exist.¹⁹⁶ From a socio-legal

191. Stefan J. Padfield, *The Silent Role of Corporate Theory in the Supreme Court's Campaign Finance Cases*, 15 U. PA. J. CONST. L. 831, 834 (2013) [hereinafter Padfield, *Silent Role of Corporate Theory*] (arguing that corporate theory plays a role in Supreme Court jurisprudence on corporate constitutional rights even when the Court does not explicitly state as much in its opinions).

192. Padfield, *A New Social Contract*, *supra* note 119, at 373 (“The three primary theories of corporate personality are: (1) artificial entity theory (also known as concession theory); (2) aggregate theory; and (3) real entity theory.”); Chatman, *supra* note 18, at 819 (identifying “the major theories of corporate personhood” as “the artificial entity/concession theory, aggregate theory, or real entity theory”); S.I. Strong, *Congress and Commercial Trusts: Dealing with Diversity Jurisdiction Post-Americold*, 69 FLA. L. REV. 1021, 1057 (2017) (identifying “the three traditional theories of corporate personhood” as “the concession theory, the aggregate theory, and the real entity theory”); Martin Petrin, *Reconceptualizing the Theory of the Firm—From Nature to Function*, 118 PA. ST. L. REV. 1, 1 (2013). Other theories of the corporation include nexus-of-contracts theory, process theory, director-primacy theory, team-production theory, and systems theory. See Padfield, *Silent Role of Corporate Theory*, *supra* note 191, at 835 (citing ROBERT W. HAMILTON & RICHARD A. BOOTH, *BLACK LETTER OUTLINES: CORPORATIONS* 327–32 (5th ed. 2006)); Tamara Belinfanti & Lynn Stout, *Contested Visions: The Value of Systems Theory for Corporate Law*, 166 U. PA. L. REV. 579, 580 (2018) (detailing a systems theory of corporations). One way to distinguish between the various theories is to see the artificial theory, aggregate theory, and real entity theory as constitutional theories of the corporation, while the others listed above represent corporate governance theories of the corporation. Stefan J. Padfield, *Rehabilitating Concession Theory*, 66 OKLA. L. REV. 327, 330–31 (2014).

193. For deeper review of the Supreme Court corporate personhood jurisprudence, see generally Blair & Pollman, *supra* note 18; Pollman, *Reconceiving Corporate Personhood*, *supra* note 11; Chatman, *supra* note 18; Reuven S. Avi-Yonah, *The Cyclical Transformations of the Corporate Form: A Historical Perspective on Corporate Social Responsibility*, 30 DEL. J. CORP. L. 767 (2005); Morton J. Horwitz, *Santa Clara Revisited: The Development of Corporate Theory*, 88 W. VA. L. REV. 173 (1985); David Millon, *Theories of the Corporation*, 1990 DUKE L.J. 201; Michael J. Phillips, *How Much Does Corporate Theory Matter? A Response to Professor Boatright*, 34 AM. BUS. L.J. 239 (1996); ADAM WINKLER, *WE THE CORPORATIONS: HOW AMERICAN BUSINESSES WON THEIR CIVIL RIGHTS* (2018); RIPKEN, *supra* note 129.

194. Padfield, *A New Social Contract*, *supra* note 119, at 373 (noting both terms are used).

195. Padfield, *Rehabilitating Concession Theory*, *supra* note 192, at 332.

196. Ripken, *Corporations Are People Too*, *supra* note 152, at 100; Chatman, *supra* note 18, at 811.

needs perspective, the artificial entity theory might be seen as calling on states to regulate corporations in order to protect natural persons¹⁹⁷ because “[t]he laws that create corporations should shape them to act in ways that serve the public interest.”¹⁹⁸

The aggregate theory, for its part, views the corporation as a collection of the people who own the corporation, and who, by their ownership, practically enable the corporation to function.¹⁹⁹ Under the aggregate theory, corporations derive their constitutional rights from the association of individual shareholders.²⁰⁰ The idea is that individual shareholders each enjoy rights and the shareholders do not surrender those rights merely by associating with others through the corporate form. Thus, the corporation may exert the individual rights of the shareholders as though those rights flow through to the corporate entity.²⁰¹ From a socio-legal needs perspective, the aggregate theory appears to prioritize the protection of the rights of the individuals comprising the corporation.²⁰²

Under the real entity theory, the corporation “is an independent reality that exists as an objective fact and has a real presence in society.”²⁰³ Under this view, the corporation stands alone, as “an entity unto itself, untethered from its founders, shareholders, and management. The people associated with the corporation are agents, investors, or lenders; they do not define the corporation.”²⁰⁴ It is not entirely clear what socio-legal needs drive the

197. Padfield, *A New Social Contract*, *supra* note 119, at 373 (“Concession theory, on the other hand, views the corporation as a state creation, and presumes the state may regulate its creation as it sees fit.”).

198. Ripken, *Corporations Are People Too*, *supra* note 152, at 101 (“Viewing the corporation as a creature of statute and a product of state action supports a public-oriented view of corporations and corporate law.”).

199. *Id.* at 100–01 (“Others argue that the corporation is not so much a creature of law as it is an association forged by the mutual agreement of the individuals composing it. . . . Therefore, the corporation is better described as a collection, or aggregate, of its individual human constituents, without whom the corporation would have no identity or ability to function at all.”); Chatman, *supra* note 18, at 822 (“Chief Justice Marshall’s view of the corporation also included the aggregate theory, which views the corporation’s rights as indistinguishable from the rights of the people who make up and own the corporation—shareholders.”).

200. *See* Blair & Pollman, *supra* note 18, at 1677.

201. Chatman, *supra* note 18, at 822. The capacity for corporations to assert derivative constitutional rights of its owners is not without limits. *See* Blair & Pollman, *supra* note 18, at 1690–91, 1727–28.

202. Ripken, *Corporations Are People Too*, *supra* note 152, at 102.

203. *Id.* at 101.

204. Chatman, *supra* note 18, at 823; *see also* Lyman Johnson & David Millon, *Corporate Law After Hobby Lobby*, 70 *BUS. LAW.* 1, 8–9 (2015) (“[C]orporations own property, enter into contracts, and commit torts. They can sue and be sued in their own right. They are subject to penalties if they violate applicable criminal laws. They must comply with a vast array of federal and state regulations. . . . [T]hey are subject to income tax liability on the net income generated by their

real entity theory of the corporation. On the one hand, adopting a real entity theory of the corporation may create a need to give the corporation the same rights and responsibilities as natural persons.²⁰⁵ On the other hand, a separate existence of a corporation from the people within it may make it easier to acknowledge that corporations are quite different from natural persons,²⁰⁶ and the unique character of corporations may demand different approaches to corporate rights determinations than that used with natural persons.²⁰⁷

Although scholars and Supreme Court justices alike often represent these three theories of the corporation as though they exist in isolation, many commentators note that the corporate reality never fits neatly into just one theory.²⁰⁸ This reality makes the debate over corporate personality theories difficult to mediate.²⁰⁹ Indeed, scholars explain that the extremely varied nature of corporate structures makes it difficult to map out a taxonomy of corporations and, therefore, to create a systematic framework for corporate rights determinations that gives sufficient space to corporate diversity.²¹⁰ In other words, the apparent haphazardness of the Supreme Court's approach to corporate personhood is intimately related to the socio-contextual complexity of the corporation's role in society.

Like the spectrum of AI personhood theories, the corporate personhood

commercial activities. . . . [T]he rights and obligations of corporations are not simply those of their shareholders, officers, directors, employees, or other humans who participate in or are affected by the corporation's activities."); Oliver Weinstein, *The Current State of the Economic Theory of the Firm, in THE FIRM AS AN ENTITY: IMPLICATIONS FOR ECONOMICS, ACCOUNTING, AND THE LAW* 21, 33 (Yuri Biondi, Arnaldo Canziani & Thierry Kirat eds., 2007) ("The firm exists in its own right, as a specific entity, beyond the changing personalities of shareholders, workers and managers.").

205. Ripkin, *Corporations Are People Too*, *supra* note 152, at 102.

206. Reuven S. Avi-Yonah, *Citizens United and the Corporate Form*, 1 ACCT., ECON. & L. 1, 41–42 (2011) ("The entire *Citizens United* opinion, both the majority and the dissent, are thus reflective of the real entity view. Corporations stand on their own, independent of both the state that created them and the shareholders that own them. The debate between the majority and the dissent is about what follows from this perspective on corporations. In the majority's opinion, this means that corporations are speakers just like individuals and entitled to the same First Amendment protection . . .").

207. *Id.* at 42 ("[T]he dissent takes the view that because of the special characteristics of corporations, they have more limited First Amendment rights.").

208. Chatman, *supra* note 18, at 818 ("The corporation is a real, stand-alone entity, independent of the natural persons who form and operate it. But it is also an artificial entity with rights that are defined and limited by the choices its creators made when adopting the state's terms."); Ripken, *Corporations Are People Too*, *supra* note 152, at 102 ("[T]he corporation is a multi-dimensional person with coinciding and conflicting properties that defy classification into a neat and tidy unitary theory. The modern corporation simply cannot be understood apart from the broader context in which it functions, and that context cannot be effectively analyzed without multiple academic perspectives.").

209. Chatman, *supra* note 18, at 853.

210. *Id.* at 845.

theories seek to protect participants in the corporation from losing their individual rights while also enabling regulation that holds corporations accountable to society at large. Further, corporate personhood serves a convenience function, allowing the corporation to sue, be sued, contract, and participate in commerce more easily. Viewed this way, the goals of AI personhood and corporate personhood do not appear that dissimilar: protecting the rights of natural people, upholding social values, and creating a fiction for legal convenience. Further, the appropriateness of using any given personhood theory for either AI systems or corporations appears to turn on the social context of each. Autonomous corporations—the intersection of AI systems and corporations—enable a deeper exploration of the potential links between the socio-technical reality of AI systems and the socio-contextual complexity of corporations. This, in turn, helps frame an approach to legal personhood for AI systems in a specific social context—autonomous business.

B. Corporate Rights and the Theories of Corporate Personality as Applied to Autonomous Corporations

Just as the AI personhood literature offered three rough theories of thinking about AI systems as persons,²¹¹ the corporate personhood literature just discussed reveals three core theories: aggregate, real, and artificial entity theories of corporate personhood. Because viewing AI personhood through the prism of autonomous corporations revealed certain theoretical gaps, the question becomes whether corporate personhood doctrine can fill the gaps. Answering that question requires considering the application of each corporate personhood theory to the socio-contextual complexity of the ABR Taxonomy.

Starting with the aggregate theory, many scholars disfavor the aggregate theory of the corporation because, in their view, corporate reality no longer supports such a view.²¹² As management became

211. *See supra* section II.A.

212. *See, e.g.,* Pollman, *Reconceiving Corporate Personhood*, *supra* note 11, at 1662 (“The aggregate view offers the advantage of explaining why corporations should have constitutional protections because it recognizes that human actors exist behind the corporation. But like the concession view, the aggregate view can be incongruent with modern times, at least in the large company context where it is not clear whose rights are being protected and what the scope of those rights should be.”); Blair & Pollman, *supra* note 18, at 1678–79 (“By about 1910, a sizable class of very large, branded, publicly traded corporations had emerged, and for these entities, it was no longer credible that they would be seen as proxies for the interests of a well-defined and identifiable group of individual investors or other participants. Although there might have been some matters in which such a corporation could appropriately be viewed as representing the aggregate interests of its investors (or perhaps of its managers, employees, or customers), in many matters, its interests could

increasingly separated from ownership in the early twentieth century, the idea that a corporation owes its existence to an association of individual owners became more attenuated.²¹³ This commentary applies to Primarily Operationally Automated Businesses, which are essentially traditional corporations that simply automated some element in their product or service chain.²¹⁴ The sharing economy²¹⁵ companies that often stand out as Managerial Automation Light corporations further support claims that some modern corporations no longer represent an association of individuals.²¹⁶ Rather, the whole point of automation for many Managerial Automation Light corporations is to replace the traditional association of persons with a peer-to-peer network of un-associated persons.²¹⁷ As a result, when considering the nature of both types of Traditional Plus corporations, neither fits the aggregate theory of corporate personhood.

Traditional Plus corporations do, on the other hand, exhibit characteristics of both an artificial entity and a real entity.²¹⁸ First, these corporations, whether part of the Sharing Economy or otherwise, exist because they incorporated according to the requirements of state law, and

not be clearly identified with any particular group of individuals.”); LISA M. FAIRFAX, *SHAREHOLDER DEMOCRACY: A PRIMER ON SHAREHOLDER ACTIVISM AND PARTICIPATION* 12 (2011) (“Although the shareholder voting right has been described as fundamental, it is relatively limited. . . . State corporate law provides that the board exercises most of the power and control within the corporation.”); Greenfield, *supra* note 17, at 320 (“The notion of derivative standing is similarly problematic. . . . First, as mentioned above, many corporate entities do not have shareholders. And many corporations have only other corporations as shareholders.”); Elizabeth Pollman, *Constitutionalizing Corporate Law*, 69 *VAND. L. REV.* 639, 676 (2016) (“Shareholders elect the board of directors, but the shareholder franchise is not a device to aggregate the political, social, or religious values of shareholders, nor is it often a deliberative or associational process.”).

213. *See, e.g.*, Blair & Pollman, *supra* note 18, at 1709 (stating that by 1910 the U.S. economy was dominated by giant corporations and observing that “[t]he new giant corporations were not just larger than corporations had been in the nineteenth century, they were in many ways, qualitatively different. They were no longer likely to be controlled by the founder or family of the founder, but were likely to have hundreds, or even thousands of shareholders, who traded their shares in public securities markets, and hundreds or thousands of employees.”).

214. Reyes, *ABR*, *supra* note 20, at 476.

215. Although it is clear that a definitional debate persists in the literature regarding the Sharing Economy, this Article borrows the definition of Sharing Economy used by Abbey Stemler, as follows: “all businesses that utilize platforms to connect people who have goods and services to offer with those who are willing to purchase them.” Stemler, *supra* note 76, at 199 n.12.

216. Orly Lobel, *The Law of the Platform*, 101 *MINN. L. REV.* 87, 90 (2016) (describing the sharing economy as “radically changing the traditional equilibria of supply and demand, blurring the lines between owners and users, producers and consumers, workers and contractors, and transcending the spatial divides of personal and professional, business and home, market and leisure, friend and client, acquaintance and stranger, public and private”).

217. *See generally* Reyes, *ABR*, *supra* note 20.

218. Carliss Chatman refers to the recognition that aspects of both the artificial and real entity theories are present in corporations as the “hybrid theory” of corporations. Chatman, *supra* note 18, at 818.

thus they enjoy the rights extended to them under state law.²¹⁹ Second, such corporations often achieve a presence that is undeniably greater than the sum of its parts. For example, Amazon enjoys a certain persona as a technology giant wielding significant levels of economic and social power.²²⁰ In other words, society reacts to Amazon as though it is more than the mere sum of its individual constituent parts—it is a real entity acquiring real power and causing real impacts in society. Similarly, the Sharing Economy companies exist as a real entity that is greater than the sum of the participants in its platform. In fact, that separateness often attracts negative attention.²²¹ As scholars repeatedly proclaim, corporations do not fit neatly into just one theory of corporate personhood.²²² Traditional Plus corporations are no different. In fact, they are the type of corporation society accepts as commonplace now. As a result, it should be unsurprising that corporate personhood for Traditional Plus corporations fits within the two theories that consistently rotate in prominence in Supreme Court decisions and scholarly discussions.²²³

Autonomous corporate personhood for Distributed Business Entities, on the other hand, cannot be adequately explained by the artificial entity theory because such corporations insufficiently rely upon the state's power to ensure limited liability, capital lock-in, perpetual existence, and the other characteristics of the corporation commonly recited as the concessions individuals seek through incorporation.²²⁴ In fact, the

219. *Id.* at 812.

220. *See, e.g.*, Nizan Geslevich Packin, *Too-Big-to-Fail 2.0? Digital Service Providers as Cyber-Social Systems*, 93 IND. L.J. 1211, 1215–16 (2018) (arguing Amazon and other massive technology companies should be viewed as Critical Service Providers); Paul Schiff Berman, *Legal Jurisdiction and the Deterritorialization of Data*, 71 VAND. L. REV. 11, 12 (2018) (detailing how multinational corporate data intermediaries, like Amazon, are increasingly asked by governmental and judicial authorities to carry out and enforce their orders because of their status as technology giants wielding significant power).

221. TOM SLEE, WHAT'S YOURS IS MINE: AGAINST THE SHARING ECONOMY 10–11 (2015) (“[A] new form of surveillance where service workers must live in fear of being snatched on, . . . marketplaces are generating new and ever-more-entitled forms of consumption . . . [and] many Sharing Economy companies are making big money for their investors and executives, and making good jobs for their software engineers and marketers, by removing the protections and assurances won by decades of struggle, by creating riskier and more precarious forms of low-paid work for those who actually work in the Sharing Economy.”).

222. *See, e.g.*, Chatman, *supra* note 18, at 824–25 (arguing that to adopt a position that actually represents the nature of the corporate form, the Court should adopt a hybrid theory); Nelson, *supra* note 118, at 1574–75 (explaining why each of the three prominent theories of corporate personhood fail to adequately capture the nature of the corporation on their own).

223. Harper Ho, *supra* note 180, at 919; Avi-Yonah, *supra* note 206, at 1041.

224. John Armour, Henry Hansmann, Reinier Kraakman & Mariana Pargendler, *What Is Corporate Law?*, in *THE ANATOMY OF CORPORATE LAW: A COMPARATIVE AND FUNCTIONAL APPROACH* 1 (3d ed. 2017); Henry Hansmann, Reinier Kraakman & Richard Squire, *Law and the Rise of the Firm*, 119

technology that powers the corporations in Distributed Business Entities endogenously provides these functions.²²⁵ This means that the entity would stand alone and could be operated with many of the same properties as a corporation prior to incorporation.²²⁶ Furthermore, Distributed Business Entities enjoy perpetual life without relying on the corporate form to provide it. These characteristics of operational and managerial automation taken together clearly evoke the real entity theory.

Nevertheless, the technology powering Distributed Business Entities also enables more democratic management-ownership structures.²²⁷ For example, in the case of the Plantoid,²²⁸ although each individual artwork is financially autonomous, the smart contract and blockchain technology powering the Plantoid enables new forms of collective economic and artistic structures for humans in art production.²²⁹ In other words, increased managerial automation reverses the corporate trend of deep separation between management and control.²³⁰ This flattening of the management-ownership hierarchy enables a view of these high-technology businesses as deeply connected to an association of natural persons, despite the fact that those natural persons are often so dispersed that they resemble shareholders of public corporations. As a result, Distributed Business Entities can clearly be viewed as an association or aggregation of natural persons.

Autonomous Entities, for their part, autonomously produce and sell a

HARV. L. REV. 1335, 1343 (2006); Henry Hansmann & Reinier Kraakman, *The Essential Role of Organizational Law*, 110 YALE L.J. 387, 390 (2000).

225. Usha R. Rodrigues, *Law and the Blockchain*, 104 IOWA L. REV. 679, 714 (2019); Carla L. Reyes, *(Un)Corporate Crypto-Governance*, 88 FORDHAM L. REV. 1875, 1901 (2020).

226. Rodrigues, *supra* note 225, at 714; Reyes, *Rockefeller*, *supra* note 21, at 377–78.

227. Roger Aitken, *After Facebook's Data 'Blow-Up' Are DAOs Leveraging Blockchain's Future?*, FORBES (Apr. 20, 2018, 3:50 PM), <https://www.forbes.com/sites/rogeraitken/2018/04/20/after-facebooks-data-blow-up-are-daos-leveraging-blockchain-the-future/#f43ac5c3cefe> [<https://perma.cc/7L5K-6K98>] (“Decisions are made through the votes of token holders. There are no boards of directors, C-level executives and management teams. Should changes need to be made to the rules themselves, decisions are made through consensus. And, all transactions are recorded transparently . . . on the blockchain . . .”).

228. For a full explanation of the Plantoid, see Carla L. Reyes, *Conceptualizing Cryptolaw*, 96 NEB. L. REV. 384, 385–86 (2017); Reyes, *ABR*, *supra* note 20, at 468–69.

229. Elena Giulia Rossi, *GAME OVER. Loading. Interview to Primavera De Filippi*, ARSHAKE (Jan. 21, 2021), <https://www.arshake.com/en/game-over-loading-interview-to-primavera-de-filippi/> [<https://perma.cc/PSJ5-2P6S>] (“The *Plantoid* represents the beginning of a new relationship between creators, their work, and the progeny of the work. Indeed, the underlying mechanisms for the financing and reproduction of a *Plantoid* obviously clash with the traditional conception of copyright law, which is based on the notion of scarcity and exclusivity. Instead of relying on exclusive rights in order to prevent the reproduction and distribution of creative works, with a *Plantoid*, artists actually have an incentive to maximize the dissemination and encourage the creation of derivative works, because that is what will maximize their return on investment.” (emphasis in original)).

230. Reyes, *ABR*, *supra* note 20, at 477–78.

product and/or service, autonomously set the price of that product and/or service, autonomously manage the venture, autonomously interact with customers, and autonomously hold the proceeds of the business within computer software itself. With only *de minimis* human involvement in Fully Autonomous businesses and no human involvement in Algorithmic Entities, Autonomous Entities cannot be viewed as an aggregation of individual natural persons. There are no natural persons to aggregate. Admittedly some natural person, whether a stand-alone software developer, a disperse group of loosely coordinated open-source software developers, or a software developer employed by a separate corporation initially created the computer software program(s) that make Autonomous Entities functional. However, when a person or corporation creates such computer software, that person or corporation typically owns it.²³¹ The code can be copyrighted,²³² and the architecture can be patented.²³³ Prior to the creation of the autonomous corporation by state government fiat, the computer software did not exist as an entity; at best, the software existed as property or as a computer agent.²³⁴ As a result, fully automated and ownerless autonomous businesses cannot be explained through the lens of the real entity theory. Instead, such Autonomous Entities truly exist solely because the state where it is incorporated allows it to exist. As a result, Autonomous Entities embody the artificial entity theory.

In sum, and as visually depicted in Table 3, below, Traditional Plus

231. Sara Boettinger & Dan L. Burk, *Open Source Patenting*, 1 J. INT'L BIOTECH. L. 221, 222 (2004) ("Source code versions of a commercial program are typically kept proprietary and undisclosed in order to hamper competitors from producing rival products. These commercial products are closed source; their source code is unavailable and inaccessible." (footnotes omitted) (first citing Andrew Johnson-Laird, *Software Reverse Engineering in the Real World*, 19 U. DAYTON L. REV. 843 (1994); and then citing Lawrence Lessig, *The Limits in Open Code: Regulatory Standards and the Future of the Net*, 14 BERKELEY TECH. L.J. 759, 764–65 (1999))).

232. Admittedly, many in the blockchain space open source code, but even then, they do so under an open-source license of their choice. See, e.g., Mark Radcliffe & Victoria Lee, Opinion, *The Big Legal Issue Blockchain Developers Rarely Discuss*, COINDESK (Sept. 13, 2021, 1:21 AM), <https://www.coindesk.com/the-big-legal-issue-blockchain-developers-rarely-discuss> [<https://perma.cc/8J5L-MYPE>] (noting that "[open source licenses (OSS)] are used by both of the two major public blockchains, ethereum and bitcoin, as well as many other major blockchain projects, including the HyperLedger programs and R3's Corda."); James Gatto, *10 Lessons on Blockchain and Open-Source Licenses*, LAW360 (Nov. 1, 2018, 2:05 PM), <https://www.law360.com/articles/1097662/10-lessons-on-blockchain-and-open-source-licenses> [<https://perma.cc/QB43-H7C9>] ("Many blockchain-based applications are licensed under open-source licenses.").

233. Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 WIS. L. REV. 905, 929 ("Even nominally open-source technologies may turn out to be subject to hundreds or thousands of patents.").

234. Koops et al., *supra* note 127, at 512 (discussing the notion of legal agency wherein "an agent refers to an entity that is at work for somebody (or something) else" and referring to semi-autonomous computer software as computer agents when they "act or interact with others on behalf of their users/owners").

corporations display elements of a hybrid artificial and real entity view of the corporation.²³⁵ Meanwhile, Distributed Business Entities fit a hybrid aggregate and real entity theory of the corporation. Autonomous Entities, for their part, find support only in the artificial entity theory of the corporation. In other words, Autonomous Entities are the most artificial on the spectrum of technical artifacts created by autonomous corporations.

Table 3: Corporate Personality Theories and the ABR Taxonomy

Traditional Plus		Distributed Business Entities		Autonomous Entities	
<i>Real & Artificial Entity Theories</i>		<i>Aggregate & Real Entity Theories</i>		<i>Artificial Entity Theory</i>	
1	2	3	4	5	6
Primarily Operationally Automated	Managerial Automation Light	Autonomous Mediating Hierarchy	Mostly Autonomous	Fully Autonomous	Algorithmic Entities

Creating a comprehensive approach to artificial personhood for autonomous corporations as a specific socio-technical context now requires combining the lessons from both AI personhood and corporate personhood when applied to autonomous businesses.

IV. LESSONS FROM AUTONOMOUS CORPORATE PERSONHOOD FOR BROADER DISCUSSIONS OF LAW AND ARTIFICIAL SYSTEMS

Having mapped the theories of AI personhood and corporate personality to the ABR Taxonomy, this Part considers the intersection of those two maps, laying out a multi-dimensional approach to autonomous corporate personhood that moves the literature closer to capturing the complexity of the field of existing autonomous businesses. This Part then argues that this new Autonomous Corporate Personhood Spectrum can serve as a guide to policy makers and legal reformers trying to develop a path for increasingly automated businesses to interact with the world. More broadly, this Part argues that the entire methodology of the Article can be used as a new approach to assessing which bundle of legal rights and duties to bestow on different AI systems. In doing so, this Part calls

235. Chatman, *supra* note 18, at 854.

for the legal community to consider where the important considerations of socio-technical and socio-legal context of technology systems fit into the principle of technology neutrality.

A. *Links Between Theories of AI Personhood and Corporate Personhood Create an Autonomous Corporate Personhood Spectrum*

By layering AI personhood theories together with corporate personhood theories, links between the two become apparent in the autonomous corporate context. For Traditional Plus corporations, the corporation owns AI systems and uses them to improve their business.²³⁶ Thus, any personhood attributed to Traditional Plus corporations must rest solely on theories of corporate personhood, in this case the real and artificial entity theories.²³⁷ Those theories both serve to enable the law to impose responsibilities upon corporations that they could otherwise avoid if they were not treated as a fictional legal person.²³⁸ Both theories also empower law-makers to incentivize corporations to internalize certain negative externalities caused by their business endeavors.²³⁹ Those theories are also the basis for allowing corporations to enjoy certain rights otherwise only enjoyed by humans;²⁴⁰ however, corporations do not enjoy those rights automatically. Any such rights of speech or privacy must be either given to corporations by statute or declared by the Supreme Court to stem from constitutional principles.²⁴¹ Distributed Business Entities, for their part, can be supported most readily by AI personhood theories of AI systems as conduits for humans and the aggregate and real entity theories of the corporation. Here, the corporation and the AI system join to form the Distributed Business Entity, such that the three theories jointly reflect that the Distributed Business Entity is both a system separate from the constituent natural persons that use it as a coordinating device and also an actual aggregation of natural persons using their own collective agency to make decisions. Lastly, Autonomous Entities are artificial hybrid social

236. See *supra* notes 71–75 and accompanying text.

237. See *supra* notes 218–223 and accompanying text.

238. Padfield, *New Social Contract*, *supra* note 119, at 373; Ripken, *Corporations Are People Too*, *supra* note 152, at 101.

239. RIPKEN, *supra* note 129, at 27 (stating that under the artificial person theory, “it is plausible that legislative and judicial authorities could . . . justify limits on corporate activity” (citing Lyman Johnson, *Law and Legal Theory in the History of Corporate Responsibility: Corporate Personhood*, 35 SEATTLE U. L. REV. 1135, 1448–49 (2012))).

240. Avi-Yonah, *supra* note 206, at 41–42.

241. Chatman, *supra* note 18, at 812 (“Corporations are defined by state law, and have rights incidental to that status. Corporations also have rights defined by statutes.”).

persons. With no natural persons to run the business, Autonomous Entities act in society as social agents but possess no intrinsic characteristics of natural persons.

In sum, and as visually depicted below in Table 4, the corporations that use AI systems as property—Traditional Plus corporations—really are not that different from the corporations that have been the subject of corporate personhood doctrine for centuries. The corporations that use AI systems as a coordinating device for more direct control over corporate affairs, however, embody the aggregate theory to a deeper extent than previously thought possible in the corporate form.²⁴² Indeed, less separation of ownership and control makes reliance on the aggregate theory to justify corporate personhood more consistent with the actual behavior of the entity²⁴³ than when the aggregate theory is used for Traditional Plus corporations.²⁴⁴ As a result, a strong need exists to protect the rights of the natural persons involved in the autonomous corporation.²⁴⁵ Even so, Distributed Business Entities do not lose their status as a real entity that acts in the world merely because of their distributed nature.²⁴⁶ Rather, although using AI systems as a conduit for the collective activity of extremely distributed natural persons holds the potential to radically

242. ADOLF A. BERLE & GARDINER C. MEANS, *THE MODERN CORPORATION AND PRIVATE PROPERTY* 17 (1933) (discussing the separation of ownership and control as the basis for corporate governance); Reyes, *ABR*, *supra* note 20, at 479 (exploring how Distributed Business Entities could return corporate governance to a pre-Berle-Means world).

243. RIPKEN, *supra* note 129, at 29 (describing the origin of the aggregate theory as the shift in incorporation laws around 1916 which enabled the formation of small- and medium-sized corporations, explaining “[b]ecause general incorporation laws allowed anyone easily to incorporate a business without the heavy state scrutiny that had previously existed, the focus shifted from the state as the authority and originator of the corporation to the human individuals who incorporated the business for profit.”). Ripken notes that “[t]he aggregate theory, also called the contractual or associational theory, is rooted in the right of individuals to associate with one another, to form voluntary groups, to strike mutually beneficial bargains, and to otherwise freely relate to each other in ways that fulfill their own private interests.” *Id.* at 31.

244. *Id.* at 33 (“As the size of the corporation grows, the aggregate theory loses some of its practicability . . .”). Indeed, as the separation between ownership by larger and larger numbers of passive investors and a small number of active managers increased in the early twentieth century, it became apparent that “the aggregate theory was not an entirely satisfactory description of the corporate person, [such that] a new theory, the real entity theory, emerged to explain the personhood of the corporation.” *Id.* at 33–34.

245. *Id.* at 32 (“[T]he corporation must be entitled to the same constitutional protection that its human members would have if acting in their individual capacity. . . . From this perspective, the law must uphold corporate rights to protect the rights of the natural persons behind the corporation.”).

246. *Id.* at 35 (“Although corporate legal personality can be regarded as a fiction, the entity that is personified is certainly not fictional. It is a full-fledged, actual reality that exists as an objective fact and has a real presence in society.”).

change corporate governance structures,²⁴⁷ if formed as corporations,²⁴⁸ such use of AI systems does not change the corporate status as a separate entity.²⁴⁹ Finally, the hybrid social persons of Autonomous Entity corporations, with no humans to control or even own the corporation, represent a very literal embodiment of an artificial entity.²⁵⁰

Table 4: Linking Multiple Theories of Personhood to the ABR Taxonomy

Traditional Plus		Distributed Business Entities		Autonomous Entities	
<i>Property</i>		<i>Substitute or Conduit for Humans</i>		<i>Hybrid Social Person</i>	
<i>Real & Artificial Entity Theories</i>		<i>Aggregate & Real Entity Theories</i>		<i>Artificial Entity Theory</i>	
1	2	3	4	5	6
Primarily Operationally Automated	Managerial Automation Light	Autonomous Mediating Hierarchy	Mostly Autonomous	Fully Autonomous	Algorithmic Entities

Why do the linkages between the theories matter? Around the world, lawmakers²⁵¹ and civil society groups²⁵² are considering how to enable

247. Reyes, *ABR*, *supra* note 20, at 478–80.

248. LoPucki, *supra* note 21, 898–99 (explaining how to form autonomous corporations).

249. RIPKEN, *supra* note 129, at 35; KENT GREENFIELD, CORPORATIONS ARE PEOPLE TOO (AND THEY SHOULD ACT LIKE IT) 2 (2018) (“[C]orporations have been, are, and should be legal persons. They are separate entities with a set of individual capacities, limitations, rights, and obligations that are distinct from those who work for them or invest in them. Corporations are independent legal personalities and can sue, be sued, enter into contracts, own property, buy stuff, and sell stuff—all in their own name and legal capacity.”).

250. RIPKEN, *supra* note 129, at 25 (“This framework for corporate enterprise was consistent with the belief that incorporation was a unique privilege or concession awarded by the state. The corporation was viewed as a creature of law, possessing only the rights and duties that the law allowed it to have.”).

251. *See, e.g.*, PARLIAMENT OF MALTA, ACT NO. XXXIII OF 2018 (July 20, 2018), <https://parliament.mt/media/95214/act-xxxiii-innovative-technology-arrangements-and-services-act.pdf> [<https://perma.cc/9LFB-4ZYY>] (creating a path for formalizing autonomous businesses and enabling legal personality); H.B. 21LSO-0263 Working Draft 0.5, 2021 Leg. (Wyo. 2021), <https://wyoleg.gov/InterimCommittee/2020/S19-2020121621LSO-0263v0.5.pdf> [<https://perma.cc/HT3D-EBHG>] (proposing amendments, which were mostly later adopted, to the Wyoming LLC Act to accommodate DAOs).

252. *See, e.g.*, Coal. of Automated Legal Applications, *The DAO Model Law*, MEDIUM (Dec. 18,

increasingly autonomous corporations to interact with the world. In light of the technology, some of the discussion considers whether business organization laws can and should be changed to account for the fact that the technology that enables autonomous corporations endogenously fulfills some of the functions of the law.²⁵³ As lawmakers and legal reform groups consider the extent to which that is true, and whether and how it should impact their approach to autonomous corporations, the links between AI personhood and corporate personhood theories in the autonomous corporate personhood context offer a framework within which to make such decisions.

When Traditional Plus corporations can be linked to both an AI personhood view of AI systems as property and a corporate personhood view of corporations as both real and artificial entities, the socio-legal needs of a system accommodating such entities becomes clear. Namely, the AI personhood theory—the AI system merely constitutes property of the Traditional Plus corporation—gives way to the socio-legal needs represented by the real and artificial entity theories: legal convenience and protecting other natural and legal persons with whom the corporation interacts. In other words, for Traditional Plus corporations, not much needs to change in the way the law determines the nature and scope of corporate personhood.

Of course, this Article passes no judgment on whether the current theories of corporate personhood and how the Supreme Court chooses to apply them make any sense. As discussed at length above, a rich and vast literature addressing that issue already exists.²⁵⁴ The point here is much simpler: whatever form of personhood corporations enjoy, Traditional Plus corporations also enjoy regardless of its ownership and use of autonomous technology. The presence of an AI system in Traditional Plus corporations does not really change the basic nature and structure of the corporation itself, just the way the corporation finds business efficiencies in the pursuit of profit.²⁵⁵ Currently, corporations enjoy only the benefits of personhood granted to them by statute and Supreme Court

2019), <https://medium.com/coala/the-dao-model-law-68e5360971ea> [<https://perma.cc/E4ZW-ECG9>] (proposing a model law for enabling the legal recognition of DAOs).

253. Rodrigues, *supra* note 225, at 714; Reyes, *Rockefeller*, *supra* note 21, at 377–78.

254. *See supra* section III.A.

255. If changes in the way corporations conduct their affairs changes the ability of laws to hold corporations accountable, other legal doctrines may need to be adjusted for Traditional Plus corporations, even if the doctrine of corporate personhood is not. *See generally, e.g.*, Diamantis, *supra* note 142 (proposing changes in corporate criminal law to account for extensive reliance by what I call Traditional Plus corporations on AI to make decisions).

jurisprudence.²⁵⁶ Corporations, in other words, do not enjoy the full spectrum of rights enjoyed by humans.²⁵⁷ Given these restrictions, traditional corporate personhood theories, equally applicable to Traditional Plus corporations, might be thought of as a type of slightly “Restricted Personhood.”²⁵⁸

Distributed Business Entities, on the other hand, can be linked to both an AI personhood view of AI systems as conduits for collective human activity, and to corporate personhood theories of corporations as both aggregations of natural persons and real entities in their own right. These theories together reveal the socio-legal needs of Distributed Business Entities as preserving the rights of the individual participants in the corporate whole,²⁵⁹ while also providing a legal fiction that enables the imposition of responsibilities upon the collective when it acts as a collective.²⁶⁰ In other words, when a Distributed Business Entity both fulfills all the formalities of a traditional corporation and yet radically flattens the ownership and management structure, such corporations might be entitled to a fuller measure of legal personhood. This form of “Full Personhood” might actually track more closely to the rights and responsibilities of natural persons than the Restricted Personhood of their Traditional Plus counterparts. Given the current critique that corporations enjoy too many rights already,²⁶¹ how could the law justify such a notion of Full Personhood? In the Distributed Business Entity context, the natural person owners of the corporation participate more directly in the management of the corporation’s affairs than in the Traditional Plus corporation context. Thus, where reliance on the rights of the natural

256. Greenfield, *supra* note 17, at 321–22 (quoting *Trs. of Dartmouth Coll. v. Woodward*, 17 U.S. (Wheat.) 518, 636 (1819) (“Being the mere creature of law, [the corporation] possesses only those properties which the charter of its creation confers upon it, either expressly, or as incidental to its very existence.”)).

257. *Id.* at 321 (“Of course corporations are not genuine human beings and should not automatically receive all the constitutional rights that human beings claim. At the same time, . . . it is similarly obvious that corporations should be able to claim *some* constitutional rights.” (emphasis in original)).

258. This may seem counterintuitive to corporate personhood scholars who view the legal landscape as already too generous in bestowing rights upon corporations. *See, e.g.*, GREENFIELD, *supra* note 249, at 81 (“Corporations may be ‘people’ but not in ways that matter for every right. They should be able to claim the rights essential to keep the government in check or those necessary for companies to fulfill their institutional role of building wealth in the marketplace. They should not be able to claim rights based on human characteristics or rights that, if asserted, would undermine the operation of the marketplace.”). However, the term Restricted Personhood remains representational of the theories underlying corporate personhood and the socio-legal needs that they meet.

259. RIPKEN, *supra* note 129, at 32.

260. *Id.* at 35; Greenfield, *supra* note 17, at 315.

261. *See, e.g.*, GREENFIELD, *supra* note 249, at 81 (arguing that corporations should not receive too many rights because they currently may claim rights based on human characteristics and not just rights related to their economic role in society).

person owners (shareholders) to give Traditional Plus organizations increasingly faces criticism for lack of actual shareholder involvement, that critique carries less force in the Distributed Business Entity context. Indeed, the argument that when natural persons organize form and together vote and take collective action via the corporate form, the law should not require such individuals to abdicate their natural rights more accurately reflects the flatter governance structure of Distributed Business Entities than it does Traditional Plus corporations.²⁶² Further, the existence of such corporations may provide an opportunity to truly restrict the Restricted Personhood enjoyed by Traditional Plus corporations. Legislatures might, for example, consider requiring corporate governance changes in order to work higher into the autonomous corporate personhood spectrum where the corporation enjoys additional rights. In any case, because natural persons in Distributed Business Entities use AI systems merely as a conduit for their collective human activity, awarding a type of Full Personhood to such corporations aligns with both the AI personhood and corporate personhood literature.

Autonomous Entities, for their part, insofar as they are connected to the least natural person-like theories in both the AI personhood literature and the corporate personhood literature, should ostensibly receive very little by way of the rights of natural persons. The law might offer to Autonomous Entities a type of “Limited Personhood.” Such a Limited Personhood might imbue Autonomous Entities with just enough recognition as a legal person to protect natural persons from Autonomous Entities, and, inversely, to protect natural persons from abusing the Autonomous Entity form. In other words, Limited Personhood would use the personhood fiction to create a liability structure to enable accountability for Autonomous Entities. For example, if an Autonomous Entity creates widgets that injure consumers, Limited Personhood would provide the legal fiction that enables the Autonomous Entity to be sued and held accountable. And inversely, Limited Personhood would place limits on natural persons’ actions and activities in creating Autonomous Entities to uphold social values. For example, an Autonomous Entity that failed to take sufficient steps to abide by the formal requirements of corporate law might not be viewed as an artificial entity at all, but rather, the property of the developer or developers that created it. Withholding any recognition of personhood in such circumstance would discourage natural persons from trying to use Autonomous Entities as a liability shield for activity they expect to cause harm.

In sum, and as visually depicted in Table 5 below, an approach to

262. RIPKEN, *supra* note 129, at 32.

autonomous corporate personhood that fully accounts for the interacting system of AI and corporations recognizes both the socio-technical and socio-legal differences among autonomous corporations and builds a spectrum of personhood to account for those differences: the “Autonomous Corporate Personhood Spectrum.” In the Autonomous Corporate Personhood Spectrum, the most limited form of personhood is enjoyed by the autonomous corporations least tied to humans while the fullest form of personhood is reserved for the autonomous corporation that genuinely serves as a conduit for collective activity by natural persons. The version of restricted corporate personhood that society has in mind when they think of corporations sits somewhere in the middle. The Autonomous Corporate Personhood Spectrum demonstrates, at least for autonomous corporations, that other categories of personhood exist beyond the traditional corporate personhood doctrine applicable to Traditional Plus corporations, which, in turn, suggests a window for legal reform, particularly as autonomous corporations become more prevalent in society.

Table 5: The Autonomous Corporate Personhood Spectrum

Traditional Plus		Distributed Business Entities		Autonomous Entities	
<i>Restricted Personhood</i>		<i>Full Personhood</i>		<i>Limited Personhood</i>	
1	2	3	4	5	6
Primarily Operationally Automated	Managerial Automation Light	Autonomous Mediating Hierarchy	Mostly Autonomous	Fully Autonomous	Algorithmic Entities

B. Implications of the Autonomous Corporate Personhood Spectrum for the Intersection of Law and AI Systems

Up to this point, this Article sought to offer insight into the implications of AI personhood theory and corporate personhood theory for the rights of a specific type of artificial system: autonomous corporations. This Article now turns the inquiry around,²⁶³ asking whether the Autonomous

263. This approach reflects a deeply held view that inquiries at the intersection of law and technology are rarely only one-way endeavors. Rather, “the relationship between law and code is a fluid, multidirectional relationship. The emergence of new computer-code structures may influence

Corporate Personhood Spectrum and the process of reaching it might teach lessons about how to approach the intersection of law and AI systems more broadly. The first lesson, simply put, is that there may not always be one theory to rule them all. Rather, when considering the nature and scope of legal rules for AI systems, context should play a significant role in defining the appropriate bundles of rights and duties that attach. Further, any such consideration of context will likely require an inquiry into both the socio-technical reality of the AI system and the socio-legal reality of the use to which the AI system is put.

The process of creating the Autonomous Corporate Personhood Spectrum demonstrates this quite well. Prior to consideration of context, scholars considering the possibility of autonomous businesses as corporations and other legal entities assumed that traditional corporate personhood should apply.²⁶⁴ However, considering the socio-technical context of the AI system within the corporate form—whether it was property, a conduit for human activity, or the corporation itself—demonstrated that neither the AI personhood theories nor the corporate personhood theories support such uniform application of corporate personhood doctrine to autonomous corporations. Rather, the socio-legal needs of the corporate personhood doctrine demand a fuller spectrum to appropriately deal with the wide variety of autonomous corporations the technology makes possible.

The lesson, then, is that without deeper investigation into both the reality of the technology and the legal demands of the social context in which the technology will be used, legal rules will continue generalizations, and perhaps worse, perpetuate myths, to the detriment of both industry and consumers. Such generalizations may lead the legal community to dismiss societal pressure for legal change, as when the corporate personhood doctrine downplayed the Personless Corporation as implausible because the legal community views autonomous corporations as just one thing. Alternatively, such generalizations may properly identify problems but lead to overly burdensome legal regimes that stifle innovation.²⁶⁵

the trajectory of the law, but the law also influences the trajectory of the code.” Reyes, *Rockefeller*, *supra* note 21, at 429.

264. See, e.g., LoPucki, *supra* note 21, at 890–91 (listing a variety of constitutional rights Algorithmic Entities would enjoy as corporations because of corporate personhood); Bayern, *Of Bitcoins*, *supra* note 22, at 1497 (noting that wrapping AI in an entity wrapper would give it legal personality).

265. See, e.g., Carla L. Reyes, *Moving Beyond Bitcoin to an Endogenous Theory of Decentralized Ledger Technology Regulation: An Initial Proposal*, 61 VILL. L. REV. 191, 194 (2016) [hereinafter *Beyond Bitcoin*] (arguing that early regulatory efforts that viewed blockchain technology solely as a payments system threatened innovation in other use cases of the technology).

For anyone involved in legal reform or law-making, this first lesson begs an important question: how can the law take context into account while still upholding the time-honored principle of technology neutrality?²⁶⁶ The answer to this question holds the second lesson of the Autonomous Corporate Personhood Spectrum for the interaction of law and AI systems more broadly. Namely, at the core of this Article's argument about the importance of socio-technical and socio-legal context for creating legal rules at the intersection of law and technology sits an understanding of technological neutrality that does not demand uniformity. Too often, the legal community uses the call for technology neutrality to hide behind the difficult work of actually understanding the technology.²⁶⁷ Doing so often leads lawmakers and regulators to create rules for problems that do not exist²⁶⁸ or to combat real problems in overly invasive or overly burdensome ways.²⁶⁹ If the Autonomous Corporate Personhood Spectrum teaches us anything about the intersection of law and technology, it is that the law cannot use the maxim of technology neutrality to hide behind failure to understand technology.

This is not to say that this Article favors calling out or defining specific technology in laws and regulations.²⁷⁰ Defining specific technology causes problems in its own right.²⁷¹ Rather, this Article contends that

266. See, e.g., Chris Reed, *Taking Sides on Technology Neutrality*, 4 SCRIPT-ED 263, 264 (2007) (“Technology neutrality has long been held up as a guiding principle for the proper regulation of technology, particularly the information and communications technologies.”); U.N. COMM’N ON INT’L TRADE, UNCITRAL MODEL LAW ON ELECTRONIC COMMERCE WITH GUIDE TO ENACTMENT, at 17, U.N. Sales No. E.99.V.4 (1996), https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/19-04970_ebook.pdf [<https://perma.cc/HT64-4UJ3>] (“The objectives of the Model law, which include enabling or facilitating the use of electronic commerce and providing equal treatment to users of paper-based documentation and to users of computer-based information, are essential for fostering economy and efficiency in international trade. By incorporating the procedures prescribed in the Model Law in its national legislation for those situations where parties opt to use electronic means of communication, an enacting State would create a media-neutral environment.”); see also *id.* at 23–24 (“It was felt during the preparation of the Model Law that exclusion of any form or medium by way of a limitation in the scope of the Model Law might result in practical difficulties and would run counter to the purpose of providing truly ‘media-neutral’ rules.”); Bert-Jaap Koops, *Should ICT Regulation Be Technology-Neutral?*, in 9 STARTING POINTS FOR ICT REGULATION: DECONSTRUCTING PREVALENT POLICY ONE-LINERS 77 (Bert-Jaap Koops, Miriam Lips, Corien Prins & Maurice Schellekens eds., 2006) (evaluating the extent to which the maxim of technology neutrality had its intended effects in the context of ICT regulation).

267. Reed, *supra* note 266, at 266–67.

268. See LoPucki, *supra* note 21, at 897, 947–48.

269. Reyes, *Beyond Bitcoin*, *supra* note 265, at 212.

270. In fact, I argue against doing so in other work. See Carla L Reyes, *A Unified Theory of Code-Connected Contracts*, 46 J. CORP. L. 981 (2021).

271. See, e.g., *id.* at 991–97 (offering a functional understanding of the term “smart contracts” and explaining how failure to use a functional approach led to misunderstandings between the legal

technology neutrality, correctly understood, uses functional equivalence to allow law to describe activity.²⁷² That activity can then be achieved in any number of ways, with or without the use of technology.²⁷³ However, to adequately describe the functional equivalents of new activities enabled by technology, legal reformers must first understand what is technologically possible to achieve, and what is not,²⁷⁴ and why developers seek to achieve such activity with particular tools, or not.²⁷⁵ In doing so, lawmakers may find, as the Autonomous Corporate Personhood Spectrum demonstrates, that the wording and content of legal rules may need to vary in order to achieve the desired technologically neutral effects.²⁷⁶ The lesson of autonomous corporate personhood for technology neutrality, then, is to let the socio-legal needs of the full technological system (the AI and its contextual components) drive the lawmaking process,²⁷⁷ and then to find the words that make the effects of regulation functionally equivalent for the same activity regardless of the medium through which the activity is conducted.

The third lesson that the Autonomous Corporate Personhood Spectrum offers for inquiries at the intersection of law and AI systems emphasizes that the use of technology, right down to the gritty details, matters for legal analysis, not the level of automation enabled by that technology.²⁷⁸ Admittedly, this third lesson is intimately tied to the second lesson regarding the importance of functionally equivalent descriptions of activity in law, rather than attempts to define particular technologies. However, the lesson stands on its own because it takes us back to the

industry and the blockchain industry); Angela Walch, *The Path of the Blockchain Lexicon (and the Law)*, 36 REV. BANKING & FIN. L. 713, 730–31 (2017) (examining the challenges created by defining specific technology, particularly emerging technology for which terminology remains in flux).

272. Reed, *supra* note 266, at 268 (identifying regulation of activities and functional equivalence as two meanings of technology neutrality).

273. Koops, *supra* note 266, at 82 (“In general, regulation aims at regulating people’s behavior. It does not regulate the behavior of machines, except to the extent that machine behavior influences people’s behavior. Moreover, behavior as such is not the point of regulation, it is rather the effect of behavior on society or on other people that is the focus of the regulation.”).

274. Reed, *supra* note 266, at 272 (“It is worth noting that the extent of neutrality as between different technology implementations depends very much on the definition of the technology to be regulated.”).

275. *Id.* at 274–75.

276. *Id.* at 267 (“We need therefore to recognise that technologically neutral rules addressing the same issue may well differ in their wording and content, in order to achieve the same (or at least broadly equivalent) *effects* when applied to these technologies.” (emphasis in original)).

277. *Id.* at 268.

278. Indeed, this is a lesson of the ABR Taxonomy, standing alone, for those considering the intersection of law and autonomous businesses: the mere fact of automation does not make autonomous businesses exceptional to the level of requiring new business organizational law. Reyes, *ABR*, *supra* note 20, at 437.

beginning. The legal community must take the time necessary to understand the relevant technologies for which they craft law or to which they apply the law for clients.²⁷⁹ Despite the definitional difficulties in the field, the legal community must look beyond labels like “emerging technologies,” “automation,” and “artificial intelligence” to truly understand whether and how use of the technology impacts analysis under existing technology neutral laws or genuinely poses questions requiring the development of new legal principles.

CONCLUSION

This Article built an approach to legal personhood for autonomous corporations that accounts for their full systems nature: part-AI system and part-corporation. To do so, this Article considered the existing AI personhood and corporate personhood literatures, applying them to the socio-technical reality of autonomous businesses. This approach revealed three core socio-legal needs of autonomous corporate personhood: protecting the rights of individual natural people that created the corporation, upholding social values even when allowing autonomous corporations to interact with society, and creating a fiction of personhood for legal convenience in devising corporate accountability structures. Further, the process of identifying these socio-legal needs underscored the importance of the socio-technical context of AI systems to crafting appropriate legal rules. Rather than interfere with law’s emphasis on technology neutrality, tying rules for autonomous corporate personhood to different socio-technical contexts enables functionally equivalent legal rules and avoids burdensome regulation (and regulation of non-existent problems).

Ultimately, this Article offers the Autonomous Corporate Personhood Spectrum for use by the lawmakers and legal reformers considering how to determine the nature and scope of artificial personhood for autonomous businesses. The Autonomous Corporate Personhood Spectrum, for its part, counsels those lawmakers and legal reformers to keep open the possibility that a system of rules might be needed, rather than one single approach to rule them all. The argument that law must account for the socio-technical context and socio-legal needs of AI systems also, however, raises significant legal issues to be explored in future work. For example, there may be possible links between corporate governance structures and a more robust bundle of rights attendant to corporate

279. The Model Rules of Professional Conduct now recognize a duty of technological competence. MODEL RULES OF PRO. CONDUCT, r. 1.1 cmt. 8 (AM. BAR ASS’N 1983). The duty should apply with equal force to those shaping the law as to those applying it in a client context.

personhood. In other words, perhaps, autonomous corporations offer lawmakers the opportunity to experiment with incentivizing certain corporate governance reforms using more robust forms of corporate personhood as a carrot. However, significant questions remain as to whether or how lawmakers could adopt such incentivization schemes, or whether doing so would withstand a legal challenge under current Supreme Court corporate personhood decisions.

Finally, the lessons of autonomous corporate personhood drive home the multi-dimensional relationship between law and technology. To fully appreciate the effect that new legal rules may have on technology and its role in society, the legal community must develop a deeper understanding of the computational processes that power the technology. Meanwhile, the legal community cannot lose sight of the context in which those computational processes operate. The law may need to rely on its own systems nature to properly provide the relevant structure for the interaction of technology and society that will continue to uphold important societal values. As this investigation into autonomous corporate personhood shows, doing so requires significantly deeper interdisciplinarity than the law as an academic discipline typically embraces, and may push lawyers to reduce silos in practice.