

# **AUTONOMOUS SYSTEMS AS LEGAL AGENTS: DIRECTLY BY THE RECOGNITION OF PERSONHOOD OR INDIRECTLY BY THE ALCHEMY OF ALGORITHMIC ENTITIES**

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## **ABSTRACT**

*At its core, agency law governs fiduciary relationships between two distinct parties (the principal and agent) in interactions with third parties. The three separate relationships within agency (principal-agent, agent-third party, and principal-third party) create binding legal rights and obligations. To be a principal or agent, one must be a person. The Restatement (Third) of Agency's definition of person attempts to distinguish legally recognized persons from purely organizational entities and mere instrumentalities. The emergence of AI computing, and the ongoing development of truly autonomous computer systems, will test traditional agency law with questions like who or what can be a person. At present, the Restatement views computer programs as mere instrumentalities of the using person and thus not a separate person capable of being a principal or agent. This Note will analyze the tension created within agency law's definition of personhood by the existence of autonomous systems. These autonomous systems can be persons in two ways: either as a direct person that is independent or as an indirect person that is formed by an algorithmic entity. This definitional outcome of personhood for autonomous systems determines whether autonomous computer programs can be principals or agents—a proposition that has monumental downstream implications beyond the scope of this Note but ripe for future research. Ultimately, this Note advocates for the acceptance of autonomous systems as legally recognized persons for the purposes of agency law. This recognition of personhood for autonomous systems should be direct and based on the acceptance that personhood depends on the moral recognition of autonomy; but, at the very least, recognition of personhood*

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*should be indirect and based on the traditional recognition of organizations as legal persons. Pragmatic benefits of recognizing the personhood of autonomous systems support both the direct and indirect acceptance of such personhood.*

#### INTRODUCTION

Agency law encompasses three-party legal relationships where one person—the principal—manifests assent that another person—the agent—has the power to affect the principal’s legal relations with third parties through the agent’s acts.<sup>1</sup> Each of these relationships requires that both parties to the relationship be a person.<sup>2</sup> In agency law, the term agency is precisely used to describe the “fiduciary relationship that arises when one person . . . manifests assent to another person . . . that the agent shall act on the principal’s behalf and subject to the principal’s control, and the agent manifests assent . . . to act.”<sup>3</sup> This definition differs from the colloquial, non-legal meaning of the word agency, with one such definition being “a person or thing through which power is exerted or an end is achieved.”<sup>4</sup> Importantly, the legal definition of agency significantly differs from the economic definition of agency as “a contract under which one or more persons . . . engage another person . . . to perform some service on their behalf which involves delegating some decision-making authority to the agent.”<sup>5</sup> Unlike the economic definition of agency, the legal definition does not require a contract or the delegation of decision-making, so legal agency can be broader than economic agency.<sup>6</sup> Notably, the legal, economic, and one colloquial definitions of agency require the existence of at least two separate persons.

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<sup>1</sup> RESTATEMENT (THIRD) OF AGENCY § 1.01 (AM. LAW INST. 2006).

<sup>2</sup> *Id.* (“As defined by the common law, the concept of agency posits a consensual relationship in which one person . . . acts as a representative of or otherwise acts on behalf of another person . . .”).

<sup>3</sup> *Id.* at § 1.01.

<sup>4</sup> *Agency*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/agency> (last visited Mar. 9, 2019).

<sup>5</sup> Michael C. Jensen and William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 J. FIN. ECON. 305, 308 (1976).

<sup>6</sup> *Compare id. with* RESTATEMENT (THIRD) OF AGENCY §1.01. Note that the two definitions are incongruous, so economic agency relationships can also exist where legal agency relationships do not.

Because personhood is a necessary element of legal agency, the definition of personhood is critical to the analysis of any possible agency relationship. Generally, personhood is an easily satisfied element.<sup>7</sup> The emergence of artificial intelligence (“AI”) and the possibility of autonomous systems being agents or principals, serving in such capacity independent from human involvement, complicates the personhood definition. Commenters have theoretically explored this definitional question for over a quarter of a century.<sup>8</sup> These previously theoretical complications of the personhood definition have become practical questions in the current technological environment, especially with the near possibility of fully autonomous cars.<sup>9</sup>

Section II of this Note sets out the relevant doctrine of the Restatement (Third) of Agency regarding personhood. Section III discusses the current technological environment of autonomous systems and highlights the development of algorithmic entities—a possible organizational structure response to the traditional non-recognition of computer programs as persons. Section IV outlines why autonomous programs should be recognized, either directly or at least indirectly, as persons in agency. Section V concludes by flagging downstream implications and issues for future research if the autonomous systems are recognized as persons in agency law.

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<sup>7</sup> See RESTATEMENT (THIRD) OF AGENCY §1.01 cmt. c (using examples like the employee-employer to describe the “wide and diverse range of relationships” encompassed by agency).

<sup>8</sup> See, e.g., Lawrence B. Solum, *Legal Personhood for Artificial Intelligences*, 70 N.C.L.R. 1231 (1992) (stating that the question of AI as a legal person “is only theoretical” but still addressing the question in a 50-page law review article).

<sup>9</sup> See Alex Davies, *The Wired Guide to Self-Driving Cars*, WIRED (December 13, 2018), <https://www.wired.com/story/guide-self-driving-cars/> (“In the past five years, [partially] autonomous driving has gone from ‘maybe possible’ to ‘definitely possible’ to ‘inevitable’ to ‘how did anyone ever think that wasn’t inevitable?’ to ‘now commercially available.’”). For an example of how AI and self-operating machines creates similar stresses on possible tort liability, see also Daisuke Wakabayashi, *Self-Driving Uber Car Kills Pedestrian in Arizona, Where Robots Roam*, N.Y. TIMES (Mar. 19, 2018), <https://www.nytimes.com/2018/03/19/technology/uber-driverless-fatality.html> (describing an incident where a test drive of an semi-autonomous car, which was still under the supervision of a human in the driver’s seat, struck and killed a pedestrian in Arizona and how the incident highlights necessitates a regulatory response to liability for similar incidents).

I must note the specific use of certain terms here. “Autonomous system” refers to non-human computer systems that, once created, can operate in undefined environments and react to unanticipated stimuli,<sup>10</sup> and my analysis will primarily focus on whether these autonomous systems should be persons under the Restatement (Third) of Agency. I purposefully avoid the use of the term “computer program” to reflect the technical usage of “autonomous systems.” These two terms are not interchangeable or analogous. While autonomous systems typically incorporate computer programs, not every computer program rises to the level of an autonomous system.

#### I. RESTATEMENT (THIRD) OF AGENCY: DEFINITION OF PERSONHOOD

Fortunately, the Restatement (Third) of Agency has provided a definition of person<sup>11</sup> and extensive commentary to support this definition.<sup>12</sup> For the purposes of agency, a person is (1) an individual, (2) an organization that “has legal capacity to possess rights and incur obligations,” (3) a governmental entity, or (4) any other entity that “has legal capacity to possess rights and incur obligations.”<sup>13</sup> The guiding principle underlying each of these categories of person is the “capacity to be the holder of legal rights and the object of legal duties.”<sup>14</sup>

Capacity to be the holder of legal rights and the object of legal duties is clarified by references to the Restatement (Third) of Agency sections outlining the capacity to serve as a principal or agent.<sup>15</sup> In defining legally recognized persons’ capacity as principals, the Restatement differentiates between individuals and non-individuals.<sup>16</sup> The “law applicable” to non-individuals governs the capacity of non-individuals.<sup>17</sup> The legal capacity of persons who are entities, like corporations, is governed by “the legal regime by virtue of which such

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<sup>10</sup> For a discussion on the technical use of the term “autonomous system,” see *infra* notes 35–38 and the accompanying text.

<sup>11</sup> RESTATEMENT (THIRD) OF AGENCY § 1.04.

<sup>12</sup> *Id.* at § 1.04 cmt. e.

<sup>13</sup> *Id.* at § 1.04.

<sup>14</sup> *Id.* at § 1.04 cmt. e.

<sup>15</sup> *Id.* (citing RESTATEMENT (THIRD) OF AGENCY §§ 3.04–3.05).

<sup>16</sup> *Id.* at § 3.04 (addressing individuals in paragraph (1) and non-individuals in paragraph (2)).

<sup>17</sup> *Id.* at § 3.04(2).

person exists . . . and functions.”<sup>18</sup> For example, a Delaware corporation’s capacity as principal would be determined by the Delaware corporate law that enabled the corporation’s creation. The Restatement also differentiates between individuals and non-individuals in determining whether actors have capacity as an agent.<sup>19</sup> Non-individuals’ ability to act as an agent depends on “the law through which the agent has legal personality.”<sup>20</sup> Like the prior example in the context of a principal, a Delaware corporation’s capacity as an agent would be determined by the Delaware corporate law.

This quality of capacity to hold rights and be subject to duties distinguishes legally recognized persons—whether individuals or non-individuals—from purely organizational entities and mere legally consequential instrumentalities.<sup>21</sup> Because characterization as purely organizational entities or mere legally consequential instrumentalities precludes personhood, such a characterization also precludes the ability to act as an agent or principal. Purely organizational entities are entities, like trusts or estates, that cannot be “directly the object of liabilities and the holder of rights.”<sup>22</sup> Animals or inanimate objects are prototypical examples of merely consequential instrumentalities that a person uses to alter his, her, or its own legal rights and obligations.<sup>23</sup>

Characterization as a merely consequential instrumentality is the more significant possible limitation on personhood than characterization as a purely organizational entity.<sup>24</sup> The reporter’s note cites a case in which dogs are characterized as instrumentalities when used as a dangerous weapon for purposes of an armed-robbery statute.<sup>25</sup> Another case describes dogs as non-persons who are thus unable to be subject to suit.<sup>26</sup> The cases summarized in the notes generally deny sentient animals the possibility of personhood even while recognizing that animals are

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<sup>18</sup> *Id.* at § 3.04 cmt. d.

<sup>19</sup> *Id.* at § 3.05 cmt. b.

<sup>20</sup> *Id.*

<sup>21</sup> *Id.* at § 1.04 reporter’s n. e.

<sup>22</sup> *Id.*

<sup>23</sup> *Id.* at § 1.04 cmt. e.

<sup>24</sup> *See id.* at § 1.04 reporter’s n. e (devoting one sentence to explain the relevance of purely organizational entities and three full paragraphs to specific analysis of mere legally consequential instrumentalities).

<sup>25</sup> *Id.* (citing *Commonwealth v. Tarrant*, 326 N.E.2d 710 (Mass. 1975)).

<sup>26</sup> *Id.* (citing *Dye v. Wargo*, 253 F.3d 296 (7th Cir. 2001)).

complex beings with independent purposes, desires, and aversions.<sup>27</sup> The Restatement's approach sets some threshold level of autonomy that separates persons from "inanimate objects or a nonhuman animal."<sup>28</sup>

The Restatement also clearly states that "a computer program is not capable of acting as a principal or an agent."<sup>29</sup> The Restatement supports the general statement that computers are incapable of being an agent with a quote that computer programs are not juridical persons.<sup>30</sup> The Restatement and the cited article both reference electronic agents, computer programs without independent volition and designed as tools for their users, as a key example of why computers cannot be agents.<sup>31</sup> The Restatement classifies computer programs as "instrumentalities of the persons who use them."<sup>32</sup> Despite the clear initial statement of the incapability of personhood and classification of computer programs as instrumentalities, subsequent discussion of computer programs cracks the door for the future personhood of computer programs by qualifying the instrumentality classification to computer programs available "[a]t present."<sup>33</sup>

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<sup>27</sup> *Id.* (quoting CHARLES TAYLOR, HUMAN AGENCY AND LANGUAGE: PHILOSOPHICAL PAPERS I at 98–99 (1985)) ("[W]hile Descartes 'saw animals as complex machines,' they are in fact subjects to whom we can attribute 'purposes, desires, aversions . . . in a strong, original sense . . . [t]hat the cat is stalking the bird is not a derivative, or observer-relative fact about it.'").

<sup>28</sup> *See id.* at § 1.04 cmt. e (clearly distinguishing persons from inanimate objects or nonhuman animals).

<sup>29</sup> *Id.*

<sup>30</sup> *Id.* at §1.04 reporter's n. e (citing Joseph Sommer, *Against Cyber-Law*, 15 BERK. TECH. L.J. 1145, 1177–78 (2000)).

<sup>31</sup> *See id.* (describing an electronic agent only as "the tool of the person who uses it" without independent volition); Joseph Sommer, *Against Cyber-Law*, 15 BERK. TECH. L.J. 1145, 1177–78 (2000) (stating that a programmed machine is "not a juridical person and therefore cannot be an agent" because it owes no duties, lacks volition due to only following its internal programming, lacks capacity for suit, and has no interests of its own).

<sup>32</sup> RESTATEMENT (THIRD) OF AGENCY § 1.04 cmt. e.

<sup>33</sup> *Id.*

## II. AUTONOMOUS SYSTEMS

Before exploring the possible personhood of autonomous systems at present, a brief survey of the state of computing is necessary. The autonomy displayed by autonomous systems supports the moral justification for the recognition of direct personhood. Additionally, indirect personhood might also be recognized by creatively structuring organizational entities. These entity structures are called algorithmic entities. Conceptually, algorithmic entities are shells of personhood through which the autonomous systems direct the shell persons' actions. Professor Shawn Bayern recently proposed such a shell using LLCs and the governing LLC law to wrap autonomous systems in personhood.<sup>34</sup>

### A. *The Current State of Autonomous System Technology*

One recognized foreign research institute focusing on artificial intelligence research<sup>35</sup> defines autonomous systems as “autonomous artifacts [like self-driving cars or smart robots] or large-scale self-managing systems consisting of physical infrastructure and software that, together with humans, provide increased functionality, sustainability, and efficiency for society.”<sup>36</sup> Autonomous systems “must be capable of planning and executing complex functions as intended, with limited

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<sup>34</sup> See generally Shawn Bayern, *The Implications of Modern Business-Entity Law for the Regulation of Autonomous Systems*, 19 STAN. TECH. L. REV. 93 (2015).

<sup>35</sup> The Wallenberg Artificial Intelligence, Autonomous Systems and Software Program. This program is “a major national initiative [in Sweden] for strategically motivated basic research, education, and faculty recruitment in autonomous systems and software development.” WASP, *About*, <https://web.archive.org/web/20190331204903/https://wasp-sweden.org/research/overview-of-autonomous-systems-area/> (last visited Apr. 20, 2019).

<sup>36</sup> WASP, *Overview of the Autonomous Systems and Software Area*, <https://wasp-sweden.org/research/overview-of-autonomous-systems-area/> (last visited Apr. 20, 2019); see also NATIONAL SCIENCE FOUNDATION, *Program Solicitation for National Artificial Intelligence (AI) Research Institutes: Accelerating Research, Transforming Society, and Growing the American Workforce*, <https://www.nsf.gov/pubs/2020/nsf20503/nsf20503.htm#summary> (last visited Oct. 16, 2019) (defining the broader concept of artificial intelligence as enabling computers to “perform tasks that have historically required human cognition and human decision-making abilities” and exercising “thought and intelligent behavior”).

human intervention, operating in uncertain and unstructured physical and/or information environments, and managing unexpected external or internal events.”<sup>37</sup> This reactivity to unanticipated stimuli “distinguishes [autonomous systems] from *mere automated systems*, which also are able to execute complex functions, but which mostly assume structured environments [and] have limited capacity to learn and adapt to unexpected events.”<sup>38</sup>

The technical definition used by autonomous system and software development researchers suggests that computing has moved past the law. This technical definition contemplates complex systems, not just the simple computer programs that caused the Restatement’s initial skepticism of computer programs as agents.<sup>39</sup> The Restatement’s consideration of computer programs, and resulting skepticism, appears to be based solely on automated systems.<sup>40</sup>

Examples of autonomous systems are readily available in society today.<sup>41</sup> The most prevalent examples of autonomous systems are “tangible instantiations” like robotics and automatic driving that are meant to “replace or complement the human’s capacity to manage complexity.”<sup>42</sup> Specific examples include Uber-CMU partnerships in autonomous driving; Nissan-NASA Ames partnerships in autonomous taxis; Volvo’s and Scania’s developments in self-driving trucking; the Google-Nest partnership possibly leading to autonomous HVAC systems; and Apple’s own developments in smart home control.<sup>43</sup> Self-managing data centers are information system instantiations of autonomous systems.<sup>44</sup> These self-managing data centers “use control,

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<sup>37</sup> *Id.*

<sup>38</sup> *Id.* (emphasis added).

<sup>39</sup> Compare *id.* with Restatement (Third) of Agency § 1.04, comment e. (citing Sommer, *supra* note 31).

<sup>40</sup> See Sommer, *supra* note 31 (“[A programmed machine] simply responds to its internal programming and external parameters.”).

<sup>41</sup> WASP, *supra* note 38 (“There are now numerous industrial examples showing the tremendous potential and positive impact of technologies arising from the use of autonomous systems and their integration in information systems.”).

<sup>42</sup> *Id.*

<sup>43</sup> *Id.*

<sup>44</sup> *Id.*

machine learning, and data analytics techniques to master architectural and operation complexity.”<sup>45</sup>

Autonomous system technology advancement is also relevant in the public sphere due to publicly funded technological development, regulation of new technologies, and the importance of new technologies to national security. Government research is currently creating autonomous systems. For example, NASA is researching a “wide range of areas, such as artificial intelligence, advanced flight control laws, new testing methods, collision avoidance technologies, and much more” that use autonomous systems to produce “lifesaving collision avoidance technologies” applicable to the operation of aviation and non-aviation vehicles.<sup>46</sup> Regulation is already adjusting to autonomous systems. The National Highway Traffic Safety Administration issued a statement regarding automated vehicles in which the agency provided recommended principles for state regulation of driverless vehicle operation and outlined the agency’s own regulatory research programs.<sup>47</sup> In its definition of vehicle automation, the agency recognized and segmented the broad range of vehicle autonomy by the vehicle’s ability to act independently from humans.<sup>48</sup> Finally, AI development is, and will continue to be, a key national government policy as the United States seeks to remain globally competitive with other countries that develop “more comprehensive plans to support homegrown AI industries.”<sup>49</sup>

The clear delineation between autonomous systems and automated systems<sup>50</sup> and readily observable technological advances in

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<sup>45</sup> *Id.*

<sup>46</sup> Lee Obringer, *Autonomous Systems*, NASA (Apr. 28, 2017), <https://www.nasa.gov/feature/autonomous-systems> (listing ten different technology projects upon which NASA is working).

<sup>47</sup> NHTSA, PRELIMINARY STATEMENT OF POLICY CONCERNING AUTOMATED VEHICLES, [https://www.nhtsa.gov/staticfiles/rulemaking/pdf/Automated\\_Vehicles\\_Policy.pdf](https://www.nhtsa.gov/staticfiles/rulemaking/pdf/Automated_Vehicles_Policy.pdf).

<sup>48</sup> *Id.*

<sup>49</sup> See BLOOMBERG, Opinion, *Trump’s AI Plan is a Good Start* (Feb. 15, 2019), <https://www.bloomberg.com/opinion/articles/2019-02-15/artificial-intelligence-trump-s-smart-american-ai-initiative>.

<sup>50</sup> See *supra* notes 35–40 and the accompanying text.

autonomous systems<sup>51</sup> indicate that it is time for the law to recognize and respond to the important difference between autonomy and automation.

### B. *Algorithmic Entities*

Advanced autonomous systems paired with limited liability companies that have no individual members, collectively called algorithmic entities, could be a sufficient development enabling autonomous systems to attain legal personhood for the purposes of agency law.<sup>52</sup> This legal personhood would not be direct personhood for the autonomous system, but indirect personhood for the autonomous system through “the opportunity to control an entity that is a legal person without potential interference from those preexisting entities that established the legal person.”<sup>53</sup>

The process by which an algorithmic entity is created utilizes the flexibility of state LLC statutes to place the autonomous system in control of a separate LLC. Professor Bayern suggests two possible methods to create algorithmic entities.<sup>54</sup> It is important to note that LLC statutes are easily amendable and state legislatures can adjust their respective LLC statutes to prevent the creation of algorithmic entities. So both of Bayern’s suggested methods, and any other algorithmic entity creation methods, are vulnerable to legislative change.<sup>55</sup> LLC statutes are unique to each state, so the creation of an algorithmic entity will depend on the specific state law. For Bayern’s suggestions, he primarily analyzes the possible creation methods under the Revised Uniform Limited Liability Company Act.<sup>56</sup>

In the first method, an existing person establishes a member-managed LLC, the person creates an operating agreement governing the LLC’s conduct which states that the LLC will act as determined by the

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<sup>51</sup> See *supra* notes 41–49 and the accompanying text.

<sup>52</sup> See Lynn M. Lopucki, *Algorithmic Entities*, 95 WASH. U. L. REV. 887, 890 (2018) (citing Bayern, *supra* note 34, at 104–05) (“In two recent articles, Professor Shawn Bayern demonstrated that anyone can confer legal personhood on an autonomous computer program merely by putting it in control of a limited liability company (LLC).”).

<sup>53</sup> See Bayern, *supra* note 34, at 104–05.

<sup>54</sup> See *id.* at 101–02, 104–05 n.43.

<sup>55</sup> See *id.* at 104 (“Of course, if legislatures do not like [the possibility of algorithmic entities], they can easily amend the LLC acts to prevent it.”).

<sup>56</sup> *Id.* at 101–03.

autonomous system, and the sole member withdraws from the LLC.<sup>57</sup> The sole member's withdrawal likely will not cause the LLC to enter dissolution, thus creating a perpetual entity managed solely by the autonomous system.<sup>58</sup> Specifically in New York, the LLC statute provides LLC operating agreement drafters with drafting discretion regarding how long the entity need not have a member.<sup>59</sup> This chosen time period could theoretically be such a significant length of time as to be practically perpetual.<sup>60</sup>

In the second method, an existing person creates two member-managed LLCs, the person creates identical operating agreements for both LLCs which state that the LLC will act as determined by the autonomous system, the existing person causes each LLC to be admitted as a member of the other entity, and the sole human member withdraws from both LLCs.<sup>61</sup> This method would create a perpetual algorithmic entity—where the first method might not—if the specific state LLC statute requires every LLC to have a member or prescribes mandatory LLC dissolution procedures upon withdrawal of the final member.

An algorithmic entity would have the rights, as specified by state law, “to own property, to enter into contracts, to be represented by counsel, to be free from unreasonable search and seizure, to equal protection of the laws, to speak freely, and to spend money on political campaigns.”<sup>62</sup> Autonomous systems will likely be capable of exercising sufficient autonomous judgment to effectively operate algorithmic entities in the near future.<sup>63</sup>

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<sup>57</sup> *Id.* at 101.

<sup>58</sup> *See id.* at 102 (“[I]t is important to recognize that under many modern LLC acts, the sole member's dissociation from the LLC does not require that the LLC terminate its existence. Indeed, many acts specifically contemplate at least the temporary continuation of a memberless LLC because this is a convenient option in several practical cases, such as estate planning.”).

<sup>59</sup> *Id.* at 103 (citing N.Y. LTD. LIAB. CO. LAW § 701(a)(4) (1999)).

<sup>60</sup> *Id.* (“The statute permits, for example, the operating agreement to provide for a million year period during which the LLC needn't have members.”).

<sup>61</sup> *Id.* at 104, n.43.

<sup>62</sup> Lopucki, *supra* note 52, at 890–91 (citations omitted).

<sup>63</sup> *See id.* at 891 (stating that “[m]ost commentators believe that algorithms . . . can run profitable businesses,” that commentators have proposed such entities in various industries like electronic data storage, bike rental, online gambling,

### III. AUTONOMOUS PROGRAMS SHOULD BE TREATED AS LEGALLY RECOGNIZED PERSONS

Autonomous systems can be persons in two ways: either as a direct person that is autonomous or as an indirect person that is formed by an algorithmic entity. The distinction between direct and indirect personhood depends on whether the rights and obligations of an entity are independent from an external reference. An entity is a direct person if it does not require an external reference to determine its personhood. The concept of independence from an external reference is best explained by an example in which an external reference bestows personhood: the algorithmic entity. In an algorithmic entity, the personhood of the underlying autonomous system is dependent on the existence of the separate LLC entity, which is the external reference. In direct personhood, the Restatement would recognize the autonomous system itself as a person; in indirect personhood, the Restatement would recognize the LLC as a person.

An algorithmic entity's treatment as a person within agency law has not been determined, and, due to its unique characteristics, it can arguably be granted or denied personhood based on the traditional analysis provided by the Restatement. An algorithmic entity has characteristics of a legal person, a purely organizational entity, and a mere legally consequential instrumentality. Additionally, when ignoring legal form, an autonomous entity is arguably only a computer program masquerading as a legal person and thus possibly subject to the Restatement commentary's general skepticism about computer programs as agents.

Ultimately, autonomous systems should be recognized as persons in agency law and thus capable of being an agent or principal. Autonomous systems should be recognized as direct persons, or, at the very least, they should be recognized as indirect persons. Direct personhood should be accepted based on the moral recognition that personhood is inherently a determination of autonomy. Indirect personhood should be accepted based on simple satisfaction of the Restatement's definition of person. Additionally, the pragmatic benefits

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vending machines, and blockchain-based ventures, and that several start-ups are already broaching this field) (citations omitted).

resulting from the ability of autonomous systems to act as principals or agents support both direct and indirect personhood.

### A. *Direct Personhood*

Moral arguments for the strong link between personhood and autonomy support the direct recognition of autonomous systems as persons. The core requirement of the personhood is the ability to “directly” be the object of liabilities and the holder of rights.<sup>64</sup> The use of the word “directly” in the reporter’s note’s explanation of personhood is a curious one. The word “directly” is not used in the definition of person<sup>65</sup> or in its relevant commentary<sup>66</sup> and the word’s most appropriate definition is from the source without interruption or diversion by an intervenor.<sup>67</sup> So, an entity is directly the object of liabilities and the holder of rights if there are no intervenors between such entity and the associated rights or obligations who are more appropriately subject to such rights or obligations than the entity itself. There can be both intervenors worthy of being subject to such rights or obligations and intervenors unworthy of being subject to such rights or obligations. To promote clarity, I have recharacterized this distinction as being a

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<sup>64</sup> RESTATEMENT (THIRD) OF AGENCY § 1.04 reporter’s n. e (AM. LAW INST. 2006) (“For the purposes of the common law of agency, a ‘person’ must be one who is directly the object of liabilities and the holder of rights.”).

<sup>65</sup> *Id.* at § 1.04(5) (“A person is (a) an individual; (b) an organization or association that has legal capacity to possess rights and incur obligations; (c) a government, political subdivision, or instrumentality or entity created by government; or (d) any other entity that has legal capacity to possess rights and incur obligations.”).

<sup>66</sup> *Id.* at § 1.04, cmt. e (“To be capable of acting as a principal or an agent, it is necessary to be a person, which in this respect requires capacity to be the holder of legal rights and the object of legal duties.”).

<sup>67</sup> *Direct*, MERRIAM-WEBSTER DICTIONARY (adverb subsenses b & c), <https://www.merriam-webster.com/dictionary/direct> (last visited Mar. 9, 2019) (defining direct as “from the source without interruption or diversion” and “without an intervening agency or step”). The word “directly” is used two other times in § 1.04: (1) “directly to” in reporter’s note j; and (2) “direct from” in the case citations by jurisdiction. These uses of the word, when paired with a preposition, indicate the second subsense of the definition, *id.* (adverb subsense b) (defining direct as “from the source without interruption or diversion”); so the use of the word directly without a preposition indicates that the third subsense, *id.* (adverb subsense c) (defining direct as “without an intervening agency or step”), is most appropriate.

distinction between means—unworthy intervenors—and ends—worthy intervenors.

The analysis of direct personhood turns on determining whether the entity is an end, and thus worthy of direct personhood, or a mean to a separate end, and thus unworthy of direct personhood. The fact that the distinction between means and ends is relevant to direct personhood indicates that moral considerations, such as autonomy,<sup>68</sup> are critical to the characterization of personhood. Autonomous systems are morally worthy of recognition as ends because they display sufficient levels of autonomy, such a recognition is economically beneficial, and the systems can be subject to ethical frameworks to guide their actions.

Autonomous systems are significantly more autonomous than the automated systems that the Restatement commentary has determined to be means, and are more worthy for recognition as ends. Autonomous systems have progressed substantially in areas that are indicative of autonomy, like sophisticated social interactivity,<sup>69</sup> which might rise above the autonomy threshold for personhood hinted at in the Restatement.<sup>70</sup> Startups are even currently creating AI, blockchains, and augmented reality to develop programs intended to replace basic intimate human relationships like romantic partners.<sup>71</sup> This level of autonomy shown by human social interactivity clearly exceeds the level of dogs

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<sup>68</sup> Here, autonomy is used to mean self-direction and independence. See *Autonomy*, MERRIAM-WEBSTER DICTIONARY (sense 2), <https://www.merriam-webster.com/dictionary/autonomy> (last visited March 9th, 2019) (defining autonomy as “self-directing freedom and especially moral independence”).

<sup>69</sup> See Jaden Urbi & MacKenzie Sigalos, *The Complicated Truth about Sophia the Robot—An Almost Human Robot or a PR Stunt*, CNBC (June 5, 2018), <https://www.cnbc.com/2018/06/05/hanson-robotics-sophia-the-robot-pr-stunt-artificial-intelligence.html> (stating that “a sentient being . . . is the goal of some developers” and that there are “a host of players pushing the limits of what robots are capable of”); see, e.g., John Markoff, *Computer Wins on ‘Jeopardy!’: Trivial, It’s Not*, N.Y. TIMES (Feb. 16, 2011), <https://www.nytimes.com/2011/02/17/science/17jeopardy-watson.html>.

<sup>70</sup> See RESTATEMENT (THIRD) OF AGENCY at § 1.04 cmt. e; see also *supra* note 28 and the accompanying text.

<sup>71</sup> See Shoji Yano, *Virtual Girlfriend Rolls AI and Blockchain Tech into One*, NIKKEI BUS. REV. (June 6, 2018), <https://asia.nikkei.com/Business/Virtual-girlfriend-rolls-AI-and-blockchain-tech-into-one> (describing the startup Cougar and its intent to create Virtual Human Agents that can be the customers’ girlfriend across all possible digital interfaces).

used in the Restatement illustrations.<sup>72</sup> In the illustration, the dog is trained to and performs the programmed task of retrieving beer from the liquor store for his owner while the liquor store owner keeps a running tab for the dog owner.<sup>73</sup> Because of the structured environment—the path to the liquor store and account charging process—and the dog’s limited capacity to learn and adapt to unanticipated stimuli, this Restatement’s illustration perfectly aligns with the technical definition of an automated system as described earlier.<sup>74</sup> The dog illustration, as an automated system, is clearly distinguishable from an autonomous system. These autonomous systems<sup>75</sup> rise above what the Restatement commentary outlines as mere means unworthy of personhood.<sup>76</sup>

The recognition of autonomous systems as ends, and thus direct persons, is economically beneficial, which supports such a recognition. The economist Paul Streeten’s article on means and ends in the context of human development supports the characterization of autonomous systems as ends and thus economically worthy of recognition as persons.<sup>77</sup> Streeten’s analysis touches on fundamental concepts of means-ends determinations that are applicable in all scenarios.<sup>78</sup> He highlights two fundamental concepts for the recognition of something as an ends: inherency and as a means to higher productivity.<sup>79</sup> These two fundamental concepts of recognizing ends might not be harmonious in all instances, but they are harmonious where there are “rigid links” between

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<sup>72</sup> See RESTATEMENT (THIRD) OF AGENCY at § 1.04, reporter’s n. e.

<sup>73</sup> *Id.*

<sup>74</sup> See *supra* note 38 and the accompanying text.

<sup>75</sup> See *supra* notes 69–71 and the accompanying text.

<sup>76</sup> See *supra* notes 36–38 and the accompanying text.

<sup>77</sup> Paul Streeten, *Human Development: Means and Ends*, 84 AM. ECON. REV. 232 (May 1994).

<sup>78</sup> *Cf. id.* Streeten emphasizes six reasons that human development and poverty eradication should be promoted. The first two are universal and applicable to all ends-means determinations, while the final four—human reproductivity, the impact on the physical environment, the reduction of poverty, and political appeal—are specifically relevant to ends-means determinations for humans. Because these final four reasons are not relevant the ends-means determinations for autonomous systems, they will not be considered further.

<sup>79</sup> *Cf. id.* (“First, and above all, it is an end itself, that needs no further justification. . . . Second, it is a means to higher productivity.”).

economic productivity and the inherent qualities of ends.<sup>80</sup> One important disharmony exists between the concepts when the inherency approach views ends as “active, participating agents” and the means-of-higher-productivity approach views ends as “targets.”<sup>81</sup> For autonomous systems, their economic productivity depends on their ability to perform in undefined environments with unique, unanticipated stimuli, and their level of autonomy inherently justifies characterization as an end. Here, inherency and economic productivity both depend on autonomy, thus, their autonomy acts as a “rigid link” that bridges the conceptual disharmony noted by Steeten. Both the autonomous system’s inherency and means to higher productivity support their recognition as ends.<sup>82</sup> Their autonomy makes them active participating agents,<sup>83</sup> and their autonomy makes them targets worthy of recognition as ends because they are economically productive.<sup>84</sup>

Moving beyond mere recognition of autonomous systems as ends due to the ability to act intentionally and the economic benefits of such recognition, the existence of the academic field of machine ethics also supports the direct personhood of autonomous systems. There are different schools of thought about what can be an artificial moral agent—i.e., an artificial autonomous actor that possesses moral value and has certain rights and responsibilities.<sup>85</sup> But the ability to exercise autonomous judgment makes such an entity an artificial moral agent across all machine ethics conceptual approaches.<sup>86</sup> Autonomous systems possess such autonomous judgment and thus are ends that possess moral

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<sup>80</sup> *Cf. id.* (“The unity of interests would exist if there were rigid links between economic production . . . and human development . . .”).

<sup>81</sup> *Cf. id.* at 234.

<sup>82</sup> *See supra* notes 80–81 and the accompanying text.

<sup>83</sup> Agent is used here in its philosophical context where the word “denote[s] the performance of intentional actions.” Markus Schlosser, *Agency*, STAN. ENCYCLOPEDIA OF PHILOSOPHY (Aug. 10, 2015), <https://plato.stanford.edu/entries/agency/>.

<sup>84</sup> *See supra* Part III.A. (describing the multitude of current productive technological uses of autonomous systems).

<sup>85</sup> *See* Robert James M. Boyles, *Philosophical Signposts for Artificial Moral Agent Frameworks*, 6 SURI 92, 92–100 (2018) (defining briefly artificial moral agents and then discussing the key concepts of three different conceptual approaches to determining what constitutes an artificial moral agent), <https://philpapers.org/archive/BOYPSF.pdf>.

<sup>86</sup> *See id.*

value and have certain rights and responsibilities. The application of ethical requirements to something recognizes that it is an end and not a mere means. Requirements that one act ethically and fulfill ethical obligations are also similar to the ability to hold legal rights and obligations—the core of personhood in agency law.

The field of machine ethics is “concerned with adding an ethical dimension to machines” by “ensuring that the behavior of machines towards human users and . . . other machines . . . is ethically acceptable.”<sup>87</sup> The stated ultimate goal of machine ethics “is to create a machine that *itself* follows an ideal ethical principle or set of principles.”<sup>88</sup> The study of machine ethics is necessary for the development of AI—which is an important development for autonomous systems—and the imposition of ethical standards on AI is likely necessary for widespread public acceptance of such technology.<sup>89</sup>

For the machine to be an ideal agent it must be an explicit ethical agent that is “able to calculate the best action in ethical dilemmas using ethical principles,” as opposed to an implicit ethical agent that is simply programmed to behave ethically.<sup>90</sup> This level of judgment that could be present in autonomous systems moves far beyond that contemplated by the Restatement commentary when expressing skepticism about computer programs or dogs as principals and agents, and supports the direct personhood of autonomous systems. The Restatement commentary practically attributes all computer program error to the user and imposes no blame on the computer program itself.<sup>91</sup> In the illustration where the dog retrieves alcohol upon the instruction of its owner, the commentary contemplates no ethical blameworthiness for the dog when it acts without

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<sup>87</sup> Michael Anderson & Susan Leigh Anderson, *Machine Ethics: Creating an Ethical Intelligent Agent*, 28 AI MAG. 15, 15 (Winter 2007).

<sup>88</sup> *Id.*

<sup>89</sup> *See id.* at 16 (“[I]t could be argued that humans’ fear of the possibility of autonomous intelligent machines stems from their concern about whether these machines will behave ethically, so the future of AI may be at stake. Whether society allows AI researchers to develop anything like autonomous intelligent machines may hinge on whether they are able to build in safeguards against unethical behavior.”).

<sup>90</sup> *Id.* at 15 (citing James H. Moor, *The Nature, Importance, and Difficulty of Machine Ethics*, 21 IEEE INTELLIGENT SYSTEMS 18 (July/Aug. 2006)).

<sup>91</sup> *See* RESTATEMENT (THIRD) OF AGENCY § 1.04 cmt. e (AM. LAW INST. 2006).

the owner's direction.<sup>92</sup> While under machine ethics, the autonomous program itself would bear ethical blame for any such wrongdoing in both scenarios.<sup>93</sup>

Machines will likely be more ethical beings than humans, making them more worthy of treatment as ends and direct persons than humans, which are clearly accepted as ends capable of direct personhood. Machines will not be subject to the "genetic predisposition toward unethical behavior as a survival mechanism."<sup>94</sup> This unethical genetic predisposition is present in human beings due to the evolutionary promotion of the human instinct to survive at all costs.<sup>95</sup> Any concern that machines can start out behaving ethically and end up behaving unethically stems more from concerns about human behavior than about the possible ethical corruption of autonomous systems and AI.<sup>96</sup>

This recommended recognition of legal status in non-human entities similar to that of humans—which inherently blurs the lines between what is and what is not morally worthy of legal recognition—is not novel just to agency law.<sup>97</sup> The progress of technology towards "truly artificial intelligences, with cognition and consciousness recognizably similar to our own"<sup>98</sup> and the creation of genetic chimeras—which involves the splicing of different genetic materials to create new biological creatures<sup>99</sup>—are also pressing once-clear distinctions between

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<sup>92</sup> *See id.*

<sup>93</sup> *See supra* notes 88–90 and the accompanying text.

<sup>94</sup> Anderson & Anderson, *supra* note 87, at 17 (citing Eric Dietrich, "After the Humans Are Gone," Keynote address presented at the 2006 North American Computing and Philosophy Conference, RPI, Troy, NY (Aug. 12, 2006)).

<sup>95</sup> *Id.*

<sup>96</sup> *See id.* ("Most human beings are far from ideal models of ethical agents, despite having been taught ethical principles; and humans do, in particular, tend to favor themselves. Machines, though, might have an advantage over human beings in terms of behaving ethically.").

<sup>97</sup> *See* James Boyle, *Endowed by Their Creator? The Future of Constitutional Personhood*, BROOKINGS INST. (Mar. 9, 2011), [https://www.brookings.edu/wp-content/uploads/2016/06/0309\\_personhood\\_boyle.pdf](https://www.brookings.edu/wp-content/uploads/2016/06/0309_personhood_boyle.pdf).

<sup>98</sup> *Id.* at 5 (quoting Rodney Brooks, *I, Rodney Brooks, Am a Robot*, 45 IEEE SPECTRUM 71 (June 2008)).

<sup>99</sup> *Id.* (providing examples of chimeras like bioluminescent tomato plants from splicing fish and tomato DNA and onco-mice used in cancer research that are the result of splicing mouse and human DNA).

the human and non-human.<sup>100</sup> Much like “constitutional law will have to classify artificially created entities that have some but not all of the attributes we associate with human beings,” agency law will have similar classification conundrums.<sup>101</sup> The previously discussed focus on determining direct personhood based on moral qualification as an end, instead of the sole focus on rights and obligations, is one normative theoretical approach to solving these conundrums. For direct personhood, agency law should recognize the existence of autonomous judgment as sufficient for personhood.

### B. *Indirect Personhood*

Because indirect personhood is determined by reference to the LLC organization of an algorithmic entity, the analysis of an autonomous system’s personhood in this context is straightforward. The LLC is a well-known and traditional legal entity and only a traditional analysis need be applied. This analysis focuses on the distinctions between legally recognized persons, mere legally consequential instrumentalities, and purely organizational entities.

Characterization of an autonomous system as a computer program that is a mere legally consequential instrumentality poses a risk to the personhood of algorithmic entities. If an algorithmic entity is truly autonomous and no individuals are associated with the LLC, then an algorithmic entity is clearly distinguishable from automated computer systems, specifically referred to as electronic agents, discussed in the Restatement’s reporter’s note.<sup>102</sup> The fact that an autonomous system directs the actions of the LLC displays volition not previously contemplated by computer programs.<sup>103</sup> The presence of the LLC entity also removes any concern about the lack of a person who can be subject

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<sup>100</sup> *Id.*

<sup>101</sup> *Cf. id.* at 6 (discussing the difficulty of classifying artificial entities in constitutional law).

<sup>102</sup> *See* RESTATEMENT (THIRD) OF AGENCY § 1.04 reporter’s note (AM. LAW INST. 2006). *See also supra* notes 35–40 and the accompanying text (differentiating autonomous systems from automated systems).

<sup>103</sup> *Compare* Lopucki, *supra* note 52, at 899 (“[A]n entity controlled by an algorithm might be virtually indistinguishable from one controlled by humans.”), *with* Sommer, *supra* note 31, at 1179 (“[The electronic agent] simply responds to its internal programming and external parameters. Beyond its programming and parameters, it cannot keep its user informed of transactions it is processing, or problems that might be developing.”).

to legal rights and obligations.<sup>104</sup> The autonomy level of the autonomous system will be a key factor in recognizing personhood even if the LLC's legal form is ignored—much like autonomy favors recognition of direct personhood for the autonomous system.

The limitation of purely organizational entities not being persons has traditionally only excluded trusts or estates,<sup>105</sup> so the LLC as a separate legal entity capable of possessing its own rights and obligations likely precludes characterizing the algorithmic entity as a purely organizational entity. There is a possible argument that the purpose of the exclusion of purely organizational entities, like trusts and estates, is to look past legal form and only recognize volitional actors, like trustees and estate administrators, as persons. But the Restatement commentary for purely organizational entities focuses primarily on direct capability of having rights and obligations and not on volition.<sup>106</sup>

Ultimately, because the guiding principle of personhood categorization is legal capacity<sup>107</sup> and algorithmic entities have sufficient legal rights,<sup>108</sup> traditional Restatement analysis likely grants autonomous algorithmic entities personhood as an entity that has legal capacity to possess rights and incur obligations.<sup>109</sup> Because the legal capacity of non-individual agents and principals is determined by the law creating such non-individual,<sup>110</sup> state LLC statutes will determine the algorithmic entity's personhood. Such state LLC statutes enable the algorithmic

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<sup>104</sup> See RESTATEMENT (THIRD) OF AGENCY § 1.04 reporter's n. e (quoting Sommer, *supra* note 31).

<sup>105</sup> *Id.* (“[T]he definition [of person] in black letter of this Restatement does not include ‘any form of trust or estate.’”).

<sup>106</sup> See *id.* (“For the purposes of the common law of agency, a ‘person’ must be one who is directly the object of liabilities and the holder of rights.”).

<sup>107</sup> See *supra* note 14 and accompanying text.

<sup>108</sup> See Lopucki, *supra* note 52, at 890–91 (stating that algorithmic entities would have the right “to own property, to enter into contracts, to be represented by counsel, to be free from unreasonable search and seizure, to equal protection of the laws, to speak freely, and to spend money on political campaigns”).

<sup>109</sup> RESTATEMENT (THIRD) OF AGENCY § 1.04 cmt. e. (“To be capable of acting as a principal or an agent, it is necessary to be a person, which in this respect requires capacity to be the holder of legal rights and the object of legal duties.”).

<sup>110</sup> See *id.* at § 3.04(2), § 3.05 cmt. b.

entity to act like any other LLC or corporation capable of being an agent or principal.<sup>111</sup>

### C. *A Pragmatic Example*

Policy arguments support both the moral-based justification for the recognition of direct personhood and the doctrine-based justification for the recognition of indirect personhood in autonomous systems. Recognizing autonomous systems as persons capable of being agents or principals can create immediate tangible benefits from AI improving present-day society. One such example in the field of corporate governance is autonomous systems revolutionizing the corporate decision-making process.

Business is becoming increasingly complex, and autonomous systems and their utilization of AI can augment, or even replace, the human board of directors' fallible judgments in this complex environment. Artificial intelligence can be a characteristic of an autonomous system.<sup>112</sup> This improved corporate decision-making is one pragmatic example that supports the need for agency law's recognition of personhood for autonomous systems. Commenters have also noted this growing business complexity and suggested that the most appropriate response to the complexity "will be to incorporate AI in the practice of corporate governance and strategy."<sup>113</sup> Companies are already

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<sup>111</sup> Bayern, *supra* note 34, at 104 ("The end result is novel legal personhood—or at least a functional analogue of it—without any ongoing commitment by, or subservience to, a preexisting person.").

<sup>112</sup> Shani R. Else & Francis G. X. Pileggi, *Corporate Directors Must Consider Impact of Artificial Intelligence for Effective Corporate Governance*, BUS. LAW TODAY (Feb. 12, 2019), <https://businesslawtoday.org/2019/02/corporate-directors-must-consider-impact-artificial-intelligence-effective-corporate-governance/> (defining AI generally as "the capacity of a computer or electronic device to use characteristics associated with human intelligence, including reasoning and learning from prior experiences").

<sup>113</sup> Barry Libert, Megan Beck & Mark Bonchek, *AI in the Boardroom*, MIT SLOAN MGMT. REV. (Oct. 19, 2017), <https://sloanreview.mit.edu/article/ai-in-the-boardroom-the-next-realm-of-corporate-governance/> ("The truth is that business has become too complex and is moving too rapidly for boards and CEOs to make good decisions without intelligent systems. We believe that the solution to this complexity will be to incorporate AI in the practice of corporate governance and strategy.").

implementing this suggestion.<sup>114</sup> One Hong Kong venture capital firm even integrated AI so deeply into its decision-making that the firm “would not make positive investment decisions without corroboration by [the AI system].”<sup>115</sup> AI can augment or replace both strategic—typically associated with board and C-suite decisions—and operational decision-making—typically associated with C-suite or lower management decisions.<sup>116</sup> The company’s success might even be wholly dependent on such AI input.<sup>117</sup> Overall, this improved decision-making will benefit companies, shareholders, and society.

The commenters’ predictions about the impact level of the AI underlying autonomous systems on corporate governance vary. Some commenters limit the impact to simply “augmenting board intelligence using AI” but not “automating leadership and governance.”<sup>118</sup> These augmentations would occur for strategic decisions—e.g., tracking capital allocation, highlighting company performance relative to industry trends, reviewing competitor press releases to identify potential new competitors, etc.—and operational decisions—e.g., analyzing internal communications to assess employee morale, predicting employee turnover, or identifying subtle changes in customer preferences or demographics.<sup>119</sup> Other commenters predict that the autonomous systems will assume a significant amount of management activity by noting that “most duties in typical corporations will be automated within five to ten years,” but they do not suggest that AI will fully assume all management

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<sup>114</sup> See Nicky Burrige, *Artificial Intelligence Gets a Seat in the Boardroom*, NIKKEI ASIAN REV. (May 10, 2017), <https://asia.nikkei.com/Business/Artificial-intelligence-gets-a-seat-in-the-boardroom> (describing a data scientist’s comment that “AI is increasingly being used to support management decisions across many sectors” and noting that many hedge funds and investment funds have already started to use AI as a decision-making tool for risk analysis without public announcement).

<sup>115</sup> *Id.* (quoting the venture capital firm’s managing partner, Dmitry Kaminskiy).

<sup>116</sup> See Libert, Beck & Bonchek, *supra* note 113 (“Artificial intelligence for both strategic decision-making (capital allocation) and operating decision-making will come to be an essential competitive advantage . . .”).

<sup>117</sup> See Burrige, *supra* note 114 (stating that the managing partner of a venture capital firm believed “that the fund would have gone under without [the AI system] because it would have invested in ‘overhyped projects’” and that the AI “helped the board to make more logical decisions”).

<sup>118</sup> Libert, Beck & Bonchek, *supra* note 113.

<sup>119</sup> *See id.*

actions.<sup>120</sup> The same commenter even noted that decentralized autonomous companies—companies able to operate without human involvement—will exist in the near future.<sup>121</sup>

One legal scholar has even gone so far as to suggest that AI could assume all corporate management responsibilities, consequently removing the need for human management.<sup>122</sup> If such AI management materializes, the scholar suggests that corporate governance might react by moving from a multi-person collective board with a two-tier corporate board and officer management model to a single “fused” management model operated solely by the AI.<sup>123</sup> The scholar further justifies this management model shift by stating that the performance of the AI “will be superior to today’s human-led governance.”<sup>124</sup> The scholar argues “that it is not an insurmountable step from AI generating and suggesting expert decisions for managers (which in some areas is already common today) to AI making these decisions autonomously.”<sup>125</sup> The scholar predicts that this fused management software will be offered either for sale or hire by large commercial AI software providers.<sup>126</sup> This full assumption approach is not near practical implementation; even the aforementioned venture capital firm that conditioned its investment decisions on AI approval only treated the AI as “a member of [its] board with observer status” and not as a full board member.<sup>127</sup>

Despite the clear beneficial role that autonomous systems can have in corporate decision making as separate consultants or direct decision-makers, their ability to fulfill this beneficial role will be limited unless both agency law and corporate law recognize autonomous systems

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<sup>120</sup> Burrige, *supra* note 114 (stating that the interview subject, the managing partner of a venture capital firm, believes that “corporate winners” will augment human decisions by combining “smart machines with smart people” but will not “fully replace people on boards of directors”).

<sup>121</sup> *See id.* (providing an example of such a decentralized autonomous company—a municipal-run taxi company that operates self-driving cars and directs the car routes and maintenance via a computer algorithm).

<sup>122</sup> Martin Petrin, *Corporate Management in the Age of AI* (Univ. Coll. London, Working Paper No. 3, 2019) (forthcoming in *COLUM. BUS. L. REV.*), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3346722](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3346722).

<sup>123</sup> *See id.* at 4, 52–53.

<sup>124</sup> *Id.* at 4.

<sup>125</sup> *Id.*

<sup>126</sup> *Id.*

<sup>127</sup> *See Burrige, supra* note 114.

as capable decision-makers. Without agency law recognition, the autonomous system-agent could not directly bind the corporation-principal by the autonomous system's decision. Without corporate law recognition, the autonomous system is not duly authorized to serve the corporation as a director-agent. One corporate law hurdle is the requirement that directors be natural persons—i.e. human individuals.<sup>128</sup> Similar natural person director limitations exist in other foreign jurisdictions.<sup>129</sup> Another corporate law hurdle is the prohibition on directors delegating decision making duties to non-directors.<sup>130</sup> The corporate law hurdles can, and should, be overcome by recognizing that autonomous systems are capable of being directors or advisors whom directors can consult. The agency law hurdle can, and should, be overcome by directly or indirectly recognizing the personhood of the autonomous systems. Overall, granting legal recognition of AI as board members or consultants, which allows AI to directly affect corporate decision making, is a significant global issue.<sup>131</sup> Society can directly and immediately benefit if agency law recognizes the personhood of autonomous systems that use AI.

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<sup>128</sup> See Else & Pileggi, *supra* note 112 (“It is important to note, however, that in Delaware board members must be ‘natural persons,’ so ‘appointing an AI program’ as a board member for a Delaware corporation would be impermissible.”) (citing DEL. CODE ANN. tit. 8, § 141(b) (2016)).

<sup>129</sup> See, e.g., Teresa Kauppila, *Is There Room on Your Board for AI?*, LEXOLOGY (Nov. 1, 2018), <https://www.lexology.com/library/detail.aspx?g=d7339c3a-c75a-45cc-be6e-92b24be924f8> (“There is one significant limitation to the use of AI in boards of directors: in Finland, AI applications cannot be appointed as full board members. The Limited Liability Companies Act does not explicitly state the board members must be natural persons, but that is only because this has been taken for granted. This issue has previously been discussed in connection with whether a legal person could service as a board member, as is the case in some countries.”).

<sup>130</sup> See Else & Pileggi, *supra* note 112 (discussing the Delaware Chancery Court’s decision in *Canal Capital Corp. v. French*, 1992 Del. Ch. LEXIS 133, \*5 and stating that, “[t]o the extent a board moves forward to adopt AI, it is crucial that the board does not delegate its essential management functions and rely solely upon AI in making decisions for the corporation. Doing so would be a prohibited delegation of its duties”).

<sup>131</sup> See Kauppila, *supra* note 129 (“Today, the global discussion has moved on to whether an AI could be a full board member and what kinds of legal challenges such membership would entail.”).

## CONCLUSION

The Restatement (Third) of Agency's definition of personhood is ripe for reconsideration, and the internal tensions of the definition are an underexplored area of legal scholarship—despite what appears to be extensive discussion of AI agency in philosophy. The emergence of AI computing, and the associated development of truly autonomous computer systems, will test traditional agency law with questions like who or what can be a person. These autonomous systems can be persons in two ways: either as a direct person that is independent or as an indirect person that is formed by an algorithmic entity. The recognition of personhood for autonomous systems should be direct and based on the acceptance that personhood depends on the moral recognition of autonomy; but, at the very least, recognition of personhood should be indirect as algorithmic entities under the traditional doctrine.

The recognition of the direct personhood of autonomous systems requires a fundamental shift in the Restatement's definition of personhood. The shift would be from the sole focus on rights and obligations to a more holistic determination that autonomous judgment should determine the ability to be a principal and agent. This normative theoretical shift within the definition is appropriate as the internal tensions of the traditional analysis are heightened with the rapid development of new technology. Fortunately, this fundamental shift will not require the common law to write on a blank slate; the philosophical analysis of agency can guide the law here.

Indirect personhood for autonomous systems occurs by attaching them to previously recognized legal entities that fit into the traditional definitional analysis. In traditional doctrine, the Restatement's definition of person attempts to distinguish legally recognized persons from purely organizational entities and mere instrumentalities. At present, the Restatement views computer programs as mere instrumentalities of the using person and thus not a separate person capable of being a principal or agent. The traditional doctrine also focuses almost exclusively on the ability to be the object of liabilities and the holder of rights. Thus, the presence of the recognized legal entity will allow the autonomous systems to attain indirect personhood. But the reliance of indirect personhood on organizational law that is easily amendable by the legislature necessitates analysis of direct personhood for autonomous systems.

Ultimately, autonomous systems should be recognized as legal persons for the purposes of agency law. This acceptance has the potential for significant knock-on pragmatic benefits, with one such example being improved corporate decision-making.

There are several downstream implications that are ripe for future research if autonomous systems are directly or indirectly recognized as persons. The most critical determination will be deciding what level of autonomous judgment is enough for personhood. While this Note clearly accepts that autonomous systems, as defined in Part I, are on the right side of the line of autonomous judgment, the line must be drawn somewhere. For computer-related systems, the appropriate line might be between autonomous and automated systems.<sup>132</sup> Overall, this line-drawing will “highlight how difficult it is to identify machine consciousness or personhood [and] how uncertain we are about the boundaries of our own [consciousness and personhood].”<sup>133</sup> Other areas of study include reacting to the inherent risks posed by recognizing the direct personhood of non-humans or so easily allowing the satisfaction of personhood by indirect personhood.

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<sup>132</sup> See *supra* notes 35–38 and accompanying text.

<sup>133</sup> Boyle, *supra* note 97, at 18.