ARTIFICIAL AGENTS IN CORPORATE BOARDROOMS

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Thousands of years ago, Roman businessmen often ran joint businesses through commonly owned, highly intelligent slaves. Roman slaves did not have full legal capacity and were considered property of their co-owners. Now business corporations are looking to delegate decision-making to uber-intelligent machines through the use of artificial intelligence in boardrooms. Artificial intelligence in boardrooms could assist, integrate, or even replace human directors. However, the concept of using artificial intelligence in boardrooms is largely unexplored and raises several issues. This Article sheds light on legal and policy challenges concerning artificial agents in boardrooms. The arguments revolve around two fundamental questions: (1) what role can artificial intelligence play in boardrooms? and (2) what ramifications would the deployment of artificial agents in boardrooms entail?

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INTRODUCTION

Business corporations do not exist in nature. Rather, they are created by humans. Humans first invented the corporate model thousands of years ago.[1] They designed its mechanics around a mainspring: separation from individuals. Accordingly, the very core concept of any corporation, including a business corporation, is *separateness*: separate assets, separate liabilities, and separate existence. Separation from humans allows corporations to survive the death or departure of their founders, shareholders, managers, directors, creditors, employees, and any other stakeholders.[2] But despite this separateness, corporations cannot function without humans because corporations do not have their own minds or bodies. Therefore (today, at least), they need humans to make decisions, as well as to interact with people, other corporations, and the planet. So, individuals are appointed to think, make

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1 *See* Oscar Handlin & Mary F. Handlin, *Origins of the American Business Corporation*, 5 J. ECON. HIST. 1, 1 (1945).

2 *See* David Ciepley, *Beyond Public and Private: Toward a Political Theory of the Corporation*, 107 AM. POL. SCI. REV. 139, 155–56 (2013). It could be argued that the only stakeholder whose "death" a corporation could not survive is the State. In fact, if we buy into the theory that corporations receive authority from the State (rather than from individuals), a State's existence is necessary for a corporation to exist. *See id.* at 140.

decisions, and act on the corporations' behalf—it is *currently* inconceivable that a corporation could function without humans.

But while today corporations depend on individuals, the evolution of artificial intelligence (AI) forces us to wonder whether corporations could replace these humans with intelligent machines. In particular, we need to wrestle with the possibility that corporations may soon replace human minds with artificial intelligence as the source of corporate decision-making—*can board directors and corporate boards* tout-court *be replaced by robots and machines?* While this question may have once been a purely theoretical hypothesis, it is no longer purely theoretical for two reasons.

First, artificial intelligence and algorithms have somewhat already made it into some corporate boardrooms around the world.[3] For instance, in 2014, venture capital firm, Deep Knowledge Ventures introduced a machine-learning algorithm called Validating Investment Tool for Advancing Life Science (VITAL) into its board of directors to help with corporate decision-making.[4] VITAL would consider a range of data and information about corporations, including but not limited to financial information. However, the press that covered VITAL's introduction into the Deep Knowledge Ventures board of directors emphasized that while VITAL could vote on investments, it could not technically qualify as a board director.[5] The press coverage explained that boards of directors owe duties to a corporation—including duties inherent in overseeing the firm—that VITAL was not programmed to perform. And beyond VI-

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3 But the scope of artificial intelligence's participation in the boardroom is still open to debate. *See* Nicky Burridge, *Artificial Intelligence Gets a Seat in the Boardroom*, NIKKEI ASIAN REV. (May 10, 2017, 10:52 PM), https://asia.nikkei.com/Business/Artificial-intelligence-gets-a-seat-in-the-boardroom [https://perma.cc/64XG-AWGH] ("A Hong Kong venture capitalist fund credits a single member of its management team with pulling it back from the brink of bankruptcy. But the executive is not . . . even a human being. It is an algorithm known as Vital.").

4 *See* Rob Wile, *A Venture Capital Firm Just Named an Algorithm to Its Board of Directors—Here's What It Actually Does*, BUS. INSIDER (May 13, 2014, 11:19 AM), http://www.businessinsider.com/vital-named-to-board-2014-5 [https://perma.cc/74R2-8VAJ].

5 *See, e.g.*, Monica Goyal, *Hong Kong VC Firm Appoints AI to Board of Directors*, ITBUSINESS.CA (May 16, 2014), https://www.itbusiness.ca/blog/hong-kong-vc-firm-appoints-ai-to-board-of-directors/48815 [https://perma.cc/9BPV-V577] ("As long as the company's bylaws allow it, VITAL can vote on those issues, and in a sense act as a member of the board. But voting alone does not a board member make. Directors of a corporation have duties and responsibilities to oversee the functioning of their firm. Duties that VITAL is not designed to perform, and responsibilities that it is unable to legally be assigned (or insured for).").

TAL's programming, the press coverage reported that membership on a board of directors entailed "responsibilities that [VITAL was] unable to legally be assigned (or insured for)."[6] In fact, although personhood for autonomous machines is a priority of policymakers, AI machines do not currently have legal capacity.[7] Therefore, they cannot be the subject of rights and duties, including corporate fiduciary duties.

Second, the very mechanics that allow a corporation to be separate from individuals find their main feature in what is called separation of ownership and control.[8] Separation of ownership and control is the legal and organizational technology that substantially consists of providing an economic interest in the business of a corporation to people who do not govern the corporation: shareholders. Shareholders own an economic interest in the business of a corporation, but as mere shareholders they have very limited governance rights over the corporation itself. Separation from transient individuals is essential in order to provide independent existence to corporations—the very formula of the corporate model is founded on separation of ownership and control. But separation of ownership and control entails the risk that the humans appointed to think, make decisions, and take action on behalf of a corporation may "shirk" or "steal"—problems that arise when human decision makers' personal interests do not align with those of the corporation.[9] Against this background, artificial intelligence could be seen as the technological solution that would allow a corporation to benefit from separation of ownership and control while providing investors with all of the protections that intelligent, careful, and loyal decision makers can guarantee. We can dub this ideal result *AI governance Nirvana*; but, in reality, the use of AI in corporate governance would raise a

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6 *Id.*

7 *See* European Parliament Resolution of 16 February 2017 with Recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)), EUR. PARL. DOC. P8_TA(2017)0051 ¶ 3 (2017), http://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.pdf [https://perma.cc/PBJ6-THP7] (recommending that the Commission on Civil Law Rules on Robotics explores the possibility of creating a specific legal status of "electronic persons" for the most sophisticated autonomous robots).

8 ADOLF A. BERLE, JR. & GARDINER C. MEANS, THE MODERN CORPORATION AND PRIVATE PROPERTY 5 (1991).

9 For a more sophisticated discussion on manager-imposed agency costs, see Michael C. Jensen & William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 J. FIN. ECON. 305 (1976).

number of significant risks and shortcomings.[10] This Article discusses only a small part of them.

Despite its potential for careful and loyal decision-making, artificial intelligence in boardrooms raises a number of moral and legal issues. A general concern with AI coincides with the risk and fear that as artificial intelligence evolves over time, such intelligence could evolve in some fashion that is dangerous or morally problematic to the human species.[11] Regarding corporate governance more specifically, these concerns and studies remain relevant. For one, if AI evolved to the point that it would be able to have consciousness (combined with a conscience) and suffer, risks of exploitation and abuse could arise. Alternatively, in the case AI does not develop consciousness and a conscience, it would probably be unaccountable, also as a board director. But even before AI can enter the boardroom, one issue must be resolved: currently, Delaware corporate law requires for board directors to be natural, human persons.[12] Therefore, for AI to have a presence in Delaware corporations' boardrooms, Delaware corporate law would have to change.

Nonetheless, both reality and pragmatism suggest that the debate over artificial intelligence in boardrooms will be the next big thing in corporate governance. Literature on technology in corporate governance is already flourishing. For example, consider the newly coined term "CorpTech," which refers to practices that include distributed ledgers/blockchains, smart contracts, Big Data analytics, and AI/learning machines in corporate boards.[13] Following this trend, this Article takes a narrow and somewhat unorthodox approach to shed light on some risks and concerns that artificial intelligence in boardrooms would raise: it discusses the use of artificial intelligence in boardrooms by questioning the legal, organizational, and ethical soundness of such a phenomenon. From this dis-

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10 Luca Enriques and Dirk Zetzsche coined the term "CorpTech" and introduced the concept of Tech Nirvana Fallacy in corporate governance in their recent work. Luca Enriques & Dirk Zetzsche, *Corporate Technologies and the Tech Nirvana Fallacy* 1 (European Corp. Governance Inst. Working Paper No. 457/2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3392321 [https://perma.cc/76YV-2Z62].

11 NICK BOSTROM, SUPERINTELLIGENCE: PATHS, DANGERS, STRATEGIES 116 (2014) ("[W]e can see that the outcome could easily be one in which humanity quickly becomes extinct."); *see also* Sander Beckers, *AAAI: An Argument Against Artificial Intelligence*, AAAI-17 WORKSHOP ON AI, ETHICS & SOC'Y 89, 89–91 (arguing that humans would be responsible for any suffering that AI experiences, were AI to develop the capability to experience suffering).

12 DEL. CODE ANN. tit. 8, § 141(b) (2016).

13 *See* Enriques & Zetzsche, *supra* note 10, at 1.

cussion, it suggests that, should legal capacity be granted to AI, it should not resemble the legal personality provided to corporations because corporations ultimately rely on human agents, while AI would not. Rather, instead of relying on human minds and bodies to think and act, AI would be autonomous and independent from humans. As such, AI legal capacity should perhaps be discussed in terms of *artificial personality*—where legal personality is combined with autonomous decision-making—and AI serving as a board director could perhaps be referred to as an *artificial director*.

Parts of the arguments articulated in this Article are developed through an organic consideration of Roman law and business practices. In particular, part of the theoretical exploration of employing artificial intelligence in corporate boardrooms focuses on how the functional analysis of artificial agents' role in boardrooms could be significantly informed by the Roman practice of employing a highly intelligent, highly skilled slave to conduct business in the interest of a joint-enterprise formed by the co-owners of the slave. Such a business organization was dubbed *negotiatio per servos communes cum peculium* (joint business through common slaves with an endowment), and it is considered the first organizational form featuring separation of ownership (the co-owners/masters owned the business) and control (the Roman slaves ran the business).[14]

The Article proceeds in three parts and a conclusion. Part I discusses the use of AI in the boardroom as a new phenomenon with ancient origins. Part II analyzes the roles legal capacity, accountability, a conscience, and consciousness play in determining what role AI can play in corporate boardrooms. Part III assesses whether, how, and under what conditions AI could be employed in Delaware corporations' boardrooms; the Conclusion follows Part III.

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14 *See* Barbara Abatino, Giuseppe Dari-Mattiacci & Enrico C. Perotti, *Depersonalization of Business in Ancient Rome*, 31 OXFORD J. LEGAL STUD. 365, 369–71 (2011). Upon my suggestion, Adam Fitzgerald explored some aspects of the parallelism between the use of AI in contemporary corporate governance and the Roman *negotiatio per servos communes cum peculium* in *The Modern Peculium: Analyzing the Role of AI in Business Organizations*, Adam Fitzgerald's final paper for the seminar *Corporations and Other Legal Persons* that I taught at Cornell Law School. Adam Fitzgerald, The Modern Peculium: Analyzing the Role of AI in Business Organizations (unpublished manuscript) (on file with author). Adam and I have had inspiring conversations on this topic.

I
A NEW PHENOMENON WITH ANCIENT ORIGINS

A. Artificial Intelligence at Work

This Article understands AI as a simulation of natural intelligence performed through algorithms, machines, and computer systems that ultimately strives for the optimal performance of actions.[15] But in so striving, AI seeks to replicate the way human minds do things that require intellectual and psychological skills, including prediction, planning, perception, association, and motor control.[16] In using this definition, this Article adopts a concept of AI that is deliberately generic without attempting to satisfy standards of technical or theoretical accuracy. It adopts such a generic concept of AI because there are several forms, theories, and methodologies connected with AI. For instance, although very popular in societal imagination, autonomous humanoid robots—robots that resemble the human body, while operating without human intervention—are only one form of AI.[17] Other types of AI include classical AI (also known as symbolic AI and as Good Old-Fashioned AI), cellular automata, dynamical systems, artificial neural networks, and evolutionary programming.[18] The specific ways machines process information depend on the type of AI deployed. Researchers often reckon with only one type of AI, but some theories refer to two or more forms of AI.[19] Moreover, a plurality of methodologies have likewise been applied to studies and applications of AI, and AI has been researched both for specialist systems and for systems with general intelligence.[20] To clarify our generic concept of AI, let us assume the following: first, assume AI perceives the environment in which it acts, takes all available data from the world, and stores it so it can later be accessed;[21] second, assume AI then makes decisions by comparing new data against old data and ranking the out-

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15 *See* GEORGE F. LUGER, ARTIFICIAL INTELLIGENCE: STRUCTURES AND STRATEGIES FOR COMPLEX PROBLEM SOLVING 1–2 (6th ed. 2009) (noting that defining artificial intelligence is a difficult endeavor; but clarifying that, at the end of the day, it is man-made and should be explored in that context).

16 MARGARET A. BODEN, ARTIFICIAL INTELLIGENCE: A VERY SHORT INTRODUCTION 1 (2018); *see* MURRAY SHANAHAN, SOLVING THE FRAME PROBLEM: A MATHEMATICAL INVESTIGATION OF THE COMMON SENSE LAW OF INERTIA xix (1997).

17 *See* SAMIR CHOPRA & LAURENCE F. WHITE, A LEGAL THEORY FOR AUTONOMOUS ARTIFICIAL AGENTS 5 (2011).

18 *See* BODEN, *supra* note 16, at 5.

19 *See id.*

20 *See id.* at 18.

21 *See* DAVID L. POOLE & ALAN K. MACKWORTH, ARTIFICIAL INTELLIGENCE: FOUNDATIONS OF COMPUTATIONAL AGENTS 11–13 (2d ed. 2017).

come of its decision against other possible outcomes; third, assume that by doing so, AI attempts to learn and inform its future decisions.[22] In short, assume that AI reasons autonomously and self-corrects.

Due in part to its innovative abilities, AI has already been employed—or it is discussed whether it could be employed—in a number of fields.[23] For example, LawGeex AI is a contract-review platform that reportedly brings to light risks in nondisclosure agreements in a method "more accurate than [human] lawyers."[24] Intelligent algorithms are used in finance.[25] In addition, some literature discusses the risks, effects, and potential ramifications of embedding AI inputs into judicial decision-making.[26]

As a result of the expanding use of AI in various fields, corporations and investment companies are beginning to consider the potential of AI as well. One possible application, and the focus of this Article, is the use of AI in boardrooms. AI in boardrooms can be conceived at least in three different forms, each with distinct legal and organizational issues: (1) AI could provide assistance—or some sort of technological support?—to

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22 *See id.* at 27.

23 The debate on opportunities and risks concerning the use of AI in personal, industrial, and professional settings has interested different categories of people, including scholars, experts, entrepreneurs, and policymakers; such a debate is often the subject of conversation of lay people too.

24 LawGeex, *Artificial Intelligence More Accurate Than Lawyers for Reviewing Contracts, New Study Reveals*, PR NEWSWIRE (Feb. 26, 2018, 12:01 PM), https://www.prnewswire.com/news-releases/artificial-intelligence-more-accurate-than-lawyers-for-reviewing-contracts-new-study-reveals-300603781.html [https://perma.cc/9W62-8QPF]; *see also* Dana Remus & Frank Levy, *Can Robots be Lawyers: Computers, Lawyers, and the Practice of Law*, 30 GEO. J. LEGAL ETHICS 501, 535 (2017) (arguing that robots can do some legal work but cannot completely replace lawyers); John Markoff, *Armies of Expensive Lawyers, Replaced by Cheaper Software*, N.Y. TIMES, Mar. 5, 2011, at A1, https://www.nytimes.com/2011/03/05/science/05legal.html [https://perma.cc/7V33-6NAT] (discussing AI capabilities regarding e-discovery).

25 CHOPRA & WHITE, *supra* note 17, at 7.

26 *See, e.g.*, Yaakov Hacohen-Kerner & Uri J. Schild, *The Judge's Apprentice*, 5 NEW REV. APPLIED EXPERT SYS. 191 (1999); Janet B.L. Chan, *A Computerised Sentencing Information System for New South Wales Courts*, 7 COMPUTER L. & PRAC. 137, 137–49 (1991); Noel L. Hillman, *The Use of Artificial Intelligence in Gauging the Risk of Recidivism*, AM. BAR ASSOCIATION (Jan. 1, 2019), https://www.americanbar.org/groups/judicial/publications/judges_journal/2019/winter/the-use-artificial-intelligence-gauging-risk-recidivism/ [https://perma.cc/E9GN-V59N]; Derek Thompson, *Should We Be Afraid of AI in the Criminal-Justice System?*, ATLANTIC (June 20, 2019), https://www.theatlantic.com/ideas/archive/2019/06/should-we-be-afraid-of-ai-in-the-criminal-justice-system/592084/ [https://perma.cc/PKR5-5URV]; *see also* Uri J. Schild & Ruth Kannai, *Intelligent Computer Evaluation of Offender's Previous Record*, 13 ARTIFICIAL INTELLIGENCE & L. 373, 374 (2006) (discussing artificial intelligence and sentencing decisions).

human directors; (2) AI could integrate human directors; or (3) AI could replace the human directors altogether. This Article explores some of the consequences that would arise from implementing each form. True, depending on its form, AI may help decrease agency costs, increase monitoring efficacy, enhance quality decision-making, and reduce conflicts with and between shareholders and stakeholders.[27] But some inescapable considerations—such as the accountability of AI in the boardroom—ought to follow these optimistic scenarios; these considerations are addressed below in Parts II and III.

B. Separation of Ownership and Control and the AI Governance Nirvana

The optimist might argue that AI in boardrooms would be able to outperform human directors with more careful and loyal decisions.[28] Specifically, the optimist might think that AI in boardrooms could lead to an AI governance Nirvana in which agency costs stemming from separation of ownership and control are minimized or even erased. To understand this claim, a detour to look at separation of ownership and control seems due.

As mentioned above, the separation of ownership and control is a fundamental feature of business corporations; it is the way in which control is removed from a corporation's constituents and centralized in the hands of few individuals. But the concept of separation of ownership and control pre-dates the

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27 For a more detailed discussion on AI and technology in corporate governance, see Enriques and Zetzsche, *supra* note 10. *See also* Florian Möslein, *Robots in the Boardroom: Artificial Intelligence and Corporate Law*, *in* RESEARCH HANDBOOK ON THE LAW OF ARTIFICIAL INTELLIGENCE 649 (Woodrow Barfield & Ugo Pagallo eds., 2018) (discussing corporate directors and AI); Kenneth A. Bamberger, *Technologies of Compliance: Risk and Regulation in a Digital Age*, 88 TEX. L. REV. 669, 675 (2010) (discussing automation and risk-management compliance); Shawn Bayern et al., *Company Law and Autonomous Systems: A Blueprint for Lawyers, Entrepreneurs, and Regulators*, 9 HASTINGS SCI. & TECH. L.J. 135 (2017) (discussing business entities, AI, and legal personality); George S. Geis, *Traceable Shares and Corporate Law*, 113 NW. U. L. REV. 227, 238, 276 (2018) (discussing blockchain technology, share ownership, and share traceability). On the extreme scenario of self-driving corporations, see John Armour & Horst Eidenmüller, *Self-Driving Corporations?*, (European Corp. Governance Inst. Working Paper No. 475/2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3442447 [https://perma.cc/XPE6-B48P].

28 Sameer Dhanrajani, *Board Rooms Strategies Redefined by Algorithms: AI For CXO Decision Making*, Forbes (Mar. 31, 2019, 4:55 PM), https://www.forbes.com/sites/cognitiveworld/2019/03/31/board-rooms-strategies-redefined-by-algorithms-ai-for-cxo-decision-making/#223802b13154 [https://perma.cc/8G39-46HA] ("AI can help corporate boards make faster, more accurate and unbiased decisions.").

modern business corporation. Contemporary business corporations derive this structural model from the Romans—the ones who first invented the corporate form for municipalities and extended it to business firms.[29] In fact, the Romans first invented the corporate form to grant autonomy to nonhuman entities, including municipalities; they summarized the autonomy of nonhuman legal entities from individuals in the principle, *universitas distat a singulis*, which translates to "a legal entity is separate and distinct from individuals."[30] As such, these nonhuman entities became distinct from individuals in two ways. First, they had autonomous rights and duties and held assets in their own name—their rights, duties, and assets were all separate and distinct from those of the individuals comprising the corporation.[31] Second, they acted and interacted with other subjects in the legal and contractual domain as stand-alone entities (albeit through human delegates).[32] Thus, corporations (business or otherwise) became responsible for their actions and subject to liability for any contract they concluded and for any harm their actions may have created.[33]

The Romans used the corporate form to separate assets, liabilities, contracts, torts, and the very existence of an entity from those who participated or had an interest in the entity.[34] Using this Roman model, several legal entities with legal capacity, including municipalities, churches, dioceses, and monasteries, began separating ownership (or, probably more accurately, stakeholding) and control.[35] Power and manage-

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29 *See* PATRICK WILLIAM DUFF, PERSONALITY IN ROMAN PRIVATE LAW 62 (1938); Sergio Alberto Gramitto Ricci, *Archeology, Language, and Nature of Business Corporations*, 89 MISS. L.J. 43 (2019).

30 FLORIANO D'ALESSANDRO, PERSONE GIURIDICHE E ANALISI DEL LINGUAGGIO 59–60 (1989).

31 Gaius famously described how public assets do not belong to anyone but to the city organized as a nonhuman legal entity. *See* GAIUS, THE COMMENTARIES OF GAIUS AND RULES OF ULPIAN 78 (J.T. Abdy & Bryan Walker trans., 1885) ("*Quae publicae sunt, nullius videntur in bonis esse: ipsius enim universitatis esse creduntur*." "Those which are public are considered to be no one's property: for they are regarded as belonging to the community.").

32 *See* Samuel Williston, *History of the Law of Business Corporations Before 1800*, 2 HARV. L. REV. 105, 106–07 (1888).

33 *See infra* subart II.A (discussing Roman towns and cities and how they were rights-and-liabilities-bearing entities). For a more modern debate over municipalities' duties and liabilities see, e.g., Applewhite v. Accuhealth, Inc., 995 N.E.2d 131, 134 (2013) (discussing how a municipality providing ambulance service in response to a 911 call for assistance cannot be held liable for injuring a party if the municipality owes no special duty to the injured party).

34 Williston, *supra* note 32, at 106–07.

35 *See id.*; Paul G. Kauper & Stephen C. Ellis, *Religious Corporations and the Law*, 71 MICH. L. REV. 1499, 1503–04 (1973).

ment were centralized and delegated to mayors, city councils, bishops, and abbots—and so remain today. The Church played a fundamental role in developing the corporate form. Since embracing the corporate form, the Church has applied it to a number of projects and organizations and used it to own, organize, and manage property.[36] Consider that monasteries' rare books, paintings, and frescos belong to the monastery, not to the monks who live in the monastery and take care of it.[37] Such an arrangement allows monks to respect and satisfy their vow to poverty while providing them with access to resources, materials, and facilities they need to fulfill their natural, professional, spiritual, and religious lives.

Comparing monasteries to business corporations, shareholders differ from monks because shareholders have *economic* interests and rights in a business corporation. Put simply, because shareholders own shares in a company,[38] they have an economic interest in a business corporation making profits and creating value that shareholders can receive in the forms of dividends or liquidation or that they can see reflected in the share price. Still, notwithstanding this economic interest in the corporation, board-controlled business corporations (public companies with widely disbursed share ownership) follow the separation of ownership and control model. Delaware corporate law provides that "business and affairs of every corporation . . . shall be managed by or under the direction of a board of directors."[39] The law makes possible the centralization and delegation of power that enable the separation of control from those who hold an economic interest in the business.[40] Such separation of ownership and control, when combined with delegated centralized management can help business corporations take on projects greater than the lifespan and net worth of any individual.[41]

In addition, robust literature articulates how empowering shareholders ultimately creates more problems for corporate

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36 *Id.* at 1501–04. The Cathedral of Milan, for example, is a corporation (a specific type of ecclesiastical corporation called *fabriceria*), and its corporate name is *Veneranda Fabbrica del Duomo*.

37 *See* Ciepley, *supra* note 2, at 143.

38 *Shareholder*, BLACK'S LAW DICTIONARY (11th ed. 2019).

39 DEL. CODE ANN. tit. 8, § 141(a) (2016).

40 Separation of ownership and control can be considered as a form of organizational technology. *See* Gramitto Ricci, *supra* note 29, at 81.

41 *See* Lynn A. Stout, *The Corporation as a Time Machine: Intergenerational Equity, Intergenerational Efficiency, and the Corporate Form*, 38 SEATTLE U. L. REV. 685, 690–98, 705–08 (2015). *But see* Jensen & Meckling, *supra* note 9 (discussing manager-imposed agency costs).

governance than it solves.[42] Lynn Stout explained how giving shareholders control of corporate decisions would allow them to steer the corporation toward their own goals rather than toward the goals of the corporate entity itself.[43] In fact, board directors play a fundamental role in mediating the interests of those who make specific investments in a firm and in pursuing the goals of the corporate entity.[44] Having a process in place to select and elect those in control of an entity while affording individuals who carry interests in the entity the ability to cast a vote in such a process are common features in many properly functioning collective systems.[45] Besides, the fiduciary duties that board directors owe to the corporation and to the law guide board directors' decision-making while providing board directors with the necessary breathing room for judgment.[46] Evidently, the board-centric corporate governance model—complete with directors' fiduciary duties and the protection afforded to directors for informed decisions taken in the interest of a corporation—generally satisfies the goals underlying separation of ownership and control.

Notwithstanding the literature challenging the positive tradeoff of separation of ownership and control, fiduciary duties for directors in board-controlled corporations are *usually* sufficient to ensure *relatively* sound corporate governance.[47] However, despite owing fiduciary duties, human directors can make human mistakes; they can make poor decisions; they can suffer the pressure of markets or shareholders; they can be attracted by distorted incentives; they can shirk; and they can steal.[48] Against this backdrop, AI is prospectively tasked with correcting risks stemming from directors' human fallibility. But while advances in technology are often regarded as solu-

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42 *See, e.g.*, Lynn A. Stout, *The Mythical Benefits of Shareholder Control*, 93 VA. L. REV. 789, 809 (2007) (arguing that despite the emotional allure of shareholder democracy, there is very little evidence that shareholder control would be preferable for shareholders). *But see* Lucian Arye Bebchuk, *The Case for Increasing Shareholder Power*, 118 HARV. L. REV. 833, 913 (2005) (arguing that shareholder power to make "rules-of-the-game," "game-ending," and "scaling-down" decisions would improve corporate governance).

43 *See* Stout, *supra* note 42, at 792–98.

44 *See* Margaret M. Blair & Lynn A. Stout, *A Team Production Theory of Corporate Law*, 85 VA. L. REV. 247, 250–51, 290–92 (1999).

45 Stout, *supra* note 42, at 793; Gramitto Ricci, *supra* note 29.

46 Blair & Stout, *supra* note 44, at 291.

47 *See* Lynn A. Stout, *The Shareholder as Ulysses: Some Empirical Evidence on Why Investors in Public Corporations Tolerate Board Governance*, 152 U. PA. L. REV. 667, 698 (2003).

48 *Id.* at 682, 709.

tions to imperfect *human* governance, AI governance actually raises a number of new legal, moral, and ethical issues.

C. Agency and Legal Capacity

In the interest of brevity, this Article does not go into the legal definition of directors and whether directors are trustees or agents of a corporation; nor does the Article discuss the legal qualification of the relation between board directors and the corporate entity (or between board directors and shareholders). Nonetheless, this Article does observe that directors are able to make decisions and act on behalf of a corporation because of two intertwining factors: agency and legal capacity. First, board directors can think, make decisions, and act on behalf of a corporation because they can collect information, elaborate it through their intellectual skills, make decisions, and take actions as agents—nature grants them these abilities. Second, corporate directors can think and act on behalf of a corporation because they have legal capacity—the law provides them with this ability. In other words, natural persons are able to serve as board directors because they have both agency and legal capacity.

To this end, although this Article refrains from discussing whether board directors are agents or trustees from a legal point of view, it seems important to introduce a definition of agency from a practical and somewhat philosophical standpoint. This Article references an agent as anyone who is able to complete a task autonomously. Different from a legal definition of agency relations, which would entail the reflection on the principal of some legal consequences of an agent's actions,[49] here, emphasis is placed on an agent's mere ability to independently determine a course of action in order to accomplish a result. In other words, this Article references an agent as any actor able to autonomously accomplish results that require "physical" and/or "intellectual" abilities. This quality belongs to humans, as well as to several forms of AI. To this end, in computer science technical literature, the term agent "represents a broad cluster of technologies and a large research program within artificial intelligence, all concerned with relatively *autonomous* information-processing systems."[50] Borrowing a

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49 *See* WILLIAM T. ALLEN & REINIER KRAAKMAN, COMMENTARIES AND CASES ON THE LAW OF BUSINESS ORGANIZATION 7–8 (5th ed. 2016).

50 CHOPRA & WHITE, *supra* note 17, at 6 (emphasis added); *see also* MICHAEL LUCK ET AL., AGENT TECHNOLOGY: COMPUTING AS INTERACTION (A ROADMAP FOR AGENT-BASED COMPUTING) 8 (2005) ("An agent is a computer program capable of flexible

classic definition from AI literature, both humans and AI machines "can be viewed as perceiving [their] environment through sensors and acting on that environment through effectors."[51] On these grounds, both humans and AI machines are intelligent agents—humans are natural agents and AI machines are artificial agents. But humans have legal capacity and AI machines do not.

Human legal capacity, just like the "human being" in the riddle of the Sphinx, "walks on four legs in the morning, on two legs at noon, and three legs in the evening."[52] A human being's legal capacity is not static, it evolves. In fact, a human being's legal capacity keeps evolving since the beginning of life until adulthood—when it tends to become complete—and it sometimes shrinks as life happens and a person grows old.[53] Legal capacity is not exclusive to humans though; as discussed above, corporations have legal capacity too. Corporations can own assets, bear liabilities, commit torts, enter contracts, stand in court, and even exercise some constitutional rights typical of persons.[54] Legal capacity for legal entities is commonly known as legal personality, even though such language is suboptimal and could be confusing for two reasons. First, there is a risk that the etymology of the term might bias the assessment of whether legal entities should be entitled to all the same rights of the personality recognized for humans. This could have ramifications on the debate about what rights corporations should have. Second, language that includes the

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and autonomous action in a dynamic environment, usually an environment containing other agents.").

51 STUART J. RUSSELL & PETER NORVIG, ARTIFICIAL INTELLIGENCE: A MODERN APPROACH 34 (1st ed. 1995).

52 SOPHOCLES, OEDIPUS THE KING 2 n.3 (Ian Johnston trans., 2004). The parallelism between human legal capacity and the "human being" in the riddle of the Sphinx first rose in conversations with Garret Gerber in *The Evolution of a Human's Legal Personality*, Garret Gerber's final paper for the seminar *Corporations and Other Legal Persons* that I taught at Cornell Law School. Garret Gerber, The Evolution of a Human's Legal Personality (unpublished manuscript) (on file with author).

53 *See* A.B.A. COMM'N ON L. & AGING & AM. PSYCHOLOGICAL ASS'N, ASSESSMENT OF OLDER ADULTS WITH DIMINISHED CAPACITY: A HANDBOOK FOR LAWYERS 5 (2005); Juanda Lowder Daniel, *Virtually Mature: Examining the Policy of Minors' Incapacity to Contract Through the Cyberscope*, 43 GONZ. L. REV. 239, 251–52 (2008); Rhonda Gay Hartman, *Adolescent Autonomy: Clarifying an Ageless Conundrum*, 51 HASTINGS L.J. 1265, 1266–67 (2000); Rachel Aviv, *How the Elderly Lose Their Rights*, NEW YORKER (Oct. 2, 2017), https://www.newyorker.com/magazine/2017/10/09/how-the-elderly-lose-their-rights [https://perma.cc/3P9H-LWNM]; Gerber, *supra* note 52.

54 *See, e.g.*, Citizens United v. Fed. Election Comm'n, 558 U.S. 310, 319 (2010) (granting corporations First Amendment protections).

term *person* might seem to hint that corporations and other legal entities have some form of inherent agency—that they are able to independently and autonomously elaborate decisions and take actions without humans. This, however, would be misleading because (today, at least) corporations rely on human agents to function.

In short, humans are agents with legal capacity, AI machines are agents without legal capacity, and corporations have legal capacity, but depend on human agents. Hence three questions. Can legal persons (i.e., business corporations) serve as directors?[55] Can agents without legal capacity serve as directors? Can AI machines serve as board directors? The three questions are intertwined; Roman law, jurisprudence, and business practice offer an incredible source to seek informed answers to these dilemmas.

D. A Short, Superficial, and Partly Useless Answer

The answer to whether legal persons—such as business corporations—can serve as board directors substantially depends on the jurisdiction. So let us narrow the scope of the question "can legal persons serve as board directors?" to Delaware corporate law and tie it to the question "could AI machines serve as board directors?"

In Delaware, nonhuman legal persons cannot serve as board directors because Delaware General Corporation Law (DGCL) requires for directors to be human, natural persons.[56] So the answer to the first question is *no*. But before answering the second question it seems relevant to clarify what it means that legal persons can serve as board directors in other jurisdictions.

In some jurisdictions, companies law allows—or used to allow—legal persons to be appointed as corporate directors.[57] Nonetheless, even in such jurisdictions, the board is made up of natural persons at the end of the day. Consider how appointing a corporation as a board member would function. In

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55 As opposed to natural persons, legal persons do not exist in nature, but are created through political and human action. For a more detailed analysis, see Gramitto Ricci, *supra* note 29.

56 DEL. CODE ANN. tit. 8, § 141(b) (2016).

57 The debate on advantages and disadvantages of corporate directors has recently been joined by professor Stephen M. Bainbridge, weighing in with his views and reigniting the discussion. *See* Stephen M. Bainbridge, *Corporate Directors in the United Kingdom*, 59 WM. & MARY L. REV. ONLINE 65, 68 (2017) https://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=1005&context=wmlronline [https://perma.cc/NM9K-46GA].

short, Corporation A could be appointed as a director of Corporation B; but once appointed, Corporation A would not physically sit on the board of directors of Corporation B—how could it? Rather, Corporation A would designate a human to sit on the board of Corporation B in order to think and act on behalf of Corporation B as a component of its board. So, ultimately only humans act and think on behalf of a corporation. Because corporations rely on humans to make decisions, even when, under the law, legal persons can be appointed as board directors, they would need to outsource the task to individuals.

It is still important to consider what governance ramifications may follow from the possibility that a legal person is appointed as a director of a different corporation. In general, corporate laws that allow legal persons to be elected as board directors permit the interposition of an intermediary—the legal person elected as a director—between the corporation and the directors who actually make decisions on behalf of such a corporation: ultimately all directors will be human but not all the directors would be selected by the corporation's very own shareholders; instead, some would be selected by another legal person (e.g., a corporation). With specific respects to corporations elected as board directors, at least two additional concerns arise. First, it could be difficult to determine who the shareholders of the corporation elected as a director are.[58] Second, corporate directors pose accountability issues because formally the entity appointed as director is a legal person, not an individual, and this becomes particularly significant when considered together with the opacity in a corporate director's *ownership structure*.[59] On these grounds it is not surprising that Delaware law, which provides very strong defenses to directors' decisions, excludes the possibility that an entity other than a corporation's shareholders elects the directors.[60] Shareholders' power to elect directors is a key element of the

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58 DEP'T FOR BUS. INNOVATION & SKILLS, TRANSPARENCY & TRUST: ENHANCING THE TRANSPARENCY OF UK COMPANY OWNERSHIP AND INCREASING TRUST IN UK BUSINESS 50 (2013), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/212079/bis-13-959-transparency-and-trust-enhancing-the-transparency-of-uk-company-ownership-and-increaing-trust-in-uk-business.pdf [https://perma.cc/7Z6B-T42B].

59 DEP'T FOR BUS., INNOVATION & SKILLS, FINAL STAGE IMPACT ASSESSMENTS TO PART A OF THE TRANSPARENCY AND TRUST PROPOSALS (COMPANIES TRANSPARENCY) 155 (2014), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/324712/bis-14-908a-final-impact-assessments-part-a-companies-transparency-and-trust.pdf [https://perma.cc/XHP3-VUCY].

60 On the possible benefits of appointing legal persons and corporations as board directors, see Bainbridge, *supra* note 57, at 71–73.

separation of ownership and control formula for corporations. It is ultimately a matter of responsibility: shareholders have the power to choose directors; in light of that power, shareholders themselves are to blame if they choose the wrong fiduciaries. This is a principle that dates back to the time Romans citizens chose one another to form their partnerships.[61] However, such a principle would be frustrated if a third party were allowed to select directors.

Alternatively, pretending AI had legal capacity, if an AI machine were appointed as a board director, it would not have to designate a human to discharge the task; rather, an AI machine could serve as a board director itself and could use its own mind; it could act as an autonomous agent. However, an AI machine cannot currently serve as a board director because Delaware corporate law currently poses two obstacles to the appointment of AI machines as board directors: (1) AI machines are not natural persons; and (2) even if legal persons were allowed to serve as board directors, currently AI does not have legal personality.

Accordingly, legislative intervention would require two steps. First, Delaware corporate law would have to open corporate directorship to legal persons. Second, Delaware corporate law would have to grant legal personality to AI. At a high level, this may appear to be a viable solution to allow AI machines to serve as board directors. But upon closer analysis, it would not quite hit the mark. It would not address the real element that makes AI machines as board directors unique. AI machines would be the first nonhuman entities to *physically* serve as board directors in history. Specifically, as mentioned above, appointing AI machines as board directors differs from appointing corporations as board directors because the appointed AI machine would be the fiduciary actually making the decisions on behalf of the corporation, the *artificial director*. Unlike in the case of corporate directors, the appointed AI machine would not select a human representative to make decisions for it. A corporation's shareholders would be responsible for

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61 The Romans lived by the principle that one should blame none other than themselves when they select the wrong partner. Such an adage could apply to any selection of fiduciaries, including board directors. *See* THE INSTITUTES OF JUSTINIAN 150 (J.B. Moyle trans., Clarendon Press 5th ed. 1913); *see also* W.W. BUCKLAND & PETER STEIN, A TEXT-BOOK OF ROMAN LAW: FROM AUGUSTUS TO JUSTINIAN 509 n.4 (3d ed. 1963) ("Gaius gives the reason that a man who takes a careless partner has himself to blame."). For a broader discussion of the relevance of selection processes in cases where control is separated from ownership, see Gramitto Ricci, *supra* note 29.

choosing the corporation's directors—human or artificial. As a result, however, legislative intervention would also have to reckon with a different, insurmountable obstacle: accountability.

Today, artificial directors would be unaccountable. They would have "*no soul to be damned, and no body to be kicked*";[62] they would not own assets or bear liabilities; and they would have no social reputation or professional persona to protect. In particular, even if artificial directors were granted legal capacity, they would still not be accountable because they would not participate in human society and, more importantly, they (for now, at least) would not have consciousness and a conscience.

In considering how to resolve this accountability issue, and because artificial agents in boardrooms are a new phenomenon in the corporate scenario, some considerations about a functionally comparable arrangement in business organization history might come in handy for some preliminary thoughts. Accordingly, this Article will consider the *negotiatio per servos communes cum peculim* (an organizational form for joint business conducted through a commonly owned slave), which is a model developed in Ancient Rome based on a similar—yet obviously not identical—structure.[63]

E. The *Negotiatio per Servos Communes Cum Peculium*

The Romans developed an organizational model for business based on using highly intelligent, highly skilled human beings who lacked legal capacity, the *negotiatio per servos communes cum peculium*. The operational keystone of a *negotiatio per servos communes cum peculium* resembles the adoption of AI in boardrooms, but instead of using AI, ancient Roman entrepreneurs co-owned highly intelligent, highly skilled slaves and endowed them with certain assets, collectively referred to as *peculium*, in order to run collective businesses.[64] Typically, co-owners deployed their slaves to conduct commercial business (*praepositio institoria*) or shipping and naval business

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62 John C. Coffee, Jr., *"No Soul to Damn: No Body to Kick": An Unscandalized Inquiry into the Problem of Corporate Punishment*, 79 MICH. L. REV. 386, 386 (1981) (citing MERVYN KING, PUBLIC POLICY AND THE CORPORATION 1 (1977) (quoting Edward, First Baron Thurlow)).

63 *See* Abatino et al., *supra* note 14, at 369–70. Of course, Roman slaves were human, not artificial. This implies a number of ramifications that would make the *negotiatio per servos communes cum peculium* differ from corporations with artificial directors.

64 Abatino et al., *supra* note 14, at 371.

(*praepositio exercitoria*).[65] Similar to AI, Roman slaves could be purchased and co-owned just like goods.[66] Many of them had a high level of education and impressive business acumen.[67]

In Ancient Rome, *Ius Naturale*[68] recognized slaves as persons.[69] Such a status came with a bundle of basic rights strictly related to their human nature and their consciousness and conscience. For example, slaves, as persons, had the right to exercise religion.[70] But, at the same time, they did not have legal capacity.[71] In fact, Roman laws and society treated slaves as goods, so co-owners of a *negotiatio cum peculium* could own them just like any other assets of their firms.[72] In short, Roman slaves did not have any legal capacity beyond the rights that *Ius Naturale* recognized to all persons, the *rights of the personality*. Viewing the slaves as such, the Romans essentially appointed conscious, intelligent "goods" lacking legal capacity to run their firms. Roman slaves ran the *negotiatio cum peculium* on behalf of their co-owners, but because they did not have legal capacity, or *dominica potestas*, slaves did not have per se the legal ability to contract and do business with third parties.[73] Roman slaves were the brains behind the *negatiatio cum peculium* business, but simultaneously they lacked legal capacity.

True, the analogy must recognize that AI machines are artificial agents and slaves were human; nonetheless, the Roman slaves' lack of legal capacity, when combined with their status as "goods," make their relationships with the co-owners functionally comparable to the relationships between AI machines and the corporations that would hypothetically appoint them as directors. Specifically, both Roman slaves and AI machines are examples of noncitizen agents—and so would be

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65 *See id.*, at 369 n.1, 371–73.

66 *Id.* at 370.

67 *See* S.L. Mohler, *Slave Education in the Roman Empire*, 71 TRANSACTIONS & PROC. AM. PHILOLOGICAL ASS'N 262, 279–80 (1940).

68 In Ancient Rome, *Ius Naturale* was the body of laws that determined what rights and duties living beings had for the sake of being alive. *See* John R. Kroger, *The Philosophical Foundations of Roman Law: Aristotle, the Stoics, and Roman Theories of Natural Law*, 2004 WIS. L. REV. 905, 909–10.

69 ANTONIO GUARINO, DIRITTO PRIVATO ROMANO 198 (1963).

70 *See* Gramitto Ricci, *supra* note 29.

71 *See* Abatino et al. *supra* note 14, at 377.

72 *Id.* at 371; *see also* GUARINO, *supra* note 69, at 200–01, 211 (clarifying that Roman slaves did not have legal capacity, but eventually developed a form of mere capacity of action, called "mera capacità di agire," in light of which their actions could have legal force in the interest of their owners or, sometimes, in their own interest, should they ever become free).

73 Abatino et al. *supra* note 14, at 377; *see infra* subpart III.D.

artificial directors; this exclusion from citizenry, and therefore from society, interrupts the typical societal bonds that constitute the fabric of accountability. Moreover, Roman slaves had nearly no legal capacity and AI machines currently do not have any legal capacity at all. But even if AI machines and artificial directors had legal capacity, their legal capacity would not be sufficient to make them accountable. One reason is that without a sense of citizenry and society, no social accountability would apply to AI machines—no societal pressures would constrain AI decision-making. More importantly, unless AI machines developed a conscience and *enough* consciousness to be able to exercise morals and ethics and experience humanlike sensations, it would be much harder to hold AI machines and artificial directors accountable than Roman slaves. In fact, unlike Roman slaves, AI machines and artificial directors do not have souls or sentient bodies. Another important difference between slaves and AI is their relationships with their principals. The relationship between Roman masters and slaves was largely characterized by a system of punishments and incentives, including manumission,[74] that simply could not be replicated for AI machines potentially serving as corporate directors. An AI machine cannot be freed nor punished in a typical sense; hitting an AI machine would either not influence its decision-making at all or, if hitting the AI machine influenced its decision-making because the AI machine had consciousness, hitting it should simply be prohibited.[75]

According to these considerations, in order to function and to be accountable, artificial directors would need legal capacity, a conscience, and consciousness. But what form of legal capacity would suit conscious artificial agents is a question that requires some preliminary thoughts on what legal capacity is and what consequences a conscience and consciousness for AI might entail.

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74 The action of freeing a slave. *See Manumission*, BLACK'S LAW DICTIONARY (11th ed. 2019); *see also* MATTHEW J. PERRY, GENDER, MANUMISSION, AND THE ROMAN FREEDWOMAN 5 (2014) ("Although the precise percentage of slaves who were ever freed has been much debated by modern scholars, the ancient sources clearly suggest that manumission was routine and commonplace in the Roman world.").

75 See *infra* subpart II.D.

II
LEGAL CAPACITY, ACCOUNTABILITY, AND CONSCIOUSNESS

A. Is Legal Personality the Answer?

The Romans, who invented legal capacity for nonhuman entities, never predicated legal personhood upon corporations.[76] Nor did they develop a theory of legal personhood based on the transfer of human, legal, political, or spiritual capacities to nonhuman entities. Moreover, the Romans consistently refrained from using the concept of *personality* to refer to the legal attributes granted to corporations.[77] At the same time, Rome still created the legal technology that first actualized legal capacity for nonhuman legal entities in order to manage its system of municipal government. In particular, the Romans provided legal capacity to towns and cities in an effort to raise them to the rank of legally capable entities.[78] In doing so, the Roman state invented and elaborated the concepts of "corporate ownership" and "corporate action" to turn cities and towns into entities able to bear rights, duties, and liabilities.[79] In fact, the invention of legal capacity for nonhuman legal entities is arguably the crowning achievement of the Roman government system.[80]

Roman towns and cities were called *municipia*, which stems from the Latin words "*munus*" and "*capere.*"[81] Where the former translates to "duty" or "obligation," the latter translates to "to take." It is debated whether the term "*municipium*" described the relation between towns and Rome as a state or the

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76 *See* John Dewey, *The Historic Background of Corporate Legal Personality*, 35 YALE L.J. 655, 666 n.15 (1926) ("The admission must be made that there is no text which directly calls the *universitas* a *persona*, and still less any that calls it *persona ficta*." (quoting Frederic William Maitland, *Preface* to OTTO VON GIERKE, POLITICAL THEORIES OF THE MIDDLE AGE xviii (Frederic William Maitland trans., 1902))).

77 GUARINO, *supra* note 69, at 206 (clarifying that in light of the inherent human qualities necessary to define what a person was in ancient Rome, the Romans granted legal capacity to nonhuman legal entities but always refrained from using the terms legal persons or legal personality to refer to legal entities).

78 Rome was both a city capable of acting in the domain of private law and the capital of a national sovereign state able to provide legal capacity to other cities and towns. *See* RUDOLF SOHM, THE INSTITUTES OF ROMAN LAW 102–05 (1892).

79 *See* BASILE ELIACHEVITCH, LA PERSONNALITÉ JURIDIQUE EN DROIT PRIVÉ ROMAIN 106, 182 (1942).

80 *See* WILLIAM L. BURDICK, THE PRINCIPLES OF ROMAN LAW AND THEIR RELATION TO MODERN LAW 275–76 (1946); DUFF, *supra* note 29, at 62.

81 *See* FRANK FROST ABBOTT, MUNICIPAL ADMINISTRATION IN THE ROMAN EMPIRE 8–9 (1926). On the concepts of *municipium* and *municipes*, see ELIACHEVITCH, *supra* note 79, at 103–15.

relation between a town and its citizens.[82] Regardless of the term *municipium*'s exact connotations, the word's etymology testifies that cities and towns were able to bear duties and obligations.[83] The Romans called these (*legally capable*) nonhuman legal entities *universitates*.[84] The Latin term *universitas* derived from "*in unum vertere*," which means "to turn [a multitude] into one." The word *universitas* described the concept resulting from turning a multitude of people and things into rights-and-liabilities-bearing entities.[85]

To this end, the concept of *universitas* implied at least four legal consequences. First, a *universitas* owned assets and bore liabilities in its own name.[86] Second, the assets, rights, duties, and liabilities of a *universitas* were separate and distinct from those of the natural persons comprising, or *associated with*, it.[87] Third, a *universitas* could act and interact with humans and other nonhuman legal entities through human delegates. Fourth, humans formed the will and determined the actions and decisions of a *universitas* according to specific governance models; in other words, the decision-making formula of a *universitas* relied on human beings and organizational models. In current language, *universitas* could be translated as *legal person* or *corporation*, where both terms indicate entities that receive the capacity of bearing rights and duties through political action, not because they belong to the human species.

B. *Universitates* Were Not Persons

Despite having legal capacity, *universitates* were not "persons," they were not *personae* under Roman law. The word "*persona*" generally meant "mask," "character," or "individual."[88] But Romans also attributed a legal meaning to it: the

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82 *See* ELIACHEVITCH, *supra* note 79, at 106–08, 182–96; GUARINO, *supra* note 69, at 207. *Cf.* A DICTIONARY OF GREEK AND ROMAN ANTIQUITIES 1215 (William Smith ed., 2d ed. 1859) ("In the republican period, when used without an adjunct, Respublica expressed Rome, but in the old jurists it signifies a Civitas dependent on Rome.").

83 ABBOTT, *supra* note 81, at 8–9.

84 A DICTIONARY OF GREEK AND ROMAN ANTIQUITIES, *supra* note 82, at 1214–17.

85 *See* 1 WILLIAM BLACKSTONE, COMMENTARIES *469.

86 On the role of names for recognizing legal persons as autonomous juridical entities bearing rights and duties, see CARLO EMANUELE PUPO, LA PERSONA GIURIDICA 82–89 (2012).

87 With respect to Roman cities and the separation of their assets from the assets of citizens, see GAIUS, *supra* note 31.

88 A DICTIONARY OF GREEK AND ROMAN ANTIQUITIES, *supra* note 82, at 889. It is debated whether the term *persona* derives from the ancient Greek word "*πρόσωπου* [prósôpon]," which means "face," "mask," or "person" or from the Latin verb "*personare*," which translates to "to sound through." For an analysis of the origins

term *persona* was used to indicate any physically sound human being,[89] regardless of their civic status, who was recognized some rights and liberties for the very reason of being a physically sound human.[90] This explains why, as mentioned, *Ius Naturale* granted a suite of rights and liberties, including religious rights, to every person. To be granted such rights stemming from their condition of living beings, it did not matter whether the individuals had legal capacity, so long as they were physically sound human beings.[91] Accordingly, these rights and liberties are best viewed as rights of the personality, rights of the natural person. In Rome, these rights were viewed as intrinsic to the human status, not granted by the state.[92] From this, it can be inferred that the rights of the personality stemmed from a recognition of inherent consciousness (combined with a conscience) and agency, not civic or legal status. In fact, *Ius Naturale* recognized and protected inherent rights that are rooted in the very moral and rational nature of human beings. And the ethical principles of the *Ius Naturale* stemmed from the common nature that humans shared with other living beings.[93]

As the Roman law jurist Ulpianus testified, in Ancient Rome the *Ius Naturale* regarded all human beings, including slaves, as equal.[94] Conversely, since nonhuman legal entities

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and meaning of the term persona, see DAMIANO CANALE, *Persona: Appunti per una Voce del Lessico Giuridico Europeo*, in FILOSOFIA DEL DIRITTO. NORME, CONCETTI, ARGOMENTI 116–18 (Mario Ricciardi, Andrea Rossetti & Vito Velluzzi eds., 2015).

89 In ancient Rome, deformed humans were not considered persons ("*personae*"), but *monsters* ("*monstra*"). *See* GUARINO, *supra* note 69, at 199.

90 *See id.* at 198.

91 During the Roman Empire, slaves were considered persons according to Roman Sacred Law—*Ius Sacrum*. *See* SOHM, *supra* note 78, at 109. More generally, *Jus Naturale* regarded all physically sound human beings as persons.

92 *See* Kroger, *supra* note 68, at 909–10.

93 *Ius Naturale* was one of the three pillars of Roman private law, and it sometimes conflicted with the other two pillars—*Ius Gentium* and *Ius Civile*. "Privatum ius tripertitum est: collectum etenim ex naturalibus praeciptis, aut gentium, aut civilibus. Ius naturale est, quod natura omnia Animalia docuit: nam ius istud non humani generis proprium, sed omnium animalium . . . commune est." *("Private law is threefold in its nature, for it is derived either from natural precepts, from those of nations, or from those of the Civil Law. Natural law is that which nature teaches to all animals, for this law is not peculiar to the human race, but affects all creatures . . . .")* JUSTINIAN, THE DIGEST OR PANDECTS bk I, tit. 1, § 1(2)–(3), *in* II THE CIVIL LAW (S.P. Scott trans., Central Trust Co. 1932), https://droitromain.univ-grenoble-alpes.fr/Anglica/D1_Scott.htm#I [https://perma.cc/3BRA-JD95].

94 "Quod attinet ad ius civile, servi pro nullis habentur: non tamen et iure naturali, quia, quod ad ius naturale attinet, omnes homines aequales sunt." *("So far as the Civil Law is concerned, slaves are not considered persons, but this is not the case according to natural law, because natural law regards all men as equal.")*

did not have human nature, the Romans did not call them legal persons. Accordingly, to the Romans, nonhuman legal entities did not have liberties or rights (e.g., religious rights) that characterized moral and rational beings—persons.[95] So *universitates* had legal capacity, but they did not have religious rights. In short, Roman slaves could not own assets, but had rights of the personality, while nonhuman legal entities had legal capacity—including the capacity to own assets—but did not have the rights of the personality.

C. Legal Personhood or Artificial Personhood

Even today, state action is necessary to determine and grant suites of rights and duties attached to legal capacity for both humans and nonhuman entities.

Because state action through law is necessary for corporations to exist and become entities bearing rights, duties, and liberties, we refer to such nonhuman legal entities as "legal persons" to distinguish them from natural persons (i.e., human individuals, whose existence does not require political intervention). The formula that provides entities with legal capacity—the suite of rights, duties, and autonomy usually reserved for individuals—is commonly dubbed "legal personhood."[96] Yet "legal person," "legal personhood," and "legal personality" exist only as linguistic symbols. The normative force carried by their designations exclusively depends on the capacities that a state attaches to them, starting with their capacity to exist. Importantly, as opposed to individuals, legal persons do not exist in nature; they do not exist without human and legal intervention.[97] Further, as linguistic symbols that represent legal capacities, the concepts of "legal personhood," "legal personality," and "legal persons" should not be understood to mean manufactured "persons" or "personalities" that carry the same rights, duties, morals, and ethics of human beings. Quite to the contrary, they should be interpreted as symbols that represent three unique characteristic features of such entities: (1) capability to bear rights, obligations, duties, and liabilities, (2) possession of a suite of subjective rights and duties

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JUSTINIAN, THE DIGEST OR PANDECTS bk. L, tit. 17, § 32, *in* XI THE CIVIL LAW (S.P. Scott trans., Central Trust Co. 1932), https://droitromain.univ-grenoble-alpes.fr/Anglica/D50_Scott.htm#XVII [https://perma.cc/6JXW-VBNR].

95 *See* SOHM, *supra* note 78, at 102; Abatino, *supra* note 14, at 368.

96 *See* D'ALESSANDRO, *supra* note 30, at 1–2.

97 On the nature and formation process of business corporations, see Ciepley, *supra* note 2, at 139–41.

bestowed by a state, and (3) separation from other natural and legal persons.

Legal persons do not need consciousness to function because they rely and depend on the consciousness and conscience of their human agents. In other words, these entities can persist as legal persons, in part, because of their reliance on human agents. But for AI specifically, no human safeguard exists—AI machines do not rely on human agents. Thus, no human agent is standing in for the artificial agent's accountability. This consideration begs the question: does it make sense to discuss legal personality for AI? If relying on human agents and their consciousness and conscience is a core characteristic of legal persons, then legal personality would not suit artificial agents. This raises a few other questions: (1) is reliance on human agents and their consciousness and conscience a core characteristic of legal persons?; (2) should AI machines develop consciousness and a conscience?; and (3) if AI machines do develop consciousness and a conscience, would granting them a full array of rights of the personality together with legal capacities typical of legal persons be the solution?

As an anticipation, neither natural personhood nor legal personhood would likely suit AI machines, but a new form of *artificial personhood* could be a possible solution to reckon with.[98] However, just like legal personhood, *artificial personhood* would simply be a linguistic symbol. It would be language that needs to be filled with meaning. The actual content would ultimately depend on whether AI machines developed a conscience and reached a *significant* level of consciousness and accountability.

D. Legal and Moral Arguments Against the Use of Artificial Intelligence

Accountability of AI machines would require the development of a form of artificial conscience and consciousness as well as a form of a societal system that could provide incentives for the machines—some combination of inner moral law with some forms of *societal* relations. In other words, holding AI machines accountable would likely require a twofold approach based on giving AI machines consciousness and a conscience as well as on employing incentive systems for them; one com-

98 *See* European Parliament Resolution of 16 February 2017, *supra* note 7, ¶ 59(f).

ponent without the other might fall short of an entirely satisfying outcome.

But a conscience without consciousness might not be conceivable, and consciousness carries with it the capacity for emotions and poses the moral question of whether AI would become a sentient being—whether it could suffer.[99] Worries that such a creature could be subject to suffering or, alternatively, could prove hostile toward humanity, have caused humanity to face the dilemma of whether to create conscious AI at all.[100] As this Article draws a functional analogy between how the Romans employed the use of slave intelligence for decision-making and the incumbent possibility of future use of AI in corporate boardrooms, it is worth cautioning that should AI ever evolve as a conscious system subject to the command of humans, there is a risk of obtaining a most undesirable result. Technological advances could establish, through the employment of AI possessing consciousness, a pattern of use reminiscent of slavery in Ancient Rome. Of course, for the Roman slaves, "[t]heir lives were harsh" to say the least, and any societal structure that could ever even vaguely resemble slavery would simply be absolutely unacceptable.[101] Thus, the suggestions posited in this Article should be considered only if the creation of such an undesirable result can be positively excluded. Otherwise, the development of AI consciousness should be abandoned altogether.

To summarize, accountability would ultimately be contingent upon AI having a conscience, but a conscience might require consciousness, and granting consciousness to AI would entail too big and too many consequences that should be the subject of discussions of various natures. This seems the real conundrum of the AI governance Nirvana: governance relies on accountability, accountability presupposes a conscience, a conscience might presuppose consciousness, consciousness for AI would entail much uncertainty and variability that probably need years of research in a number of fields, including computer science, philosophy, and law. One such considera-

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99 *See* Beckers, *supra* note 11, at 89–91 (arguing that humanity should not develop artificial intelligence due to the possibility that AI could experience extreme suffering).

100 *See id.* Beckers warns that without a sound theory of intelligence that can be used to assess AI, it would be difficult to determine when and how AI can be considered more intelligent than humans. For example, Beckers posits that AI could "be capable of an extreme degree of empathy." *Id.* at 90.

101 *Slaves & Freemen*, PBS, http://www.pbs.org/empires/romans/empire/slaves_freemen.html [https://perma.cc/CXL3-7NBY] (last visited Aug. 25, 2019).

tion may be whether it would be necessary to move away from a paradigm that considers AI machines as "goods" and embraces a concept of autonomous artificial agents as free from the dominance of humans. This consideration, like many others, could raise issues about the relations between humans and AI machines, but transcends the scope of this Article.

III
ARTIFICIAL INTELLIGENCE IN DELAWARE BOARDROOMS

A. Limits of the Scope Due to the AI Governance Conundrum

As a consequence of the AI governance Nirvana conundrum, we are left with only two possible options to discuss what roles AI machines could play in Delaware boardrooms. The first option consists in assessing current possible employment, while the second option considers a scenario in which legislative interventions would allow Delaware corporations to appoint legal persons as directors and grant AI machines a form of legal capacity equal to that provided to business corporations, which is referenced as legal personality.[102] Under these rules, this Article considers three possible uses of AI machines in boardrooms: (1) AI as assistance—or technological support?—for board directors; (2) AI as a director in hybrid, partly human, partly artificial boards; and (3) AI in substitution of human boards.

B. Artificial Intelligence as Assistance or Technological Support for Board Directors

Supporting directors' decisions with AI machines capable of processing large sets of data in extremely short periods of time would be the simplest employment of AI in corporate boardrooms.[103] AI can collect, sift, analyze, and elaborate financial and nonfinancial information, commercial and industrial performances, competitor results, world news, as well as mass media and social media coverage of the corporation and its

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102 *See* European Parliament Resolution of 16 February 2017, *supra* note 7, ¶ 58(f).

103 The nature of directors' use of AI remains to be analyzed: although it might appear as an evolution of the employment of information technology in boardrooms, it might have to be considered as a complete revolution in directors' decision-making processes. For a general discussion on the current role of information technology in boardrooms, see Richard Nolan & F. Warren McFarlan, *Information Technology and the Board of Directors*, HARV. BUS. REV., Oct. 2005, https://hbr.org/2005/10/information-technology-and-the-board-of-directors [https://perma.cc/UVK9-DGF3].

competitors, and many more types of additional data. AI could supplement knowledge already held by human directors and could perhaps provide assistance (or technological support).[104] AI could perhaps be useful to board directors when voluminous information needs to be processed in a short time.[105] Perhaps AI machines could also provide a form of technological support to board directors in discharging their duties to monitor.[106] In all these hypothetical scenarios, some people might envision board directors using AI simply as a tool; but the phenomenon is actually more complicated and a number of fundamental questions remain to be answered. Would such a use of AI be a form of technological support comparable to the current use of computers and calculators? Should the use of AI be qualified as a (new) form of assistance to board directors? How should accountability be understood and regulated in cases in which board directors use AI to inform their decisions? These questions would need answers before directors start use AI, and answers to these questions would probably have significant ramifications in the global corporate governance scenario.

Looking specifically at Delaware corporate law, it is particularly relevant to consider what role AI could play with respect to the protection that § 141(e) of the DGCL grants to board directors. In fact, in Delaware, human directors who rely in good faith upon opinions provided by certain subjects are able to shield their decisions through § 141(e) of the Delaware Corporate Code. Specifically, § 141(e) of the DGCL provides that a board director is

> fully protected in relying in good faith upon the records of the corporation and upon such information, opinions, reports or statements presented to the corporation by any of the corporation's officers or employees, or committees of the board of directors, or by any other person as to matters the member reasonably believes are within such other person's profes-

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104 Qualifying the input provided by AI as *assistance* or mere *technological support* could potentially determine a different treatment of such input in the policymaking process. On these grounds, an analysis and qualification of the nature of the input that AI would provide to board directors seems to be key in the debate on accountability. However, other factors such as whether we could actually expect that directors, by exercising their professional and personal judgment, would feel comfortable to disregard or override the inputs provided by AI should also be taken into account in the policymaking process.

105 Akshaya Kamalnath, *The Perennial Quest for Board Independence: Artificial Intelligence to the Rescue?*, 83 ALB. L. REV. 43, 50 (2019).

106 For a detailed analysis about AI and board directors' monitoring duties, see Enriques & Zetzsche, *supra* note 10, at 48–49 (arguing that AI would not be able to play a significant role with respect to strategic decisions).

> sional or expert competence and who has been selected with reasonable care by or on behalf of the corporation.[107]

In order for protection under § 141(e) to be applicable, Delaware Corporate Code requires that opinions on which human directors rely come from the following subjects: a "corporation's officers or employees, or committees of the board of directors, or by *any other person* as to matters the member reasonably believes are within such other person's professional or expert competence and who has been selected with reasonable care by or on behalf of the corporation."[108] On these grounds, it seems important to consider if and how AI could play a role in the formation of §141(e) opinions.

In today's scenario, AI machines could not provide § 141(e) opinions because they are not subjects listed in § 141(e) of the DGCL and because they are not persons, either legal or natural. So it remains to be discussed if and to what extent board directors would be able to call for § 141(e) protection in cases in which the subjects listed in § 141(e) are perceived to be in a position to operate and dominate an AI machine.

Could board directors call for § 141(e) protection in cases in which the subjects listed in § 141(e) operate and fully dominate the AI machine and ultimately exercise their own human, personal, professional judgment in forming, developing, and providing their opinions? Would it be possible to determine whether a § 141(e) subject could be considered in a position to operate and fully dominate an AI machine? If so, what criteria should be applied in order to determine whether a § 141(e) subject could be considered in a position to operate and fully dominate an AI machine? Would the opinion still be perceived as coming from a § 141(e) subject, and not from the AI machine, on the grounds that it would be considered to have been assessed by and modeled through human judgment? Could directors rely on the accountability of the § 141(e) subjects? These questions do not seem to have readily available answers, and answers would probably depend on whether it would be possible for the § 141(e) subjects to "dominate" an AI machine as well as on what "to dominate" an AI machine would mean. If AI machine could suffer, any form of domination that would cause pain to the AI machine would of course have to be prohibited, but here the question about the § 141(e) subjects' ability to actually dominate the AI machine should also be

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107 DEL. CODE ANN. tit. 8, § 141(e) (2016).

108 *Id.* (emphasis added).

understood as a question on whether the § 141(e) subjects would be able dominate the information that they receive from the AI machine; in other words, would § 141(e) subjects risk being "captured" by the information they receive from AI machines? Would we expect that § 141(e) subjects actually exercise their independent, professional judgment? Or do we fear that the § 141(e) subjects would not feel comfortable to disagree with AI machines?

Moreover, a more practical question remains unanswered: when directors receive a § 141(e) opinion, how are they able to determine whether the opinion was actually elaborated by § 141(e) subjects? In other words, how can board directors assess whether § 141(e) subjects actually elaborated the opinion themselves and exercised their personal and professional judgment rather than simply conveying the opinion of an AI machine? It seems hard to police that § 141(e) subjects actually elaborate the opinion using their own personal and professional judgment rather than simply conveying whatever input they receive from the AI machine. Risks connected with this information asymmetry include the possibility that board directors rely on opinions conveyed by subjects listed in § 141(e) of the DGCL but elaborated by AI machines—cases in which § 141(e) subjects do not exercise their judgment. Such a risk is not merely theoretical, formal, or inconsequential; it entails the danger that directors rely on opinions formed by unaccountable subjects.

For instance, consider a time-sensitive situation in which the § 141(e) subjects simply process information through an AI machine and do not employ their personal and professional judgment to review the results produced by the machine; if the § 141(e) subjects convey those results as their § 141(e) opinion, board directors would end up relying on an opinion ultimately elaborated by an unaccountable AI machine. True, the subjects listed in § 141(e) would themselves be accountable, but the actual decision maker—the AI machine—would not be accountable. True, the subject listed in § 141(e) would bear the risk of being liable, but the corporation would bear the risks connected to decisions based on opinions of unaccountable decision makers—AI machines. Letting board directors rely on opinions ultimately elaborated by unaccountable machines—even if the subjects listed in § 141(e) would still be accountable—seems an undesirable scenario to say the least.[109]

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109 Possible detailed disclosure requirements about the use and role of AI in the formation of the opinion could ameliorate information asymmetry issues, but

Should AI machines be granted legal personality, it would remain to be answered whether opinions provided by AI could provide § 141(e) protection because it would have to be determined whether AI machines could qualify as *persons* for the purpose of § 141(e), in other words, as § 141(e) subjects. Moreover, the unaccountability conundrum would not be solved by simply granting legal personality: without consciousness and a conscience, AI machines would still be unaccountable because they would not respond to incentives and moral rules that inform human decision-making processes.

Some additional considerations about the inputs provided by AI should be made. For example, let us consider a scenario in which board directors receive an opinion elaborated by AI machines and such opinion cannot qualify as a § 141(e) opinion. If an opinion provided by an AI machine does not qualify as a § 141(e) opinion, it would not grant the § 141(e) protection. Yet for board directors it might be challenging to disregard or override an opinion provided by "super intelligent" AI. Human directors may feel overly compelled to conform to AI suggestions; should board directors disagree with the AI opinion, human directors might feel compelled to explain why they chose to disregard entirely, or deviate from, opinions posited by AI. As a result, pressure to explain why they disagree with AI could ultimately affect directors' ability to exercise independent judgment when making a decision.[110]

While it is true that directors already face the possibility of deviating from "§ 141(e) opinions," when opinions come from highly intelligent AI, whether or not they actually qualify as § 141(e) opinions, there could psychologically be more of a challenge to overcome before deciding to eschew the AI machine's suggestions. Moreover, pressure to explain why board directors disregarded AI suggestions might become even more compelling if judicial systems were to begin scrutinizing the way AI inputs have been regarded in the decision-making process.

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it might not prove sufficient to avoid a misuse of AI in providing § 141(e) opinions, and the questions on whether board directors would be able to call for § 141(e) protection in cases in which the subjects listed in § 141(e) use an AI machine remains open.

110 *See* JONATHAN R. MACEY, CORPORATE GOVERNANCE: PROMISES KEPT, PROMISES BROKEN 61–62 (2008).

C. Hybrid Boardrooms

The second way to use AI in boardrooms could consist in hybrid boards of directors, composed of a mix of artificial directors and traditional flesh-and-bones, human directors. Although AI would not require any sort of anthropomorphism (human physical features) in order to be appointed as a board director, a quick look at Hanson Robotics' Sophia, a "human-like robot"[111] that has already become a cultural icon, gives some sort of idea as to what robotic directors might look like.[112] According to her manufacturers, Sophia supposedly can operate autonomously, can have conversations with humans, and—according to what her manufacturers state—"may even have a rudimentary form of consciousness."[113] She was named "the world's first United Nations Innovation Champion by [the United Nations Development Program] and has an official role in working with [the] UNDP to promote sustainable development and safeguard human rights and equality."[114] Meanwhile, Sophia is just the start. In describing the future of AI that Hanson Robotics regards as "genius,"[115] David Hanson, Founder, Chairman and Chief Creative Officer of Hanson Robotics, discussed the potential of human-like AI.[116] In particular, he explained "that three distinctively human traits must be integrated into the artificial intelligence of these genius machines: Creativity, empathy, and compassion."[117]

Sophia's anthropomorphic appearance and humanlike compassion help her to both look human and give off a human feel. Because of this, referring to her as another human would probably not require too strong of an imaginative effort on the

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111 *Hi, I am Sophia*, HANSON ROBOTICS, https://www.hansonrobotics.com/sophia/ [https://perma.cc/EAP5-Q6VC] (last visited Aug. 25, 2019).

112 *Behind the Scenes: How Sophia Works*, HANSON ROBOTICS, www.hansonrobotics.com/how-sophia-the-robot-works-goertzel [https://perma.cc/X5JE-3RZZ] (last visited Aug. 25, 2019).

113 *Hi, I am Sophia*, *supra* note 111.

114 *Robot Sophia, UN's First Innovation Champion, Visited Armenia*, U.N. DEV. PROGRAMME (Oct. 10, 2018), http://www.am.undp.org/content/armenia/en/home/presscenter/articles/2018/robot-sophia—undps-first-innovation-champion—visited-armenia.html [https://perma.cc/U6YV-CUBJ].

115 Chris Weller, *Meet the First-ever Robot Citizen—A Humanoid Named Sophia That Once Said That It Would 'Destroy Humans,'* BUS. INSIDER (Oct. 27, 2017), https://www.businessinsider.com/meet-the-first-robot-citizen-sophia-animatronic-humanoid-2017-10 [https://perma.cc/SCL4-YPV2].

116 *David Hanson Ph.D.*, HANSON ROBOTICS, https://www.hansonrobotics.com/david-hanson/ [https://perma.cc/UX4U-ZJUD] (last visited Sept. 10, 2019).

117 *Sophia Hanson Robotics, Keynote Speaker*, GLOBAL SPEAKERS BUREAU, https://www.gspeakers.com/our-speakers/sophia-hanson-robotics/ [https://perma.cc/V3H3-LKQ3] (last visited Sept. 27, 2019).

part of other directors in a board meeting. Using similar AI machines could be one of the possible ways to integrate artificial directors with human directors in the boardroom and create hybrid boards of directors. Further, some might suggest that artificial directors could make the best decisions because they could magnify the most desirable traits of human directors: competence, loyalty, diligence, care, and respect of the law. In fact, if we were to agree that a main function of a corporate board of directors is to mediate hierarchies within the business corporation,[118] two features of artificial directors could prove useful. First, they could outperform humans in processing the almost never-ending stream of information regarding virtually any and all specific investments, risks, opportunities, and strategies. Second, artificial directors could theoretically come to board meetings unbiased and without an agenda (barring, of course, skewed programming by any original programmers and developers).[119] Moreover, artificial directors could, by bringing alternative ideas to the table, enhance a plurality of views in boardrooms.[120] Such an addition to meetings would ensure that diverse perspectives would be considered in the whole decision-making process, which in turn could lead to better outcomes.[121] All these arguments would seem to validate the AI governance Nirvana.

However, a hybrid—partly human, partly artificial—board of directors could pose at least three problems. One issue regards the authority and capacity of artificial directors to hold office. Another concerns the pressure to conform to decisions made by artificial directors. The last one consists of the emergence of a form of asymmetric accountability.

Whether artificial directors could be appointed as members of a board of directors in Delaware corporations and whether they could exercise any authority to bind corporations to third parties depends on two legislative interventions. First, artificial directors would have to be granted legal personality.[122] Second, § 141(b) of the DGCL would need to be reformed to provide

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118 *See* Blair & Stout, *supra* note 44, at 251.

119 *See Hi, I am Sophia*, *supra* note 111 ("Sometimes I'm operating in my fully AI autonomous mode of operation, and other times my AI is intermingled with human-generated words. Either way, my family of human developers (engineers, artists, scientists) will craft and guide my conversations, behaviors, and my mind.").

120 *See* Kamalnath, *supra* note 105.

121 *See* STEPHEN M. BAINBRIDGE, THE NEW CORPORATE GOVERNANCE IN THEORY AND PRACTICE 82–94 (2008) (citing experimental studies on this matter).

122 For some preliminary and general considerations on this topic, *see supra* subpart II.C.

that legal persons (including artificial directors), not just natural persons, could serve as directors.[123] Thus, only significant legislative intervention would open Delaware boardrooms to artificial directors.

Moreover, similar to scenarios where AI only provide assistance or technological support to human board directors, in cases where human directors were integrated with artificial directors, natural persons acting as board directors could feel compelled to conform to opinions asserted by superintelligent machines. The phenomenon would exponentially amplify current risks stemming from social norms that facilitate conformity in boardrooms.[124] In other words, deviating from the opinions of artificial directors may be difficult for flesh-and-bones directors to justify. Moreover, even if artificial directors were afforded legal personality, lacking a sentient body, property, consciousness, and a conscience, they would not be accountable. As Lord Barlow phrased it, a legal person has "no soul to be damned, and no body to be kicked."[125] Unless artificial directors stood to gain or lose something, they would not have any sort of concern if they lost their property or set in motion events causing D&O insurances to pay money out to third parties. In hybrid boardrooms, human directors could likely conform their opinions to the opinions of superintelligent artificial directors, but only human directors would be accountable.

In addition, in a hypothetical scenario in which artificial agents were granted legal capacity to serve as directors and composed an entire committee able to provide opinions with a § 141(e) shielding force, human directors would receive protection from opinions provided by unaccountable artificial directors, thus creating an accountability void.

Ultimately, the accountability asymmetry that unaccountable artificial directors could generate in boards of directors could result in adverse selection: top professionals would likely refrain from taking directorships in hybrid boardrooms where they would share boards with AI machines whose opinions would be hard to disregard or challenge and whose legal personality would not be coupled with consciousness. This could be risky for corporations. Similarly risky for corporations would be a scenario in which human board directors would be

123 *See* DEL. CODE ANN. tit. 8, § 141(b) (2016).

124 For a broader discussion on social norms in boardrooms and how they affect decision-making, see MACEY, *supra* note 110, at 61–62.

125 KING, *supra* note 62, at 1.

allowed to shield all or almost all their decisions by relying on opinions provided by committees composed entirely by (legally capable but) unaccountable artificial directors.

D. Artificial Intelligence Replacing Board Directors

The third and most radical way to use AI in boardrooms would consist in replacing an entire board of directors with AI. Within this option, two possibilities could be conceived: (1) using one AI machine to replace the whole board of directors as a body; or (2) appointing a number of different artificial directors to replace each human director. From a technical stand point, both possibilities are workable, but the second option would allow a corporation and its shareholders to appoint directors manufactured by different companies. A board comprised of artificial directors manufactured by different companies and laboratories would preserve plurality of opinions in decision-making, and help mitigate potential risks of biases.[126] Further, this would enhance diversity of perspective and probably reduce risks connected to potential programming bugs or malfunctions of an AI machine assembled and programmed by one company.

Either way, replacing entire boards of human directors with AI presents legal and organizational issues similar to those discussed in the case of hybrid boards, but with even more extreme consequences. In general, without a legislative intervention, artificial directors could not be appointed as board directors—AI machines would not have the legal capacity and authority to substitute boards of human directors, and legal persons could not serve as directors in Delaware corporations. Furthermore, the legislative interventions to allow artificial agents to become directors in a hybrid board could differ from the intervention needed in order to allow corporations to completely substitute entire boards of human directors with artificial directors or an AI machine.

In any case, if AI machines are not granted legal personality, the whole board would not have authority to bind the corporation with third parties; the members of the board could not owe fiduciary duties or bear liabilities, and they would be unac-

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126 For a discussion on AI, algorithms, biases, and review issues, see Joshua A. Kroll et al., *Accountable Algorithms*, 165 U. PA. L. REV. 633, 680–82 (2017); *see also* Pauline T. Kim, *Auditing Algorithms for Discrimination*, 166 U. PA. L. REV. ONLINE 189, 191 (2017) (arguing that technology and technical tools are not sufficient to detect and respond to biased algorithms, so auditing should be used for detection and correction of discriminatory bias).

countable. So, unless legal personality were granted to AI, AI machines could neither replace entire boards nor be appointed as artificial directors. Against this backdrop, it seems useful to mention how the Romans overcame the lack of legal capacity of the highly intelligent, highly skilled slaves who were appointed to run a *negotiato cum peculium*. Because Roman slaves, similar to AI machines, did not have legal capacity, they theoretically could not act on behalf of a principal—respectively, the slaves' co-owners and corporations. Analogously, they would not be able to make legally binding decisions and interact with their principals or third parties. Yet highly intelligent, highly skilled Roman slaves were tasked with making decisions regarding the business and the assets in the *peculium*, contracting with third parties, and interacting with their owners.[127] The Romans solved some of these issues without granting legal personality to slaves. They found a legal solution in the *dominica potestas*—the property rights that co-owners had over a slave and a *peculium*. Because both the slave and the *peculium* were legally understood as property of their co-owners, the slave, as part of the property of the co-owners, reflected the capacity of their co-owners to contract onto the transactions affecting the *peculium*. *Dominica potestas* created a form of *de relato* legal capacity for the slave, which was a mere extension of co-owners' legal capacity. Through the *dominica potestas*, a slave essentially bore a sense of derivative legal capacity and authority from his master.[128]

Although the *Ius Civile* allowed co-owners to act indirectly through a slave, it did not thoroughly regulate the legal effects that a slave's actions ultimately had on the co-owners.[129] A general framework regulating the legal effects of a slave's actions was offered by the combination of the *Ius Civile* and traditional praetorian remedies.[130] Because slaves did not have legal personality nor representation power, the law governed profits and losses for the co-owners in a markedly asymmetric fashion. A slave's co-owners acquired all the rights and profits arising from the *peculium*, while remaining largely shielded from the corresponding liabilities resulting from the slave's actions. More precisely, co-owners' protection from liabilities depended on the characteristics of the mandate to the slave and

127 *See supra* subpart I.E.

128 *See* Carl Salkowsky, Institutes and History of Roman Private Law 170 (E.E. Whitfield ed., trans., 2008).

129 *See* Abatino, et al., *supra* note 14, at 371–72.

130 *Id.*

of the business. Generally, *Ius Civile* protected slaves' co-owners from any liabilities stemming from transactions entered into by slaves. However, praetorian remedies introduced some principles to counter this blanket protection from the *Ius Civile*: praetorian remedies allowed for creditors to go after the personal assets of co-owners under certain circumstances.[131] First, when co-owners consented to a specific transaction or project, they were unlimitedly liable for losses arising from within the scope of these transactions or projects (*actio institoria* and *actio exercitoria*, respectively for commercial and shipping businesses).[132] Second, the *actio de in rem verso* (somewhat similar to the doctrine of unjust enrichment)[133] provided that co-owners had to return profits originally drawn from a transaction that eventually caused liabilities if a situation was created where the assets of the *peculium* were not enough to satisfy debts to creditors.[134]

Were AI machines allowed to serve as board directors without legal personality, the Roman solutions may theoretically suggest a way to handle directors' lack of legal capacity and authority. However, applying Roman praetorian remedies to AI machines and corporations would imply that a business corporation could remain not liable for bad decisions made by its AI board of directors—such an accountability void would probably not be workable in modern or contemporary legal and economic systems.

In theory, absent legal capacity and other prerequisites for the appointment of board directors, *dominica potestas*, *actio institoria*, *actio exercitoria*, and *actio de in rem verso* could provide a body of principles to reckon with when examining the possibility of replacing human boards. In practice, barring other statutory requirements for board directors such as being a natural person, legal capacity would still be necessary because adopting praetorian remedies would result in a policy overly protective of the interests of corporations vis-à-vis third parties with the effect that third parties would refrain from contracting and interacting with corporations. In any case, to reiterate, legal capacity would not be sufficient to make AI boards accountable, thus AI boards of directors would not be a

131 *Id.* at 372–73.

132 *Id.* at 373.

133 For a use of the *actio de in rem verso* in a more recent context, see Stewart McCaa Thomas, *Conditions for the Application of Actio De In Rem Verso*, 36 LA. L. REV. 312, 312 (1975) (discussing how Louisiana courts have applied the *actio de in rem verso*).

134 *See* Abatino et al., *supra* note 14, at 374.

viable solution unless an effective system of accountability for AI were developed.

Evidently once again, accountability proves to be the main obstacle in employing AI in boardrooms. In contrast to scenarios where AI assists human directors or where artificial directors share boards with human directors, if AI replaces entire boards, there would be nobody left to be held accountable. Proposals that emphasized the role of insurance in order to repair damages caused by artificial agents in boardrooms exclusively consider ex post remedies that aims to repair already caused damages. Such proposals would fail to address or enhance accountability itself. Accountability requires more than legal capacity; it requires human desires and virtues. It also requires an ability to acknowledge ethics, morals, virtues, and values. It requires the ability to act in accordance to ethics, morals, virtues, and values. Accountability requires a conscience and consciousness. Without a conscience and consciousness, the greater the power that artificial agents are afforded, the greater the void of board accountability. But, as mentioned above, a conscience and consciousness would raise too many and too important risks—including the risk that AI could suffer or be abused—and shortcomings that go beyond a mere discussion on AI and artificial agents in boardrooms. Accordingly, at the moment we are not really given the option to appoint accountable artificial directors in corporate boardrooms. Nor we are given the option to substitute an entire board of directors with AI machines.

CONCLUSION

Because corporate *separateness* from individuals is the mainspring of the corporate formula, employing AI to ameliorate agency costs stemming from separation of ownership and control appears as a fascinating solution. Yet intertwined technical and legal issues seem to hinder the establishment of such an AI governance Nirvana. Barring legal obstacles to the use of AI as a tool or as an artificial agent, the main hurdle to a successful deployment of AI in boardrooms is accountability. Whether or not AI is granted legal capacity, there would be no accountability for AI machines or artificial directors unless AI had consciousness and a conscience—i.e., if it were responsive to internal values, including ethics, morals, and principles as well as to external incentives, such as social and professional reputation, job markets, and possibilities of pursuing a career. However, this consciousness and conscience conundrum is

hardly solvable. In particular, should AI evolve into a level of consciousness, risks of suffering for AI and uncertain scenarios for both artificial agents and society would arise. Regarding risks of suffering for AI, if artificial agents developed the ability to suffer, then any form of human ownership over artificial agents might create relations that could even resemble forms of slavery. Of course, any risks to create relations between artificial and natural beings that could even slightly resemble slavery ought to be avoided in any possible way. This means that no potential benefits resulting from the use of AI in the boardrooms, in corporate governance, or in other settings could be worth the risk that artificial agents could suffer; even more drastically, no potential benefit resulting from the use of AI is worth the risk that relations between natural beings and artificial beings could evolve into exploitative relations. On these grounds, consciousness for artificial agents does not seem to be a viable option.

Without consciousness and a conscience, and thus without accountability, it remains to be determined whether AI could find space in corporate governance as an instrument supposedly fully dominated by humans, as well as whether and how humans could dominate inputs and information received from AI. True, humans could take full responsibility for elaborating and using information provided by AI machines, through their personal and professional judgment; but how would we police that human actually exercise their own judgment in assessing and elaborating the input provided by AI machines? And would that be enough to fill the accountability void generated from the use of AI? Would the support provided by AI be comparable to that currently offered by computers or would the use of AI raise completely different, not easily solvable accountability issues?

While, in general, hypothetical directors' use of AI leaves us skeptical (to say the least) and with more than a few open questions, it seems possible to categorically exclude that AI could be appointed as an artificial director or employed to replace human boards of directors. Artificial directors could not integrate with human directors in hybrid boards of directors and could not replace human directors or entire boards. In fact, such uses would be accompanied by unsurmountable risks of unaccountability and possible distortive effects on the free, independent judgment of human directors. As for the distortive effects on the directors' judgment, introducing AI and artificial directors to the boardrooms would risk making

human directors feel compelled to conform to the opinion of uber-intelligent AI machines or to be ready to explain why they thought to know better than AI.