

The Robot Koseki:

A Japanese Law Model for Regulating Autonomous Machines

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Abstract: After touching on some of the conceptual and practical hurdles facing the developing field of robot law, this article will describe the Japanese *koseki* system of family registration and then explain why it offers a source of models and analogies that are useful in the development of a framework for regulating robots.

1. INTRODUCTION: WHAT TO DO ABOUT ROBOTS

A review of the growing body of literature on the relatively new subject of “robotics law” reveals a number of common themes. For example, many works reflexively reference Isaac Asimov’s famous but fictional “three laws of robotics” as a touchstone,¹ though it is unclear whether they will prove to offer any useful guidance in the real world.² There already being a growing body of literature on the subject of whether autonomous armed drones or other robotic weaponry should be allowed to make “kill” decisions without human intervention,³ with some authors advocating in favor of doing so, even Asimov’s most important, first law (“A robot may not harm a human being”) seems unlikely to be implemented in the real world.⁴

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¹ See, e.g., Bryan Casey, *Amoral Machines, or: How Roboticians can Learn to Stop Worrying and Love the Law*, 112 Northwestern U. L. Rev. 1 (2017); Gabriel Hallevy, *The Criminal Liability of Artificial Intelligence Entities* (February 15, 2010), available at SSRN: <https://ssrn.com/abstract=1564096>.

The three laws of robotics were first introduced in “Runaround” a 1942 short story that was included in ISAAC ASIMOV, *I ROBOT* (1950).

² Laurel Riek and Don Howard, *A Code of Ethics for the Human-Robot Interaction Profession* (April 4, 2014). Proceedings of We Robot, 2014, available at SSRN: <https://ssrn.com/abstract=2757805> (In the robot ethics literature, Isaac Asimov’s laws of robotics (Asimov, 1942) have so dominated discussion about the ethics of human-robot interaction as to eclipse the day-to-day ethical challenges facing HRI research, development, and marketing”. “Asimov-as-starting” point is not limited to Western writers as well. In one of the few Japanese books on the law of robots, Professor Susumu Hirano also starts his discussion of the subject with the Three Laws, also noting that Asimov subsequently added a “zeroeth” law (“A robot may not injure humanity or, through inaction, allow humanity to come to harm”) in his 1985 book, *Robots and Empire*. SUSUMU HIRANO, *ROBOTTO HÔ [Robot Law]*, 9-22 (2017)to

³ See e.g., Michael Schmitt & Jeffrey Thurnher, “Out of the Loop”, *Autonomous Weapon Systems and the Law of Armed Conflict*, 4 HARV. NAT’L SEC. J. 231 (2013); William C. Marra & Sonia K. McNeil, *Understanding “The Loop”: Regulating the Next Generation of War Machines*, 36 HARV. J. OF L. & PUB. POL’Y 1139 (2013).

⁴ For example, Professor John Yoo suggests that “[d]eployment of robotics could advance the humanitarian goal of reducing the death and suffering of combat, once it begins, far more

Other common themes addressed in the literature on robot law include who (if anyone) should be liable when robots cause harm,⁵ whether robots can or should be subject to criminal liability, how robots should act when faced with the “trolley problem,”⁶ who should enjoy the benefits of whatever value a robot or its programming creates (such as intellectual property),⁷ how to address disagreements between human and robotic “experts,”⁸ the ethics of human-robot interactions,⁹ whether robots should be granted legal personality,¹⁰ pay taxes,¹¹ have freedom of speech or any other rights,¹² or simply be treated by the law the same as humans.¹³

effectively than a complete ban.” John Yoo, *Embracing the Machines: Rationalist War and New Weapons Technologies*, 105 CAL L. REV. 443, 488 (2017).

⁵ See, e.g., David C. Vladeck, *Machines without Principals Liability Rules and Artificial Intelligence*, 89 WASH. L. REV. 117 (2014); F Patrick Hubbard, *Regulation of and Liability for Risks of Physical Injury from “Sophisticated Robots”*, Paper for presentation as a work in progress at We Robot Conference University of Miami School of Law April 21–22, 2012, available at: http://robots.law.miami.edu/wp-content/uploads/2012/01/Hubbard_Sophisticated-Robots-Draft-1.pdf.

⁶ See, e.g., Sabine Gless, Emily Silverman & Thomas Weigend, *If Robots Cause Harm, Who is To Blame? Self-Driving Cars and Criminal Liability*, 19 NEW CRIMINAL LAW REV. 412 (2016); David Levy, *When Robots Do Wrong*, in: COGNITIVE ROBOTICS 3 (Hooman Samani, ed., 2016); Hallevy, *supra* note 1; Abhiuday Chandra, *Liability Issues in Relation to Autonomous AI Systems* (September 29, 2017), available at SSRN: <https://ssrn.com/abstract=3052154>; Peter Asaro, *Robots and Responsibility from a Legal Perspective (he Liability Problem for Artificial Agents)* (2017). The trolley problem is a classical ethics problem involving a choice between operating a switch so as to prevent a runaway trolley from running into a group of people but in doing so cause it to run into a single or lesser number of people; Bryan Casey notes that in 2016 Mercedes announced that it would deal with the real-world version of the problem by programming its self-driving cars to protect passengers at the expense of pedestrians if necessary. Casey, *supra* note 1 at 2-3.

⁷ See, e.g., Annemarie Bridy, *Coding Creativity, Copyright and the Artificially Intelligent Author*, 2012 STAN TECH. L. REV. 21; Ralph D. Clifford, *Intellectual property in the Era of the Creative Computer Program: Will the True Creator Please Stand Up?* 71 TUL L. REV. 1675 (1997).

⁸ Millar & Kerr, *infra* note 36.

⁹ See, e.g. Riek and Howard, *supra* note 2.

¹⁰ Possibly the earliest proposal that robots, or rather AI, be accorded legal personality was made by Lawrence Solum, in 1991. Lawrence B. Solum, *Legal personhood for Artificial Intelligences*, N. C. 70 L. REV.1231 (1991). See, e.g., Joanna Bryson, Mihailis E. Dieamantis & Thomas D. Grant, *Of, for, and by the People: The Legal Lacuna of Synthetic Persons*, University of Cambridge Legal Studies Research Paper Series Paper No. 5/2018; Evan J. Zimmerman, *Machine Minds: Frontiers in Legal Personhood*, (February 12, 2015), available at SSRN: <https://ssrn.com/abstract=2563965>.

¹¹ See, e.g., Ryan Abbott & Bret Bogenschneider, *Should Robots Pay Taxes? Tax Policy in the Age of Automation*, 12 HARVARD L. & POL’Y REV. 145 (2018).

¹² See, e.g., Toni Massaro & Helen Norton, *Siri-ously? Free Speech Rights and Artificial Intelligence*, Arizona Legal Studies Discussion Paper No. 15-29 (Oct. 2016); Nathan Heller, *If Animals Have Rights, Should Robots*, THE NEW YORKER (Nov. 28, 2016), available at: <https://www.newyorker.com/magazine/2016/11/28/if-animals-have-rights-should-robots>; David J. Gunkel, *The Other Question: Can and Should Robots have Rights?*, J. Ethics Inf Technol (2017), available at: <https://doi.org/10.1007/s10676-017-9442-4>; Joanna J. Bryson, *Robots Should Be Slaves*, in: Close Engagements with Artificial Companions: Key social, psychological, ethical and design issues 63 (Yorick Wilks, ed., 2010), available at: <http://www.cs.bath.ac.uk/~jib/ftp/Bryson-Slaves-Book09.html>.

¹³ “If [the deep normative structure of a society] ... is utilitarian, smart robots should, in the not too

Possible answers to these various questions tends to start from seemingly familiar, neighboring areas of existing law: products liability, tort and insurance law for self-driving cars,¹⁴ the laws of conflict for killer drones,¹⁵ corporate law for robotic legal personality,¹⁶ and so forth. Even efforts to address the subject more holistically seem to do so by referencing recent noteworthy interactions of law and new technology, such as Ryan Calo's seminal 2015 article *Robotics and the Lessons of Cyberlaw*.¹⁷

Yet none of these approaches seem likely to lead to the development of a foundational "law of robots," though that might be what is actually needed. For all the talk of robots as an emergent technology, perhaps the laws we need to consider for dealing with them are not as new as we think. For example, the ancient remedy of deodands – suing animals or even inanimate objects that cause harm so they can be taken, sold and the proceeds used for compensation - might be a perfectly plausible way of dealing with tortfeasors or criminal robots, particularly expensive ones whose owners would thus have an incentive to pay attention to their safe use and procure insurance.¹⁸

After all, the law has been dealing with artificial persons – corporations - for centuries, and there is already useful literature on the analogies to corporate law and the legally significant differences between corporations and robots.¹⁹ An obvious difference, of course is that corporations only "think" though human agents, and lack the ability to directly affect the physical world. The point is that the idea of recognizing separate legal status in something artificial is hardly new.

distant future, be treated like humans. That means that they should be accorded legal personality, have the power to acquire and hold property and to conclude contracts." Horst Eidenmuller, *The Rise of Robots and the Law of Humans* (March 26, 2017). Oxford Legal Studies Research Paper No. 27/2017. Available at SSRN: <https://ssrn.com/abstract=2941001>

¹⁴See, e.g., *Driverless Cars: The Legal Landscape*, in *Torts of the Future* (U.S. Chamber Institute for Legal Reform (Mar. 29, 2017)); Stephen S. Wu, *Product Liability in the U.S. and Associate*; Steven Seidenberg, *Who's to blame when self-driving cars crash*, ABA JOURNAL (Jul. 2017), available at: http://www.abajournal.com/magazine/article/selfdriving_liability_highly_automated_vehicle?icn=most_read; John Villasenor, *Products Liability and Driverless Cars*, Brookings Institution Report (Apr. 24, 2014); Vladeck, *supra* note 5 (discussing generally how existing rules of products liability could apply to AI-enabled machines.

¹⁵ See, e.g., Christopher Ford, *Autonomous Weapons and International Law*, 69 S. CAROLINA L. REV. 413 (2017); Schmitt & Thurnher, *supra* note 4.

¹⁶ See, e.g., SM. Solaiman, *Legal personality of robots, corporations, idols and chimpanzees: a quest for legitimacy*, 25 ARTIFICIAL INTELLIGENCE AND LAW 155 (2017), available at: <http://ro.uow.edu.au/cgi/viewcontent.cgi?article=4088&context=lhapapers>.

¹⁷ Ryan Calo, *Robotics and the Lessons of Cyberlaw*, 103 CAL L. REV. 513 (2015).

¹⁸ See, e.g., Edmund W. Burke, *Deodand – A Legal Antiquity That May Still Exist*, 8 CHI-KENT. L. REV. 15 (1930). 1 WILLIAM BLACKSTONE, COMMENTARIES 289-290, available at http://avalon.law.yale.edu/18th_century/blackstone_bk1ch8.asp.

¹⁹ See citations at *supra* note 10.

The law has also been dealing with unpredictable moving creatures – animals - for centuries. Some writers have even suggested that regarding robots as animals might be an appropriate response for the legal system.²⁰ Of course this may also not be a wholly useful analogy in that it does not address whether and how to attribute property or other rights, agency or legal personality to robots. It also potentially leaves victims potentially uncompensated for harm caused by “wild animal” robots, where the person responsible for introducing them into human communities can be identified. Nonetheless, there would seem an ample source of antecedents for robot law in what many technology lawyers may regard as the dusty corner of tort and property law. As we shall see, the more modern practice of “chipping” pets by embedding RFID tags containing identifying information is another area where animals provide a useful reference for a system of regulating robots.²¹

Then there is family law, which few if any authors seem to mention as a possible reference. Perhaps it is not sexy enough. Yet family law may actually offer the best source of analogies for a law of robots. After all, it is widely expected that robots will increasingly come to live in our homes as servants or companions (many already do in the form of vacuum cleaners or toys), and there is already a healthy (?) discourse on the subject of robot sex partners.²²

Family law may be a useful reference because it addresses a collective in which individual members may be liable for or benefit from what is essentially a

²⁰ Enrique Schaerer, Richard I Kelley & Monica N. Nicolescu, *Robots as animals: A framework for liability and responsibility in human-robot interactions*, The 18th IEEE International Symposium on Robot and Human Interactive Communication 72 (2009).

²¹ See, e.g. Doğan, Habib & Caglar, Mehmet & Yavuz, Musa & Gözel, Mahmut, *Use of Radio Frequency Identification Systems on Animal Monitoring*. 8 SDU INTERNATIONAL JOURNAL OF TECHNOLOGICAL SCIENCE 38 (2016). The use of similar technology by some humans within the context of an employment relationship for purposes such as access to facilities is also highly relevant to the type of system of robot regulation proposed by this article. See, e.g. Mary Bowerman, *Wisconsin company to install rice-sized microchips in employees*, USA Today, Jul. 24, 2017, available at: <https://www.usatoday.com/story/tech/nation-now/2017/07/24/wisconsin-company-install-rice-sized-microchips-employees/503867001/> (“We foresee the use of RFID technology to drive everything from making purchases in our office break room market, opening doors, use of copy machines, logging into our office computers, unlocking phones, sharing business cards, storing medical/health information, and used as payment at other RFID terminals,” CEO Todd Westby said in a company statement. ‘Eventually, this technology will become standardized allowing you to use this as your passport, public transit, all purchasing opportunities, etc.’ ”). Whether the use of such technology is appropriate for the private or public regulations of human beings is, of course, an important question. However, the answer to that question is arguably irrelevant to whether comparable technology would be useful in regulating robots.

²² See, e.g., Chelsea Summers, *There are a Lot of Problems with Sex Robots*, Medium (Jul. 26, 2018), available at: <https://medium.com/s/futurehuman/there-are-a-lot-of-problems-with-sex-robots-38ea0c17b7db>. See also, Gutiu, *infra* note ____.

social unit, a collective enterprise: the family. One of the basic problems with the characterizing how the law should deal with robots is that each robot is effectively a discrete unit, but one whose existence and actions are usually the result of a collective enterprise: manufacturer, programmer, owner, user and so forth.

Many of the questions about robotics law summarized at the beginning of this article stem from the ability of robots to act with agency in a way that affects the physical world in a potentially harmful way, combined with uncertainty as to the allocation of rights and responsibilities accruing to robot behavior. Like robots, children have agency and can move unpredictably in the physical world, causing harm to others. Family law has been dealing with parental liability for the torts and even crimes of minors for a long time.²³ Many of the issues of robot law might be amenable to an approach that sees robots treated analogously to “perpetual children.” The provisions on parental liability for harm caused by children contained in §316 of the Restatement (Second) of Torts might provide as useful a model for allocating responsibility for robots as anything in products liability or criminal law – if we could just figure out who the “parents” are, a definitional and informational issue we will turn to shortly.²⁴ Similarly, question like who is entitled to manage and dispose the fruits of a robot’s labor are also a fairly standard issue of family law in the parent-child relationship, at least were in days gone by.²⁵

Children are not the only area of family law that may be a useful reference. The field also deals with responsibility for adults with diminished capacity, those judicially declared incompetent or subject to guardianship or conservatorships. ²⁶

²³ See, e.g., Hazel Glenn Beh, *Tort Liability for Intentional Acts of Family Members: Will Your Insurer Stand By You?* 68 TENN. L. REV. 1 (2000); Jason Emiliios Dimitris, *Parental Responsibility Status – and the Programs that Must Accompany Them*, 27 Stetson L. Rev. 655 (1997).

²⁴ Restatement (Second) of Torts §316:

A parent is under a duty to exercise reasonable care so to control his minor child as to prevent it from intentionally harming others or from so conducting itself as to create an unreasonable risk of bodily harm to them, if the parent:

- (a) knows or has reason to know that he has the ability to control his child, and
- (b) knows or should know of the necessity and opportunity for exercising such control.

²⁵ See, e.g., 1 WILLIAM BLACKSTONE, COMMENTARIES 441, available at http://avalon.law.yale.edu/18th_century/blackstone_bk1ch8.asp. (“A father has no other power over his son’s estate, than as his trustee or guardian; for, though he may receive the profits during the child’s minority, yet he must account for them when he comes of age. He may indeed have the benefit of his children’s labour while they live with him, and are maintained by him: but this is no more than he is entitled to from his apprentices or servants.”)

²⁶ See, e.g., DANBY P. FRY, THE LUNACY ACTS: CONTAINING ALL THE STATUTES RELATING TO PRIVATE LUNATICS: CRIMINAL LUNATICS: COMMISSIONS OF LUNACY; PUBLIC AND PRIVATE ASYLUMS; AND THE COMMISSIONERS IN LUNACY (1864), available at: <https://books.google.com/books?id=fRRXAAAACAAJ&pg=PA8&lpg=PA8&dq=lunatics+blackstone&source=bl&ots=cMUDi8504I&sig=dB4U4w0XPW5uti9Y9PA81Tey2Tw&hl=en&sa=X&ved=2ahUK>

Family law might also offer useful analogies in areas where there is an odd silence in the current literature about robot law. While some writers express concern about excessive liability hindering innovation in robotics, nobody has gone so far as to suggest there should be a “parent-child immunity” rule that would make recovery difficult for harms caused as between the robot and its owner or developer.²⁷ Similarly, those advocating independent legal personhood do not seem to have gone so far as to advocate it rendering robots able to independently bring suit in their own name, including against their owners or other parties involved in their existence or operation. Corporations can sue their own directors and shareholders,²⁸ and parents may be subject to suits by or on behalf of their children, so why not robots who can sue their owners and creators, or robot whistleblowers able to independently inform authorities of human malfeasance?²⁹ Similarly, if we are to worry about the “abuse” of robots, as some writers have suggested we should,³⁰ why not allow them legal recourse against their abusers, or at least allow third parties to seek such recourse on their behalf? Here too we see existing family law on subjects such as child and elder abuse may offer a potentially useful model for regulation.

2. CROSSING THE DEFINITIONAL THRESHOLD

Before we can get to the potentially fruitful subject of considering family law analogies for robots, however, we have to overcome a more basic definitional issue that still bedevils much of the literature on the subject of robot law: what *is* a robot?

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²⁷ See, e.g., Gail D. Hollister, *Parent-Child Immunity: A Doctrine in Search of Justification*, 50 *FORDHAM L. REV.* 489 (1982).

²⁸ See, e.g., Eleanor Bloxham, *A lazy, expensive way to intimidate shareholders*, *FORTUNE* (Mar. 14, 2014) (“Corporations unhappy with shareholder proposals are taking their frustrations to federal court, suing investors...”), available at: <http://fortune.com/2014/03/14/a-lazy-expensive-way-to-intimidate-shareholders/>; David Hall & Matt Walker, *When can a company sue its directors for their illegal acts?*, *Burges Salmon Briefing* (May 2015), available at: https://www.burges-salmon.com/-/media/files/publications/open-access/when_can_a_company_sue_its_directors_for_their_illegal_acts.pdf Michelle Singletary, *Daughter 18, Sues parents for Support*, *THE WASHINGTON POST* (Mar. 6, 2014), available at: https://www.washingtonpost.com/business/economy/daughter-18-sues-parents-for-support/2014/03/06/75beb836-a49e-11e3-84d4-e59b1709222c_story.html?utm_term=.bbc69d484e8b.

²⁹ Perhaps this is a matter for joint discussions with those who focus on when autonomous weapons should be allowed to kill humans, including possibly their owners or creators, including in self-defense.

³⁰Kate Darling, *Extending legal protection to social robots: the effect of anthropomorphism, empathy, and violent behavior towards robotic objects*, in *Robot Law*, *supra* note 2.

A great variety of definitions have been offered. The RoboLaw project co-funded by the European Commission, proposes the following answer to the question “what is a robot?”

According to the most widespread understanding, a robot is an autonomous machine able to perform human actions. Three complementary attributes emerge from such a definition of robot: They concern: 1) physical nature: it is believed that a robot is unique since it can displace itself in the environment and carry out actions in the physical world. Such a distinctive capability is based on the assumption that a robot must possess a physical body. Indeed, robots are usually referred to as machines; 2) autonomy: in robotics it means the capability of carrying out an action on its own, namely, without human intervention. Autonomy is usually assumed to be a key factor in qualifying a thing as a “robot” or as “robotic”. In fact, in almost all dictionaries definitions, including authoritative sources such as the International Standard Organisation (ISO 13482), there is always a reference to autonomy. Finally, 3) human likeness: the similarity to human beings.³¹ (footnotes omitted)

This is indeed a comprehensive definition, though some may question whether “human likeness” is or should be a central feature of the definition. Much of the literature introduced earlier in this article addresses technology systems that are not humanoid, or are AI systems that do not have any physical manifestation at all. Moreover, what “human likeness” means itself seems like an entirely separate definitional problem fraught with minefields.

More examples can be found in the 2016 book *Robot Law*, which contains almost as many definitions of robots as the number of chapters by its various contributors.³² For example, Neil Richards and William Smart propose:

“[a] robot is a constructed system that displays both physical and mental

³¹ RoboLaw, Regulating Emerging Robot Technologies in Europe: Robotics facing Law and Ethics Project, *Guidelines on Regulating Robots* (Delivery Date Sept. 22, 2014), 15 available at: http://www.robolaw.eu/RoboLaw_files/documents/robolaw_d6.2_guidelinesregulatingrobotics_20140922.pdf (“Guidelines”).

³² ROBOT LAW 3, 6 (Rylan Calo, A. Michael Froomkin & Ian Kerr, eds. 2016)

*agency but is not alive in the biological sense.”*³³

Another author in the same volume offers as the definition of a *social* robot:

*“A physically embodied autonomous agent that communicates and interacts with humans on a social level”*³⁴

Yet another describes a particular subcategory of robot – a *sexbot* – as:

*“a combination of existing artificial (AI) technology, sensory perception capabilities, synthetic physiological responses, and affective computing.”*³⁵

Two other articles discuss the subject in terms that are essentially inconsistent with these formulations, doing away with the physical manifestation entirely and focusing on the AI aspects of a robot. IBM’s Watson supercomputer is referenced in the context of robot and human expert disagreement,³⁶ and another chapter does so in the context of automated law enforcement.³⁷

Writing from a Japanese perspective, Professor Hirano Susumu suggests a robot can be defined as a machine vested with a sense-think-act cycle.³⁸ He also points out that as early as 2004 a Japanese government study group on which he was a member had established a definition of a robot as something which had sensors enabling it to confirm its own status and that of the external world as well as the capability to analyze the information so obtained and to act accordingly.³⁹

The European Parliament has called for the creation of “a common European definition for smart autonomous robots,” including appropriate

³³ Neil Richards & William Smart, *How should the law think about robots?*, in: ROBOT LAW, *supra* note 2, 3, 6.

³⁴ Darling, *supra* note 2, at 213, 215.

³⁵ Sinziana M. Gutiu, *The roboticization of consent*, in: ROBOT LAW, *supra* note 2, 186, 187

³⁶ Jason Millar & Ian Kerr, *Delegation and responsibility: the prospect of expert robots*, in: ROBOT LAW, *supra* note 2, at 102;

³⁷ Lisa A. Shay, Woodrow Harzog, John Nelson, Dominic Larkin & Gregory Conti, *Confronting automated law enforcement*, in: Robot Law, *supra* note XX at 235, 239 (“We define automated law enforcement as any computer-based system that uses input from unattended sensors to algorithmically determine that a crime has been, or is about to be, committed and then takes some responsive action, such as to prevent the crime, to inform the appropriate law enforcement agency or to impose some form of punishment.”)

³⁸ Hirano, *supra* note 4 at 55.

³⁹ *Id.* at 67.

subcategories, taking into consideration:

- the capacity to acquire autonomy through sensors and/or by exchanging data with its environment (inter-connectivity) and the analysis of those data;
- the capacity to learn through experience and interaction;
- the form of the robot's physical support;
- the capacity to adapt its behaviour and actions to the environment.⁴⁰

Yet this merely describes the scope of a possible definition rather than serving as a functional one.

In one of his seminal works on the subject Ryan Calo, one of the leading scholars in the field, has (probably wisely) avoided defining a robot, while at the same characterizing them as an emergent technology that combines "*the genitive promiscuity of data with the capability to physical harm.*" With this definition he suggests that robotics represent a technology that is exceptional enough to invite "*a systemic changes to laws or legal institutions,*"⁴¹ which suggests that incremental use of analogies from discrete fields of law may be inadequate.

AI is certainly a factor in many definitions of robots, with some authors even suggesting that "[w]e may be misled if we insist on too sharp a distinction between robotics and AI systems."⁴² Others have simply defined AI as a feature of what constitutes a robot without getting into the details.⁴³ Andrea Bertolini describes the quest for a definition of a robot as "a pointless exercise."⁴⁴

Nothing in this article is intended as criticism of these various definitions or their authors. Each definition serves the purposes of the arguments and agendas being advanced in the writings where they are used. They are, however, *academic*, theoretical definitions. None seems likely to serve as something that

⁴⁰ Motion for a European Parliament Resolution with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103 (INL)), Annex to the Motion for a Resolution, Detailed Recommendations as to the Content of the Proposal Requested ("Annex to Resolution"), available at: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A8-2017-0005+0+DOC+XML+V0//EN#title1>.

⁴¹ Ryan Calo, *Robotics and the Lessons of Cyberlaw*, 103 Cal. L. Rev. 513, 534 and 553 (2015).

⁴² Jack M. Balkin, *The Path of Robotics Law*, 6 CAL LAW. REV. CIR. 45, 51.

⁴³ E.g., Horst Eidenmüller, *The Rise of Robots and the Law of Humans*, (March 26, 2017). Oxford Legal Studies Research Paper No. 27/2017. Available at SSRN: <https://ssrn.com/abstract=2941001> or <http://dx.doi.org/10.2139/ssrn.2941001> ("...robots are a form of embodied AI", at 4); Mehlman, Maxwell and Berg, Jessica Wilen and Ray, Soumya, *Robot Law* (January 30, 2017). Case Legal Studies Research Paper No. 2017-1. Available at SSRN: <https://ssrn.com/abstract=2908488> (Discussing the subject of robot using the undefined term "artificially-intelligent robot.")

⁴⁴ Andrea Bertolini, *Robots as Products: The Case for a Realistic Analysis of Robotic Applications and Liability Rules*, 5 LAW, INNOVATION AND TECHNOLOGY 214 (2013).

could be used in connection with the development of coherent legal or technical rules for actually regulating robots in the real world. This would be for the simple reason that it would usually be unclear whether any particular robot fit whichever definition was being applied.

3. PROBLEM AS SOLUTION: DEFINITION AS A FUNDAMENTAL PURPOSE OF *PRACTICAL* ROBOT LAW

This article approaches the subject of robot law from a different perspective: that a fundamental purpose of any coherent system of *practical* robot law should be to provide definitions that can be used as a framework for further regulation. Hard or soft laws defining what is and is not a robot would be - *should be* - the starting point for either applying existing rules to those definitions or developing new rules.

Whatever definitions this practical law of robots provides will be unsatisfactory and incomplete; such is the nature of legal definitions. Its will invariably exclude technology systems that have many robot-like features, but are not “robots” under whatever definitions we establish. From the outset out system of robot law will have to distinguish between those “robots” which fit the legal definition and those which don’t.

This will likely be a good and useful thing. Why? Because this very basic definitional boundary can be used to establish criteria for robots that make them safer and the people who make, own and use them more responsible. Definitional rules can serve as a foundation for encouraging the development and use of robots that fit the definition and disfavor those that do not.

Let us look at family law again for examples. The law accords numerous advantages – tax benefits, inheritance rights, testimonial privileges to family relationships, particularly spousal ones.⁴⁵ The same sorts of rules could be developed to favor particular types of robots: 4th amendment (or comparable) protections could be accorded to sensitive video and voice recordings stored in home companion robots, but only if they fit our definition. Taxing robots (or their transactions) differently depending on whether they fit our definition would be another obvious possibility.

There are also analogies we could apply from other areas of law. We could impose negligence liability for torts caused by robots meeting our definition, and

⁴⁵ See, e.g. CAL. EVIDENCE CODE § 970 (spousal testimonial immunity), 26 U.S.C. § 2523 (inter-spousal gift tax exemptions); FLA PROBATE CODE § 732.201-732.228 (spousal inheritance rights).

strict liability on those caused by anything else.⁴⁶ Who should bear this liability is another question, but one for which definition will at least help us develop answers.

Whether the examples given above would be appropriate rules is open to debate. However, they should at least illustrate why none of the definitions given above would be particularly helpful in figuring out what sort of rules to apply.

One simple way of establishing a definitional “robot/not-robot” dichotomy (though it need not be dichotomous in practice), would be through a registration system. Technology systems that are registered in the system would be capital “R” Robots; those that are not would be mere drones, Roomba’s, hobbyist toys or other lower-case (and lower-caste) “robots.”

The devil would be in the details, of course and much of the real definitional functioning of the rules would come through the registration protocols. These would be the technical, informational, legal and other parameters that must be satisfied in order to register a Robot (and maintain such registration), as well as the rules by which other systems (technological, administrative or others) interact with that registry. This subject will be addressed later.

Registering things as part of a system of rules is hardly a new idea. Most readers will likely quickly think of land, motor vehicle and corporate registries. However, these may not be ideal cognates. Real estate does not move and corporations don’t really exist. Robots do both. Motor vehicles exist and move but only through human agency (or product defects). As previously noted, most of the “robots” discussed in the context of robot law are expected to be capable of independent decisions and motion, and are thus capable of taking actions that impact the real world without any decisions or input from human beings.

Nor do existing registry systems offer a comprehensive system of regulation or involve the high level of technical sophistication that, given their nature, should be a part of a robot registry system. Unregistered automobiles can still be driven on roads and enter parking structures, registration of land title does not itself prevent trespass or adverse possession or identify who actually does things on it.

⁴⁶ Some may object that such rules would discourage innovation in the “robot” space. Such objections will unlikely be supported by empirical evidence, and more likely it will mean innovation will take place subject to a known, higher risk profile. In any case, to transpose what parents say about fun to children brandishing pointy sticks, “it only innovation until someone loses an eye.” The difference, of course, is that with innovation in areas such as robots, the person losing the eye is unlikely to be the person doing the innovation.

While registry systems may identify who owns and/is or notionally responsible for whatever is registered, the owner of a registered vehicle is unlikely to be responsible if someone else has an accident while driving it, and corporations seem to have evolved so as to deliberately obfuscate who is actually responsible for most of its behavior. In other words, other than corporate registries which at least identify corporations as having a separate legal status and notionally responsible directors, existing registration systems do not address the issue of independent agency or capacity, two of the key features of robots that generate much of the discourse introduced earlier in this article.

The European Parliament has recommended the creation of a centrally-administered system of registration for “smart robots” (whatever that means):

For the purposes of traceability and in order to facilitate the implementation of further recommendations, a system of registration of advanced robots should be introduced, based on the criteria established for the classification of robots. The system of registration and the register should be Union-wide, covering the internal market, and could be managed by a designated EU Agency for Robotics and Artificial Intelligence in case such an Agency is created.⁴⁷

This is fine as far as it goes, but does it go far enough? It is not clear that this recommendation envisions anything beyond something derived from existing registration systems for corporations, vehicles or other forms of property. Nor does it indicate whether the “criteria” for registration will be anything other than broad guidelines.

Let us now return to a subject introduced earlier, the potential for family law to provide a useful source of rules that could be applied to robots. Here we should do so in the context of registration system. However, in the common law system there is no comprehensive system of registering families, only what might be called an event-based system of certifying discrete family “transactions,” that affect personal and family status: births, deaths, marriages, divorces, adoptions and so forth.

Japan, however, has a well-established and comprehensive system of family registration that may offer a more useful model, one that that has been functioning in the real world for over the century. The next section will give a brief

⁴⁷ Annex to Recommendations, *supra* note 28.

summary of the key aspects of this system. It will also illustrate why the Japanese system offers a number of useful possible analogies to use in developing a system of robotic registration. Just as the Japanese family registration system historically functioned as part of the foundation of the civil law and government infrastructure in Japan, a robotic registration system could provide a similar foundational role for a comprehensive system of robot law.⁴⁸

3. FAMILY LAW FOR OTHER PEOPLE: JAPAN'S KOSEKI FAMILY REGISTRATION SYSTEM

a. Overview

Japan's system of formal family law can confound Western observers who may be tempted to attribute its functioning primarily to vague notions like "culture" or "tradition." In fact, all Japanese family law as exists today only dates back as far as the Civil Code of 1896 which was in fact heavily influenced by continental European models at the time, and then further impacted by American-driven amendments to the Code in 1947, during the post-war occupation.⁴⁹ In many ways Japanese family customs and norms of an older vintage were forced to fit

⁴⁸ This is also the appropriate juncture to point out that Japan has its own literary "law of robots," in the form of the Robot Law introduced in *Tetsu'ude Atomu*, the classic cartoon by Tezuka Osamu and known in translation as "Astro Boy." Roughly translated, Tezuka's law consists of the following rules: (1) robots may not hurt or kill humans (2) robots are born to serve humans, (3) robots can make anything except money, (4) robots may not go abroad without permission, (5) male and female robots may not interchange themselves, (6) robots may not change their own faces without permission, (7) a robot created as a robot may not become a child robot, (8) a robot dismantled by humans may not be put together by another robot, (9) robots may not destroy human homes or property, and (10) a robot must call the human who made it "father." The gendered and paternalistic aspects of these rules may seem quaint, one should bear in mind that they appear in a fictional world populated by robots in a children's comic written decades ago. Nonetheless, insofar as some of them are focused on robot *identity*, the author would suggest they reflect a conceptualization of robot law that is in some ways more relevant to real world than Asimov's. Tezuka Osamu, *Aokish [The Blue Knight]*, 15 TETSU'UDE ATOMU 7, 15-16 (1981).

Outside the world of fictional Japanese robot law, in 2015 Keiō University's Professor Fumio Shinpo proposed eight precept of robot law. Roughly summarized and translated, these were: (1) humanity first (robots may not harm or become people), (2) obedience to order (they must follow human orders and must be subject to control), (3) secrecy and privacy (robots must preserve the secrecy of information they gather and be designed accordingly, with reference to OECD guidelines) (4) use limitation (robots must be limited to their intended use and may not be used to harm humans), (5) security safeguards, (6) openness & transparency (there must be visibility in the design and use of robots), (7) individual participation (individuals must participate in the creation of rules governing robots, and robots must not govern individuals), and (8) accountability (there must be rules of liability for harm caused by robots). Fumio Shinpo, *Roboto hō wo meguru hōryōiki betsu kadai no chōkan [A bird's eye view of robot law issues by legal field]*, 1 Jōhō hōsei kenkyū 64, 74-75 (2017).

⁴⁹ COLIN P.A. JONES & FRANK RAVITCH, *THE JAPANESE LEGAL SYSTEM* (2018).

into the constraints of this more modern law.⁵⁰

A more immediate explanation of why Japanese family law seems strange and alien may be due to the nation essentially having two interlinked systems of family law: one public, and one private. What most people associate with substantive family law – how people get married, divorced, adopt, fight over estate and marital property, decide custody of the children and so forth – can be found in Part IV of the Civil Code (and Part V, as to inheritance) and court practice.⁵¹ To the extent it is primarily concerned with the private law rights and duties between persons within the context of family relationships, this system could be described as “family law for family members.”

Most of the things people fight over in family court - who the children live with, visitation, child support and so forth – may seem important to those doing the fighting, but for the most part do not (or should not) affect the rights and duties of third parties. The universe of changes in family status that potentially affect third parties is not large: divorce which terminates spousal joint liability for debts and terminates joint property rights, for example, and post-divorce allocations of parental authority is relevant to anyone who deals with a child through the parent having it. Such changes do not necessarily need to be accomplished through, courts; the principal requirement of third parties as to the family is identifying who comprises it.

The second system of Japanese family law is thus essentially “family law for everyone else.” In other words its primary purpose can be seen as to unambiguously authenticate the existence (or absence) of those family relationships that could potentially affect third parties, whether through claims on property, the ability to repudiate contracts made by other family members, joint liability for debts, authority to deal on behalf of a minor child and so forth.

This latter system of family law is based primarily on a registration system known as the *koseki* – the Family Register - and governed by the Family Register Act.⁵² On a national level the *koseki* system falls under the jurisdiction of the Ministry of Justice but day-to-day administration is left to municipal authorities.⁵³ In some respects it is similar to the German *Sandesamt* system of civil registration

⁵⁰ BUMMEI SATO, KOSEKI TO SABETSU [The Koseki and Discrimination] (2010); Colin P.A. Jones, *Japan's discriminatory koseki registry system looks even more outdated*, THE JAPAN TIMES (Jul. 10, 2016), available at: <https://www.japantimes.co.jp/community/2016/07/10/issues/japans-discriminatory-koseki-registry-system-looks-ever-outdated/#.WxtbkPX8lrQ>.

⁵¹ MINPŌ [CIVIL CODE].

⁵² Kosekihō [Family Register Act], law no. 228 of 1947.

⁵³ Family Register Act, arts. 1-3.

and other systems used in other continental European countries.

Article 6 of the Family Register Act illustrates the basic purpose and parameters of the *koseki* system:

A family register shall be created for each unit consisting of a husband and wife, and any children thereof with the same surname, who have their registered domicile within the area of a municipality; provided, however, that when a new family register is created for a person who has entered into marriage with a person who is not a Japanese national (hereinafter referred to as a "foreign national"), or for a person who does not have a spouse, it shall be created for each unit consisting of such person and any children thereof with the same surname.⁵⁴

This language illustrates two features of the *koseki* system that make it a particularly useful model for a robot registration system – a Robot *Koseki*.

First, just as we have proposed should be a basic feature of a system for robots, the *koseki* provides a very basic and binary definitional framework based on *nationality*. Only Japanese people have *koseki* registrations. To be registered in a *koseki* means you are Japanese. Japanese nationals have *koseki* registrations and since Japanese nationality is transmitted through parentage rather than place of birth (with some minor exceptions), being registered in the *koseki* as the natural child of a Japanese parent means you must also be Japanese.⁵⁵ Non-Japanese cannot register a *koseki* unless they acquire Japanese citizenship through naturalization, a process which requires abandoning other nationalities.⁵⁶

On a very basic level, therefore, the system is inherently binary, and makes it easy to create and implement rules based on a simple Japanese/Not-Japanese distinction. As is suggested by the latter half of article 6 of the Family Register Act, Japanese family law distinguishes in a basic different way in situations involving foreigners, who only show up as marginal notations in the *koseki* of a Japanese spouse or child. Some might call this discrimination, but the starting point is that

⁵⁴ Family Register Act, art. 6.

⁵⁵ *Kokusekihō* [Nationality Act], Law No. 147 of 1950, art. 2. More complex rules exist for children born out of wedlock to Japanese fathers and non-Japanese adopted by Japanese parents. Arts. 3 and 8(i) and (ii).

⁵⁶ Nationality Act, arts. 5-9. Japan's Nationality Act does not permit Japanese adults to have dual nationality, and losing Japanese nationality means removal from the *koseki* system. ⁵⁶ Nationality Act, arts. 11 and 14; *Kosekihō shikōkisoku* [Family Register Act Implementing Regulations], Ministry of Justice Regulation No. 95 of 1947, arts. 35(xii) and 39(vii).

foreign family members do not have *koseki* and therefore *must* be treated differently.

With the appearance of the word “discrimination” it is important to be clear that nothing in this article is intended to praise the *koseki* as part of a system of regulating human families. As the discussion that follows will show it has (or, in prior iterations had) numerous aspects that could be considered deleterious to them. However, many of the features that might make it seem an unsuitable system for some humans, are precisely those features that would be desirable in a system for robots. “Discrimination” is the first such feature, since we want our system to favor and encourage the development of and registration of robots that satisfy the registration criteria, and discourage the development of those that do not.

The second key feature of the Japanese *koseki* illustrated by article 6 of the Family Register Act is that the basic unit of registration is the family rather than the individual, making it fundamentally collective enterprise. Under the Japanese system, the two events which render the creation of a new *koseki* mandatory involve at least two people: marriage or the birth of a child out of wedlock.⁵⁷ The Civil Code requirement that legally-married spouses share the same surname (which is registered in the *koseki*) is similarly indicative of the role of the *koseki* in treating a collective as a single unit.⁵⁸

b. Historical Context

When it was first introduced shortly after the Meiji Restoration of 1868 during a period when Japan rapidly had to rapidly modernize in order to address the threat of Western colonization, the *koseki* system performed a number of important governance functions. Originally tied to the location of the family residence, it operated as part of a surveillance system that facilitated keeping track of who was from where and related to whom (this might be a desirable functionality for a robot *koseki* system as well).⁵⁹

⁵⁷ Although it is possible for a child who has reached adulthood to establish a registration separate from his or her parents, this is not required and it is not uncommon to remain on the parental *koseki* until marriage.

⁵⁸ Article 750 requires couples registering a marriage to share the same surname, either the husband's or the wife's. Article 790(1) imposes the same requirement as to children of the marriage, while article 790(2) mandates a child born out of wedlock take the surname of his/mother.

⁵⁹ For the discussion in this section I have relied heavily on the wonderfully useful book by Professor Endō: MASATAKA ENDŌ, *KOSEKI TO KOKUSEKI NO KINGENDAISHI* [A recent and modern history of family registration and nationality] (2013). Those not able to read Japanese may find Chapness and

Registration systems had existed in Japan prior to the Meiji Restoration but were localized within the individual feudal domains that comprised the nation at the time. Movement between these domains had been tightly controlled. The breakdown of the social and political order that characterized the years before the Restoration saw numerous people leaving their domains and effectively becoming untraceable.⁶⁰

At the same time, as this domestic unrest, Japan faced the related threat of colonization by the foreign powers who were coming to live and trade in Japan thanks to the treaty rights wrested from Japan's reluctant feudal leaders by American Commodore Matthew Perry in 1954. The introduction of a nationwide *koseki* system was thus critical for a number of reasons, not only to forge a new unified "Japanese" identity, but also to provide its new national government basic demographic information about the Japanese people. Such information was critical to formulate and implement national policies such as taxation and conscription.⁶¹

The initial *koseki* system adopted by the Meiji government was a failure and came to be replaced by the system adopted in conjunction with the Civil Code of 1896, which contained what became the basic rules of Japanese family law.⁶² The collectivist nature of the *koseki* was more pronounced under this system until its reform during the post-war occupation. "Families" under this system might consist of three or four generations and multiple married couples being registered in a single *koseki*.

These families had a registered *koshu* or "head of household." This was a legal, heritable status accompanied by numerous rights, authorities and duties, including the duty to support members of the household, a presumption in favor of family property being attributed to him, the right inherit and dispose of family property and control entry into the family through approval of marriages by junior members or acceptance into the household of children born out of wedlock or members of related households, and even the right to control where members resided.⁶³ It was a status that could not be freely shed by the person in who it was vested, unless he reached the age of 60 and there was a suitable successor

Krogness' edited volume equally useful. JAPAN'S HOUSEHOLD REGISTRATION SYSTEM AND CITIZENSHIP: *KOSEKI*, IDENTIFICATION AND DOCUMENTATION (David Chapman & Karl Jacob Krogness, eds., 2014).

⁶⁰ See, Endō, *supra* note 59 at 107-130.

⁶¹ *Id.*

⁶² *Id.* at 125-230.

⁶³ Old Civil Code, arts. 735, 736, 747, 748, 749, 750, 955, 986.

available and willing to assume his powers, at which point he could retire.⁶⁴

The head of household enabled the government to effectively use the family, rather than the individual, as the smallest unit of society subject to governance for many purposes. In exchange for allowing heads of household broad autonomy in how they managed their family, they were responsible for helping implement policies such as taxation and conscription.

A historical aspect of the system that is of particular interest to our hypothetical robot registration system is how the government encouraged – or forced – people to register when it was introduced. As suggested earlier in the article, this was accomplished by using law and regulation to create incentives to registration and disadvantages to doing so.

One noteworthy example was – and still is – marriage and inheritance. Registration of a marriage was and is an absolute requirement for the marriage to have legal effect. Failure to register a marriage meant that the children of the marriage were illegitimate. This was a status to which the Civil Code accorded various disadvantages, some of which remained into the 21st century.⁶⁵

Another example was through the linkage with nationality. Not being registered in a *koseki* meant you weren't a member of the "Japanese people" (*kokumin*), and thus not entitled to the privileges and protections that came with that status.⁶⁶ The linkage of nationality to constitutional protection remains a part of Japanese law today.⁶⁷

⁶⁴ Old Civil Code, arts. 752 and 753.

⁶⁵ Until 2013 when the Supreme Court ruled the provision unconstitutional on equal protection grounds, the Civil Code (article 900) accorded lesser inheritance rights to children born out of wedlock. Saiko Saibansho [Sup. Ct.], Grand Bench decision of Sept. 4, 2013, 67 SAIKŌ SAIBANSHO MINJI HANREISHŪ 1320.

⁶⁶ As described by one of the leading authorities on the *koseki* the business of its introduction was "... a pivotal national policy: it was by posting in the family register that the people [*jinmin*] were first identified as "nationals" [*kokumin*] and those who were left out did not enjoy the protection of the state, emphasizing their exile to outside the scope of nationals, and attempting to crate enforceability of registration in the family register." (translation from Japanese by Colin Jones) Endō, *supra* note 59, at 121 (2013). See also, Karl Jakob Krogness, *Jus Koseki: Household registration and Japanese citizenship*, in Chapman & Krogness, *supra* note 59, at 146-165. Notwithstanding the numerous disadvantages to not registering in the *koseki*, it is estimated that every year approximately 3,000 children born in Japan are not registered and may even reach adulthood while suffering the tremendous disadvantages of being "bureaucratically, administratively and legally invisible" for that reason. David Chapman, *The Invisible Japanese*, EastAsiaForum (Aug. 13, 2017), available at: <http://www.eastasiaforum.org/2017/08/13/the-invisible-japanese/>.

⁶⁷ Note while not apparent from the English version of the constitution, Chapter III of which enumerates the rights of "the people," the Japanese version uses the term "*kokumin*," which clearly refers to Japanese nationals. Japan's Supreme Court has thus had to develop jurisdiction as to the degree to which non-Japanese enjoy constitutional protections. E.g., Saikō Saibansho [Sup. Ct.], Grand Bench judgment of October 4, 1978, 32 SAIKŌ SAIBANSHO MINJI HANREISHŪ 1223. In a 2008 decision the Supreme Court of Japan confirmed that Japanese citizenship is "...an important legal

Under the pre-1947 system, citizenship was also family affair. Marrying a Japanese person meant either entering the Japanese spouse's *koseki* and acquiring Japanese nationality or *leaving* the *koseki* and losing it.⁶⁸

Citizenship was also tied up with colonialism. Japan's acquisition of a colonial empire meant addressing existing registry systems in Taiwan and Korea which were based on very different systems of family law than Japan.⁶⁹ These were left in place and essentially the same rules as applied to marrying foreigners applied: marrying a Korean meant either the Japanese spouse either becoming "Korean" (by the Japanese spouse entering the Korean *koseki*) or the reverse. This system enabled colonial Japan to develop different forms of citizenship within its empire based on *koseki* registrations. Someone registered in a Korean *koseki* would not have the same freedom to come to the Japanese islands or enjoy the same political rights if they did, as someone registered in a Japanese *koseki*.⁷⁰ Again, such a system would likely seem deplorable if applied to humans today, but offers some possibly useful analogies for how overlapping robotic registration systems could be used.⁷¹

Another noteworthy historical aspect of the system is that *Koseki* records used to be essentially public documents. From the 1890s the *koseki* system was designed so that the family records of everyone were accessible to other members of the general public (subject to payment of the relevant fees).⁷² This was said to be to make it possible to confirm that contract counterparty was not a minor or subject to other capacity restraints, a fiancée was not married or to address a myriad of other situations where it might be useful for one private person to confirm the identity, status or family composition of another.⁷³

status that means a lot to people in order to enjoy the guarantee of fundamental human rights...". Saikō Saibansho [Sup. Ct.], Grand Bench judgment of June 4, 2008, 62 SAIKŌ SAIBANSHO MINJI HANREISHŪ 1367.

⁶⁸ *Endō*, *supra* note 59, at 97-98.

⁶⁹ *Id.* at 173-178, 183-186.

⁷⁰ Japan's former colonial subjects lost their Japanese citizenship based on an interpretive directive from the MOJ stating that those registered in Korean or Taiwanese registries at the time the Treaty of San Francisco took effect in 1952 (and which stripped Japan of its territories) would no longer be Japanese. This would have included ethnic Japanese who married into Korean or Taiwanese families, but excluded Koreans and Taiwanese who married into Japanese ones. *Endō*, *supra* note 58 at 231-255.

⁷¹ For an extremely useful description in Japanese of the colonial registration and nationality systems of pre-war Japan, see *Endō*, *supra* note 59, at 161-214. See also, Michael Kim, *Sub-nationality in the Japanese empire: A social history of the koseki in colonial Korea 1910-1945*, in Chapman & Krogness, *supra* note 59, 1t 111-126.

⁷² *Endō*, *supra* note 59, at 45-48.

⁷³ *Id.*

It was not until 1976 that the first restrictions on access to *koseki* records were imposed, with an amendment to the Family Register Act prohibiting access to *koseki* records for “improper purposes.”⁷⁴ 2008 amendments to the Family Register Act finally saw it converted to a non-public system, with stringent restrictions on third party access imposed for the first time.⁷⁵ This came four years after Japan passed the Personal Information Protection Act which essentially recognized data privacy as a basic human right.⁷⁶ Some legal professions still have statutory rights to request *koseki* information from the authorities if they have an appropriate reason for doing so.⁷⁷

One final historical note, is that the *koseki* system used to disclose more information about the registered family and its individual members than it does now. Information that was once recorded in the *koseki* includes noble status, prior *samurai* status, birth out of wedlock, being an abandoned child, birth or death in a sanatorium or prison, roots in *burakumin* “untouchable” communities and criminal records.⁷⁸ Until 2000 amendments, being subject to a declaration of incompetence or guardianship was also recorded in the *koseki*.⁷⁹

In short, therefore, the *koseki* system historically enabled both the government and other third parties to identify a unit known as the “family” and confirm its members and various known legal attributes that accrued to such status. Through the system it was possible to confirm that someone was Japanese and who might be responsible for the behavior of an individual family member, or empowered to deal on the family’s behalf.

c. The Koseki System Today

The “head of household” status was inconsistent with the equal protection guarantees and individualistic focus of Japan’s postwar Constitution and abolished during the post-war occupation Civil Code reforms.⁸⁰ However, the current system

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ *Id.*

⁷⁸ *Id.* at 44.

⁷⁹ Now guardianship arrangements are registered in a separate registry maintained by Legal Affairs Bureaus under the Ministry of Justice. Instead of a *koseki* extract one can prove that one is not subject to any capacity restraints through issuance of a “no registration” certificate from this Legal Affairs Bureau. See, Tokyo Legal Affairs Bureau website guidance at: http://houmukyoku.moj.go.jp/tokyo/static/shoumei_mihon.html.

⁸⁰ See, e.g., ALFRED C. OPPLER, LEGAL REFORM IN OCCUPIED JAPAN: A PARTICIPANT LOOKS BACK, 111-120 (1976). Ministry of Internal Affairs and Communications, Shinsei tetsuzuki tō no minaoishi ni kansuru chōsa – koseki tōhontō no teishutsu ga hitsuyō to sareru tetsuzuki wo chūshin to shite:

of family law and *koseki* registration is still essentially collective. As already noted, new registrations are triggered by marriage or births.⁸¹ Similarly, the Civil Code rules still theoretically make it possible to attribute rights and responsibilities to family members based on their registration status.

Today, births, deaths, disappearances, marriages, divorces, adoptions (and their dissolutions), acquisition or loss of Japanese nationality, legal name changes, formal disinheritance of a presumptive heir, and changes of gender are still recorded in the *koseki*.⁸² Other than birth and death, of course, many changes of status – marriage, consensual divorce, some adoptions and the consensual dissolution of those adoptive relationships – can be accomplished merely by filing the necessary paperwork with the local authorities.⁸³ Others – some (but not all) adoptions of minors and changes of gender - for example, require involvement of a family court but only in a ministerial oversight role, with the result being registered in the *koseki*.⁸⁴

kekka hōkokusho [Report of Results: survey of reconsideration of application procedures, with a focus on procedures requiring the submission of family register extracts (etc.)], Mar. 2017, available at: http://www.soumu.go.jp/menu_news/s-news/110614_00001.html#kekkahoukoku.

⁸¹ Many aspects of the current family law system likely seem quirky and counterintuitive even to some Japanese people. This is because it represents an occupation-era compromise between the US occupation officials overseeing the transformation of Japanese laws and institutions and their Japanese government counterparts. The Americans wanted an individual-based registration system while the Japanese did not. The Americans compromised in accepting a collectivist registration system, but only so long as it did not permit registration of more than two generations to be registered in it. This explains why women having a child out of wedlock must separate herself from her parents' registry, and why whether a woman can return to her parents' registry after the termination of a marriage is dependent on whether she has parental authority of the child of the marriage or not.

⁸² Family Register Act, arts. 49-59, 86-94, 76-77-2, 66-69-2, 70-73-2, 102-106, 107-107-2, 97, 20-4.

⁸³ Marriage: CIVIL CODE, art 739 and Family Register Act, art. 74 ; Divorce: CIVIL CODE, art. 764 and Family Register Act, art. 76; adoption: CIVIL CODE art. 799 and Family Register Act, art. 66; dissolution of adoption, CIVIL CODE, art. 812 and Family Register Act, article 70.

⁸⁴ CIVIL CODE, arts. 798 and 817-2; Seidōitsu shōgaisha no seibetsu no toriatukai no tokurei ni kansuru hōritsu [Act on Special Cases in handling Gender Status for Persons with Gender Identity Disorder], law no. 111 of 2003. Of course there are families that don't fit within the parameters recognized by the Civil Code and the *koseki* system. For example, same-sex marriages are not currently recognized. Courts have developed well-established rules and practices for dealing with the rights of parties in *de facto* marriages (for example), based on other provisions of the Civil Code such as those dealing with tort, contract and the Japanese equivalent of equitable principles. Thus, such relationships don't exist outside the protections of the law; but they *do* exist outside of the *koseki* system and are thus less significant to the rest of the world, and are enjoying increasing recognition in the public sphere. For example some municipalities have started to issue certificates recognizing same-sex couples, though doing so has largely symbolic value other than in connection with commercial services. See, e.g. *Sapporo first major city in Japan to issue certificates recognizing same-sex couples*, The Japan Times, Jun. 1, 2017, available at: <https://www.japantimes.co.jp/news/2017/06/01/national/sapporo-first-major-city-japan-issue-certificates-recognizing-sex-couples/#.W2JefTn8lrQ> ("These documents do not confer legal rights or obligations, but enable them to become recipients of life insurance money and use family-member

The *koseki* system makes Japan one of the easiest countries in the world to get a mutually consensual divorce; there is no residence requirement or need to go to court – or even be in Japan.⁸⁵ The divorce can be procured merely by submitting a confirming divorce notification with the registration authorities. Allocation of parental authority over minor children to a single parent post-divorce is mandatory, but can also be accomplished simply by filing the *koseki* paperwork.⁸⁶ Litigation over the operation of the *koseki* system falls primarily into the sphere of administrative law and involves issues such as registry authorities refusing to accept registrations in unusual situations, or parties challenging the registration requirements.⁸⁷

The Civil Code and Family Register Act remain closely interlinked, with the former providing the rules by which people can enter into and terminate the relationships registered in the latter. The family relationships that can be reflected in the *koseki* are only those provided for in the Civil Code. For changes in status such as marriage, divorce, some adoptions and the dissolution of those adoptive relationships, registration is what gives them legal effect.⁸⁸ Court resolution of disputes that would affect a *koseki* registration and thus third parties (e.g., divorce, dissolution of adoptive relationships, changes in allocation of parental authority) represent only a small subset of the matters family courts deal with, and the court-sponsored conciliation process is designed to filter out as many cases as possible before the court must resolve any through formal litigation (which, at risk of repetition, is not required in the first place). Historically, around 90% of divorces have been accomplished through *koseki* filings.⁸⁹ The small minority of cases in

discounts for mobile phone and other services.”)

⁸⁵ Article 40 of the Family Register Act allows Japanese nationals living abroad to make *koseki* filings through their local embassy or consulate.

⁸⁶ CIVIL CODE, art. 819(1) and Family Register Act, art. 76.

⁸⁷ Perhaps the most famous example is that of a parent who sought to register his new-born child under the name of “devil” (*akuma*) and brought suit when the register authority refused to accept it. Tokyo Kateisaibansho Hachiouji Shibu, Jun. 1, 1994, 1486 HANREI TAIMUZU 56.

⁸⁸ See, e.g., CIVIL CODE, art. 739(1) (“Marriage shall take effect upon notification pursuant to the Family Registration Act...”).

⁸⁹ According to Japanese government statistics, in 2015, 87.6% of divorces were consensual (i.e., achieved merely through *koseki* filings). The remainder were resolved through family courts, but even the majority of these through court-sponsored conciliation or settlements. Only a little over 1% of divorces were judicial divorces, with the change of status resulting from final judicial action rather than the agreement of the parties (accomplished out of court or with judicial assistance/pressure). Japanese government population statistics; divorce: <https://www.e-stat.go.jp/stat-search/files?page=1&layout=datalist&toukei=00450011&tstat=000001028897&cycle=7&year=20150&month=0&tclass1=000001053058&tclass2=000001053061&tclass3=000001053070>.

This represents a slight decline from the previous decade, with consensual divorces accounting for 87.8% of divorces in 2008, 91.2% in 1998, and 95.5% in 1950. Minister of Health Welfare and

which the courts play any role are resolved through conciliation; only about 1% of Japanese divorces are the result of judicial action.⁹⁰

The *koseki* also functions in a code-like fashion in that it prevents prohibited changes of status from occurring in the first place, through the parameters built into system. Bigamy is a crime in Japan,⁹¹ but it is also one that is almost impossible to commit since registry authorities would not accept a marriage registration filed by a couple whose *koseki* records showed them still married to someone else. The same is true of other prohibitions on marriage.⁹² This has caused problems in specific cases, including transgender individuals seeking to register themselves as the fathers of children born using donor sperm when their registry reveals them to originally have been registered as female,⁹³ biological parents seeking to register children born to surrogate mothers abroad,⁹⁴ and mothers or children seeking to use DNA evidence to rebut the presumptions of paternity imposed by the Civil Code (article 772) that would result in children being born during or even after a marriage being registered as the child of the husband.⁹⁵

Similarly, the *koseki* maintains its own integrity by rejecting filings that do not satisfy its requirements. For example, the form used to report births for registration in the *koseki* must still be filed with a denotation of whether the child was born in or out of wedlock. In 2013 the Supreme Court upheld a registry authority's rejection of a registration from parents who refused to check the relevant box on the reporting form.⁹⁶

Labor Divorce Statistics:

<http://www.mhlw.go.jp/toukei/saikin/hw/jinkou/tokusyuu/rikon10/01.html>. Common lawyers accustomed to a system where even consensual divorces must be accomplished through court proceedings are particularly likely to find a discussion of Japanese family law that focuses on what Japanese courts do may thus find the system both familiar yet alien.

⁹⁰ *Id.*

⁹¹ KEIHŌ [PENAL CODE], art. 184. Bigamy is also proscribed by CIVIL CODE art. 732.

⁹² These include marriages by men under 18 or women under 16, marriages to family members (including adoptive) within a certain degree of affinity, and marriages by women within 100 days of the dissolution of a prior marriage. CIVIL CODE, arts. 731, 734-736, and 733(1).

⁹³ SAIKŌ SAIBANSHO [Sup. Ct.], 3RD PETTY BENCH, DEC. 10, 2013, 67 SAIKŌ SAIBANSHO MINJI HANREISHŪ 1847.

⁹⁴ SAIKŌ SAIBANSHO [Sup. Ct.], 2ND Petty Bench, Mar. 23, 2007, 61 SAIKŌ SAIBANSHO MINJI HANREISHŪ 619.

⁹⁵ This result was achieved through a trio of judgments issued on the same date by the same petty bench. SAIKŌ SAIBANSHO [Sup. Ct.], 1ST Petty Bench, Jul. 17, 2014, 61 SAIKŌ SAIBANSHO MINJI HANREISHŪ 619 (no case reporter citation); SAIKŌ SAIBANSHO [Sup. Ct.], 1ST Petty Bench, Jul. 17, 2014, 247 SAIKŌ SAIBANSHO SAIBANSHŪ MINJI 79; and SAIKŌ SAIBANSHO [Sup. Ct.], 1ST Petty Bench, Jul. 17, 2014, 68 SAIKŌ SAIBANSHO MINJI HANREISHŪ 547.

⁹⁶ Saiko Saibansho [Sup. Ct.], 1ST Petty Bench, Sept. 26, 2013, 67 Saikō Saibansho Minji Hanreishū 1384.

d. The Attributes and Uses of of Koseki Registration Information

The rules of these two interlocked systems of family law are unambiguous and often binary in a computer code-like fashion. Parties are *legally* married or they aren't. Having an elaborate wedding ceremony in front of a crowd of friends and family, exchanging marital vows before a suitable religious figure and even having children may give rise to rights and liabilities under tort or contract, and possibly even recognition as a *de facto* marriage for the purpose of some benefits programs, but will never be a *legal* marriage unless it is registered in the *koseki*.⁹⁷

Rigid rules also apply to other family members and their registration. Children born out of wedlock or they are not. Children born within 200 days of and thereafter during the marriage are presumed (and registered as) the child of the husband, as are children born within 300 days of its termination, regardless of what DNA tests reveal.⁹⁸ Children's names must be derived from the government-approved set of ideographs.⁹⁹ Lineal relatives by blood and siblings within a degree of affinity defined through the *koseki* have a statutory duty of mutual support,¹⁰⁰ and so forth.

The rigidity of the Civil Code rules mean that, for example, the locus of legal parental authority over (and thus responsibility for) a minor child is never ambiguous and can be verified through the *koseki*. Parental authority over children

⁹⁷ Since as in other countries, marriages were entered into on the assumption they would result in children, it became a common practice to have a wedding ceremony but defer actual registration of the marriage until the wife became pregnant. This practice survived well into the post-war period, as is illustrated by the 1966 crash of an All Nippon Airways flight from Osaka to Matsuyama which resulted in the death of all on board. The dead included 12 newlywed couples embarking on what had become the newly-fashionable custom of taking a honeymoon. However it transpired that not a single one of the marriages had been registered, meaning that there was no legal family relationship between them, a fact that reportedly made compensation negotiations with the airline more complicated. See, e.g. Colin P.A. Jones, *Japan's discriminatory koseki registry system looks even more outdated*, THE JAPAN TIMES (Jul. 10, 2016), available at: <https://www.japantimes.co.jp/community/2016/07/10/issues/japans-discriminatory-koseki-registry-system-looks-ever-outdated/#.WzWv4fX8lrQ>.

⁹⁸ CIVIL CODE, art. 772. Only the husband has the statutory authority to rebut the presumption of paternity of children and must do so within one year of knowing of the child's birth. Civil Code, arts. 774 and 777. In a trio of 2014 cases the Supreme Court of Japan rejected efforts by mothers and children to use conclusive DNA evidence to rebut paternity over the objections of ex- or estranged husbands. These cases are discussed in Colin Jones, *Nineteenth Century Rules Over Twenty-First Century Reality: Legal Parentage Under Japanese Law*, 49 FAMILY L. QUART. 149 (2015).

⁹⁹ Family Register Act, art. 50(1) ("For the given name of a child, characters that are simple and in common use shall be used") and (2) ("The scope of characters that are simple and in common use shall be defined by Ordinance of the Ministry of Justice").

¹⁰⁰ CIVIL CODE, art. 877(1). If special circumstances apply this duty can be extended by a family court to the third degree of affinity, which again would be demonstrated through *koseki* records. CIVIL CODE, art. 877(2).

born out of wedlock vests in the mother by default;¹⁰¹ children of married parents are under the joint parental authority of both parents, and a provision of the Civil Code specifically protects third parties from conflicting exercises of such authority.¹⁰² After divorce only one parent is allowed to have parental authority.¹⁰³ Those identified as having parental authority are presumptively authorized to deal on the child's behalf, permit the child to work, manage his or her property as well as having responsibility over care and education,¹⁰⁴ or even exercise parental authority over the children of the child¹⁰⁵ (the age of majority currently being 20).¹⁰⁶ The rules for attributing tort liability for minors are more complicated, but the locus of parental authority serve as a starting point.¹⁰⁷

The binary and unambiguous nature of the family relationships reflected in the *koseki* means that that an extract of a person's *koseki* will usually suffice as proof of family relationships that are relevant to third parties. For a small fee the appropriate municipal authority can issue an extract that serves as up-to-date official proof of a person's personal identity (legal name, gender, date of birth, etc.) or a more extensive one showing parentage, marital status and children. A translation of a *koseki* extract is given later in this article and illustrates the principal data fields it contains. The *koseki* system thus plays a key role in not only *authenticating* identity and status of the family registered in it and its constituent components, but the legal rights and duties that come with registration of the family unit and its individual components. The utility of a registry of robots that confirmed similar information is hopefully obvious.

Because it is a unified system and registration of most changes in status is what gives them legal effect, a *koseki* extract will show an up-to-date snapshot of the *legal* status of a family that is superior to the "event-based" documentation (e.g., birth certificates, marriage certificates and divorce decrees) used in places

¹⁰¹ CIVIL CODE, art. 819(4).

¹⁰² CIVIL CODE, art. 825.

¹⁰³ CIVIL CODE, art. 819(1) and (2).

¹⁰⁴ See, e.g. CIVIL CODE, arts. 820, 821, 823 and 824

¹⁰⁵ CIVIL CODE, art. 833. Another interesting area that does not seem to have been discussed in the robot law literature is who should be responsible for robots created by robots; here too family law may offer a useful source of analogies.

¹⁰⁶ CIVIL CODE, art. 4. At the time of writing the Diet had passed a law to reduce the age of majority to 18 for certain purposes. *Japan's government approves bill that would lower age of adulthood from 18 to 20*, KYODO, Mar. 13, 2018, available at:

<https://www.japantimes.co.jp/news/2018/03/13/national/japans-government-approves-bill-lower-age-adulthood-18-20/#.WzWw4PX8lrQ>.

¹⁰⁷ CIVIL CODE, arts. 712 through 714 provide the basic rules regarding liability for the torts of children and others lacking capacity and of those obligated to supervise them.

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like the United States. An American may be able to use a marriage certificate to prove they married a certain person on a certain date in the past, but would struggle to positively prove they were *still* married to that person today. Such proof would be possible through a *koseki* extract.¹⁰⁸

A copy of the translation of a full family register extract that is made

Complete Record of Family Register	
Permanent Domicile	
Full Name (Householder)	
Creation Date	
Person Registered	[Name]
	[Date of Birth]
	[Name of Father]
	[Name of Mother]
	[Relationship to Above]
Personal Data Birth	[Date of Birth]
	[Place of Birth]
	[Date Registered]
	[Person Registering Birth]
Marriage/Divorce	[Date of Marriage/Divorce]
	[Spouse's Name]
	[Spouse's Nationality]
	[Spouse's Date of Birth]
	[Date Notification Received]
	[Accepted by]
Other Relevant Information	
Person Registered	[Name]
	[Date of Birth]
	[Name of Father]
	[Name of Mother]
	[Relationship to Above]
Personal Data Birth	[Date of Birth]
	[Place of Birth]
	[Date Registered]
	[Person Registering Birth]
	[Date Notification Received]
	[Accepted by]
Other Relevant Information	

Certificate No.

¹⁰⁸ The system is also superior in also only providing that information about the legal status of the family relationship that third parties need to know; the status itself. The American practice of using divorce or custody decrees as proof of custody rights means that schools, passport authorities and other third parties may be routinely receiving court documents full of information about the terms of a divorce or separation that are irrelevant for their purposes.

available on the US Embassy & Consulates in Japan website has been provided below for reference.¹⁰⁹

An explanation of some of these data fields is necessary. First, “Permanent Domicile” is a misleading translation of the Japanese term *honseki*. The *koseki* originally tied the family registered to it to a geographical locus – the ancestral home, for example. This is no longer the case, if it ever was in reality. As already noted, the actual residential arrangements are reflected in a separate residence registry, which is becoming more important as a framework for law and government programs, and may actually be more reflective of real (as opposed to legal) family life for a particular household.¹¹⁰ While each *koseki* is still tied to a geographic location which, among other things, identifies the municipality responsible for its administration, it does not need to be the place where one resides or even a location physically capable of serving as a residence.¹¹¹ It is also possible to change the location of one’s *honseki* to another location, though this will be reflected in the current *koseki* record, enabling one to track back through prior registrations.¹¹²

Second, the “householder” (*hitōsha*) is a remnant of the “head of household” concept and reflects the principal that all (Japanese) members of the household registered in the *koseki* must share the same legal surname. The householder data field identifies the person whose surname is to be shared. This must be decided at the time of marriage, and is a requirement framed in gender neutral terms but in 98% of marriages the wife takes the husband’s surname.

The remaining data fields are probably self-explanatory, and would show the names and other pertinent details of other members of the family (spouse and children, both natural and adopted) registered in the *koseki* as well as parents, making it possible to track back through the ancestry of both parties.

The above reflects the “standard” full *koseki* extract. It is also possible to

¹⁰⁹ American Embassy & Consulates in Japan website Translation Templates:
<https://jp.usembassy.gov/u-s-citizen-services/passports/translation-templates/>

¹¹⁰ The residence registry is also nationality-neutral in that it also includes non-Japanese with residence status. Until 2012 non-Japanese residents were registered in a separate “alien registration” system.

¹¹¹ By way of example, the author’s children are presently registered with their Japanese mother at their Japanese grandparent’s home, which results in their *koseki* – and Japanese passports – showing their “domicile” (*honseki*) as being a location in Japan where they have never actually lived. Hundreds of people reportedly register their *honseki* at Tokyo Disneyland and the famous Kōshien baseball stadium. Jones, *supra* note 50.

¹¹² Some Japanese persons may be reluctant to change their *koseki* location since it may create the appearance that they “have something to hide.”

procure an extract showing the pertinent details of just an individual member. For inheritance or other purposes it may also be necessary to obtain an extract of a *koseki* that no longer is “active” (because all its members have either died or moved to other *koseki*) or of older *koseki* records that predate their reformatting from paper-based to computerized systems and other changes based on change of law.¹¹³

Unlike family law in the United States, the system is not dependent on judicial decisions. Even in the minority of cases where a change in status *is* accomplished through litigation, that result is simply reflected in the *koseki*. This has a number of important ramifications that may not be immediately obvious to an American lawyer.¹¹⁴ It means the system is freed of the constraints of jurisdiction or even geography: Japanese people can get married or divorced for Japanese law (*koseki*) purposes from anywhere in the world by filings through their local consulate.¹¹⁵ It also means documents produced by courts are not generally needed as proof of status, since authentication is established through a unified registry system. It also means the extracts generated by the system are standardized as to format and content, as opposed to American-style divorce or custody decrees which may vary by court or judge and include case-specific details and orders.

At the risk of trying to sound trendy, the *koseki* system also has a “blockchain”-like feature: each *koseki* record traces back to a previous *koseki* record. This includes previous registrations in different locations, but also those of parents and children. The *koseki* thus establishes a clear “chain of title” in family

¹¹³ In 2017 the Ministry of Justice introduced a “proof of legal heirs” certification that obviated the need for heirs to go to title registries clutching a pile of *koseki* extracts in order to retitle a decedent’s property. The certification is still based on information derived from the decedent’s *koseki* records. See, Ministry of Justice Web Page: http://www.moj.go.jp/MINJI/minji05_00284.html.

¹¹⁴ Family Register Act, article 116(1). Japan’s Civil Code contains a procedure for recognition of foreign judgments. MINJISOSHŌ HŌ [Code of Civ. Pro.], art. 118. In the author’s experience common law judges and lawyers dealing with Japan-related family disputes spend an inordinate amount of time wondering about whether a divorce or custody decree from their jurisdiction will be “recognized” in Japan. This may be an important question when it comes to property and other obligations, but since the *koseki* system means that court decrees are never used as proof of status – particularly parental authority/legal custody – the way they are in common law systems, it may not be as important a consideration as they expect. For a Japanese person, the most basic issue of a foreign judgment may be whether it will be accepted by *koseki* authorities for purposes of registering a divorce or other change of family status achieved abroad. In the first place this will be a matter of administrative law and will likely only involve the courts if the registry authorities refuse to accept a foreign court order on public policy grounds.

¹¹⁵ Family Register Act, art. 40.

relationships.¹¹⁶ A set of *koseki* records dating back to a decedent's birth can be used to show that all possible legal heirs are present and accounted for; if they all agree to a particular disposition of the decedent's property it is possible to liquidate bank accounts or re-title land without probate or other court proceedings. Similar functionality would doubtless be desirable in a robot registration system.

e. Summary

The rigidity, discriminatory foundations and invasions of privacy inherent in the *koseki* system may seem shocking to Western readers. Many Japanese people may also regard the rules of the Civil Code and the *koseki* system itself as rigid and outdated, particularly the presumptions of paternity embedded into both systems which literally date back to the 19th century and continue to bedevil families today.¹¹⁷

However, at risk of repetition the purpose of this article is not to praise the *koseki* system specifically or offer Japanese family law as a model for regulating humans.¹¹⁸ Rather, its goal is to identify some of the features of the past and present *koseki* system which may prove useful in developing family law analogies for the regulation of robots.

First, the *koseki* identifies who is and is not a member of legally-significant group (Japanese/not-Japanese). Second, it treats (or treated) families as a single unit for some regulatory purposes, but one in which further rules can be used to allocate rights and responsibilities among members constituting - involved in the creation of - the registered family unit (husband, wife and child; head of household in the past). Third, it provides a means of clearly authenticating to external actors legal attributes of the family and its members that are potentially relevant to deciding how and whether to interact with it. Fourth, it provides or provided a means of identifying responsibility for the actions of members of the collective, particularly where limited capacity is an issue (children, adults adjudicated incompetent). Fifth, it provides a basic source of demographic information about family populations. Sixth, it establishes a framework for

¹¹⁶ The *koseki* system also creates a *presumptive* genealogical record, though as noted below, the Supreme Court has demonstrated itself to preferring to preserve the unambiguous presumptions of legal parenthood built into the Civil Code and the Family Register Act than they are in ordering families based on the fact of genetic parenthood.

¹¹⁷ See, e.g., *Nineteenth Century Rules over Twenty-First Century Reality—Legal Parentage under Japanese Law*, 49 FAMILY L. Q. 149 (2015).

¹¹⁸ The *koseki* system has, in any case, become decreasingly important, with more regulations tied to the more modern residence registry system which, since 2012, has also incorporated non-Japanese residents of Japan.

developing numerous other rules, regulations and policies based on the relationships and data reflected in the *koseki* data fields. Seventh, these other rules can be used to reinforce the system by according benefits to registration and disadvantages to not registering. Eighth, the system is flexible in that it can be adjusted to add or remove attributes that should be registered or are no longer necessary, as well as the manner in which they are expressed in the registration system. Ninth, in the past the *koseki* was an open-access system that provided a useful reference to anyone considering interactions with a particular family or family member. Tenth, the system functions in a code-like fashion in preventing legally prohibited “transactions” such as bigamy from occurring in the first place. Finally, it helps maintain its own integrity and usefulness by prohibiting registrations that do not include the required information in the required format.

4. WHAT WOULD A ROBOT KOSEKI SYSTEM LOOK LIKE?

We can now return to the subject of regulating robots and how it could be informed by the *koseki* system. Of course the *koseki* system does not provide a perfect analogy. It registers as a single unit a family comprised of multiple separate actors each capable of independent agency and action. Robots, whether registered or not, will generally be single units behaving as sole actors, but with multiple other parties (programmers, manufacturers, owners, etc.) who are essentially passive but potentially have rights or liabilities attributable to its acts. Nonetheless, the author believes that the *legal* aspects of the parent-child relationship in particular, as well as other family relationships that can be confirmed through the *koseki* system provide a very useful basic source of analogies for robot regulation. The remainder of this article will be devoted to some preliminary speculation and suggestions about what a Robot Koseki might look like.

a. Definitional Attributes

First, as indicated at the outset one of the most important functions of the Robot Koseki would be definitional. Just as the Japanese *koseki* system defines who is Japanese and who is not, the Robot Koseki would divide the world into registered Robots and unregistered technology systems. This latter universe might include systems that have many attributes commonly associated with “robots.” However they would not be Robots for purposes of the registration system or the rules and regulations tied to it. In fact, the only difference between two otherwise identical technology systems might be that one is registered in the Robot Koseki as Robot

and the other is not. This difference could be – should be – quite significant not only for legal purposes but, as discussed below, for practical reasons relating to the comparative utility of the registered Robot over the unregistered technology system.

The definitional function of the Robot Koseki does not need to be entirely binary. Within the universe of registered Robots, it would be possible to provide for various sub-categories of Robot that could have differing attributes and registration criteria. These could be used for purposes of applying additional technical requirements within the registration parameters, or imposing external class-specific rules. Some of the existing literature on the regulation of specific types of robots and introduced earlier on this article suggest that sub-categories might be based on the task the robots perform (service, transportation, etc.), the environment in which it operates or should be limited to (water, space, air, land, inside, outside), the manner in which the robot “manifests itself” or exists (embodied physical robots, or primarily virtual ones), the manner in which the robot interacts with humans, or the degree of autonomy it will have.¹¹⁹

Whether there are sub-categories of registered Robots, a key aspect of the system will be in providing by definition a *defacto* defining non-Robots. This will enable the system to be used as a framework for developing additional rules that discriminate against unregistered robots by according increasing benefits and advantages to the creation and use of Robots that are registered, and disadvantages to the creation and use of those that are not. The merits and demerits of registration would be both legal and technological, the latter possibly developing in the form of greater network accessibility and interoperability with other technology systems. The use of this definitional function in conjunction with suitable registration parameters would have significant social and commercial utility in associating registered Robots with safety and an identifiable nexus of liability.

b. Registration Parameters and Criteria

The registration parameters and criteria – the data fields that need to be filled in a Japanese *koseki* offer some analogies - would themselves form part of the regulatory foundation of the Robot Koseki system. Only robots satisfying the parameters would be eligible for registration. This would be part of the system’s merit: being a registered Robot would provide third parties with assurances that it satisfies certain minimum standards as to technical specifications, safety, information, possible liability nexuses and so forth. Hard and soft law requirements

¹¹⁹ Some of these categories are anticipated in the Guidelines, *supra* note 31 at 16,

as well as technical rules and regulations can then be built by governments and private actors based on these standards.

What these parameters should be is a matter for further consideration. Some may be optional and others mandatory. In general terms, however, they can be assumed to be primarily technological and informational. These subjects are developed further below

c. The Robot Koseki as a Technology-Based System

Unlike the Japanese *koseki* system, which was originally based on paper ledgers, the Robot Koseki would be based on modern technology, rooted in code, hardware and network systems. The technological aspects of the system would dictate some of the registration criteria – the technical specifications - that a robot would have to satisfy in order to be registered.

A detailed discussion of those parameters is a subject for another time and probably a more technically astute author. However it is easy to envisage that it would include requirements and specifications such as those relating to: (i) the method the Robot uses to interact with other technology systems (*wifi*, USB, QR codes, Bluetooth, RFID etc.), (ii) basic safety parameters as to size, speed of motility, etc., (iii) location (e.g., incorporation of GPS; compatibility with geofencing systems, etc.), (iv) cybersecurity requirements (anti-malware, spyware requirements, etc.), (v) access requirements (*i.e.*, if the Robot Koseki system requires Robots to submit to software updates for various purposes, the Robot will have to be set to accept such updates regularly), (vi) privacy protection (e.g., mandatory data encryption and access restrictions for video, voice and other data recorded by the Robot), (vii) operating system, (viii) override capability (e.g., a kill switch that can be used remotely to shut the Robot down remotely when necessary in emergency situations),¹²⁰ (ix) sensory capabilities for perceiving the world (video, sound, motion sensors, facial recognition technology, etc.) and (x) a “black box” that records all that is happening inside the Robot (software updates, etc.) and which can be used for forensic purposes, if necessary. Roboticists will doubtless have other suggestions as to what technological parameters should be included.

¹²⁰ For those who actually worry about such things, this could include the doomsday scenario depicted in the *Terminator* movie series in which an AI becomes self-aware and uses robots to try to destroy humanity.

d. Informational Parameters

Registration systems are essentially informational, and the Robot Kosei would be no different. First, just as cars, mobile phones and numerous other technological devices have unique identifying codes, Robots registered in the system would also be assigned unique identifying codes or numbers that would become a key part of its identity. Codes identifying members of the same series or production line of robots could also be used. Robot Identification Numbers could even serve as taxpayer identification numbers if the Robot is accorded legal personality and the ability to engage in revenue-producing activities.

The Robot Koseki would presumably also require various technical information about the Robot to be included as part of its registration details – operating system, whether it contain a camera, recording devices, the nature of its power source and so forth. Some of this information would be necessary to confirm whether the Robot is eligible for registration in the first place, but others might be optional but useful for other persons and technology systems trying to ascertain whether they should interact with a particular Robot.

Notwithstanding the technical aspects of Robots and our proposed Robot Koseki, it must be remembered the goal is to have a registry that facilitates the development and use of Robots compatible with and amenable to regulation and enforcement outside of the sphere of technology, including through the “traditional” legal system.

For this reason, some of the key registration parameters should provide information about people involved in the creation and ongoing existence of the Robot, people who through the system will effectively become a part of the Robot’s identity. This is where the Japanese *koseki* system provides a particularly useful model, since it involves the registration of a single unit (the family) that is comprised of multiple constituents. If we are to develop robot law from family law analogies and attempt to regulate Robots as a form of “perpetual children” then the *koseki* system will make it possible to identify who is analogous to their parent(s).

Thus, the mandatory registration criteria for a Robot should include identification of certain categories of persons. Whether such persons can include corporations is a question for further consideration; if a key goal of the system is to ensure a nexus of responsibility for robotic behavior is always identifiable, this goal may not be best served if some or all of these informational requirements can be satisfied through the use of artificial entities (corporations) whose core utility lies

in their ability to obfuscate and limit liability (which is, after all, a synonym for “responsibility”). As for the categories of persons that should be included in the registration details, the ones that seem obvious to someone writing in the year 2018 are: maker (or manufacturer), programmer, owner and user.

Who should be named in these categories may not be as difficult as one may first imagine. “Maker” would most easily be a large company engaged in the mass production of consumer robots, like Japan’s *Pepper* or *Aibo* – a manufacturer. On the other side of the spectrum would be hobbyists or inventors creating their own robots, out of individual components or kits. There should not be any impediment to the latter category registering as well, and the system should require them to know enough about the construction of the robot they are making in order to do so.

“Programmer” may be more complicated. Or maybe not: mass-produced consumer robots will likely have standard software that is attributable to a particular vendor. But other robots may be empty shells that can be programmed by the owner or third parties (even other robots). Other robots may rely on open-source or crowd-sourced software that is not easily attributable to a particular individual or entity. Some may sit empty until “occupied” by an AI “presence” through a network connection, here again attribution of the source of the programming may be difficult. But perhaps this should not matter; for purposes of the registration system it may not be as important to identify the source or sources of the code that gives the robot life, but who is presumptively *responsible* for allowing it to do so. In this sense perhaps the correct term is not “programmer” but “gatekeeper.” Default rules may be possible; for example the manufacturer could be responsible for programming – or even just “programmability,” unless the owner or some other party changes the software, in which case the burden of proof as to the absence of liability could shift to that person.

“Owner” would seem to be a fairly obvious category of required information and one that most robot owners would likely want to make clear. “User” may not be necessary, but it is easy to envision a future where robots are rented out for short periods or lease-financed for extended periods by people unwilling or unable to make capital investments in expensive robots. In fact, depending on how it is implemented the Robot Koseki could also simultaneously serve as or augment platforms for buying, selling or renting out robots, perhaps even combined with a digital currency.

The system would of course need to be capable of promptly reflecting

changes in the information about at least some of the persons comprising a Robot's identity – in much the same way that marriages, divorces and other changes in personal status are reflected in the *koseki*, or changes in title of registered property. Like cars a Robot might go through several Owners. Just as the Japanese *koseki* system fails to reflect the realities of family life – a couple registered as husband and wife may be long estranged and living apart with new partners – the *Robot Koseki* may not always be up to date as to who is actually the owner, user or programmer of a Robot at any given time. However, both technical and legal incentives can be built into the system to encourage registration of changes. Liability for a robot should remain with the registered person or persons unless a change in status is also registered. Again, Part of the system's value broader value would be its function as a reliable source of information about robotic identity for innocent third parties.

While it might seem unfair to hold a registered owner responsible for harm caused by a robot that has been stolen, hijacked or hacked, the harshness of default rules such as “the owner is responsible” can be mitigated through other rules allowing for a shifting of the burden of proof once evidence of hacking or theft is introduced. In any case, it is these informational aspects of the system that may prove most important, since that is how more general rules of robotic law can be developed, either through the existing rules of law such as products liability or the creation of new ones that attribute robot behavior to identified categories of people.

The author believes that many of the issues raised at the beginning of this article can be resolved through the development of rules based on the criteria and parameters of a registration system. Who is responsible for harm caused by the Robot, who enjoys the fruits of its labors, who is entitled to assert privacy rights in the data it gathers and so forth can all be tied to a small universe of possible, identifiable claimants. Further rules can be developed as between this possible universe through contracts. Clarity as to who is liable for the robot will facilitate the development of standard robot insurance products. And in fact, a digital certificate of insurance coverage could be one of the registration parameters, either optional or mandatory.

These are the easy, specific examples already receiving the attention of those who debate robot law and introduced earlier in this article. Yet there are doubtless numerous other areas where a framework that clearly identifies a limited universe of possible obligors or claimants will be useful.

Let us take the rules of possession in the law of property as an example. Say a shopping mall security finds a dropped wallet; it picks it up and proceeds towards the mall office. A passer-by grabs it from the Robot and starts to walk away. In this example there may well be an interesting bar-exam type question along the lines of “what crime has been committed, if any?”

But before we can answer that question, we should be able to define who – if anyone – is able to claim possession of the wallet once the robot has picked it up. Is the robot acting as agent for someone, and if so who? The mall’s owner? The robot’s owner (it could be provided by a management company?) The wallet’s yet-to-be-identified owner?

This article will not offer an answer. However the example hopefully illustrates how it would be useful to have rules that facilitate attributing physical possession (or an agency relationship) to an identifiable person associated with the robot. A registration system with the suitable information parameters would make it possible to develop simple rules of broad applicability that would quickly be comprehensible to the population at large. While the system will facilitate the development of new rules and laws that take into account the special nature of robots, it will also facilitate applying existing rules of law with necessary modifications or through judicial precedent. As with possession, well-established rules about the creation, attribution and ownership of new property (including intellectual property) can also be developed through the registry system. To the extent robots are capable of harming other people or their property, the system can be used to apportion rights or liabilities to multiple parties; comparative negligence between programmer, owner and user for example.

Some of these rules may be subject to variations, exclusions or fine tuning through contract. But having an identifiable status vis-à-vis a robot will naturally facilitate the development of contractual rules and practices relating to robots as well. The key thing is that there will always be a responsible human (or at least a corporation) who can be identified, with Robots effectively being treated as “permanent children” as far as liability for their acts and attribution of their property are concerned. ¹²¹

¹²¹ For those concerned with what the author considers to be largely speculative philosophical questions such as “should robots have freedom of speech” or “should robots be granted personhood” the Robot Koseki would also provide an answer. Registration in the Robot Koseki would be the first step to possible “adulthood” – autonomy free from the Koseki, or perhaps transfer to a higher order registry of “sentient” robots that still contains features intended to secure human control, oversight and safety. Such concerns will remain in the realm of science fiction for the foreseeable future (hopefully).

Whatever the informational and technical registration parameters of the system are, it will be desirable that they are capable of expansion and modification. The system will need to be able to evolve to reflect technological developments and new regulatory requirements, including the ability to expunge requirements that are obsolete or no longer appropriate.¹²²

e. The Robot *Koseki* as a Soft Law and Private Law Initiative

One important difference between the Robot *Koseki* and the Japanese *Koseki* is that a robot registry could be established first through industry action, starting primarily first as a creature of code, of soft law and technical standards. This being the case, it could be driven primarily by industry players, professional associations or open standards organization comparable to the Internet Engineering Task Force, which has developed many of the rules and standards governing the technical aspects of the Internet.¹²³ In the same way that industry standards and soft law have brought us much of the generally interoperable technologies that drive the Internet and many of the devices connected to it, whether it is Internet Protocol, WiFi, USB, or countless other commonly used technologies, the development of the Robot *Koseki* does not need to wait for government action.¹²⁴

The likelihood that the system will be based in code is another reason why it is probably unnecessary for the government to drive a registration initiative. To the extent that the system operates through computer code that automatically prevents non-conforming robots from being registered, and enables other technology systems to decide automatically whether and how to interact with those that are, formal legal rules will be unnecessary to govern those interactions.

It should thus be feasible to establish a private consortium-based Robot *Koseki* system. The key, however, will likely to be in the establishment of one that has sufficient utility to government bodies (including courts) that they are able to

¹²² As noted earlier in this article, the Japanese *koseki* system provides ample examples of an evolving system, though mostly one in which the nature of information included in it is gradually removed (different denotations of children depending on whether born in or out of wedlock) or transferred to a separate registration system (being subject to adult guardianship).

¹²³ Cite

¹²⁴ The Internet Protocol (IP) and WiFi originate from standards developed by the IEEE. <https://ieeexplore.ieee.org/document/7100280/>. There is now a WiFi alliance of industry players supporting the standard. <https://www.wi-fi.org/who-we-are>. The USB standard was originally developed through a consortium of computer hardware manufacturers. <http://www.usb.org/home>. Organizations like the Robotic Industries Association whose activities include setting standards for robot safety already exist, of course, though they do not appear to be addressing the subject in the context of Robotic identity. See, e.g. <https://www.robotics.org/robotic-standards>.

use it as a framework for developing hard-law rules and regulations of the type posited above. By way of example, governments in some countries are already requiring commercial providers of “smart bike” bicycle sharing services to incorporate geo-fencing technology, though they did not develop the technology itself.¹²⁵ The likelihood of similar requirements being imposed on Robots in such countries and elsewhere seems high, but could be readily accomplished through an existing registration system.

The challenge will be in allowing industry to develop a system that is not too favorable to robot designers and owners, one that obfuscates liability rather than clarifies it. Here is where at least some degree of government involvement (or perhaps judicial activism) will be desirable. In order for the system to have broad social utility it will need to make as many people as possible feel safe about robots, or at least Robots. Social utility could see the development of a virtuous cycle which encourages more people to register their robots in the Robot Koseki, and in doing so satisfy the registration parameters. Governments can facilitate this by incorporating a registration requirement into regulations or procurement specifications that involve robots.¹²⁶

f. Robots and the Internet of Things

Not only will the Robot Koseki be a creature of technology, but it will be one of networked technology. Robots and other technology systems that interact with the registry will need to be able to communicate with the registry system through the Internet or other network technology. The system would need to work

¹²⁵ Yingzhi Yang, *Singapore requires ‘geofencing’ for all bike-sharing operators in the city by the end of this year*, SOUTH CHINA MORNING POST (June 4, 2018), available at: <http://www.scmp.com/tech/enterprises/article/2149218/singapore-requires-geofencing-all-bike-sharing-operators-city-end>.

¹²⁶ Concerns about the impact of robotic liability on innovation seems an obvious area where the registration system could be used to grant advantages to registration that would not accrue to unregistered robots. See, e.g., Guidelines, *supra* note 31 at 23 (“A first proposal is to limit liability, as a way both to boost innovation in the robotic industry, by reducing the fears of liability-related costs, and to exclude that producers have to bear responsibility for risks that could not be avoided notwithstanding the care in informing and designing the products. The ‘compromise between the need to foster innovation and the need to incentivize safety’ would have precedents in the immunity of gun manufacturers from what people do with their guns, on the assumption that robots can be put to multiple uses not all of which can be predicted and warned against by producers, or in the immunity enjoyed by web providers. A “selective immunity” for open robotic platforms manufacturers would avoid disincentives to open robotics while preserving incentives for safety”); and Ryan Calo, *Open Robotics* 70 MARYLAND L. REV. 571 (2011). Some would likely argue that complying with the various restraints of the registration system would hinder innovation, but that would be the compromise. In any case, it is an unusual argument that persons who receive no direct benefit from robotic innovations should bear some of the costs in the form of damage to their property, physical injury or even death.

in a way so that that the current registration details of each Robot was accessible to other technology systems (which might include other Robots) interacting with it. There are doubtless numerous design strategies. It could be based on a centralized or distributed database system. It could be based wholly or in part on blockchain or a similar distributed ledger system (which would facilitate incorporating robots into payment systems). Whether robots themselves would act as components of the network/ledger, or passively interact with it would, along with the foregoing other considerations, be a design choice that may be driven by the technical capabilities reflected in the registration parameters that individual robots must satisfy. To the extent robots may incorporate private data in the informational data fields or whatever sensory and recording equipment it incorporates, it may be necessary to establish various levels of access to the Robot, such as distinguishing between technical information that may be freely accessible, but personal information about owners and users or video/sound data recorded on internal storage media which could require a higher level of access or some element of legal process.

The distributed nature of the system would mean that, like the Internet itself it would be relatively unconstrained by borders, unless efforts are put into imposing such through constraints. Examples could include mandatory geo-fencing constraints that affect operability outside or within political borders. Since Robots will have a significant data-gathering capability, the impact of various personal data protection regimes may be a factor. Depending on the nation involved, this may be a primary reason for government involvement in the development of the Robot Koseki system, or at least the local version of it.

g. A system of systems

Sixth, while for ease of reference this article generally refers to “the” Robot Koseki as a single system, the existence of multiple systems is possible or even desirable. For example, if the jurisdiction-specific registration systems do develop as anticipated in the previous section, there would be pressure for them to be inoperable to an extent. This could in turn facilitate the development of legal or *de facto* “robot nationality” or at least the rules addressing the legal status of robots who cross national borders.¹²⁷

¹²⁷ One question that those discussing robot law do not seem to have asked let alone tried to answer (outside the scope of drone warfare) is what happens – or should happen – when a robot autonomously decides to cross a border? Has the border been illegally crossed in some way? Does anything happen to the property rights of the owner in such a Robot?

It may also be possible that even within a single jurisdiction there will be multiple, overlapping or even competing systems. It may transpire that the tremendous possible variety of robots means that different systems are needed. To the extent Robots can be modified and upgraded (or downgraded), it may also be possible for them to “evolve” and become eligible for higher order registry systems that enjoy greater regulatory, social or commercial benefits.¹²⁸ Perhaps there can even be a process for dealing with the question that some in the field of robot law and ethics are already discussing – what should happen to a robot who becomes self-aware? They can either be transferred to the highest order of *Koseki* or “set free” from all registration requirements, having matured away from the status of “permanent child” that the Robot *Koseki* is otherwise designed to impose. This takes us well into the realm of science fiction, but just as the Japanese *koseki* system enables children to leave the parental registration upon maturity, a Robot *Koseki* would solve another problem that is already discussed by those in the fields of robot law and ethics.

Finally, even a single Robot *Koseki* would naturally come to be part of a “system of systems” as other technologies developed to interact with it. The simplest example would be access restrictions that allow registered Robots into public spaces but exclude unregistered ones, similar to pet door flap that only open for the animal(s) with the appropriate embedded RFID chip. More complex examples would be payment systems that enable robots to transact independently of human decision and for tax liabilities to be imposed and paid appropriately.

5. CLOSING REMARKS

This article has attempted to illustrate how comparative law may provide a useful but different set of analogies for thinking about how robots should be regulated. At risk of repetition, the view of the author is that one of the most important and basic tasks facing *practical* robot law is definitional; both the establishment of a definition of “robot” itself, as well as specific attributes (the registration parameter) of a robot that can provide adequate structure for further regulation, both through law and private ordering. The technical aspects of a Robot *Koseki* will be a matter for technologists to develop, but it is hoped that the

¹²⁸ Here too the Japanese *koseki* system offers a useful analogy; members of the Japanese imperial family are not registered in the *koseki*, but in a separate registry, the *kōtōfu*. Marriages between members of the imperial family and “commoners” thus involve either the imperial family member leaving the *kōtōfu* and being registered in a new *koseki* or the reverse, depending on the circumstances of the marriage.

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primarily western-driven focus of Robot law can benefit from analogies from other legal systems of the world.¹²⁹

Perhaps some day in the future the Robot Koseki will even see the overthrow of Asimov's laws of robotics. Perhaps some day the first law of robots will be: A Robot Shall be Registered in the Robot Koseki.

¹²⁹ At the time of writing the author had filed a utility patent application for a robot registry system.